



# Model 6455 Cartridge Tape System

## Loaded with Features — Loaded with Benefits.

Kennedy products have always provided innovative features. And these features have always provided benefits and convenience for the user. For the Model 6455 offers these features and benefits:

**Feature: Start/Stop Operation**  
**Benefit:** Drive can emulate a 1/2" tape drive the ability to perform selective file restructuring, journaling and updates.  
 The drive is effectively a 1/2" in a smaller package.

**Feature: Hard Read Error Space**  
**Benefit:** Best data reliability of any drive. Gives the user confidence in the backup procedure.

**Feature: Onboard Memory**  
**Benefit:** Drive requires no external equipment. Works with any computer.

### Cartridge Jam Protection

Protects the cartridge from damage if cartridge jams. This is accomplished by sensing a current surge and then disabling the motor, thus ensuring that the cartridge will not be damaged.

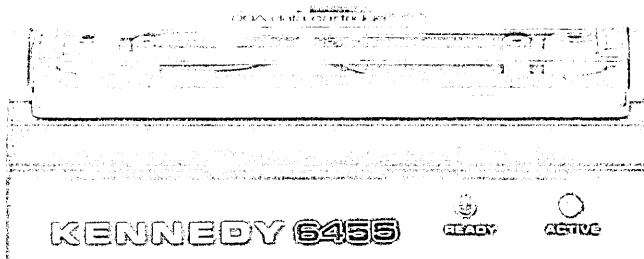
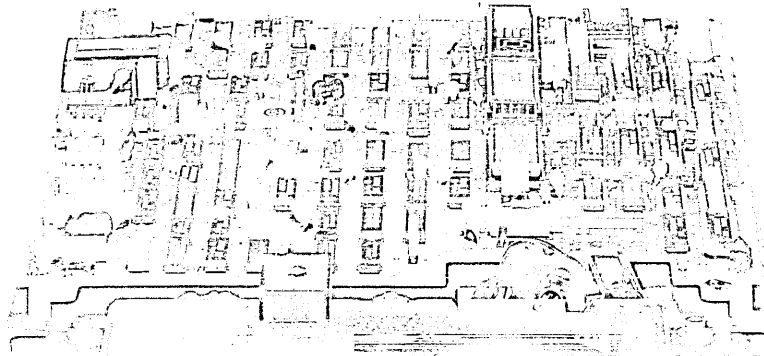
### High Density Recording

Large capacity of 28 MB on a single cartridge.

### Local Industry Standard 1/2" Tape Interface

Compatible with existing tape couplers and software. Drive operates as though it were a 1/2" drive without having to modify existing software.

Now you're driving at Model 6455. You'll get all the benefits for you. For the price of a 1/2" drive.



**WARRANTY**  
 Kennedy warrants this product to be free from defects in materials and workmanship for a period of 3 years from the date of purchase. This warranty is void if the product is used for any purpose other than that intended by Kennedy.



# Why should you care that we became the big name in the little end of the concentrator business?

*One reason you might care is that we got there by building a family of data concentrators which saved you money and solved your data communications problems:*

## **Micro800/2 Data Concentrators**

The world's most popular line of data concentrators. Specifically designed for the user of minicomputers and "dumb" asynchronous terminals, they can pay for themselves in a few months by supporting many remote terminals on one telephone line, while also providing Automatic Retransmission on Error, Satellite Capability, Synchronous Channel Support, a Command Port, and much more....

## **Micro800/2 Multidrop Concentrators**

Bringing the benefits of MICOM's data concentration to users whose terminals are widely scattered, so that "dumb" terminals in up to 16 different locations can share a single telephone line.

## **Micro800/2HP Data Concentrators**

Specially designed to handle the unique requirements of HP 3000 systems employing HP's ENQ/ACK protocol.

*Another reason you might care is that now we can solve your next data communications problems too, with new family members such as:*

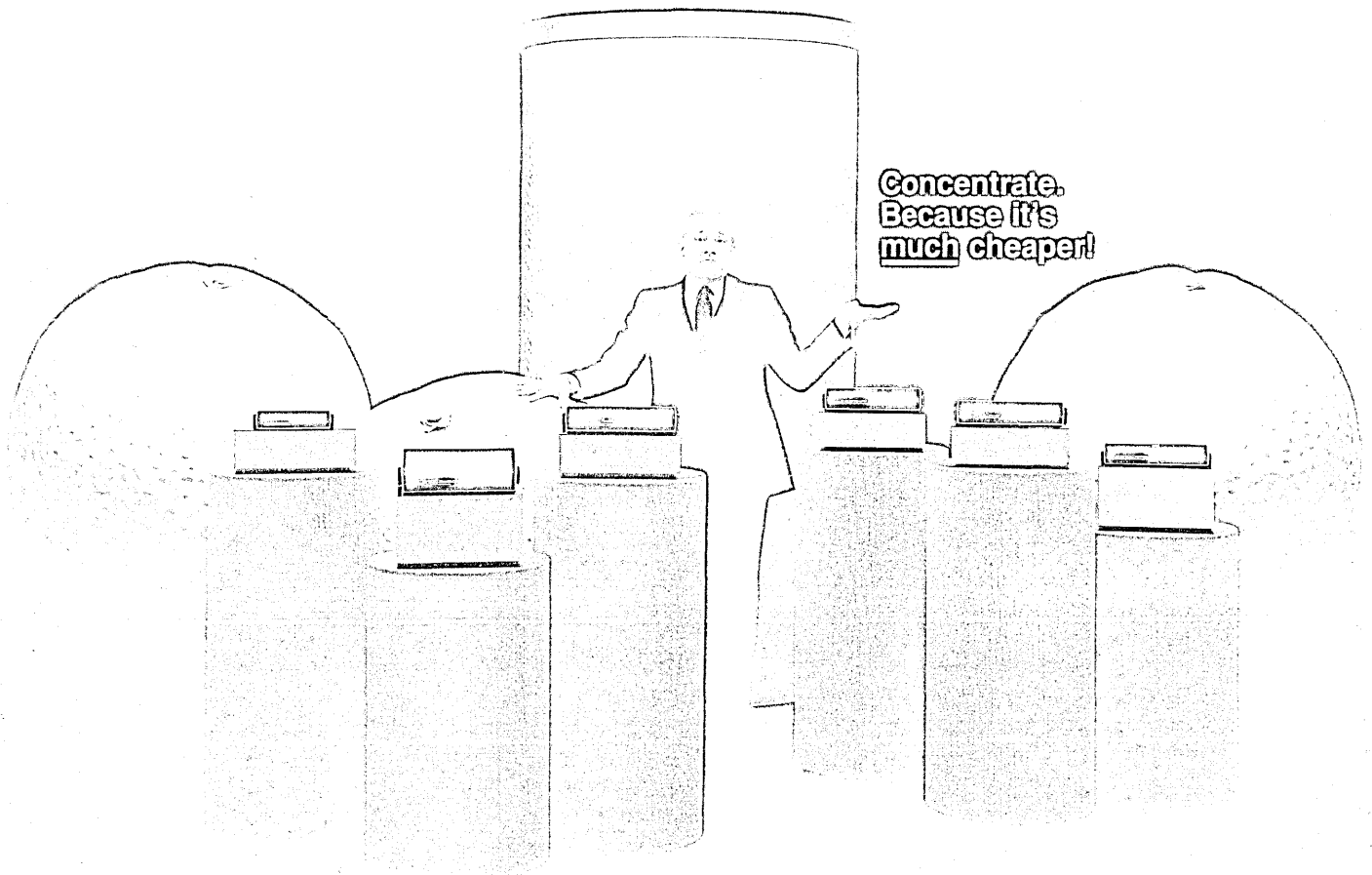
## **Micro860 Concentrator Switches**

Brand new kinds of products which bring add-on switching, contention, queuing, and centralized management to networks of up to eight data concentrators.

## **Micro800/X.25 Concentrator PADS**

Products which combine the benefits of Micro800/2 Data Concentrators with CCITT X.25-compatible packet assembly to allow asynchronous terminals and computer ports to access public or private Packet Data Networks easily and inexpensively.

*And still another reason is that concentrators are only one family of MICOM products. Now we can be the only source you need for minicomputer data communications products from modems to data PABXs to local networks. Thanks to you, we're big in those fields too!*



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## MVS PERFORMANCE IN 3 EASY STEPS

The EPILOG™/MVS Installation Performance Management System will allow you to easily analyze and manage your performance and capacity concerns.

### Step 1

Discover your problems. Ask EPILOG/MVS to plot TSO response times or batch job run times (yesterday, last week, last month) on your CRT. After analyzing the workload for problems, simply place a "d" next to the problem time period and press enter. In this example, July 12 is the problem day.

| DATE | RESPONSE |
|------|----------|
| 7/8  | 4        |
| 7/11 | 5        |
| 7/12 | 1.8      |
| 7/13 | 4        |
| 7/14 | 5        |
| 7/15 | 4        |
| 7/19 | 3        |
| 7/20 | 4        |

Historical TSO plot for the month of July

### Step 2

The result is a display of degradation reasons for that time period. Now you know the major causes of poor response. In this case, paging caused 60% of response time problems. But what is causing the degradation? Place an "r" on the problem line and press enter.

|                     |     |
|---------------------|-----|
| USING CPU           | 8%  |
| PAGE-IN WAIT        | 60% |
| WAITING FOR CPU     | 12% |
| DISK SYS 001 ACTIVE | 5%  |

Detailed analysis of TSO response time problem for July 12.

### Step 3

EPILOG/MVS will automatically bring you the information needed to help analyze degradation for that time of day. In this example, Step 3 shows an analysis of paging activity where a paging device has contention from another system.

Use EPILOG/MVS for monitoring: trends, capacity, TSO response time problems, batch job run times, effects of changing hardware, and effects of making tuning changes. It's as easy as 1-2-3.

TOTAL PAGES/SEC=160

DEVICE PAGE01  
% IN USE=15%  
% RESERVE DELAY=60%

Analysis for paging on July 12

- Please send me more information on EPILOG/MVS.  
 Please enter my free subscription to the Candle Computer Report.

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CIRCLE 5 ON READER CARD

# DATAMATION®

NOVEMBER 1983/\$4.00 U.S.A.  
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This issue, 176,650 copies

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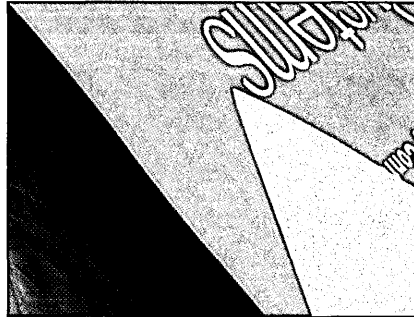
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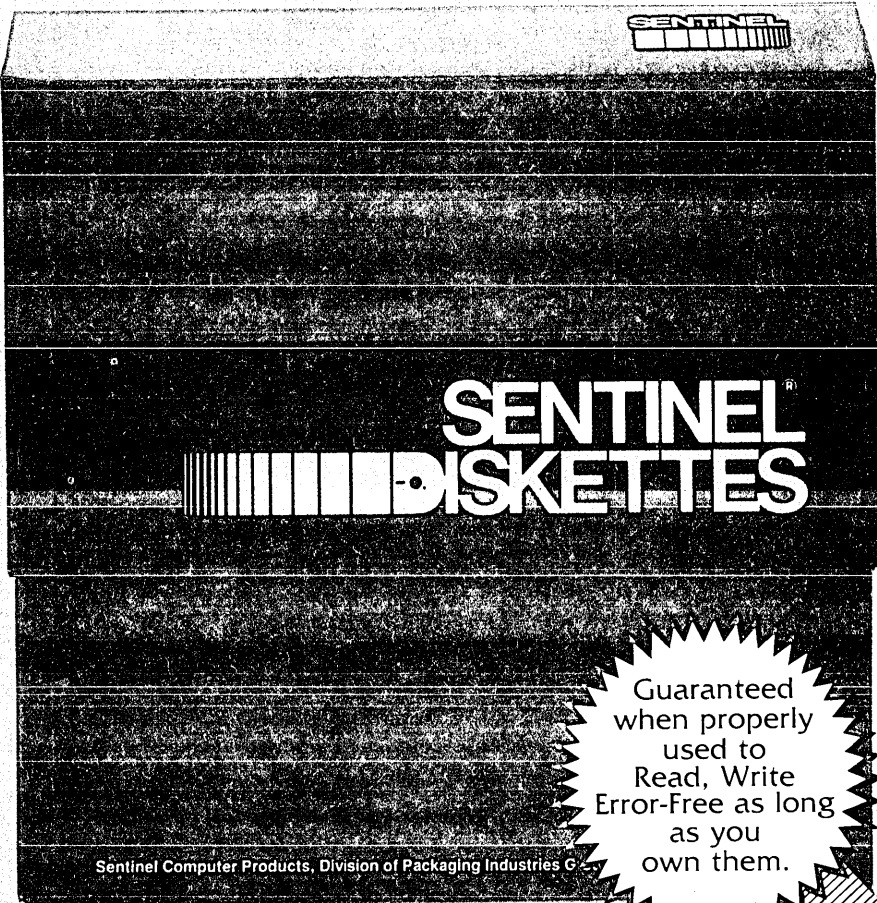
## OEM SUPPLEMENT 270-1

- 1 **DATAGUIDE**  
The DATAMATION listing of oem computer products.

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CIRCLE 6 ON READER CARD

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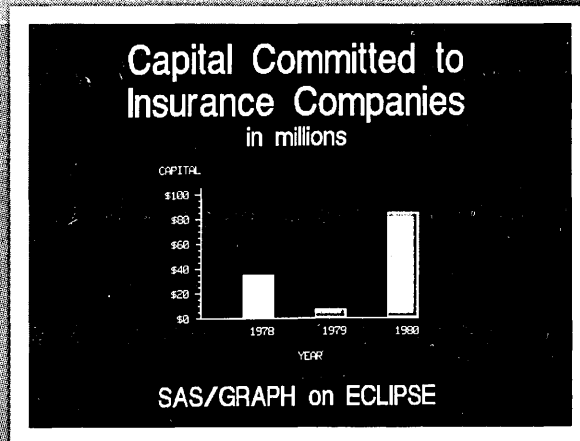
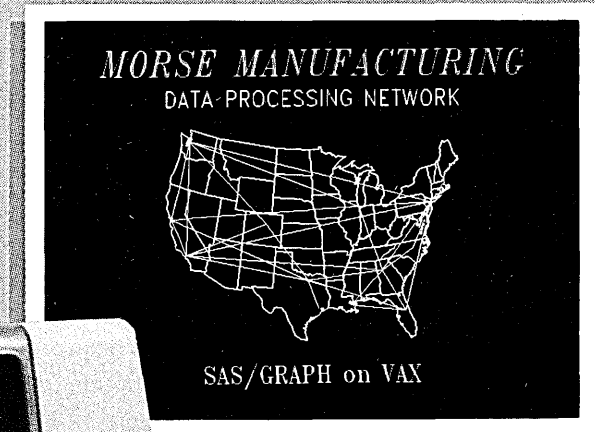
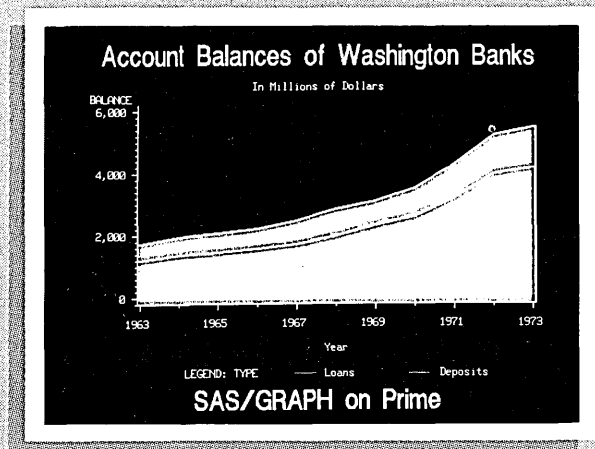
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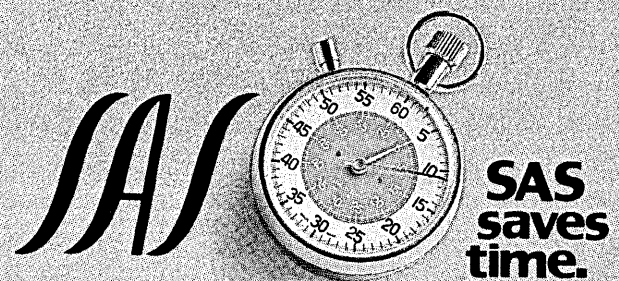


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# With all the clamor about personal computers, a fundamental fact is often overlooked: some simply *work* better than others.

## Consider the COMPAQ Portable.

A computer will make you more productive. A computer will make you more efficient. You hear it everywhere. But you don't hear about which computer actually *works* best.

A computer isn't magic. It's a tool. And just like other tools, some computers work better than others.

The COMPAQ™ Portable is a combination of 20th-century electronics and 19th-century pragmatism. It simply does personal computing better. Here's why.

### Works in more places

You don't do all your thinking in one place. Why have a computer that stays in one place?

The COMPAQ Portable has all the capabilities of a large desktop computer. But now those capabilities can go where you go.

You can move it from office to office to share its resources. You can move it into the conference room to answer questions when and where they come up.

With the COMPAQ Portable, you can be as productive in your hotel room or your lake house as in your own office. It's a reliable companion on a business trip. It's a powerful sales aid in your customer's office.

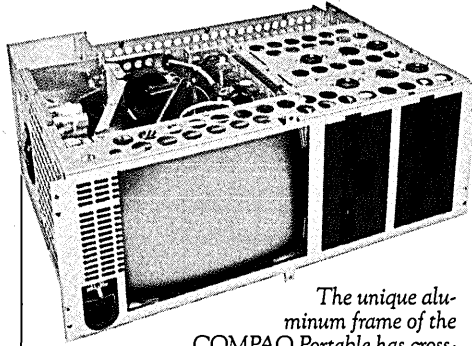
What's more productive than a computer? A computer that works for you in more places.

### Works with the greatest number of programs

The most important consideration when you choose a computer is "what programs will it run?" And that's one more reason for choosing the COMPAQ Portable.

The COMPAQ Portable runs more programs

*The COMPAQ Portable was designed to fit under a standard airline seat so you can take it on business trips.*



*The unique aluminum frame of the COMPAQ Portable has cross-members that strengthen it front-to-back, side-to-side, and top-to-bottom. It's a design practice commonly used in race cars.*

than any other portable. In fact, it runs more than most non-portables. That's because it runs all the popular programs written for the IBM® Personal Computer. There are hundreds of them. They are available in computer stores all over the country, and they run without any modification, right off the shelf.

Imagine the power of a portable word processor. There are dozens of different word processing programs available for the COMPAQ Portable.

Planning, problem-solving, and "what-ifs" are a cinch with a variety of popular electronic spreadsheet programs. The COMPAQ Portable runs them all.

There are accounting programs for anything from computerizing your family budget to full-scale professional management of payables, receivables, inventory, and payroll for your company.

There are programs for making charts and programs for communicating with other computers. Or if you want something really specialized, there are even program languages for writing your own programs.

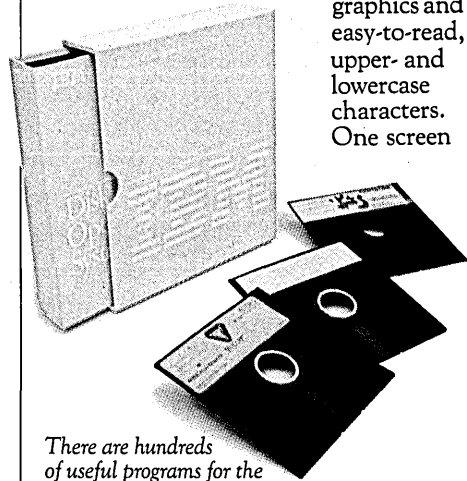
So, you get portability and you don't give

up problem-solving power. The combination adds up to the most useful personal computer on the market today.

### Works better because it's easy to read

The display screen of the COMPAQ Portable measures nine inches diagonally. It shows a full "page width" of 80 characters on a line so tasks like word processing are easier. And those characters are big enough to read even if you're leaning back in your chair.

The display shows both high-resolution graphics and easy-to-read, upper- and lowercase characters. One screen



*There are hundreds of useful programs for the COMPAQ Portable because it runs all the popular programs written for the IBM.*

for all the information. With some personal computers, including the IBM, you can have either the graphics or the legible characters, but you can't have both unless you buy two different displays.

Incidentally, computer prices are often quoted without a display. The display of the COMPAQ Portable is built in, of course.

### Add-on options make it work the way you work

Inside the COMPAQ Portable are three open slots. Electronic devices called expansion boards fit those slots and give the COMPAQ Portable new powers.

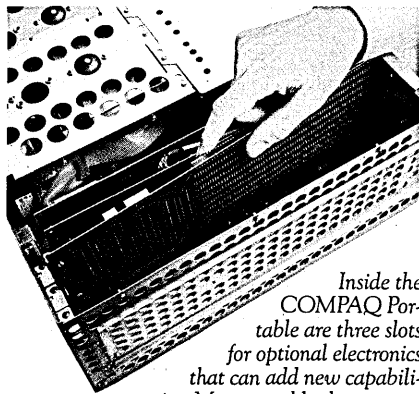


Just like the programs, expansion boards designed for the IBM work with the COMPAQ Portable, so there are dozens available right now. With them, you can make your personal computer more personal.

Want to check a stock price? Or look up something in The New York Times Information Service? One expansion board enables the COMPAQ Portable to handle those communications over ordinary phone lines.

Want to use your company's central computer files while you're on a trip? There are boards that allow the COMPAQ Portable to communicate with a variety of large mainframe computers.

Other boards let you hook up controllers for computer games or increase memory capacity. Still others let you connect personal computers in a network so several people in your office can share the same information.



Inside the COMPAQ Portable are three slots for optional electronics that can add new capabilities. Most portables have none.

### Works better because it's tough enough for the road

Portable doesn't just mean smaller. Portable means tough, too.

The COMPAQ Portable was built to withstand the hard knocks of constant travel. An aluminum frame within the case completely surrounds the computer's working components. Each disk drive is mounted in rubber shock absorbers instead of being bolted directly to the frame.

To test internal components, the COMPAQ Portable was subjected to impacts of 40 G's while running a program. After impacts on each side, there was no internal damage and the program was still running. Without error.

Computers are for getting rid of worries, not giving you new ones.

### Designed to help you work better, too

The COMPAQ Portable was designed to feel good.

## Specifications

### Software

- Runs all the popular programs written for the IBM PC

### Memory

- 128K bytes RAM
- Expandable to 640K bytes

### Storage

- One 320K-byte minifloppy disk drive, second drive optional

### Display

- 9-inch (diagonal) monochrome screen
- 25 lines by 80 characters
- Upper- and lowercase, high-resolution text characters
- High-resolution graphics

### Expansion board slots

- Three IBM PC-compatible slots

### Interfaces

- Parallel printer interface
- RGB color monitor interface
- Composite video monitor interface
- TV RF modulator interface
- Communications interface optional

### Physical specifications

- Totally self-contained and portable
- 20"W x 8 1/2"H x 16"D

The keyboard is detached so it can fit into your most comfortable working position.

The keyboard cable remains connected at all times. So you don't have to unpack it and hook it up every time you use your computer.

Because the display is built in, the COMPAQ Portable makes a neat,

small package on your desk, instead of a big obstacle you have to talk around. The built-in display also avoids the usual cable clutter because there's no need for separate cables for the display.

The COMPAQ Portable even has an electronically synthesized sound to create the familiar keyclick of a typewriter. With a simple keyboard command you can adjust the volume to suit the level of background noise in your office.

### The added usefulness is free

The COMPAQ Portable can do what desktop computers do and do it in more places. But it doesn't cost any more than an ordinary desktop.

In fact, it costs hundreds less than a comparably equipped IBM or Apple® III. The COMPAQ Portable comes standard with one disk drive and 128K bytes of memory, both of which are usually extra-cost options. A second disk drive and additional memory are available to make your COMPAQ Portable even more powerful.

The bottom line is this—you just can't buy a more practical, useful, productive computer. Before you decide on a computer, you owe it to yourself to compare the COMPAQ Portable.

**For the location of the Authorized Dealer nearest you, call 1-800-231-9966.**

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**VMSECURE** Provides comprehensive security and directory management for the VM environment, ensuring data protection.

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**CIRCLE 7 ON READERCARD**

Twenty Years Ago/Ten Years Ago

# LOOKING BACK

## FORSYTHE'S SAGA

*November 1963:* "Our long-range goal," said George E. Forsythe, director of Stanford University's Computer Science Division, "is to continue development of the computer as an extension of the human mind—and enable almost anybody with a problem to have access to computers, just like the availability of telephone service."

And on that note, the 10-year-old Stanford Computation Center opened the doors of its new quarters to all students and faculty members campus-wide, as well as to the 500 to 1,000 students enrolled annually in courses run by the Computer Science Division.

Rather than offer a complete problem-solving or programming service, the center served as computer consultants and was guided by three cardinal rules, according to Forsythe. First, the center was not interested in creating an empire; its competence in acquiring answers could not match that of the department with the problem; and its members must be dedicated to aiding people with their problems, and helping them learn to use the computer "gracefully." The computation center was also used to supplement the Computer Science Division's classroom instruction by teaching programming and giving students hands-on experience.

Another activity of the Computation Center was research. The members were dedicated to increasing man's understanding of the computing sciences. Under Forsythe's guidance, Stanford's research areas had changed from heavy numerical analysis into more immediate or popular research—timesharing and list processing.

Forsythe's ideal computer science department would eventually include experts in programming, numerical analysis, automata theory, data processing, business games, adaptive function theory, information retrieval, recursive function theory, linguistics, and so forth, as these fields emerged. "Like the computation center itself," said Forsythe, "one of the significant roles of computer science should be to provide an academic clubhouse where interdisciplinary stimulation can counteract the effects of specialization."

Set in a landscape conducive to meditation and quiet research, the computa-

tion center at Stanford proved instrumental in attaining a high level of work throughput, while offering more services to more students than any other university at the time.

## WHO'S SPYING NOW?

*November 1973:* In the aftermath of Judge A. Sherman Christensen's decision against IBM in the Telex-IBM antitrust case, the industry sat back and took note that there were some stern words for Telex, too. While Christensen ordered IBM to pay Telex \$352 million in damages, he also ordered Telex, in a separate trade secrets decision, to pay IBM \$21.9 million for what he said was a "programmed and massive invasion" of IBM's trade secrets. The trial and subsequent decision succeeded in establishing a pattern of industrial espionage practiced by Telex.

Said Christensen, "We have been confronted here by a widespread, purposeful effort of Telex to secure confidential [IBM] technical information concerning the design of products which were then unannounced, for the purpose of duplicating such equipment through use of such confidential information. Telex's patterns on recruitment, job assignment, production growth, and compensation arrangements were so designed as to lead inevitably to the misappropriation of IBM's confidential information."

Judge Christensen also noted Telex's negotiations with Hitachi for a rather unusual contract. The negotiations, said the judge, were made on behalf of Telex by Jack James, a former IBMer.

The judge disclosed that part of the inducements Telex offered Hitachi was "access to information relating to IBM's unannounced disk programs known to Telex employees. Telex also offered to provide Hitachi with information that would enable Hitachi to design an equivalent to the unannounced IBM Apollo [disk drive project]."

While industrial espionage was inexcusable, Christensen did note the unusual circumstances in the computer industry that led to monopoly of submarkets. This, in turn, could force companies to resort to espionage as the only way to stay in the competition.

—Lauren D'Attilo

# For Florida school officials, menu-driven applications come Naturally.



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NATURAL is Software AG's fourth-generation information processing system—the system with the largest installed base of its kind in the world. NATURAL is one of the most powerful programmer productivity tools around: typically 10 to 20 times more productive than COBOL.

And NATURAL is backed by ADABAS, Software AG's widely imitated (but never equalled) data base management system—the system that's given more

people a taste for relational architecture than any other DBMS.

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So, whether you're managing a lunch program or just trying to digest a lot of information, you owe it to yourself to find out what NATURAL and ADABAS can do for you. We'll be glad to show you the rest of our menu.

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Trailways faced a challenge recently. They wanted to improve cash management, the accuracy of pricing and scheduling, and the efficiency of their terminal operations.

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Trailways' managers will benefit by having faster access to data. For example, the system facilitates interline accounting and furnishes feedback on marketing campaigns—a critical edge in a newly deregulated environment.

What's more, the microSystem 6/10 is easy to use, easy to program, and

compatible with the Honeywell minicomputer and mainframe host at Trailways' home office. (Only Honeywell has total instructional set compatibility for micros, minis and mainframes).

The microSystem 6/10 has 512K of memory. More than enough to handle the vast amounts of rate/schedule data Trailways must store, as well as information on daily transactions.

And the system is a snap to install, reliable, and backed up by Honeywell's nationwide service organization.

Information control. That's what keeps Big Red rolling.

For more information on the microSystem 6/10 and the advantages of full-line compatibility, call 800-328-5111, ext. 2708 (In Minnesota, call collect 612-870-2142, ext. 2708) or write Honeywell Inquiry Center, 200 Smith Street (MS 440), Waltham, MA 02154.

**Together, we can find the answers.**

## Honeywell

# dBASE II.™

dBASE II® is, quite simply, the best-selling database management system (DBMS) made for any computer, ever.

And because it is so powerful yet so easy to use, it has become the standard for managing data with a microcomputer.

**Over 150,000 users.  
So far.**

Doctors and lawyers, accountants and salespeople, stockbrokers and students, big businesses and small are all managing their data better with dBASE II. All over the country, around the world, users have found that dBASE II is the best solution to all their information needs.

### **Knowledge is power.**

With dBASE II, you can quickly and easily create a full business information system that does exactly what you need done, a system that will handle today's problems yet grow with you.

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dBASE II is the most advanced information management tool available for your micro. And it's only \$700 (suggested retail price).

**See us at Comdex Booth #3558**



### **A legend in its own time.**

Already, books have been written about it. Hundreds of independent businesses are based on it. And other microcomputer programs measure themselves against dBASE II.

To see why, drop by your nearest computer or software store and ask for a demonstration. Then take a package home and use it for 30 days. If it's not everything we said it was, return it and get your money back.

But we think you'll keep it.

Can over 150,000 users be wrong?

For the name of your nearest dBASE II dealer, contact Ashton-Tate, 10150 West Jefferson Boulevard, Culver City, CA 90230. (213) 204-5570. (800) 437-4329, ext. 217. (In Colorado, (303) 799-4900).

## ASHTON-TATE

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CIRCLE 10 ON READER CARD



# LOOK AHEAD

PC BIRTHS LAN,  
KILLS D-MASTER

IBM's new personal computer controller, the Columbus, is just the first of a series of upcoming announcements that tie the PC more closely to the mainframe environment. Other software modules will link Columbus and a new hard disk 3274 into a "baby" local area network for PCs. Important for the future of office automation, the LAN will use IBM's proposed electronic mail interface standard DIA/DCA. In addition, sources say, third party software companies that have written for Datamaster are now preparing for a new dedicated word processor, based on Intel's 8086 micro. Next year the new PC-type device will run the high-quality text processing software found in Datamaster and Displaywriter, thus making these machines obsolete.

OPTICAL DISK  
FROM CDC...

Not to be outdone by Storage Technology Corp., inside sources say, Control Data Corp. will introduce an optical disk mass storage system some time next spring. Unlike STC's \$130,000, large-footprint and 4-gigabyte system, the CDC approach will focus on the small end; samples now being shipped are the size of the Lark floppy disk drive, with 1 gigabyte of memory and a fraction of the STC price -- less than \$10,000, we hear. Performance is nothing to cheer about, concede the CDC sources, because of the mirror and lens system on the pickup arm. "It's quite a bit of mass to move around," explains a source. Adds another, "It's not going to replace magnetic media, but will be an archival system."

...ALONG WITH  
SOFTWARE STORE

Having pretty much botched it in the retail hardware market with its business centers, CDC is trying another approach -- a software store. Just Software is a wholly owned subsidiary of CDC's publishing company, which also handles micro-Plato programming. Word is that the pilot outlet in San Diego is doing fine, so CDC probably will go ahead with plans to open a chain of retail software stores.

WHY THE VAX  
780 DELAYS?

Digital Equipment Corp. seems to be experiencing continuing problems with delivery schedules. "DEC has let its customers down in a big way in recent months by not being able to ship the VAX 780," claims Sonny Monosson, of Used Computer Corp., Boston. "We're getting upwards of six inquiries a day, many from the aerospace industry, because customers can't get hold of the 780." The 780 and its big brother, the 782, are due to be

# LOOK AHEAD

## WILL AMDAHL LOSE ITS PAD?

replaced in the next few years. Maybe DEC is winding down early?

Amdahl's important contract with AT&T may be in jeopardy. Sources at American Information Systems say that Amdahl may lose its large contract to produce packet hardware for the Net 1000 datacom network that is already long overdue. The firm is producing Packet Assembly Disassembly devices to function as network entry points for customers' terminals. Amdahl got into the packet switch business with its 1980 acquisition of Tran Telecommunications Corp., of Marina del Ray. Meanwhile, a series of personnel setbacks is expected to hurt sales. Headquarters marketing vice president Clifford Rudolph, western regional sales vp George Klous, and director of systems marketing Wayne McIntyre have left during the past few months.

## LANs AHEAD FOR PCS

Several local area network vendors are scrambling to offer the software and hardware to link personal computers. Sytek, Ungermann-Bass, and Interactive Systems/3M say that early next year they will deliver PC and 3270 network capabilities. Sytek and U-B will offer direct cpu-to-cpu connections; 3M's latest network, LAN 1, is designed to compete with Sytek and U-B in the broadband market but will interface at the RS232 level.

## DEBASING dBASE II

The Federal Trade Commission is investigating Ashton-Tate for possible violations of government rules prohibiting vendors from dictating retail prices of their products. The FTC move comes at a distinctly inopportune time -- the maker of dBASE II microcomputer software is trying to raise \$27 million in a public stock offering. To date A-T has shipped 130,000 copies of dBASE II, and in the past six months the DBMS package accounted for 81% of the company's \$14.9 million in revenues. If the stock offering is successful, a big pot of gold will go to the author of dBASE II, Wayne Ratliff: earlier this year A-T bought the rights for \$150,000 in cash, a \$6.4 million promissory note, and 392,000 shares of stock.

## ANOTHER YEAR FOR MITEL PBX

Deliveries of the big data switching private branch exchange from Mitel, the SX-2000, won't start until late next year. Incomplete versions of the data and voice PBX may appear in October, say industry analysts, after an April introduction of a complete speech-only version of the 20,000-line box. It will be mid-1985 before the complete data/voice system is ready for delivery. Mitel's software development is the culprit.



## C.ITOH LEADS IN THE SPACE RACE.

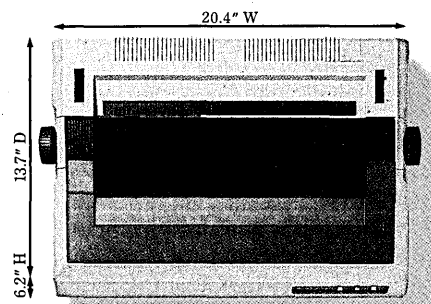
The C. Itoh Starlet A-10 Daisy Wheel printer is made to order for the OEM micro market. Its footprint is so incredibly small, it goes just about anywhere – desktop, shelf, bookcase – yet it offers highest quality word processing printing at *less* than the cost of an electronic typewriter.

The A-10 is also extremely versatile. It can literally be configured thousands of different ways to accommodate your systems and performance needs. Its Shannon-text-rated 18 cps speed and unique 100-character drop-in print wheel (it's self-aligning) make it ideal for office applications.

### PROVEN RELIABILITY

The A-10 is built around the same sound principles that have made our F-10

and Starwriter printers so successful. You get field proven, firmware-intensive technology for increased reliability. Plus a rugged, cast-aluminum baseplate, high quality metal parts, and low parts count for reduced maintenance: MTBF is 2300 hours, at 30% duty cycle (45 million character impressions). Easy access to all boards and subassemblies ensures



low MTTR. And the A-10 is U.L. and FCC class-B approved as well as ESD tested.

### ECONOMY OF OWNERSHIP

Low cost of ownership is one of the A-10's best features. Industry standard ribbons and a wide variety of wheels are available at popular prices. But best of all, many of the extra features that others call options come standard on the A-10. Like microprocessing for proportional printing, superscripts/subscripts, and bidirectional carriage and platen motion.

C. Itoh's Starlet A-10 Daisy. Small footprint. Big features. Contact C. Itoh Electronics, Inc. 5301 Beethoven Street, Los Angeles, California 90066. Telephone (213) 306-6700.

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A World of Quality

CIRCLE 11 ON READER CARD





# WHAT GOOD IS A PRODUCT OF THE FUTURE FROM A COMPANY WITHOUT ONE?

Dealing with a company you've never heard of can often lead to an experience you'll never forget.

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At ITT Courier, we can get as excited about new technology as anyone. In fact, last year alone, ITT spent over \$1 billion on R&D. And millions more preparing each new product for the real world.

What's more, because the real world is filled with uncertainty, we back up every product with 150 ITT Service Centers in North America alone.

That's how you build a company that's installed over 325,000 terminals worldwide.

And that's why instead of gambling on the company that makes a new product first, you're a lot better off waiting for the company that knows how to make it last.

Contact your nearest ITT Courier Representative. Or call the ITT Courier Sales Support Department at 1-800-528-1400, toll free.

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# CALENDAR

## NOVEMBER

### **10th Annual Computer Security Conference.**

Nov. 7-10, New York, N.Y., contact: Carol Smith, Computer Security Institute, 43 Boston Post Rd., Northboro, MA 01532, (617) 845-5050.

### **Fifth Annual Northeast Computer Show and Software Exposition.**

Nov. 10-12, Boston, Mass., contact: Northeast Expositions, 822 Boylston St., Chestnut Hill, MA 02167, (800) 841-7000.

### **14th Annual Canadian Computer Show.**

Nov. 14-17, Toronto, Canada, contact: Robert Grainger, Industrial Trade Shows, 20 Butterick Rd., Toronto, Ontario, Canada M8W 3Z8, (416) 252-7791.

### **International Information Management Congress (IMC '83).**

Nov. 14-17, San Francisco, Calif., contact: IMC '83, P.O. Box 34404, Bethesda, MD 20817, (301) 983-0604.

### **AUTOFACT 5.**

Nov. 15-17, Detroit, Mich., contact: Gregg Balko, CASA/SME Sr. Administrator at the Society of Manufacturing Engineers, One SME Dr., P.O. Box 930, Dearborn, MI 48121, (313) 271-1080.

### **The Sixth Western Educational Computing Conference**

Nov. 18-19, San Diego, Calif., contact: Dennie Van Tassel, Computer Center, University of California, Santa Cruz, CA 95064, (408) 429-2434.

### **COMDEX/FALL.**

Nov. 28-Dec. 2, Las Vegas, Nev., contact: The Interface Group, 300 First Ave., Needham, MA 02194, (617) 449-6600.

### **Global Telecommunication Conference (GLOBECOM '83).**

Nov. 29 - Dec. 1, San Diego, Calif., contact: Dr. Estil Hoversten, GLOBECOM '83, P.O. Box 81466, San Diego, CA 92138, (619) 457-2340.

## DECEMBER

### **CMG XIV, International Conference on Computer Performance Evaluation.**

Dec. 6-9, Crystal City, Va., contact: Computer Measurement Group, P.O. Box 26063, Phoenix, AZ 85068, (602) 995-0905.

### **Conference on Personal and Small Computers.**

Dec. 8-9, San Diego, Calif., contact: Billy G. Claybrook, Publicity Chairman, The MITRE Corp., MS B332, P.O. Box 208, Bedford, MA 01730, (617) 271-2439.

## JANUARY

### **Seventeenth Hawaii International Conference on System Sciences.**

Jan. 4-6, Honolulu, Hawaii, contact: Emily M. Yano Jorgensen, Center for Executive Development, College of Business Administration, University of Hawaii, 2404 Maile Way C-202, Honolulu, HI 96822, (808) 948-7396.

### **6th Annual Pacific Telecommunications Conference.**

Jan. 8-11, Honolulu, Hawaii, contact: Fred Smith, Pacific Telecommunications Council, 1110 University Ave., Suite 303, Honolulu, HI 96826, (808) 949-5752.

### **Southcon/84.**

Jan. 17-19, Orlando, Fla., contact: Nancy Hogan, Electronic Conventions Inc., 8110 Airport Blvd., Los Angeles, CA 90045, (213) 772-2965.

### **Sixth Annual Advanced Semiconductor Equipment Exposition (ASEE'84).**

Jan. 24-26, San Jose, Calif., contact: Joyce Estill, Carlidge & Associates Inc., 4030 Moorpark Ave., Suite 205, San Jose, CA 95117, (408) 554-6644.

## FEBRUARY

### **1984 Office Automation Conference (OAC'84).**

Feb. 20-22, Los Angeles, Calif., contact: Ann-Marie Bartels, AFIPS, 1899 Preston White Dr., Reston, VA 22091, (703) 558-3613.

### **IMPRINTA 84. (International Congress and Exhibition for Communications and Techniques).**

Feb. 22-28, Dusseldorf, West Germany, contact: Dusseldorf Trade Shows, 500 Fifth Ave., New York, NY 10110, (212) 840-7744.

## MARCH

### **SaudiComputer 84.**

March 18-22, Riyadh, Saudi Arabia, contact: Overseas Exhibition Services Ltd., 11 Manchester Square, London W1M 5AB, England, (01) 486-1951.

### **Federal Office Systems Expo (FOSE '84).**

March 19-22, Washington, D.C., contact: Mary Beth Gouled, National Trade Productions Inc., 9418 Annapolis Rd., Lanham, MD 20706, (301) 459-8383 or (800) 638-8510.

### **International Symposium on the Performance of Computer Communication Systems.**

March 21-23, Zurich, Switzerland, contact: Harry Rudin, IBM Research Laboratory, Saumerstrasse 4, CH-8803 Ruschlikon, Switzerland, (01) 724-2727.



# The printer for what the world is coming to.

**T**he more a business relies on charts, graphs, forms, diagrams and specialized characters, the more it needs a flexible and reliable computer printer.

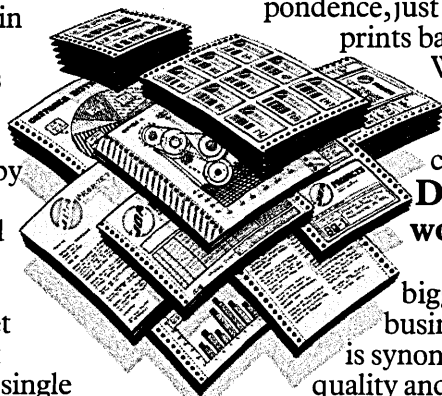
And if that business also uses bar codes and labels, it needs a printer with a brain.

## The brain is built in.

Instructing the printer how to make codes can take a lot of input time from the host computer—time that it can't be used for other jobs.

Dataproducts' M-100L matrix printer has its own label-printing control board built in. It's pre-programmed to produce bar codes, block letters and other label graphics in a variety of configurations and sizes.

The board was designed by Dataproducts and is installed at the Dataproducts factory. So you get this intelligent printer from a single supplier, not a printer from here and a control board from there.



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After the day's labels are printed, the M-100L is just getting started.

It prints reports, invoices, checks, sales charts, forms and even a lot of office correspondence, just as well as it prints bar codes and labels.

Whatever you're printing, you want a printer you can depend on.

**Depend on the world leader.**

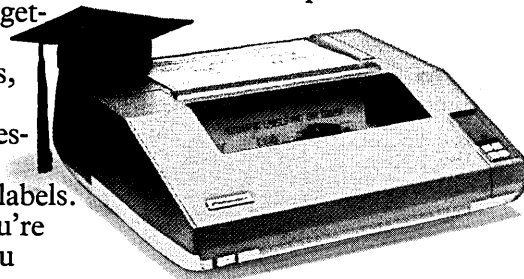
To some of the biggest OEMs in the business, Dataproducts

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To end users, Dataproducts means high productivity, low

cost of ownership. We're the world's largest independent manufacturer of computer printers. We build the M-100L to the same stringent standards we set for all our printers, including

our most sophisticated high-speed printers. And we warrant it to OEMs a full two years—the printhead itself for one. To learn more, phone (213) 887-3924 or send the coupon below.



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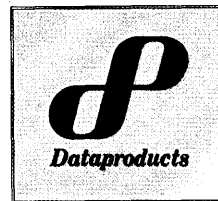
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D/11-83

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**Available when you need them.** Many items are available immediately. Ask about our quick delivery program.

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Call today for more information. Our toll free number is (800) 538-9303; in California (408) 996-9000, Ext. 616. Or write to Memorex Marketing, 18922 Forge Drive, Cupertino, CA 95014. Once you've got all the facts, we're confident of your decision.

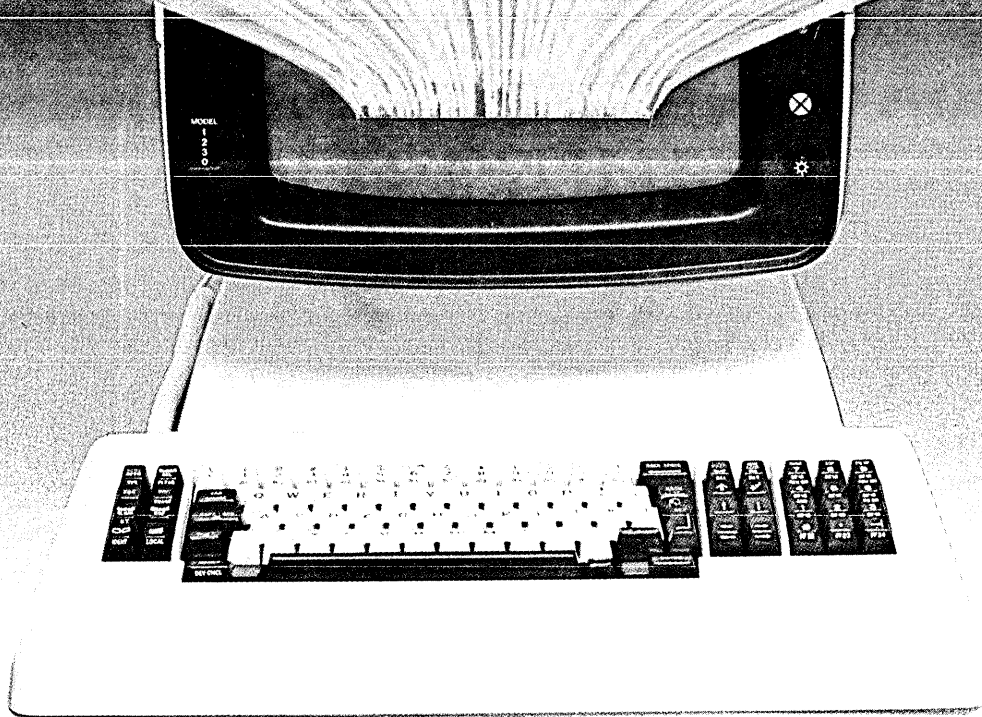
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CIRCLE 14 ON READER CARD

# More versatility than ever with Lee Data's 3270 terminal system

## Integrated Personal Computing



**Lee Data's new Personal Workstation** now lets you enjoy all the advantages of professional business computing plus have both 3270 and asynchronous access to CPU-based applications—all from the same Lee Data workstation!

**That's right! Completely-integrated, IBM-compatible personal computing**—offering the latest functional capabilities and these value-added features:

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**Personal Workstation-to-host file transfer capabilities** that allow transfer of data from CPU-based files through existing system communications net-

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**And four standard system expansion slots** for add-on requirements as your needs change.

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CIRCLE 15 ON READER CARD

# LETTERS

## IN DEFENSE OF MAINFRAMES

Once again we have been entertained with the wild-eyed prediction of a new computer revolution in Martin Healey's "Junking the Mainframe" article (August, p. 120). Mr. Healey did a creditable job of describing systems and network connections to come. The fatal flaw in his reasoning is an assumption that computer literate executives will allow anarchy to rule their businesses! The microcomputer will make a large contribution in the future, but under a managed condition that we could call organized anarchy. In the world of organized anarchy, functions will be performed on sized engines based upon a premise of small jobs on small machines, large on large, etc. Networking of processors and storage devices will, of course, happen. This move toward organized anarchy will be characterized by prudent management rules (the organized part) governing:

- Security and integrity of information
- Disaster planning
- Standards—especially in office areas
- Auditability—financial records and other systems vital to a company's success will continue to receive detailed attention
- Cost control—remember you are often buying a copy of software for *each* micro in your complex and that each new user spawns a need for storage and disaster backup support.
- Integration of information—we will be gathering, relating, and analyzing much more information as business becomes more complex. If this information exists in islands throughout the corporation, simple file server mechanisms will not be capable of supporting executive decisions analysis; therefore we will invent database engines to hold corporate information. I suspect this brings us back to the mainframe in its proper perspective: a repository of corporate da-

tabases and somewhat of a traffic cop for the network.

• Corporate information—information vital to corporate objectives or which crosses departmental lines will be classed as corporate information subject to central controls. My experience is that very little information is departmental or principal specific without corporate significance.

The future bottom line seems to be one of user-driven development that will only succeed if the right information has been captured, validated, and protected.

Who cares what computing engines are used as long as a corporate strategy is in place requiring each new engine to join the existing network able to read, write, and transfer information subject to security rules.

MICHAEL G. BARNES  
Manager of Computer Production  
Atlantic Electric  
Pleasantville, New Jersey

Martin Healey's contention that mainframes will be obsolete in 10 years begs criticism from many directions. That future workstations will have the computing power of today's mainframes can be readily extrapolated from current trends. However, Dr. Healey ignores the function of today's mainframes.

One might argue that the primary function of mainframes is to do batch processing or to support many individual workstations. Indeed, these are ancillary functions of today's mainframes. The primary function of mainframes, however, is to support large databases. These databases must process and store huge amounts of information while they simultaneously service many users. For a single database to be of value to many users, data accuracy and security are overriding considerations. In or-

der to achieve the required levels of data accuracy and security, large databases require auditable and maintainable data processing systems. Such systems seem very difficult if not impossible to achieve in a distributed environment. The need for large, accurate databases will insure the survival of large, centralized data processing organizations and their large mainframes for the foreseeable future.

JOHN MCNELLIS  
New York, New York

Thank you for presenting Predicasts' projections on the future of mainframes—and the dissenting viewpoint of Martin Healey—in your August issue. Mr. Healey's thorough understanding of the computer and semiconductor industries was more than evident in his informative article. Predicasts does not disagree with any one point made by Mr. Healey; in fact, most of the evidence he presents can be confirmed by referencing any of Predicasts' numerous studies on microcomputers, minicomputers, mainframes, and office automation equipment. However, we *do* disagree with his conclusion.

Underlying Mr. Healey's analysis are two assumptions which we do not make: 1) that mainframe manufacturers cannot adapt to changing market and technological environments; and 2) that the market for computational power is finite, fixed, and well defined.

The first suggests that mainframe producers made a strategic blunder when they adopted batch-oriented designs because future applications will emphasize user-friendly real-time processing. It also implies that producers are forever doomed to batch applications. Until very recently, however, batch orientation was a market-imposed constraint, *not* a vendor-selected



## LETTERS

option. For a variety of reasons—including shortages of qualified dp personnel, the high cost of computer resources, the shortage of broadband communications channels, and management's desire to maintain centralized control—users have demanded centralized data processing. And in some sectors, this will remain the case. An examination of the current offerings of major mainframe vendors shows that interactive operating systems are already widespread, which indicates to us that mainframe manufacturers are neither blind to the needs of the marketplace nor ill equipped to meet those needs.

The second assumption, that of a static market for computational power, fails to consider the economic axiom that a supply creates its own demand. It's a well-known fact that the first mainframe, the ENIAC, was not as powerful as the majority of today's pocket calculators; yet, in its time, the ENIAC represented a major technological breakthrough. And since 1946, mainframes have continuously migrated up the computational power spectrum, abandoning applications that created niches for minicomputers and, in turn, microcomputers. Because there is no hard evidence to support the claim that mainframes are abdicating their role as pioneers in more demanding applications, we believe that technological advances will also result in the identification of new mainframe applications at the higher end of the performance scale, which will permit minicomputers and even microcomputers to undertake tasks now performed by mainframes. In other words, computer scientists have *only begun* to discover the computer's capabilities and applications.

The last word in this debate is, of course, the final vote of the marketplace.

The high profitability shown by major mainframe manufacturers—even during a major recession—and the new producers entering the industry (IPL, Cambex, and Trilogy, to name a few) indicate to us that the market will vote in favor of the mainframes.

NEIL DIGERONIMO  
Manager

High Technology Research  
Predicasts Inc.  
Cleveland, Ohio

### REQUIRED READING

My congratulations to Laura L. Scherer on her article "User Training: Less is More" (July, p. 175). Her short article contained more ideas, tips, and suggestions than most seminars and books written on the subject. It became required reading for my systems analysts as soon as I had finished it.

JAMES P. FLANAGAN  
Manager

Corporate Administrative Services  
Bose Corp.  
Framingham, Massachusetts

### A MEMORABLE JULY!

I would like to congratulate you on your July 1983 issue. I thought the material on artificial intelligence (AI) was most informative, particularly to an older engineer like myself, who invented the implantable cardiac pacemaker 25 years ago, but who now is fighting obsolescence! Such a look at the future is indispensable to me.

It was particularly useful to read the comments of an authority like Larry Harris (who presented a very unbiased review, in spite of his claimed bias!) and then to compare that with the comments of four other "practitioners," each with a slightly different opinion, each from his own specialty

viewpoint. After duly filtering through all these inputs, I came away feeling I really had the inside story on the USA/Japan foot-race in AI.

I thought Jan Johnson did a fine job asking the right questions of the "specialists" and then putting it all together. It was interesting that she should again appear in the same issue doing an equally good job on an unrelated subject. You are indeed fortunate to have such an able person running your Midwest office. Again, thank you.

WILSON GREATBATCH  
President

Wilson Greatbatch Prosthetics Ltd.  
Clarence, New York

### POST TOASTIES

It was difficult to determine whether or not Ed Post was serious in his article "Real Programmers Don't Use Pascal" (July, Readers' Forum, p. 263). After all, this was not your annual "April Fool" issue. Let me share some impressions of Ed's article from the perspective of a 30-year veteran who migrated from the world of real programming (i.e., in a scientific laboratory) to the world of academics.

The point that Ed has missed is that there is a difference between a programmer, even a "real programmer," and a true professional. A true professional has the ability to use a wide variety of existing tools, the creativity to develop new tools when necessary, and the competence to select the best (i.e., the most effective) tool to meet each situation. A truly professional computer scientist will grow with his profession; a real programmer of the type described by Ed Post will be ripe for early retirement at the age of 50, to relieve his boredom.

There was a hint of short-range nostalgia in Ed's article. I remember the day when "real programmers" would not even consider using FORTRAN, except under duress; we all knew that we could write better programs without it, in assembly language, and were not afraid to say so. We were all wrong. Perhaps, St. Paul said it best: "When I was a child, I spake as a child, I understood as a child, I thought as a child; but when I became a man, I put away childish things." (I Corinthians 13:11). Accepting FORTRAN was a painful experience, but well worth it. I have since come to accept, among other things, BASIC, COBOL, and Pascal. Each has its peculiar uses, the things that it does best.

I note Ed's complimentary remarks regarding Seymour Cray and the work at Control Data and Cray Research. Seymour is a real professional. Why, then, are all of Ed's illustrations based upon experiences with IBM equipment? The Control Data and Cray Research machines are real computers; the IBM competitors are merely overglamorized data processors! Ed talks about hexadecimal; real computers use octal!

I agree with Ed's disdain for COBOL.



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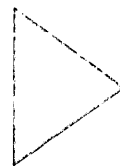
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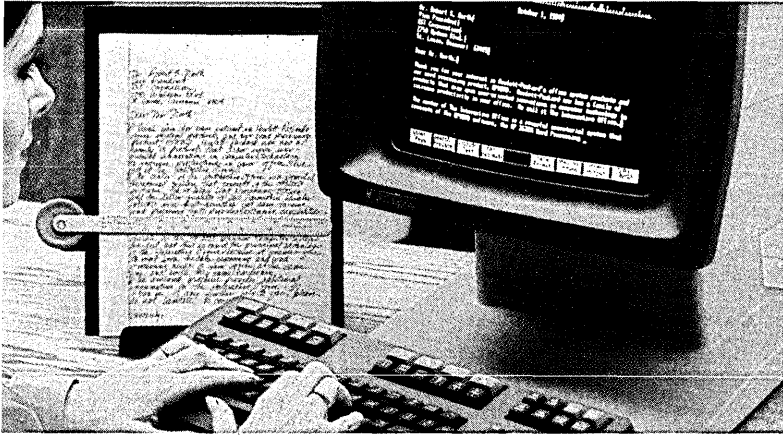
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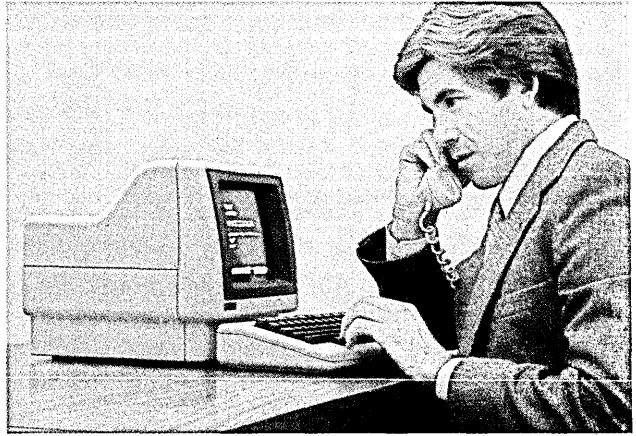


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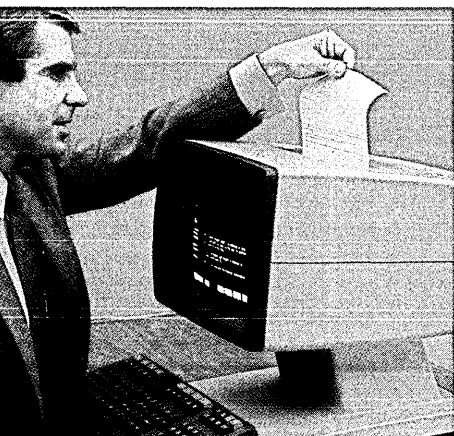
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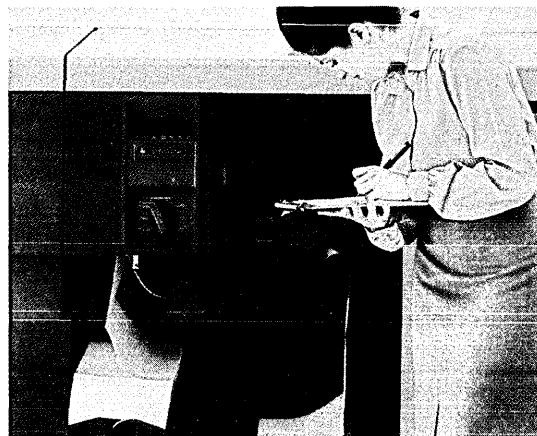
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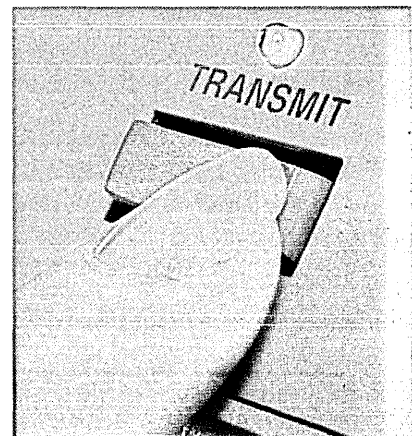
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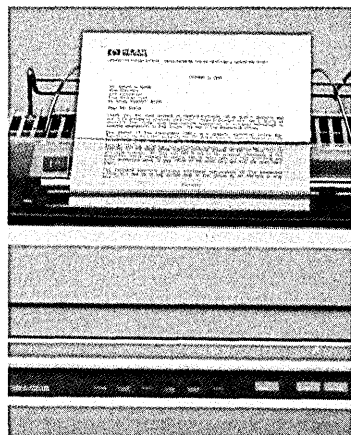
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 **HEWLETT  
PACKARD**

CIRCLE 16 ON READER CARD

## LETTERS

and the kinds of things one usually does with COBOL. I would not, however, want to write a direct access file update application in FORTRAN.

The world is full of real programmers who have built their employment security around undocumented programs for which the source is no longer available, while true professionals have been promoted into the really useful jobs.

Ed's love of obsolete methods and his disdain of structured programming, documentations, and the other aspects of good programming are alarming. He is working hard without accomplishing anything for his boss. I would not hire him. He does not speak like a true professional; in fact, he sounds like a hack. For his own sake, I hope that he has the blanket, snugly, around his boss's eyes.

Ed questions the teaching of Pascal when the world uses FORTRAN. Ed is probably correct in saying that FORTRAN will be with us, ad infinitum, ad nauseam; i.e., it is like English. We teach Pascal, fully aware of this. We know that we cannot change the tool, we are only trying to change the method by which the tool is used. We acknowledge that FORTRAN is a necessary evil, and teach it to students who have learned to write structured Pascal programs. They are, to say the least, disappointed by FORTRAN's inadequacies.

This whole procedure, of course, speaks to the dilemma between FORTRAN, which is heavily used and inadequate, and Pascal, which is new, different, and unpopular. The whole thing is really IBM's fault; they should have replaced FORTRAN with an extension of ALGOL 60 when they had the chance, instead of creating a marketing aide known as PL/I, to support sales of the IBM/360. Now we are stuck with FORTRAN. Actually, FORTRAN could have become a viable alternative had the standards committee done its job. The problem is that, with friends like the standards committee, FORTRAN did not need enemies; the half-structured FORTRAN 77 is only marginally better than its predecessor. Pascal is now the only viable introduction to programming available to students.

I would close with two suggestions to Ed Post: first, he should reread Ed Dijkstra's various pronouncements from the perspective of a professional in a dynamically growing field, and second, that he should stop eating quiche.

JULIUS A. ARCHIBALD JR.  
Professor and Chairman  
Department of Computer Science  
State University of New York  
at Plattsburgh  
Plattsburgh, New York

### BREAKING UP—WITH LAUGHTER

Laton McCartney's article on the Archie McGill fiasco at American Bell (August, "Breaking Up Is Hard to Do," p. 36) con-

firmed my opinion that often "fast-trackers" like McGill wreak more havoc than they do benefit to their companies. The ABI story has all the ingredients of a first-class corporate disaster: 1) a know-it-all executive who disregards human sensitivities; 2) grandiose predictions and promises totally out of scale with reality; and 3) internal competition and conflict that overshadow the common goal of providing good service to customers.

McCartney quotes John Connell of Office Technology Research Group as saying, "I think ABI vastly underestimated what was required in developing this kind of product [Net 1]. The software problems were enormous." Speaking of those of us who have spent a decade or two trying to get large software systems to function, I say "Welcome to the club, ABI." The chastening effect of failing to deliver a large, ambitious software project on time or on budget should give ABI management a bit more respect for their more experienced colleagues in the computer field. Apparently ABI is learning what the rest of us have known since our first programming projects: that computers are very unforgiving of human error, and the worst mistake in project planning is to assume everything will go according to plan.

The other lesson many hotshots learn too late is that human sensitivities cannot be disregarded in the climb to the top. Sounds like Archie and his boys stepped on a few toes while pulling strings and making end runs. That sort of thing makes one vulnerable to changes in fortune, such as the Justice Department's divestiture decree. Many in the computer field, especially hotshots, have well-deserved reputations for disregarding the human side of the equation in their preoccupation with the mechanistic elements.

Pardon me for chortling, but if I sound delighted to hear about Archie McGill's troubles at American Bell, it's because I am.

PETER MARTIN  
Morristown, New Jersey

### MOPPING UP ON MARPLE

G.P. Marple Jr. correctly points out that your March article on PBX systems confused stored program control with digital technology (July, Letters, p. 23). Unfortunately, his letter only increases the confusion. He confuses time division switching with digital modulation, then confuses both of them with nonblocking switching, then confuses all three with modular architecture. Perhaps the following points will help.

*Analog* PBXs translate voice into electrical signals that vary over an infinite range. The signals may be continuous, or they may be pulses of varying amplitude or width. *Digital* PBXs translate voice into pulses that represent ones and zeros. There are several different ways of doing this.

*Space Division* PBXs establish and maintain a physical path for the duration of each call. It happens that all space division switches are also analog, but there is no necessary connection. *Time Division* PBXs intermingle many connections on a single physical path, by allocating a different "time slot" to each conversation. A time division PBX may be analog (e.g., Western Electric Dimension) or digital (e.g., Northern Telecom SL1, or Rolm CBX).

*Blocking* PBXs cannot connect all possible pairs of terminals (trunks, stations, etc.) simultaneously. *Nonblocking* PBXs can do so, although there may be other limitations on the system's ability to process large numbers of simultaneous calls.

*Modular* systems offer growth in reasonably small increments. The manufacturers all claim modularity, but anyone familiar with the market knows that true modular growth is very hard to find. No digital PBX is as modular as that longtime workhorse of analog, space-division, electromechanical technology, the 701 PBX.

There is no doubt that digital technology is critical to the future of telephony and to office integration, but the coming of the digital world will not be hastened by misinformation.

IAN ANGUS  
President  
ICA Telemanagement Inc.  
Willowdale, Ontario

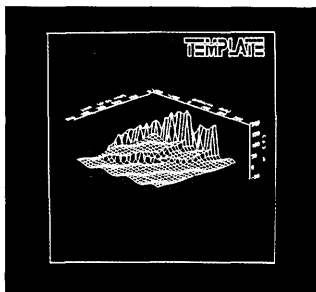
### WORTH NOTING

Clusters of abnormal pregnancies are not new phenomena (July, "Do Crts Kill?" News in Perspective, p. 56). During my obstetrics rotation in internship several babies over a few weeks were born with severe, rare cardiac defects. When we discovered that most of the parents were employed at one firm, we became concerned. The abnormal births ceased as quickly as they had begun, and the parents in question were found to work in very different jobs with no common exposure to potentially hazardous situations. Our review of the medical literature revealed, however, that such clusters may be explained by viral infections. The assumption is that the working parents infect each other and their spouses with a virus that, in adults, causes no more than cold-type symptoms. Unfortunately, the embryo in early gestation is severely affected. The result is a cluster of abnormal births several months after the parents have recovered from infections they may not have noticed at all.

Clearly this is a possible explanation for the clusters of abnormal pregnancies in a few vdt work places. A study of pregnancies in large installations such as airline reservation centers that have been in operation for many years would be a better test for the existence of vdt hazards. Perhaps the manufacturers and operators associations could form a study group that

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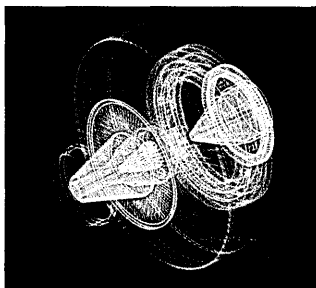
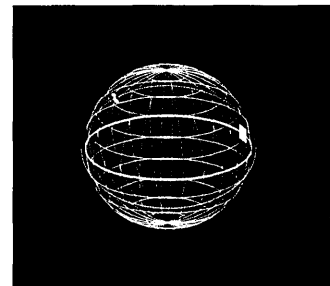
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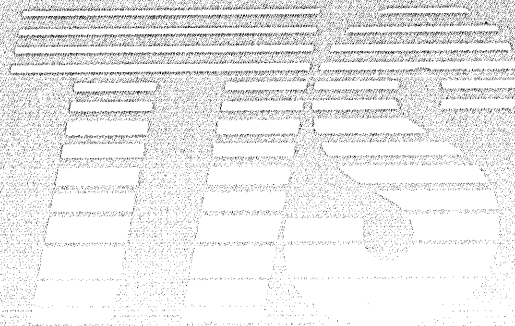
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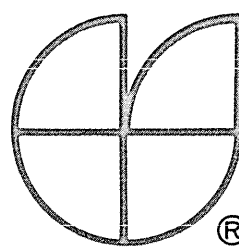
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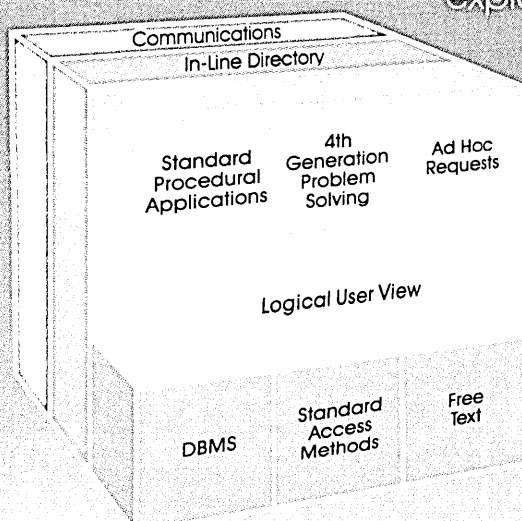
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## LETTERS

would request the needed data from appropriate firms. An unequivocal study accepted by all concerned would clearly be useful to everyone.

ERIC P. BATSON, MD  
Medical Computing Resources Center  
University of Texas  
Health Science Center  
Dallas, Texas

### ACCURACY, AT ANY COST

Regarding Edith Myers's article, "Storage Standards Efforts" (July, News in Perspective, p. 85), I would like to make the following clarifications:

1. X3B7 is not an "American National Standards Institute volunteer committee."

a. X3B7 is a technical committee of the American National Standards Committee X3—Information Systems, which operates under the procedures of the American National Standards Institute as an accredited standards-making committee.

b. I recommend X3B7 be characterized as a "volunteer technical committee operating under the procedures of ANSI." This applies to all X3 technical committees.

2. X3B7 is not, in its scope and program of work, "faced with the task of determining a standard for cartridge disk drive interfaces."

a. The X3B7 scope for the 5¼-inch diameter unrecorded rigid disk reads "... scope of the standard will be the general, physical, mechanical, electrical, and magnetic properties of the disks."

b. X3T9 technical committee for I/O interfaces has as part of its scope the responsibilities for drive interfaces, e.g., "... specify a device level interface between 8-inch rigid disk drives and their host control units."

3. Re "The ANSI Committee has already put its seal of approval on de facto standards..."

a. There is no ANSI "seal of approval," let alone an ANSI Committee seal of approval.

b. X3 technical committees follow rigorous committee balloting rules to reach consensus on draft proposed American National Standards (dpANS). There is no known committee procedure in X3B7, X3, or an ANSI procedure that considers "de facto standards" for approval unless the "de facto standards" are formally submitted to X3 as a candidate for processing as a dpANS.

4. Ms. Myers refers to an "ANSI steering committee with responsibility for X3B7 to expand the latter's charter to include user data exchange."

a. There is no "ANSI steering committee" responsible for X3B7.

b. Changes in scope and program of work of standards-making projects assigned to each technical committee such as X3B7 are approved by a vote of the X3 committee members. The X3 Standards Planning and Requirements Committee (SPARC) reviews all project proposals before forwarding them to X3. Perhaps the "ANSI steering committee" reference should have been to X3 SPARC. The reference to "user data exchange" is probably intended to mean a recorded media format standard which complements the unrecorded media standard.

5. Re "Circulate questions within the family to ANSI people..."

a. Questions are not circulated to ANSI, as a general rule.

b. Questions are circulated to the technical committee members and members of other technical committees with which X3B7 has liaison, e.g., X3B8 (Flexible Disk Cartridges) and X3B1 (Magnetic Tapes). Unresolved questions are forwarded with the dpANS to X3, and if still unresolved after X3 review, they eventually will

accompany the dpANS to the ANSI Board of Standards Review with an X3 recommendation.

6. Re "Twelve companies have recommended to ANSI that a 3½-inch microfloppy be adopted as a standard."

a. This may have been done, but normally standards-making project proposals are submitted to X3, not ANSI. An X3 technical committee such as X3B8 (Flexible Disk Cartridges) has an approved project to develop a nominal 3-inch microfloppy standard, but the committee has further divided the project proposal to address four different proposals for standards development.

7. Re "ANSI itself in March issued a revised standard..."

a. Publication of the revised standard was announced in the Feb. 18, 1983, issue of the ANSI publication, "Standards Action."

b. ANSI publishes and sells American National Standards as its principal source of income. The correct reference is "ANSI/X3.55-1982, Unrecorded Magnetic Tape Cartridge for Information Interchange, 0.250 inch (6.30 mm), 1600 bpi (63 bpm) Phase Encoded." The standard describes the characteristics of the cartridge and recording media for cartridge interchange, but does not address the recorded media format and label and file structure for information interchange.

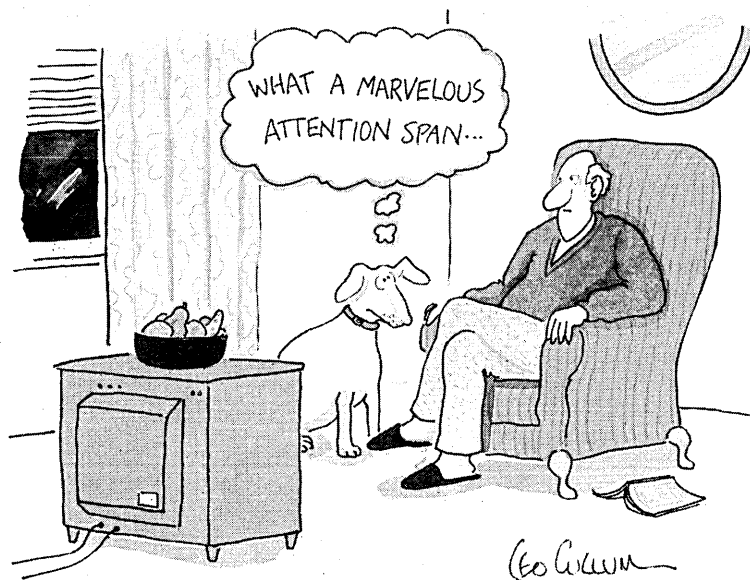
I hope this explanation clarifies the fact that ANSI or any X3 standards-making technical committee does not issue a "seal of approval" and that X3B7 and other X3 voluntary technical committees are not directly affiliated with or under the management control of ANSI. Perhaps Ms. Myers used the term ANSI rather than the specific committee name as a convenient journalistic style. Convenience of style, however, should not take precedence over accuracy.

THOMAS M. KURIHARA, CDP  
Member, American National  
Standards Committee X3  
Vienna, Virginia

### CORRECTIONS

While it's true that "All PBXs Are Not Created Equal" (August, pp. 156-157), neither are all editors. Within that two-page chart accompanying our "Voice/Data PBX Survey" we inadvertently reduced Rolm Corp.'s installed base from the actual 12,000-plus number to 1,200-plus. Thus, this leading manufacturer of digital business communications systems appeared to be one of the smaller vendors. We apologize for the omission of that all-important zero.

Also within that same article, we list GTE Automatic Electric as the manufacturer of the GTE Omni SII. The company's correct name and address should be: GTE Business Communication Systems, P.O. Box 4050, 12502 Sunrise Valley Drive, Reston, VA 22091. Again, our apologies.—Ed.



CARTOON BY LEO CULLUM

INTERESTING

FACTS

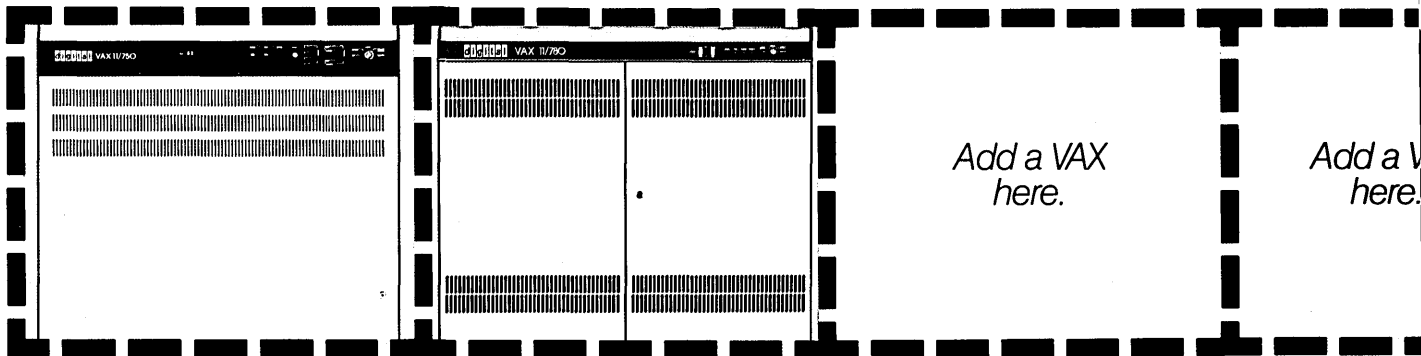
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*Add a VAX  
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**digital**

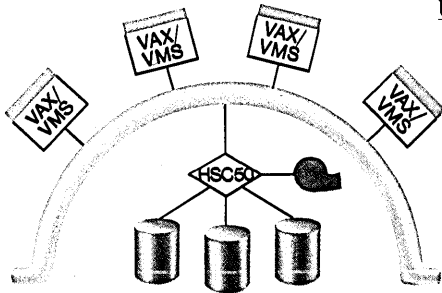
# BUILD A COMMON FILE NEVER OUTGROW.

EVERYTHING



# SYSTEM YOU'LL

Shared data is the heart of a VAXcluster system. A common file system of virtually unlimited proportions that every user in the cluster can access simultaneously and transparently.



*A VAXcluster is a loosely-coupled, multi-computer system with globally-shared data. Globally-shared data means that all mass storage devices are available to any user connected to any host. A cluster is comprised of VAX system processors, the HSC50 mass storage server and the Computer Interconnect. These components can be mixed and matched in almost unlimited ways to respond to growing application demands.*

Digital's new HSC50 and the VMS operating system make this possible.

The HSC50 masks individual drive characteristics from the hosts, and with VMS, gives every authorized user in the cluster access to any file or record, from any terminal, through any host.

Each HSC50 supports over 10 gigabytes of disk storage. Since a cluster can contain many HSC50s, You can build a common file system of huge proportions while minimizing the cost of your mass storage investment.

Even a single VAX linked to a single HSC50 provides exceptional data availability and redundant mass storage through the HSC50's built-in volume shadowing and the CI's dual data paths.

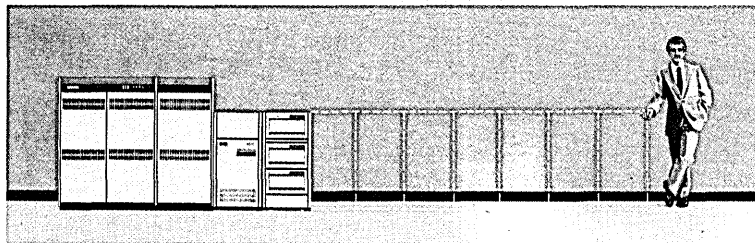
## Protecting your wealth of information.

Extensions to the VMS operating system are your key to maintaining data integrity in a VAX-cluster system.

Among them: Common Journaling to track file system activity as it happens and provide a precise means of recovering from failure. Recovery Facilities to protect the data from corruption. Checkpointing to protect each user's investment in computation. And a Distributed Lock Manager to synchronize access to common resources across the cluster.

In a VAXcluster system, information becomes the corporate resource it should be. Each user in the cluster, performing his or her highly specialized task, relies on the same body of information.

Information that's readily available, always up-to-date, and entirely managed by you.



# VAX

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# GROW FAR AND WIDE

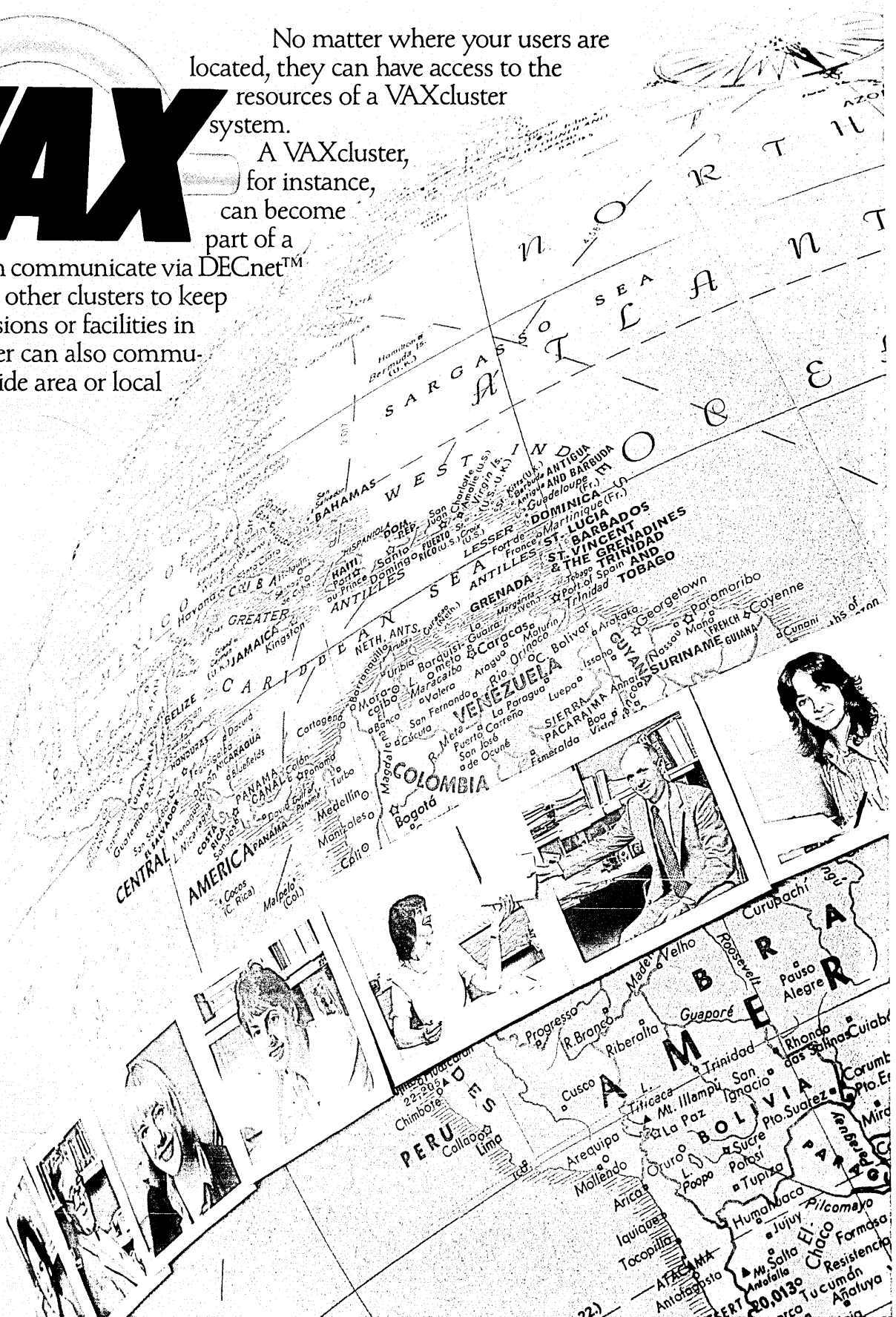
# VAX

No matter where your users are located, they can have access to the resources of a VAXcluster system.

A VAXcluster, for instance, can become

part of a

network. It can communicate via DECnet™ software with other clusters to keep corporate divisions or facilities in touch. A cluster can also communicate with wide area or local

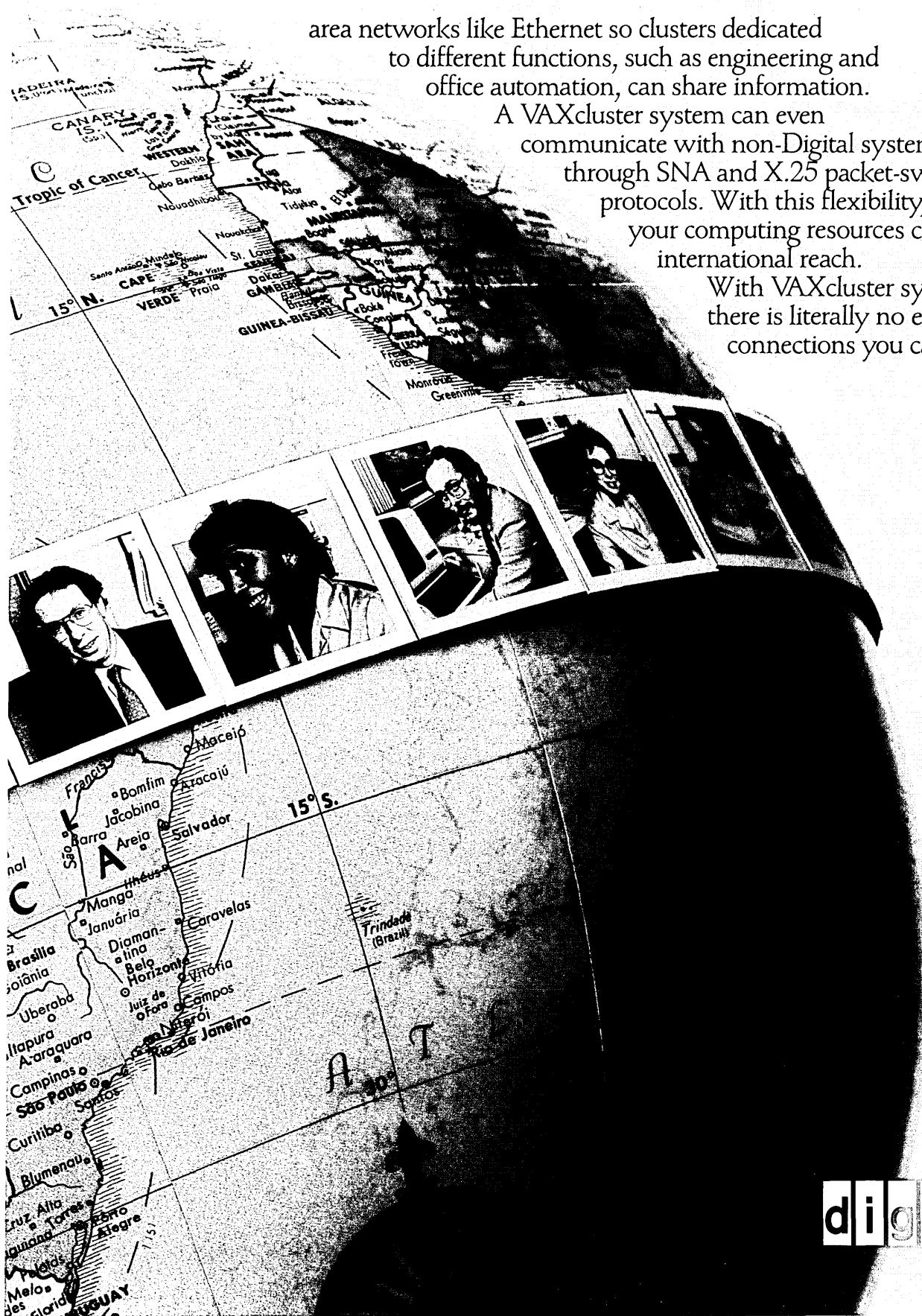


# AND STILL STAY CLOSE.

area networks like Ethernet so clusters dedicated to different functions, such as engineering and office automation, can share information.

A VAXcluster system can even communicate with non-Digital systems through SNA and X.25 packet-switching protocols. With this flexibility, your computing resources can have international reach.

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# EDITORIAL

## EATING YOUR CHILDREN

**The widespread practice of product preannouncement is a blight on the industry.**

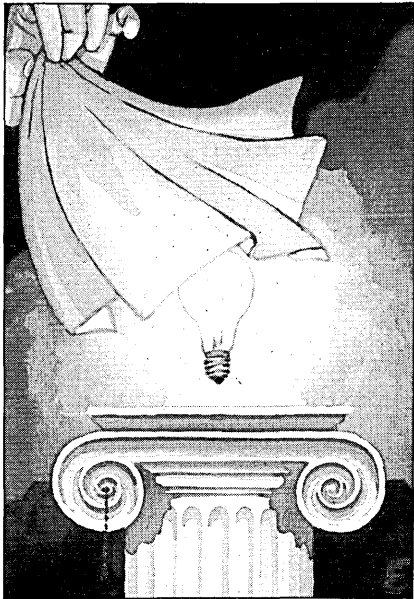


ILLUSTRATION BY DORIS ETTLINGER

Phantoms. Ghosts. Shadows dancing on the walls of the cave—the insubstantial images of computer systems announced but not available, of software packages that exist only as press releases. This is the world of preannouncements and unreal delivery dates, of paper tigers and empty promises.

Unfortunately, these questionable marketing practices have been with us from the earliest days of our industry. One old-timer told us that IBM first announced the IBM 701 and then its engineers sat down to build it. When the 360 series was unveiled, large portions of the line were unavailable; the 360/90 series, a response to Control Data, really never saw the light of day as a full product line.

But IBM wasn't the only one playing the preannouncement game back then. Just about everyone did it, especially during the go-go era of the late '60s, when market pressures were extraordinary.

Today the industry is a bit older, but we doubt that it's any wiser. We are back in the pressure cooker environment, particularly with the advent of the micro and the cutthroat machinations of the personal computer marketplace. As competition, both domestic and international, heats up, the intense rivalries and fear of losing market share are backing many a company into a competitive corner. Unfortunately, and predictably, the track taken by some of these companies reflects both desperation and bad judgment. Osborne's preannouncement of the successor machine to the popular Osborne I dried up its cash flow and helped to force the company into Chapter XI. Sonny Monosson in his *Monosson on DEC* newsletter reported in August that "It is well over a year since DEC announced its three personal computers . . . and coming up on a year since it began the first few deliveries. DEC now freely admits it announced prematurely—relative to its ability to deliver product—and did so to keep its customers from deserting ship."

VisiCorp's VisiOn is still not available, and if you turn to p. 142 of this issue, where Jan Johnson lists micro-to-mainframe software, you'll note that several of the packages—those from ADR, Cullinet, and Informatics General—have delivery dates of six months or more after announcement. (Hats off to Omnar, Tominy, VM Personal Computing, and MSA Executive Peachpack II for announcement and availability on the same date.)

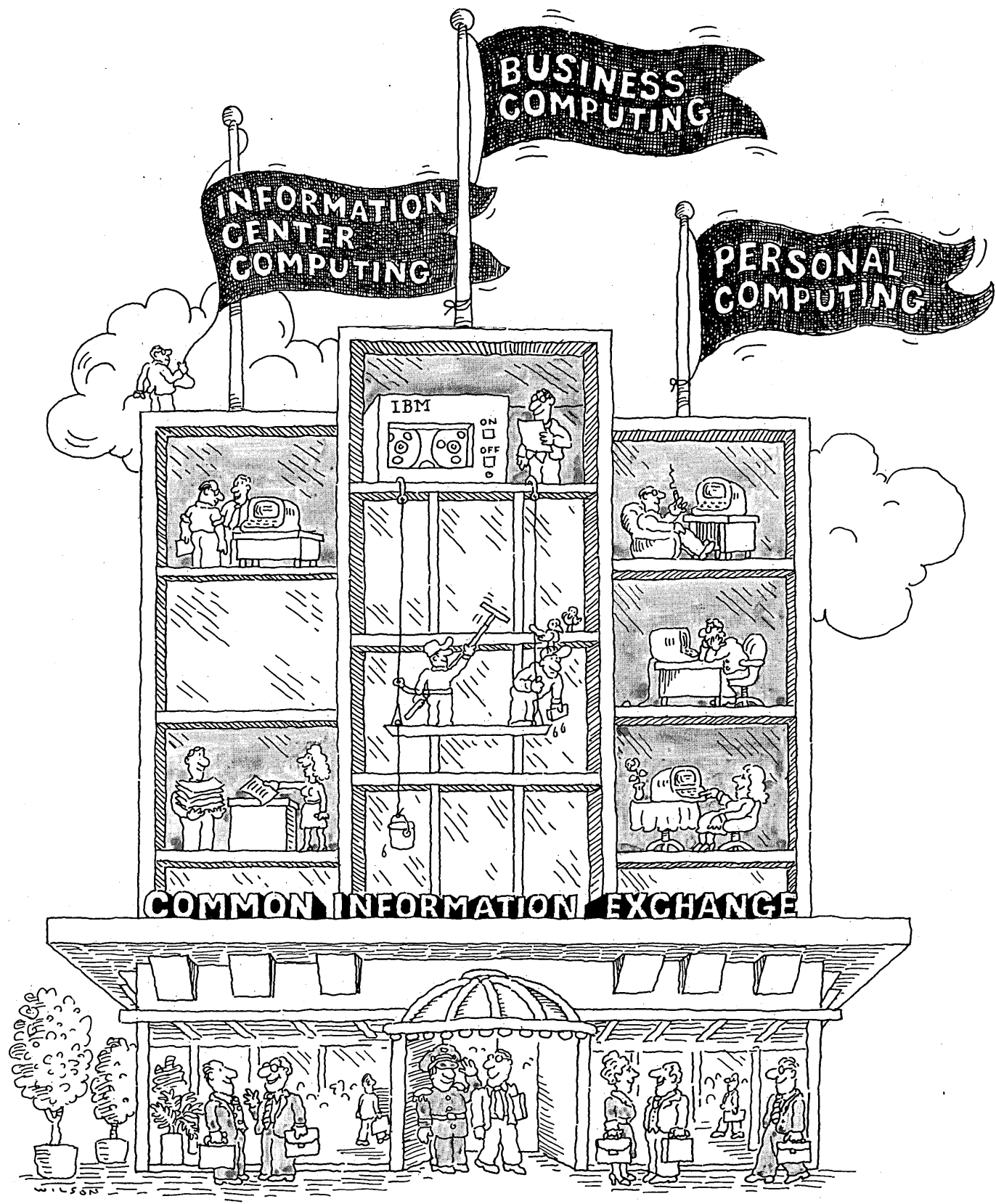
As a competitive strategy, preannouncements can often boomerang, as Osborne discovered. You wind up "eating your own children," as one marketer put it rather vividly.

But these paper tigers can also disrupt the life of dp managers and MIS directors who are trying to make rational purchase decisions. Users, excited by the ad claims and trade press reports of the latest wonder package or magic machine, indignantly ask the information processing manager why he's trying to foist "obsolete" equipment on them. When he points out that the system he is recommending actually exists, is field proven, and has all the support in place; when he replies that the preannounced products not only do not exist, but in some cases may never exist, or if they do, may never be supported, he's hooted down by technology-crazed users.

Preannouncing is an industry-wide problem. We're not trying to point a finger at the companies mentioned earlier—they are cited only to give a concrete context to a widespread practice that we feel is in no one's best interest.

Wouldn't it be nice if standard industry practice was never to announce a product until the company was ready to deliver it in realistic production quantities? And wouldn't it make sense if the company had some beta site experience to draw upon and could also provide full support?

But then again, as one radio commercial puts it so succinctly, if the world made sense, men would ride sidesaddle. \*



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*"Integrated application packages, fourth-generation languages and program generators (are) combined together in a fashion which is unique today."*

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D 11/83

# INFEEDS

## MINIS LOSE OUT TO PCS

**The personal computer is coming on strong, taking away market growth from the traditional minicomputer.**

by John W. Verity

As the trend toward centralized purchasing of personal computers strengthens, IBM is capturing more than half of all users entering the corporate personal computer marketplace, according to a major survey of DATAMATION readers.

The personal computer has brought about profound changes in the small-systems marketplace, causing users to alter

their spending plans and prompting new strategies in distributed processing and other techniques. Sales of traditional 16-bit minicomputers have been most affected and vendors have had to rely on the hotly contested 32-bit market for most of their near-term growth, according to the survey.

Taken in conjunction with Cowen & Co., a Boston investment research company, the 1983-84 Mini/Microcomputer Survey tallies the responses from 7,012 users of small systems, detailing their purchases prior to August 16 and the purchases they planned to make in the following 18 months.

After eliminating duplicated and invalid responses, a total of 7,012 responses were tabulated and evaluated. For the survey's purpose, the term "minicomputer" encompasses cpus ranging from the Digital Equipment PDP-8 and Data General Nova 4 through the DEC VAX-11/780 and IBM System/36. It should be noted that this survey does not take into account IBM's introduction of aggressively priced 4300 models in September.

FIG. 1

### TOP 10 MINICOMPUTER SYSTEMS 1983/84

A. Based on number of respondents acquiring systems (7/83-12/84)

| MANUFACTURER | SYSTEM           | HOW MANY SITES ACQUIRING | AVG. UNITS/SITE |
|--------------|------------------|--------------------------|-----------------|
| DEC          | VAX-11/780       | 247                      | 1.7             |
| IBM          | System/36        | 195                      | 2.1             |
| DEC          | VAX-11/750       | 195                      | 1.5             |
| DEC          | VAX-Unspecified  | 81                       | 3.6             |
| IBM          | Series/1         | 80                       | 12.0            |
| HP           | 3000-Unspecified | 73                       | 2.6             |
| IBM          | System/38        | 70                       | 1.5             |
| DEC          | PDP-11/44        | 69                       | 2.5             |
| DEC          | PDP-11/23        | 66                       | 5.2             |
| DEC          | VAX-11/730       | 64                       | 1.9             |

B. Based on number of units being acquired (7/83-12/84)

| MANUFACTURER | SYSTEM                 | HOW MANY UNITS BEING ACQUIRED | EST. VALUE (\$ MILLIONS) |
|--------------|------------------------|-------------------------------|--------------------------|
| IBM          | Series/1               | 961                           | 41.2                     |
| Microdata    | Reality 4000           | 540                           | 13.5                     |
| DEC          | VAX-11/780             | 426                           | 132.2                    |
| IBM          | System/36              | 417                           | 31.7                     |
| DEC          | PDP-11/23              | 345                           | 8.0                      |
| DEC          | VAX-11/750             | 296                           | 43.4                     |
| DEC          | VAX-Unspecified        | 294                           | 53.6                     |
| DEC          | PDP-11 Unspecified     | 272                           | 28.6                     |
| HP           | 3000 Other/Unspecified | 193                           | 28.9                     |
| Microdata    | Reality 2000           | 180                           | 7.2                      |

The respondents also plan to acquire:

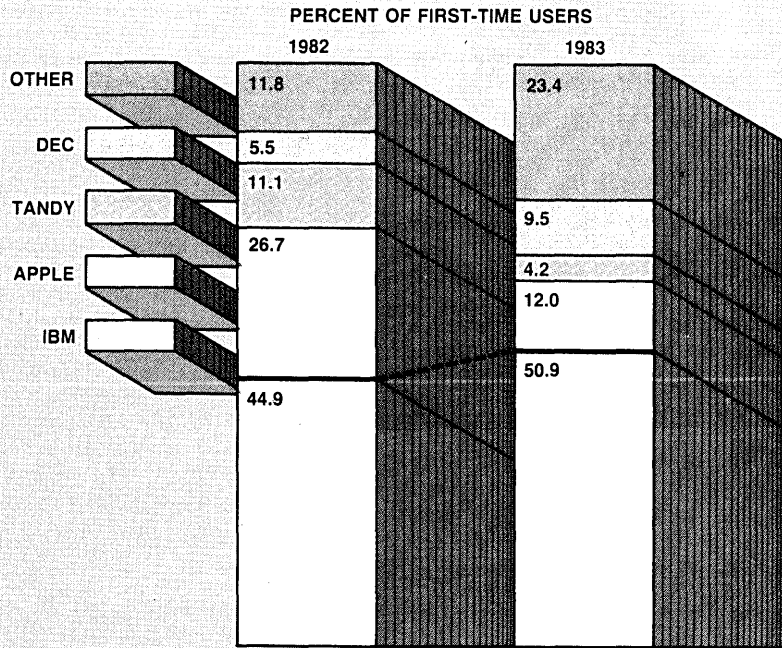
- 173 PDP-11/44's for \$9.1 million
- 48 DG MV/10000's for \$14.0 million and 60 MV/4000's for \$7.4 million
- 146 IBM 8100's for \$20.4 million and 108 System/38's for \$26.7 million
- 167 Burroughs B20's for \$2.3 million
- 83 Prime 2250's for \$6.3 million and 7 9950's for \$2.9 million
- 33 Western Electric 3B20's for \$7.4 million and 21 3B5's for \$1.4 million

In total, 2,629 respondents reported plans to acquire 13,325 systems valued at roughly \$1.2 billion between 7/83 and 7/84.



FIG. 2

### IBM NOW CAPTURING OVER HALF OF ALL NEW CORPORATE PC USERS

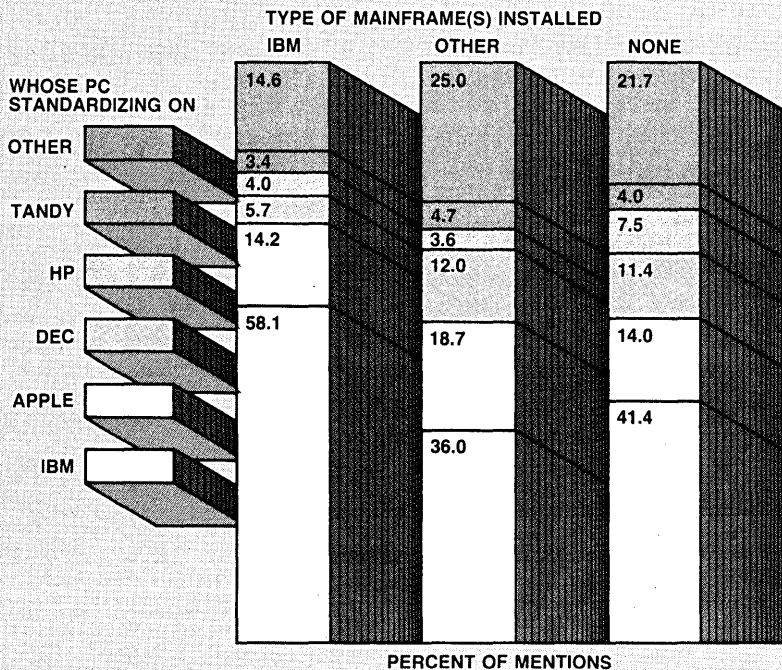


Rapid growth in this percentage indicated for DEC also, and for "Other" supplier category.

FIG. 3

### IBM MAINFRAME STRENGTH AIDS PC GROWTH

Query: If your organization has standardized (or is likely to soon) on just one or two personal computers, whose?



Particular attention was given in this year's survey to the personal computer, leading to the following observations:

- Pioneers in the market, such as Apple Computer and Tandy, have lost and will continue to lose market share to IBM.
- Software availability is far and away the most important criterion for selection of personal computers by corporate users.
- A handful of software packages offering a rather narrow range of functions accounts for 70% of personal computer applications.
- Among end users surveyed, as opposed to OEMs and systems houses, more sites will buy personal computers than minicomputers.

This year's survey indicates that the peak rate of new personal computer user growth has passed. Last year, the first full year of IBM P.C. shipments, saw a 130.4% yearly growth rate in the personal computer user base, compared to this year's rate of 86.1%.

This, however, is only one sign of IBM's dominance in the corporate purchasing of personal machines. The compound growth rate of installed user population for Apple and Tandy sites dropped dramatically in this year's figures. While last year its survey base grew 69% compounded over three years, Apple's rate this year was only 30%. Similarly, last year Tandy showed a rate of 64%, which plummeted to 27% this year.

Indeed, the survey indicates that IBM is currently capturing over half (50.9%) of all new users entering the corporate personal computer marketplace. This compares with Apple's figure of 12%, Tandy's

### IBM's dominance of the personal computer industry is clear in virtually every measurement.

4.2%, and DEC's 9.5%. For DEC, the question arises as to how many of its personal computer installations are new sites and how many are replacements for installed minicomputers.

Banking, insurance, and education SIC sites showed particularly strong use of the IBM personal machine. However, the machine is apparently finding use in many other sectors, including manufacturing, communications/utilities, and government. The corporate market for personal computers is far from saturated, and it appears that second-round purchases by corporations are generally larger than first rounds.

Virtually all vendors of personal computers—24 different suppliers are tabulated—find their machine in use as office systems and standalone business systems. Commodore was the major exception, finding a stronger use in education.

Software availability is still the most important criterion among respondents for choosing personal computer hard-

## IN FOCUS

ware, according to 63.8% of the survey's respondents. Following it are compatibility (48.1%), price (41.6%), and product reputation (41.1%). Where last year's survey indicated a 53% measure for price, this year's results suggest users are now choosing machines more by function than by raw pricing. The vendors whose users indicated price as the leading factor in vendor selection were Altos, Atari, Commodore, Kaypro, Osborne, Televideo, Texas Instruments, and Victor Technologies.

Product reputation and software availability are the IBM personal computer's major strengths, garnering 50% and 67%, respectively, of the mentions among respondents. The product is also the machine of choice at larger organizations, beating out Apple and DEC by a wide margin.

Large volume purchases of personal computers are more likely to be made centrally than locally, particularly by users of Wang, IBM, and DEC machines.

However, DEC and HP personal computers are more likely to be acquired directly from the manufacturer. While 68% of IBM sites and 74% of Apple sites purchased systems from independent stores, 58% of DEC sites and 64% of HP sites deal with the vendor directly. This indicates that shelf space in retail stores is still vitally important to sales of personal computers and that despite its best efforts to organize a national accounts program, Apple is still heavily dependent upon local shops.

Just under a third of all respondents in this year's survey said their organizations have standardized (or will do so soon) on one or two PC vendors. For companies with revenues of over \$50 million, however, about 46% have standardized.

Of those selecting an approved vendor, 48% have chosen IBM, compared to 15% for Apple, and 8% for DEC. HP follows with 5%, while Tandy scored 4%, IBM-compatibles scored 3%, and Wang came in with 2%.

An organization's choice of mainframe vendor also seems to be a strong factor in the choice of personal computers. For instance, among IBM mainframe sites, 58.1% opted to standardize on IBM's personal computer. That number drops to 36% where other mainframes are installed and 41.4% where no mainframe is present. Apple's standing as the PC standard among IBM mainframe sites is 14.2%.

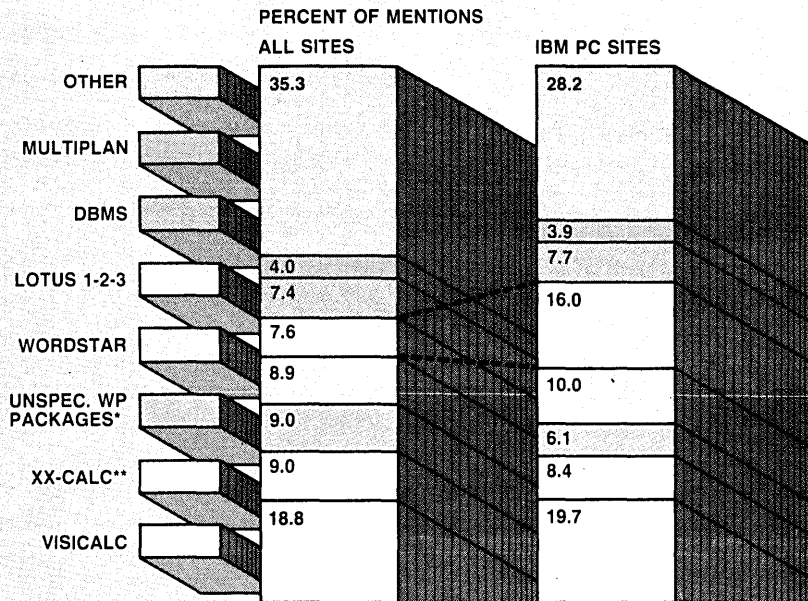
IBM's share of installed personal computer sites is up to 35.4% this year, compared with 13.1% last year, contrasting with Apple's current share of 23.6% down from 39% last year and Tandy's plummet to 9.3% this year from 17.5% last year. DEC has a 5.7% share this year, up from 1.7% a year ago.

In fact, IBM and, less so, DEC are putting the squeeze on other personal computer suppliers. Among those sites planning to purchase personal machines in the com-

FIG. 4

### MOST POPULAR MICRO SOFTWARE PACKAGES

Query: Regarding your organization's personal computer software usage, what are your two primarily employed (already installed) applications software packages?

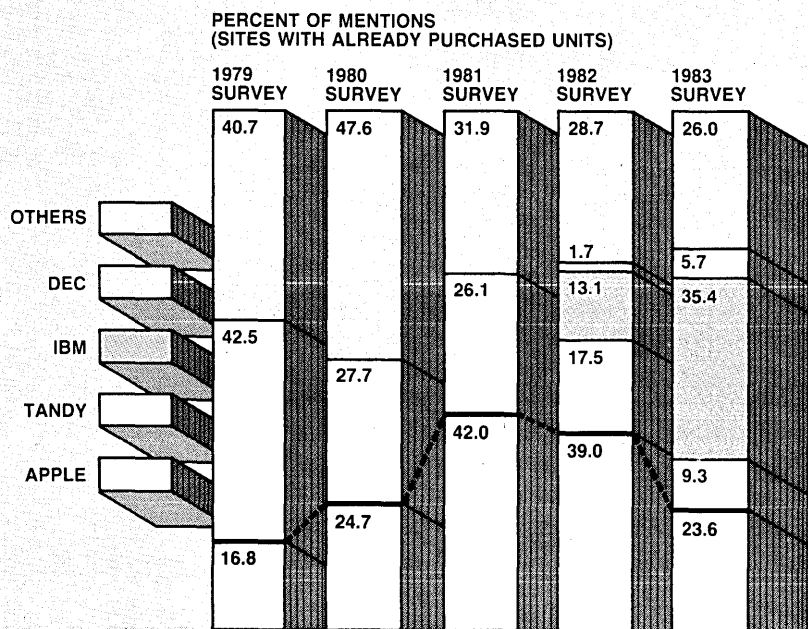


\*Excludes Scripsit (1.1% of All Sites mentions), Easywriter (1.1%), etc.

\*\*Includes SuperCalc (3.8% of All Sites mentions)

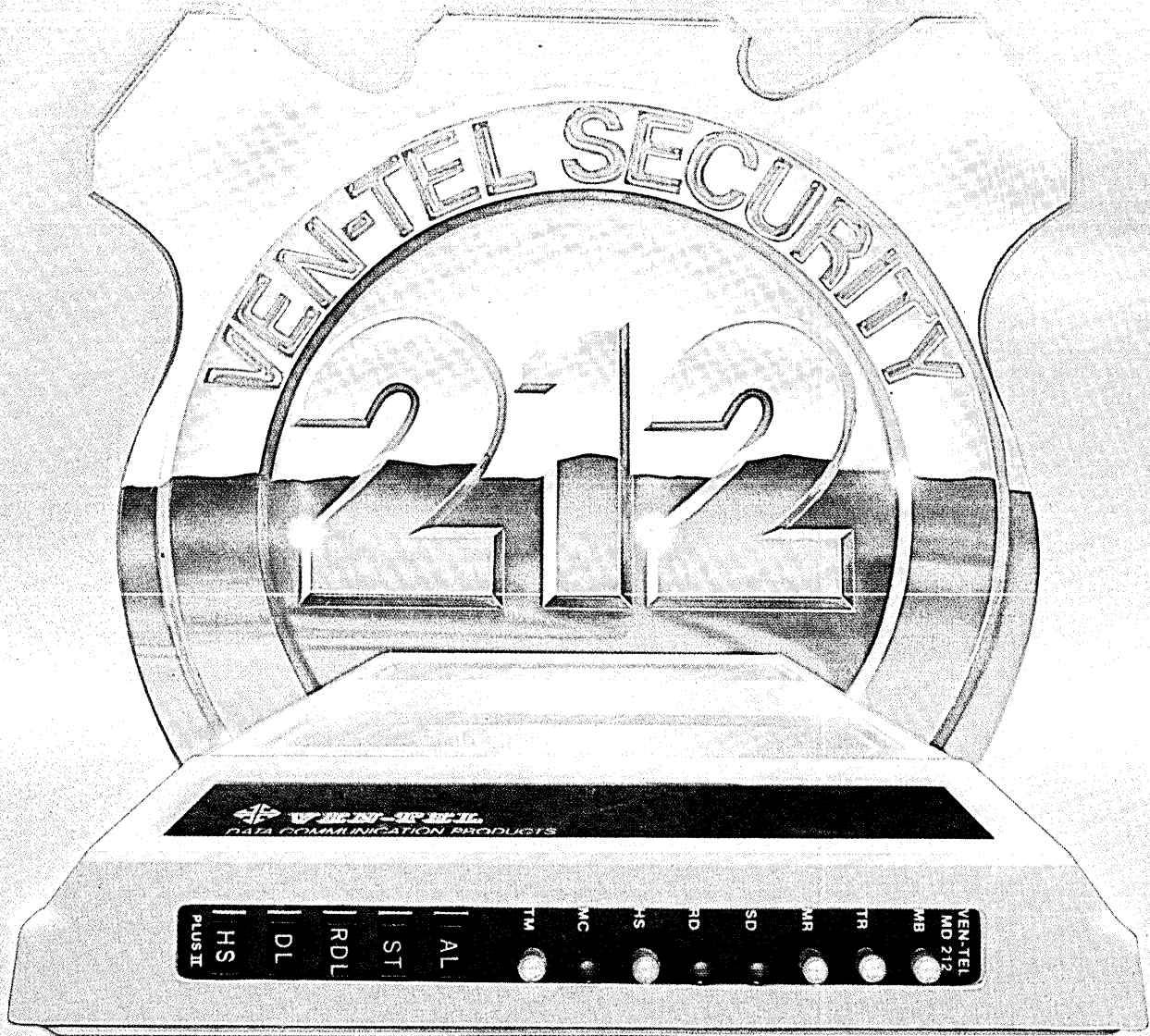
FIG. 5

### IBM'S LEAD IN PCs INSTALLED



After consistent previous rise and leveling off in 1982 (the first full year of IBM PC deliveries), 1983 survey shows Apple share downshifting to state of decline.

\*"Others" includes HP (5.0%, down from 6.3% in 1982), Commodore 2.1%, Osborne 1.9%, Zenith 1.2%, Kaypro 1.0%, Victor 1.0%, TI 1.0%, etc. (the rest all less than 1.0%).



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ing year, 51% have chosen IBM and 8% DEC. These numbers are up from 24% and 6% portions of planned purchases last year, respectively. Apple's share shrank from 28% last year to 13% this year.

It appears that DEC has made little headway with its personal computers outside of its own minicomputer user base. This contrasts with IBM's astounding dominance among Data General sites (where it has been chosen by 50% of respondents), HP (34.6%), and Wang (40.4%). So far, Hewlett-Packard is also largely confined to its own minicomputer base.

Of DEC minicomputer sites, the company has 26.6% planning to buy its personal computers in the coming year, just down from the 28.3% who did so in the last 18 months. Among those same sites, IBM had a 15.5% share in the past 18 months and a 41.2% in the coming 18 months. In contrast, 52.9% of current IBM minicomputer sites had installed IBM's personal computer in 1982-83, while a whopping 82.3% plan to install the IBM personal machines in the coming year and a half.

The survey data were inauspicious for Apple Computer's Lisa workstation, which was introduced last January after much industry speculation. Only 4% of the total Apple purchases planned through 1984 are for Lisa systems. Planned purchases of DEC personal computers break down as follows: 37% Rainbow, 30% DECmate, and 33% Professional.

Growth in spending for software is outpacing that for personal hardware. In the last 12 months, the split between software and hardware was 16.4% soft and 83.6% hard. In the coming months respondents indicated their purchases would be 20.7% soft and 79.3% hard.

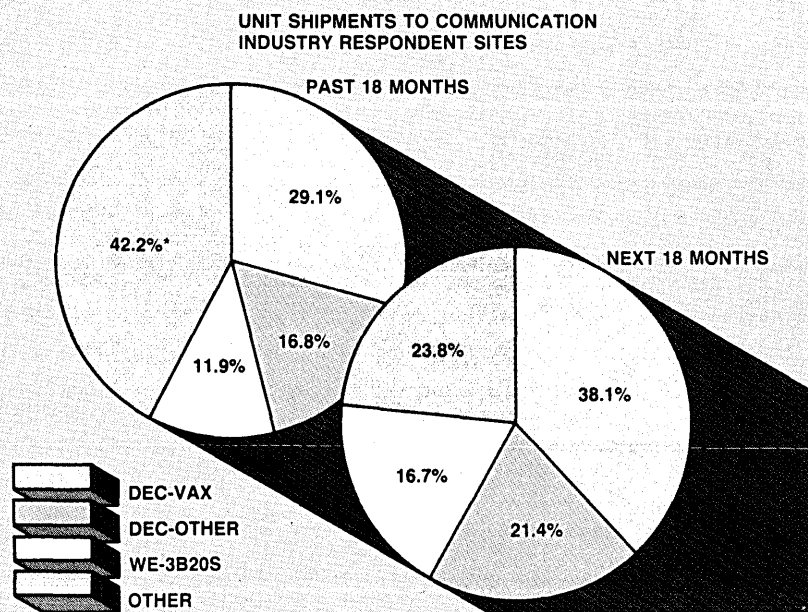
A handful of popular software packages account for about 70% of applications on respondents' personal computers. The leader remains VisiCalc, followed by Lotus 1-2-3, Wordstar, other "Calcs," and database packages. This finding leaves unanswered the question of whether any dramatically new software for personal computers other than what is currently available will be found. It also raises the possibility of vendors beginning to bundle their machines with software, according to Cowen analysts.

As for the minicomputer market, survey data project an upturn in overall sales in the coming year, but market growth will be far from the rates enjoyed when the industry emerged from the recession of 1974-75.

In terms of year-to-year expansion, this year's survey indicates only 7% growth in the domestic minicomputer-user population. This number supports the observation that new users are a decreasingly material source of minicomputer industry growth, a sign of the industry's maturation. The slowdown is evident in all segments of the in-

FIG. 6

### WESTERN ELECTRIC 3B20S GAINS MARKET SHARE

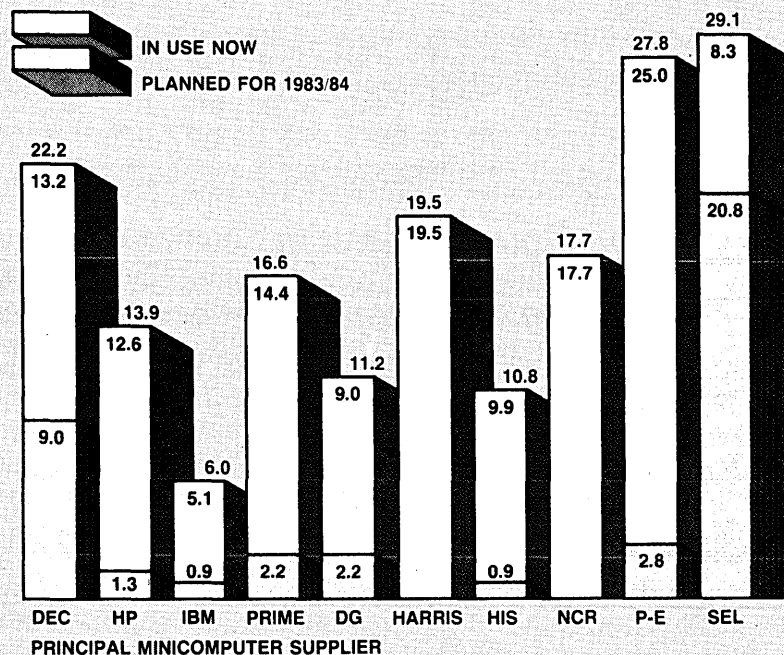


\*9.2% Tandem systems

Western Electric itself a sizable user of 3B20S systems, but counted in Electrical Machinery SIC rather than in Communication SIC.

FIG. 7

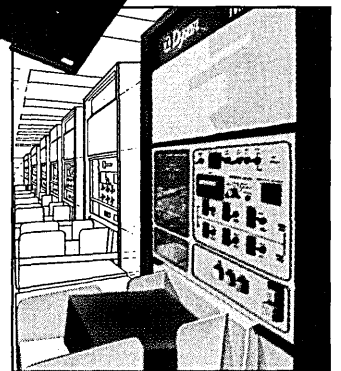
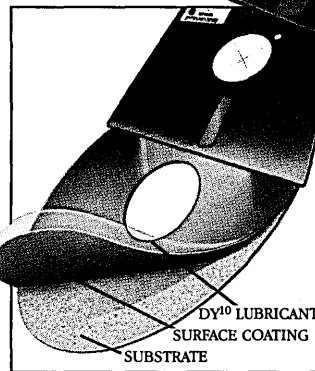
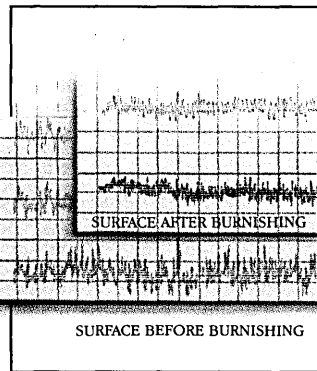
### SIGNIFICANT GAINS AHEAD FOR UNIX



Western Electric 3B20S population 100% Unix based

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dustry measured: small business systems, traditional minis, intelligent terminals, data entry systems, and office systems.

Moreover, a trend observed in recent years of users consolidating their purchasing activities to a small number of current suppliers was further evident in this year's data. In all categories of the mini-computer market, respondents indicated that they are increasingly considering only one vendor, their current one, in buying new minis. For instance, among those buying traditional minis, 41% of those responding looked at only one vendor.

With few exceptions, Digital Equipment was the most frequently cited close competitor in multi-vendor procurements. Fully a half of those eventually choosing Data General hardware, for instance, also looked at DEC hardware. Even among IBM buyers, 24.1% considered DEC equipment.

The highest incidence of noncompetitive, one-supplier procurements went to Western Electric, DEC, and IBM. (Western Electric was counted in the survey for the first time this year, its 3B20s and 3B5 machines all showing up at AT&T sites.) In multiple supplier procurements, DEC and IBM were winners more often than not, followed by Hewlett-Packard.

Among the traditional minicomputer suppliers, HP was found to capture much more of its users' peripherals add-on business than Data General or DEC. Almost 83% of HP respondents chose HP peripherals, compared to only 58.7% for Data General and 58.1% for DEC. IBM respondents ranked in at 72.2%. Overall, however, the survey showed a continuing yearly trend of less peripherals business going to systems suppliers: this year only 61.4% of such business went to primary systems suppliers, while the comparable figure for 1981 was 73.8%.

The strongest small-systems peripherals shipment growth this year, as last year, was indicated for low-end rigid disk drives (up 219.1% over the previous 12 months) and color graphics terminals (up 131.1%). Add-on memory, serial printers, and monochrome terminals also showed strong growth.

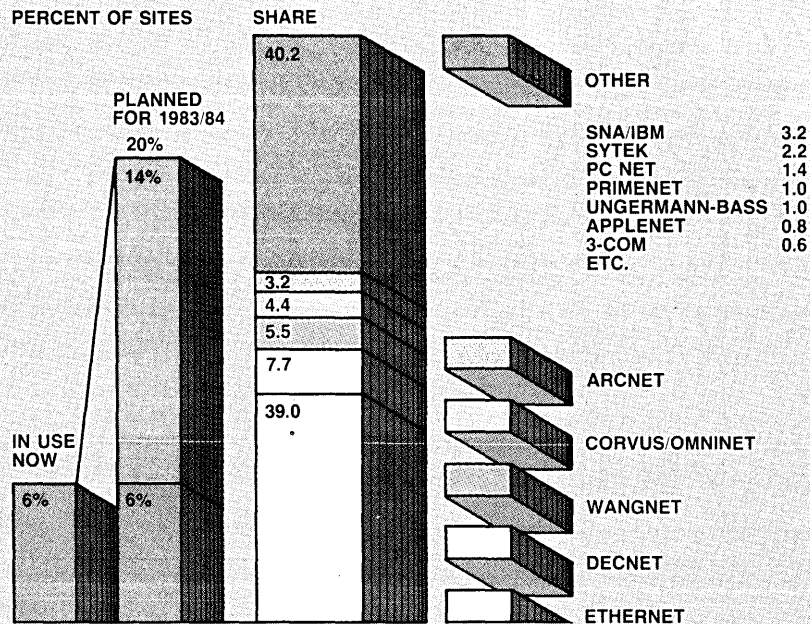
The growth in small rigid disk drives—less than 15 megabytes—was attributed primarily to the IBM XT personal computers. Fully 53% of those respondents indicating they were purchasing a personal computer of some sort said they would also buy a small hard disk. Meanwhile, 83% of those users were shopping for a printer, 79% for a monitor, and 82% for a floppy disk. Epson and DEC led the way in share of serial printer purchases for the coming 18 months, while IBM and DEC were tops in crt terminals.

Disk storage on minicomputers rose a small amount this year, to an average of 275 megabytes, which works out to a better

FIG. 8

## LOCAL NETWORK IMPLEMENTATIONS TO TRIPLE

Query: Any plans to install a non-phone local area network (such as Ethernet)?

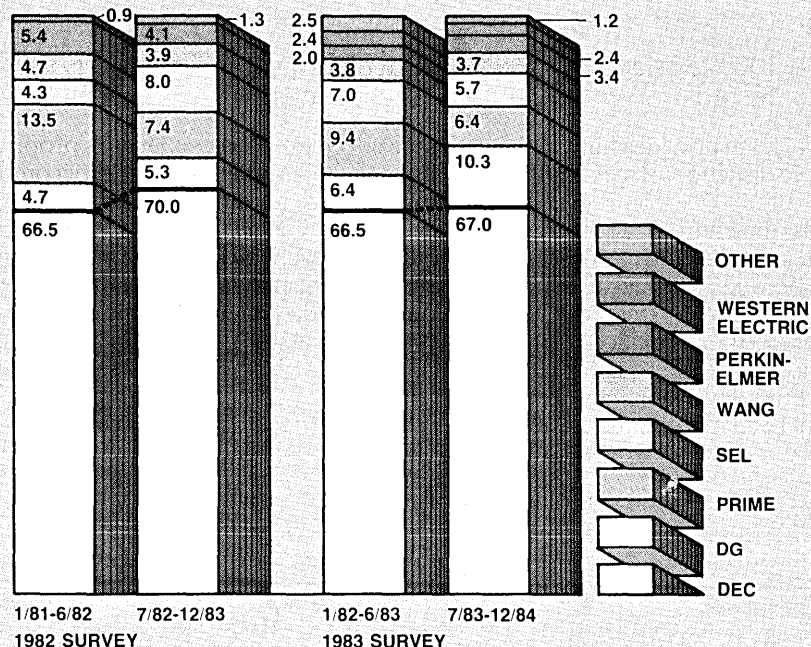


A minority of respondents still indicate some confusion regarding the definition of local area network. Ethernet by far most frequently cited.

FIG. 9

## LEVELING OFF IN DEC SHARE OF 32-BIT SYSTEMS MARKET

PERCENT OF RESPONDENT 32-BIT SYSTEMS PURCHASES



\*4.8% from a single site large-end user purchase

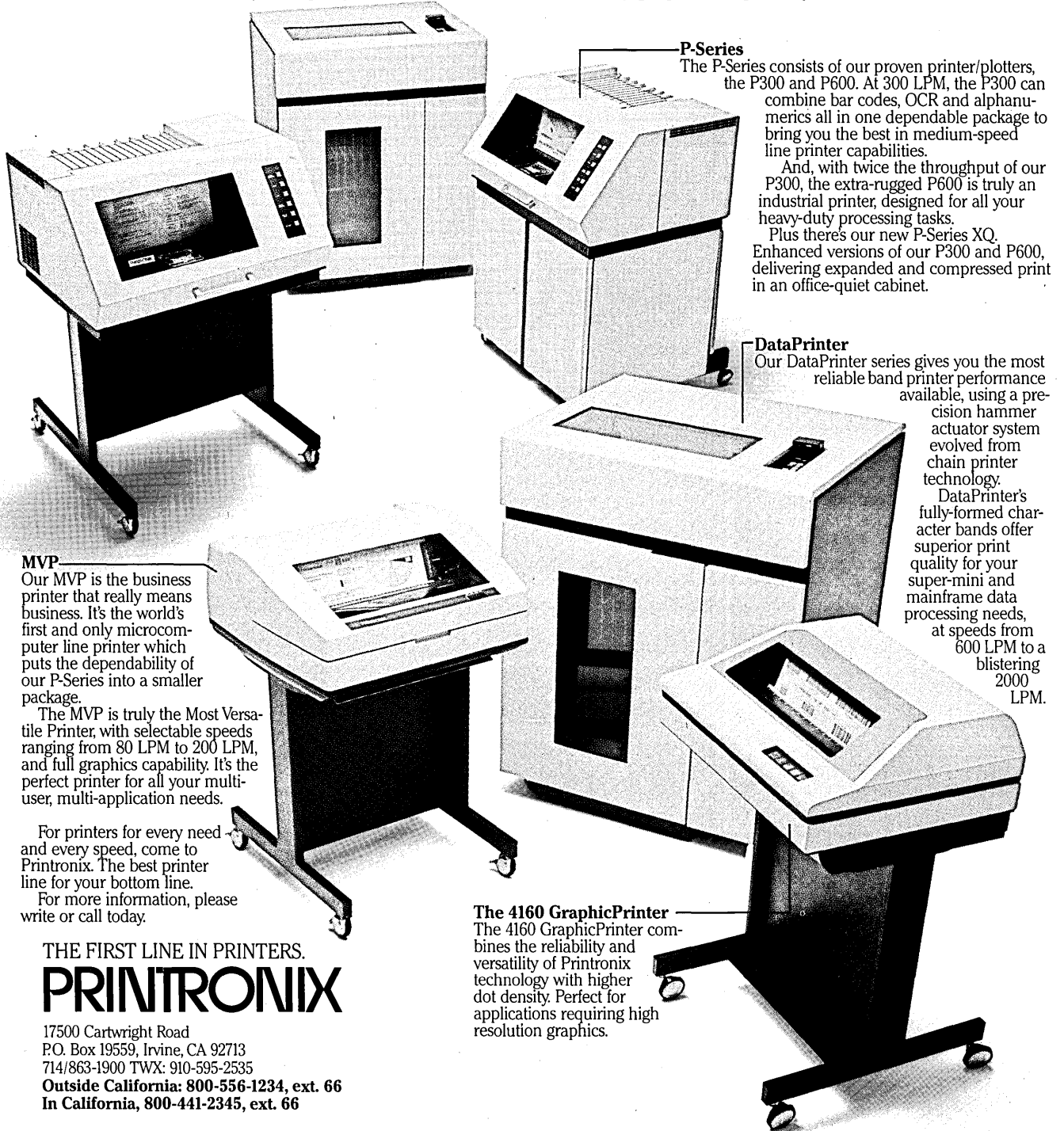
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than 30% five-year compound growth. Tandem users indicated the largest disk usage—an average of 689MB per system.

Add-on memory showed a 50% five-year compound growth rate, amounting to an average size of 950 kilobytes per system this year. Last year's number was 551 kilobytes.

However, the rise in microprocessor-based memories is rising even faster, at 63% for a three-year compound rate compared to a similarly measured rate of 44% for minicomputers. The average desktop machine now has 186 kilobytes attached.

Turning to the outlook for minicomputer purchases, the survey found an unambiguous upturn for the positive. For instance, after three years of falling, the number of oem/systems house respondents claiming their on-hand inventories were "too low" took a jump from 8% to 11%. Apparently, those resellers in the business and commercial market had a lower supply of machines than those involved in technical applications. The implication, of course, is that oem/systems houses soon expect to purchase machines, because they perceive business coming their way.

Another measure of the positive outlook came from a decided drop in the number of end-user and reseller sites admitting they had delayed or cancelled orders for minicomputers previously scheduled for delivery in 1983. According to Cowen analysts, the number of sites indicating such rescheduling of orders dropped to prerecession levels.

Even more encouraging for vendors was the relatively stable minicomputer pricing foreseen in the coming year among oems and systems houses. This came after a year of "soft pricing" in which vendors—particularly Prime Computer and Texas Instruments—slashed prices to increase sales.

The respondents' planned minicomputer purchases through 1984 show IBM garnering a 16.4% share of total spending compared to DEC's 36.1%. HP and Data General follow with 8.3% and 8.2%.

Overall minicomputer shipments will increase in dollar terms by about 14%, without taking into account revenues from service, terminals, personal computers, and other equipment sold by minicomputer makers, according to the survey. While this growth rate is better than the 12.5% projected in a similar survey last year, it is nowhere near the 117% growth foreseen for personal computer shipments. These two figures combined work out to a total minicomputer/personal computer industry increase of about 30%.

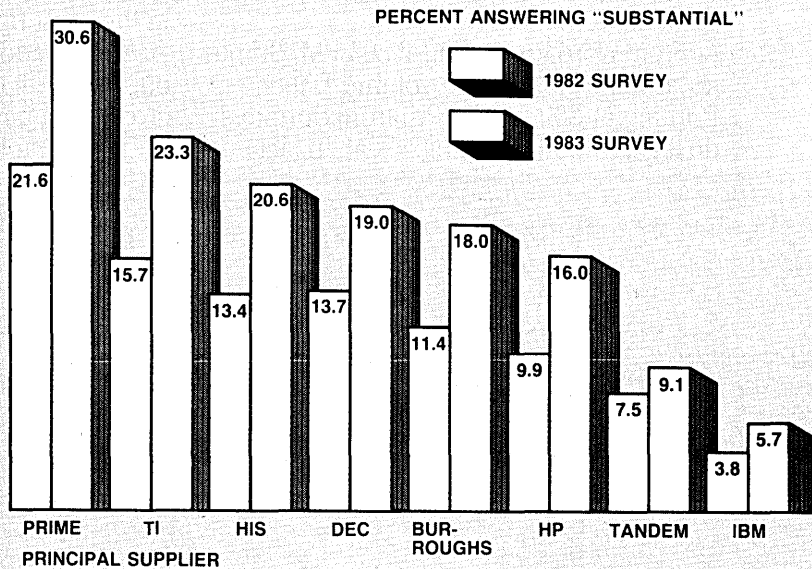
The weakest growth is foreseen in the traditional minicomputer market, which has been most affected by the personal computer. Small business systems shipments will rise, on the other hand, as will data entry and office systems.

Some additional observations:

FIG. 10

### MINICOMPUTER PRICE DISCOUNTS ON THE UPSWING

Query: How big a price concession (above and beyond any normal quantity discount) did you receive when acquiring your last minicomputer system(s)?



Survey shows relatively stable pricing behavior for Wang, Data General, and Perkin-Elmer relative to year earlier.

- Interest in nonstop computer systems was even higher in this year's survey than in last year's. Superminicomputer sites were most interested, but the concern with remaining compatible with current systems was quite pronounced. This may mean that newcomers to the fault-tolerant market pioneered by Tandem Computers will have a rough time convincing buyers to install machines built with obscure architectures.

- The 32-bit segment of the minicomputer market is by far the strongest, showing an expected 46.2% share of respondents' total minicomputer purchases planned for the 18 months following the survey date.

- DEC's two-thirds share of the 32-bit market is leveling off among survey respondents, while Data General appears to be gaining share. Prime slipped a few points. DEC, it would appear, will soon have to replace the now six-year-old VAX-11/780 as the top end of its 32-bit line.

- Data General has enjoyed a strong reception for its high-end MV/10000 machine. Respondents indicated that 41.5% of the dollars they spend on DG's 32-bit machines will be for the model 10000.

- Western Electric is soon to become a contender in the minicomputer market, through its Unix operating system and its line of 32-bit minicomputer systems. Among respondents in the communications industry, 16.7% of minicomputer ship-

ments will be the WE hardware. Unix usage is currently found primarily in DEC sites, but the highest rate of new use is expected to come from HP and IBM sites.

- DEC and IBM are doing particularly well in the distributed processing arena, accounting for about 50% of current ddp use and just over 60% of planned use. In contrast, Datapoint's share is showing a dramatic decline.

To summarize:

- The emergence of the IBM personal computer as an industry standard has ominous implications for differentiated suppliers. However, it is still incumbent upon traditional systems suppliers to participate in the personal computing segment, as well as in the relatively healthy high end of the minicomputer market to protect against competitive incursions and for growth.

- Peripherals, packaged software, and integrated circuit vendors are seemingly the beneficiaries of the overall growth trend, regardless of the competitive outcome on the systems side.

- The minicomputer industry may only be experiencing a cyclical upswing, and its future strength may be seriously weakened by incursions by the personal computer and other micro-based systems.

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# NEWS IN PERSPECTIVE

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### NOMDA VS. CBEMA

**The how and how much of office equipment dealerships is being fought over by the two trade groups.**

by Willie Schatz

A fierce battle of words is raging on Capitol Hill, where office equipment dealers are fighting manufacturers over a bill that would change the way business is conducted between the two groups.

The dealers, many of whom are entering the volatile small computer market, say their fate is too much in the hands of the manufacturers. Dealers want added protection from the allegedly fickle manufacturers who, it is claimed, can take their business away from dealers with little or no notice or compensation.

The manufacturers vehemently oppose the proposed changes that they say are anticompetitive and would damage their ability to compete effectively.

The object of the battle is the Office Machine Equipment Act (H.R. 1159, S. 286), which would bring "fairness and equity" to the office machine marketplace, according to supporters.

Opponents, of course, disagree. "Of all the legislation I've worked on, this is the most pointless," says Tracy Mullen of the Coalition for Competition, an alliance of 19 groups as diverse as the Computer and Business Equipment Manufacturers Association (CBEMA), the National Association of Manufacturers (NAM), the American Electronics Association (AEA), and Public Citizen's Congress Watch, a Ralph Nader creation. When these four groups join hands, one would think nothing short of the future of the republic is at stake. It's not quite that dramatic. The coalition's sole mission is in fact to stop passage of the dealers' bill.

"The whole concept [of the bill] is illogical and ill advised," Mullen contends. "All of American business opposes it except the dealers. But this is the third [congressional] session it's been around. It's got a life of its own. It's like a multiheaded hydra. And there's not a kernel of good legislation in there."

Not so, counters John Kuchta, president of the National Office Machine Dealers Association (NOMDA), which is leading the charge up Capitol Hill. It has found a fervent advocate in Sen. James

Exon (D-Neb.), a former office equipment dealer and author of the bill. Exon's House counterpart is Rep. Bill Alexander (D-Ark.), a believer but not a fanatic.

"Special problems deserve special solutions. Congress has done that for years," Kuchta says. "More than ever before, the future of independent dealers is being threatened by the predatory behavior of suppliers. We've tried numerous times to negotiate solutions to these problems, but the vast majority of manufacturers have been totally uncooperative and persist in exploiting their dealer networks. We've gotten no relief from government agencies and our current laws don't really deal with this problem.

"So we're left with our last option—legislation to require, once and for all, that office machine manufacturers treat dealers in a fair and equitable manner."

To push that legislation through, NOMDA has hired Tommy Boggs and J.D. Williams, two of Washington's most potent lobbyists. On the coalition's team is high-powered lawyer Stuart Eizenstat, former insider in the Carter administration.

You won't find the well-chosen words of Boggs and Williams in the record. They do their best stuff away from the microphones and witness tables. Just because the public can't hear them doesn't mean the legislators won't.

Both the public and the legislators—members of the House Subcommittee on Commerce—had a chance to hear Eizenstat's opinion of H.R. 1159 in the only hear-

**"Special problems deserve special solutions. Congress has done that for years," says NOMDA's Kuchta.**

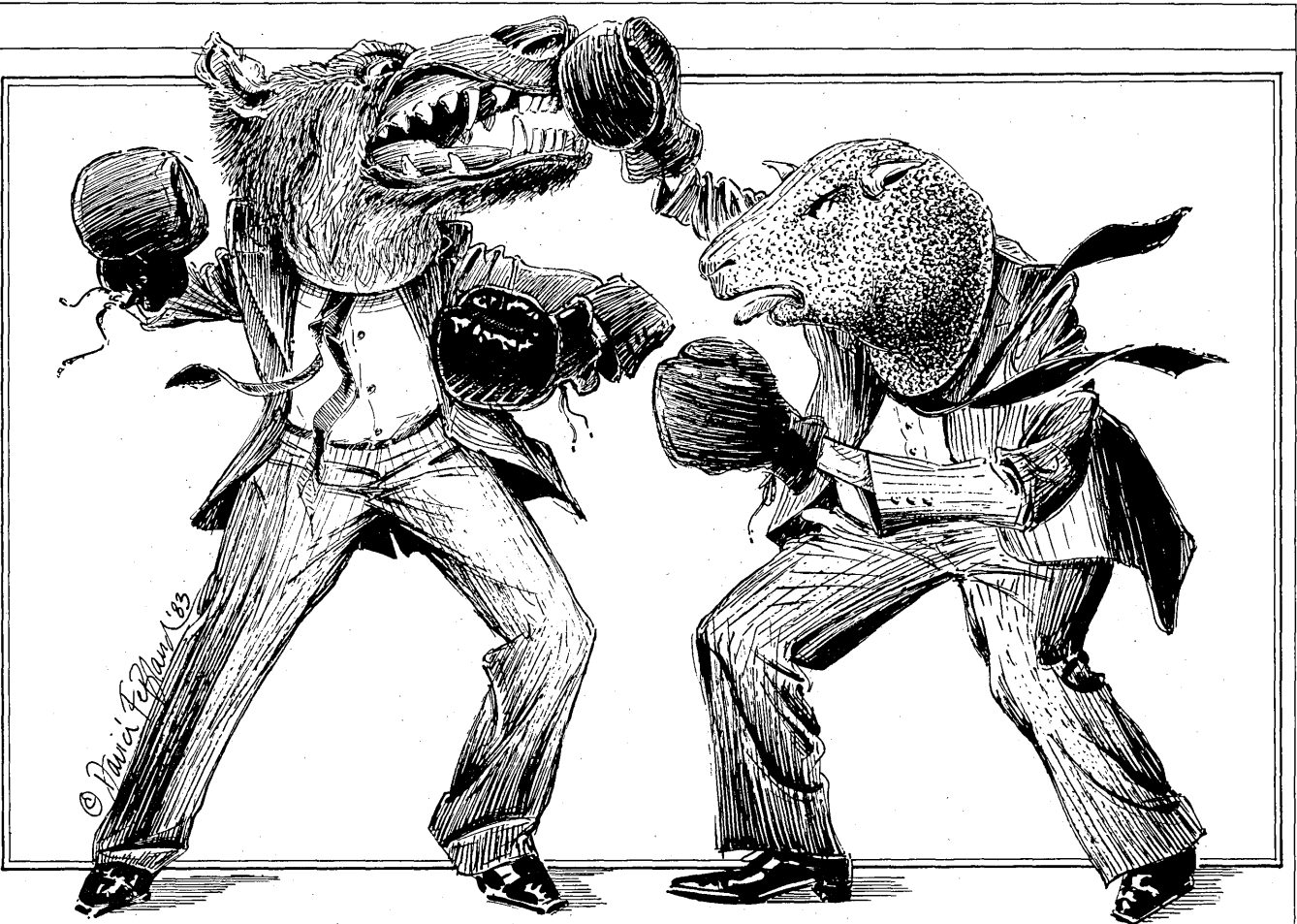
ing the subcommittee has had on the bill. Suffice to say he wasted no words.

"The bill is classic special interest legislation," he charged. "It is designed to confer unique and unprecedented advantages on a narrow industry segment. It will harm all other affected interests. It is highly anticompetitive. It places unique burdens on one of the most promising sectors of our nation's economy—high-technology office products. Those burdens fall with particular severity on emerging, smaller, high-technology manufacturers.

"The bill is totally unnecessary. There is nothing unique about the unconcentrated, competitive, office products market to warrant the extraordinary brand of federal intervention reflected in the provisions of H.R. 1159. This bill will have a pernicious impact on a healthy office products market. It turns sound industrial policy on its head."

No way, retorts Senator Exon. "The purpose of the bill is to strengthen the position of the small office machine dealer by mandating that all dealings with him be

ILLUSTRATION BY DAVID FEBLAND



ruled by fairness and equity," Exon said when he introduced the bill earlier this year. "This bill would effectively remove the threat to dealers of large, primarily foreign suppliers whose predatory actions have been responsible for countless bankruptcies and financial loss in this high-tech, service-oriented industry."

Now let's look at the record.

The bill prescribes a "good faith" course of conduct that manufacturers must follow in doing business with dealers. For example, a manufacturer would have to give a dealer 60 days' notice when a new dealership is set up in the dealer's market area. The measure also establishes termination procedures for dealer contracts. These procedures require the supplier to pay a dealer "fair and reasonable compensation" for the value of the dealership, "including a reasonable amount of good will," if the supplier terminates the pact before a specified expiration date or at any time if the agreement contains no expiration date. In either of these cases the dealer agreement could require the parties to submit to binding arbitration. Any party affected by a violation of the bill's provisions could file suit in any U.S. District Court.

"This locks you into your existing dealerships and method of distribution," 3M's Hal Northbrook declared at CBEMA's fall meeting. "You've got to provide the dealer with any product you manufacture no matter what he's already carrying. So if

you've got someone carrying only the low-end product and he wants the high-end, you have to give it to him even if the dealer carrying the high-end item is doing a terrific job. If the dealer doesn't do the job for you, you'll have to pay him off or see him in court."

If the testimony submitted to the House subcommittee and the Senate Subcommittee on Consumer Affairs is any indication of the prevailing winds, NOMDA and Sen. Exon should already have been blown away. The business equipment industry and

**"The bill is classic special interest legislation," states lawyer Stuart Eizenstat.**

consumers, however, aren't the only ones leveling the blasts. The Justice Department, the Federal Trade Commission, and the Small Business Administration also think the bill should die a quiet death.

"H.R. 1159 is special interest legislation that would constitute unjustifiable federal government interference in private contractual arrangements in the office products industry," Robert McConnell, Assistant Attorney General for Legislative Affairs, wrote Rep. James Florio (D-N.J.), chairman of the House Subcommittee on Commerce. "The bill could lead to increased litigation in the already overburdened federal court system concerning issues that are more often appropriately con-

sidered under state law. There is simply no justification for this bill."

"Existing law more than adequately protects dealers from unfair trade practices," FTC chairman James Miller told Rep. Peter Rodino (D-N.J.), chairman of the House Judiciary Committee. "The bill may be anticompetitive. There is no sound basis for enacting this legislation."

Don't tell that to the bill's supporters. If the tyrannical business practices of the suppliers aren't convincing enough, they'll give you an even better reason why the bill should be enacted. You've probably heard this one a few times lately. It's called "the Japanese are taking over."

"Many independent dealers must now depend on foreign manufacturers for products, parts, and supplies," Exon said when introducing the proposal. "As a result, the dealers have at best limited bargaining power with such corporate giants as Sharp, Canon, Minolta, Toshiba, Olympia, and Olivetti." At a recent Senate subcommittee hearing, Exon told his colleagues the legislation was aimed at foreign companies, but for legal purposes it had to be written to include all equipment manufacturers.

Kuchta had previously expounded on the "anti-Japan" theme before the House Subcommittee on Commerce. He claimed the entry of the Japanese into the office machine industry has "virtually eliminated American companies as a factor in dealer-sourced business," particularly in

## NEWS IN PERSPECTIVE

the eyes of customers seeking low-priced machines. He also said more than 70% of the "bread and butter" products sold by dealers—photocopiers, calculators, and typewriters—come from abroad.

"An environment exists in which relatively few, mostly foreign, manufacturers control a substantial share of the marketplace," Kuchta told the subcommittee. "These suppliers, secure in their markets and dominance over the dealers, continue to treat their dealers unfairly. They have full knowledge that their dealers' options are severely limited, and exploit that knowledge to the hilt."

Kuchta and the bill's supporters told numerous "horror stories" of unilaterally terminated contracts, unethical practices,

### **Some critics say the bill is anti-Japanese, a charge denied by its supporters.**

and don't-give-a-damn treatment by such foreign manufacturers in the copier business. They contend that many of the same problems are not occurring with computers and software.

"Proponents portray this as an anti-Japanese bill which will protect American dealers from big Japanese manufacturers," the Coalition for Competition says. "This is not the case. The bill is not anti-Japanese; it applies to an industry in which American companies hold major market shares for the products covered by the bill."

Similar sentiments were expressed by the entire Massachusetts congressional delegation, which noted that the state's economy is heavily dependent on high technology firms and that the legislation, if passed, would "harm all office equipment manufacturers and suppliers to the detriment of competition and affordable prices."

Even the threat of losing IBM business hasn't swayed NOMDA from the swift completion of its appointed round.

"If this legislation is enacted, IBM will certainly have to reexamine its own position regarding the use of independent dealers," IBM vice president Terry Lautenbach told the House subcommittee. "If we conclude, as a result of this legislation, that the use of dealers is no longer the most economic way to sell our products, and that the cost and bother of litigation is just not worth it, we can expand our existing direct sales forces."

So be it, the dealers say. They'll take their chances. They've already come close to the promised land. A corresponding bill of another name and number passed the Senate Commerce Committee by a 19 to 0 vote in the last session of Congress. It passed the House Subcommittee on Commerce by a 4 to 0 vote.

"If [Sens.] Ted Kennedy (D-Mass.) and Orrin Hatch (R-Utah) hadn't walked for

us [out of a Judiciary Committee hearing]," a trade association source said, "this bill could be law right now." Sponsors and supporters believe this year's version, with more conciliatory language and far less onerous antitrust provisions, looks even better.

"Our only opposition is from manufacturers and the administration," NOMDA's Kuchta says. "The manufacturers have been against us from the beginning and the Administration is opposed to any government intervention in business. This is a pro-consumer bill because it will assure that customers get the parts, services, and support they need. We're no different from other groups for which Congress has passed specific legislation. And all the burdens are not on the dealers. It's a two-way street all the way."

Well then, there should be room for negotiation and compromise, right? Wrong. Kuchta says NOMDA has the votes to get the bill out of both the House and Senate Commerce Committees and that it will pass Congress sometime in January. The coalition insists that will happen only over the dead bodies of its 19 members.

"If there's a better way to handle this, we're open to it," Kuchta says. "But we've been negotiating in good faith for the last 10 years and gotten nowhere."

"We've looked and looked for a possible compromise," the coalition's Mullen says. "We can't find one."

Maybe they should bring back Henry Clay and give him a shot. But he probably wouldn't do much better.

## OFFICE AUTOMATION

# MAKING WP SMARTER

**Spelling checkers are only the first of a new breed of office automation products coming to market.**

**by Jan Johnson**

Office automation vendors are poised to introduce a series of products that will make it easier for users to produce well-written business texts. Word processing systems will no longer be mere typing aids—they will also help writers with spelling, synonyms, and even grammar.

The new products represent an attempt by office automation vendors to extend their word processing products by tying them into the wide array of linguistic databases that have been developed in re-

cent years. The first and simplest of these are spelling checkers, which are now commonly offered with word processing systems. For such vendors, however, as Wang Labs, IBM, and AT&T, on-line technical dictionaries, thesauri, and other writer's aids may be strategic weapons in the overall office automation battles.

In the next few years, observers say, such linguistic tools will evolve into highly sophisticated editors that will automatically highlight problem areas in grammar, syntax, spelling, punctuation, and even writing style.

Also in the wings are industry-specific data retrieval software packages that will help users work with on-line electronic books, newspapers, periodicals, and database services. A lawyer, for example, would supposedly be able to input a few keywords and search many on-line reference materials at once.

As more databases are brought on-line, "we have this very messy situation," agreed Amy Wohl, president of Advanced

### **Wang Labs has apparently seen the value of on-line databases to the development of its word processing user base.**

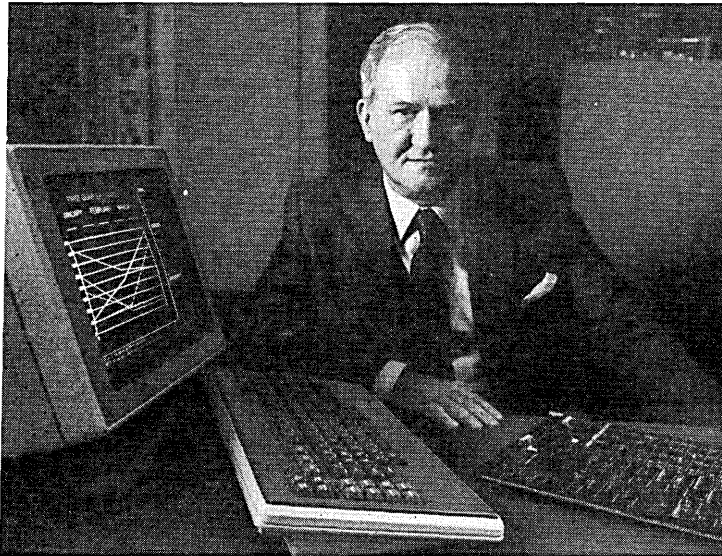
Office Concepts in Bala Cynwyd, Pa. Most databases today are a hassle to use, Wohl says. They require a knowledgeable user to sign on, find and extract needed material, store it in a local memory, and then get out of the database and into an application where the extracted data will be used.

"The key to using a database is to have the interface made transparent to the user," says Wohl.

She singles out Wang Laboratories as one company that is aware of the need for easier-to-use databases. "I think Wang has figured out something clever," observes Wohl. "If you can make money being a systems integrator, then you can also make money selling the databases, as well as the interfaces and the integration into the databases."

This past June, Wang Labs quietly acquired Dictronic and promptly folded it into a newly formed, wholly owned subsidiary, Wang Electronic Publishing Company (WEP). In addition to a staff of 15, Wang acquired electronic publishing rights to an impressive list of linguistic-oriented databases: the *Random House Dictionary in English*, *The Oxford Dictionary of Quotations*, *Roget's Thesaurus*, *Black's Law Dictionary*, *Stedman's Medical Dictionary*, *The McGraw-Hill Dictionary of Scientific and Technical Terms*, *Rand-McNally's Atlas*, *Strunk and White's Elements of Style*, *Hart's Rules*, and others. Wang Electronic Publishing continues to expand its empire of titles, especially concentrating its efforts on the European market.

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Dr. W. LEE SHEVEL  
Senior Vice President, Corporate Operations, Burroughs Corporation

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## NEWS IN PERSPECTIVE

For WEP, it's a two-sided business, oem and retail. Currently there are less than 20 "solid" oem customers, most of which are software houses, including Peachtree Software and Microsoft, claims John Thibault, director of office systems for Wang Labs. (WEP reports to Thibault). Among the few hardware vendors is Apple, he notes.

WEP's retail business involves three microcomputer-based packages aimed at end users and sold direct mail. The packages are the Random House Proof Reader, a spelling checker program that retails for \$50; the Random House Thesaurus, for \$150; and the \$75 Grammatik, which detects repetitions, certain punctuation errors, and inappropriate expressions. Plans are to expand the retail business, as well as double WEP's staff to 30 people by year-end, say Wang sources. Although Thibault would not release volume or sales figures, he did say WEP sales are growing at about 40% annually.

With its databases tucked securely into the Wang fold, development of a number of new products is said to be underway at WEP and Wang Labs. One product expected before year-end is a menu-driven letter generator. Working off a template of stored letters, said to be an electronic version of Prentice-Hall's *Business Letters*, the letter writer enables a user to select subject as well as tone. Also under development is a program called Strunk & White, a style checker named after the two authors of the classic *Elements of Style*. For the future is an expert sentence analyzer, an element that lies at the heart of any electronic editor. Sources say the sentence analyzer won't be ready until 1985, however.

Without Dictronics and its stable of reference databases, Wang saw itself

### Many companies are developing linguistic databases for use in office automation systems.

locked out of the database business and, as a result, was unable to influence a critical element in its OA strategy; the development of electronic editors, dictionary, grammar, and style standards are considered the core of electronic editors.

"You need to have a grammar and spelling checker before you can do textual recognition and translation, before you can develop a system to understand words and how they are used," explains Rich Turner, product manager for electronic publishing products at Wang Labs.

Losing control of standards was not an acceptable outcome to Wang. For years the company has been in the enviable position of leading the word processing market. Several hardware vendors, such as Harris and Data General (DG), have produced or promised to produce utilities enabling their systems to use Wang files. But the market

was changing, Wang's big customer base was in word processing and its stronghold was with department managers, while the OA market was coming under the rule of traditional dp, where Wang had little if any clout. "Word processing tends to expand into OA but hasn't yet," said Wohl. "We asked Wang about that and it said less than 1% of its installed base was in OA as of May of this year. All the rest was word processing. They weren't saying they had not been selling, they just haven't installed that much yet."

The challenge for Wang was obvious—how to continue its momentum in the face of a changing market. Enter Dictronics and its databases. The strategy appears to proceed as follows: Wang would gain control of several core linguistic databases; establish them as a standard by selling to Wang's installed base, in addition to others; then control the amount of integration provided to those databases.

That might be one way to convince traditional computer vendors, such as DG and Harris, to be Wang-compatible, muses industry consultant Wohl. "Wang could create an environment in which it pays vendors to be Wang-compatible so they can get at the databases in a more integrated way," she speculates.

Now, even if the OA evolution evolves into the hands of traditional dp managers and out of the realm of Wang and other word processing vendors, by controlling the databases Wang may be able to leverage its linguistics and landing right back in the mainstream.

Meanwhile, what are the other OA contenders up to? It appears that many companies—IBM, AT&T, Xerox, Digital Equipment, NBI, Lanier, CPT, and Syntrex—are also developing linguistic-based applications. Most, however, have gone elsewhere than to Wang Electronic Publishing for their database needs. The choices are limited, for only two other companies are generally considered on a par or better than WEP in their offerings. One is Houghton Mifflin (HM), the Boston publishing company that bases its spelling corrector software on the *American Heritage Dictionary*. The other is Proximity Technology, Ft. Lauderdale, Fla., which recently struck a deal with the Merriam-Webster people.

Houghton Mifflin lays claim to "about 20" oem customers, most of which are hardware vendors: IBM, Digital Equipment, CPT, AES/Lanier, Hewlett-Packard, and Micropro, among others. "IBM tells us they purchased only one lexical property from an outside vendor" and that was HM's *Roget's II Thesaurus* for the basis of its synonym product in PROFS and Textpack 6, says Bill Griffith, HM director of electronic products.

HM's spelling corrector costs between \$250 and \$700 retail for the microcomputer version, while a VAX version is

priced in the \$4,000 range.

Proximity sells only oem, so it quotes cost on a royalty basis only—\$10.95 per copy, says Louis Harris, Proximity vice president. Proximity estimates it has about 22 customers, all oems, including Xerox, Lanier, NBI, Fortune Systems, and Syntrex.

HM and Proximity agree that OA contenders are moving "very rapidly" toward electronic editors. HM's Griffith said his company expects to have a sentence analyzer on the market within the year, but he estimates it will take another eight months before his customers integrate the product into their own OA applications.

In contrast, Proximity has chosen to concentrate its efforts on expanding into Eu-

### Xerox's R. R. Bowker subsidiary could make its reference works available on-line for a wide range of uses.

rope. Currently Proximity offers a spelling checker, a spelling corrector, and a hyphenator. "Down the road is a thesaurus, a proof reader, and a context checker. But for now our emphasis is on getting current products into foreign countries," said Harris.

No one is sure what IBM and AT&T are up to, exactly, but observers say the two giants are moving in the same direction. The mystery is how fast and when products will be commercially available. Researchers at IBM's Yorktown research labs, for instance, are developing a sentence analyzer called Epistle. It recognizes parts of speech; notes the use of inappropriate words, dependent clauses, and prepositional phrases; and offers corrections and alternatives. It also knows to check with the author when it encounters such words as "affect" or "effect." Epistle was designed for a large system, but word has it that IBM is planning to port the program down to the personal computer level.

Hardly behind the times, AT&T's Bell Laboratories has developed an electronic editor called Writer's Workbench. The package runs under Unix and includes about 24 programs that note word lengths, sentence lengths, the number of complex sentences and compound clauses, and the use of inappropriate words. It also highlights passive phrases and makes suggestions for corrections and readability. The program has been in use inside Bell Labs since 1980, and in 1981 it was beta-tested at Colorado State University. Like IBM, Bell is developing most of its core databases in-house. The Workbench family of programs was designed to run on Unix-based mini-computers and will probably be ported down to micros in the near future. Unlike IBM, Workbench hit the commercial market this past June. It is being marketed through Western Electric and is available for a one-time license fee of \$4,000 for the first cpu and \$1,600 for additional copies. Educa-

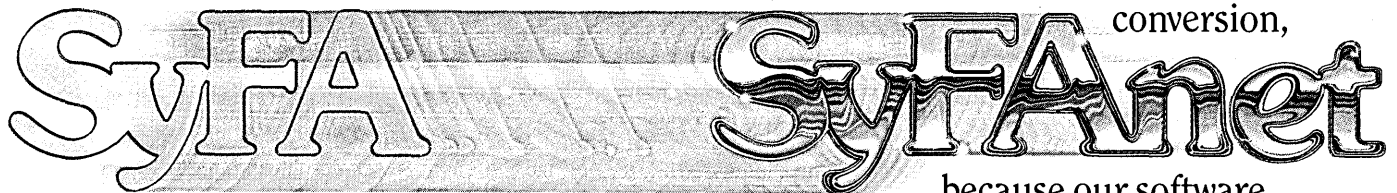
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## NEWS IN PERSPECTIVE

tional institutions get the product family at discount—\$2,000 for the first cpu, \$800 per additional copies.

Xerox also is chasing the elusive OA market. As Proximity's Harris attests, Xerox is in the market for linguistic databases and is working on electronic editors of its own. But Xerox, like Wang, owns many reference databases. Xerox owns six publishing companies, all under the umbrella of Xerox Information Resources Group. The best known and probably most immediately helpful to the company's OA efforts is R. R. Bowker Co., which supplies a wide range of reference works including the massive *Books in Print* seen at local bookstores. Bowker could easily make its resources available electronically, perhaps storing reference books on optical disk for access by office automation systems.

Another Xerox company, University Microfilm International of Ann Arbor, Mich., offers a vast number of periodicals and is said to have the largest number of doctoral dissertations on file of any company. Those papers are on-line electronically and the firm could probably profit by converting its microfilmed works to electronic form.

Xerox's other publishing companies include three textbook houses and Autex Systems, which runs a computer network that links buyers and sellers of commodities. Says William Senter, chairman of the Xerox Information Resources Group, all companies are moving—some faster than others—to electronic delivery.

"Once everyone is automated, there is a large market opportunity for the delivery of many kinds of information," says Senter.

## STRATEGIES

# MAPPER GOES MICRO

**Smaller versions of the Sperry software are coming, along with new hardware in the 1100 line.**

by Jan Johnson

Sperry Corp. will soon introduce the first member of its long-awaited Chaparral series of 1100 series mainframes, which will be sold under the name System 11. The first machine of the series will be unveiled with a new version of the company's Mapper decision support system.

Sperry's aim with the new product is to expand the 1100 beyond its current user base. Mapper 10, as the software is to

be called, will offer batch processing as well as boosted performance, financial planning and support, business graphics, and a variety of personal computing facilities introduced with the company's Sperry-link office automation system.

The computer, once slated to come out as the 1100/50, will use one or two processors and will run at 0.6 to 0.9 million instructions per second, according to Tom Flynn, director of major systems, worldwide product marketing. He says the system will include an integrated disk controller, communications controller, and cluster controller in a box about two yards long. Also in that box will be main memory up to 2096K words and up to two disk drives.

Pricing for the system ranges between \$208,000 for a one-processor system to about \$1 million for a fully configured dual processor.

Flynn said the machine is designed to be installed by the customer, one of several steps Sperry is apparently making to give its customers more than they might receive from IBM.

The System 11 with Mapper 10 software is scheduled for delivery in April, according to Flynn, who notes that the hardware will be reintroduced in June 1984 as a new model in the Distributed Data Processing (DDP) line and as a general purpose 1100 series machine in July. While the DDP line is aimed at the company's installed user base, the general purpose System 11 is designed to lure customers away from IBM. Apparently, the Blue Bell, Pa., company has had some success in that endeavor, due largely to the Mapper software.

The main difference between the Mapper 10 and DDP versions, Flynn says, is the capabilities each machine is tuned for. "With DDP the user gets a clone of the host and ability to ship files back and forth. In Mapper he has to know where the data are. In DDP a user won't have to know where the data are."

Sperry's overall thrust for the System 11 is aimed at departments of large corporations that need local processing and communications to remote host mainframes. Meanwhile, the company is readying a microcomputer version of Mapper, a down-sized version of the software that will run on a machine designed around Motorola's 68000 microprocessor. The system, says Flynn, will be dedicated to running Mapper. It will handle up to 16 terminals, seven disk drives of 30 megabytes each, a streaming tape with up to 45 megabytes of storage, a megabyte of main memory, and seven ports for peripherals. A minimal configuration of the system, including three terminals, two disks, and a printer, will be priced about \$40,000, while a full-blown cluster will come in at about \$120,000.

Rounding out the bottom end of the firm's general purpose line is still another family, a line of personal computers pro-

duced by Mitsubishi. Both the CP/M and IBM-backed MS/DOS operating systems will be supported and a link into IBM 3270 networks will be offered as well. Of course, Sperry's own protocols will be supported, too. No pricing details were available at press time.

Sperry's experience with Mapper, a package it says was developed primarily for internal use but which has gained a loyal following without much directed marketing effort, has been a pleasant one. The software is claimed to "sell itself," once users see how it works.

Roughly described, the system is a relational data manager with what the firm claims is a "unique" user interface. Instead of natural language processing, as used on such competing products as Mathematica

## The company's main competition has been IBM, which doesn't offer Mapper-like software.

Inc.'s Ramis II, Mapper uses a combination of single-word commands and icons. Several commands, or manual functions, as the company described them, can be combined into a single macro function and run to create a new table of information.

Users experienced with the package say it is well designed in most respects but still leaves some things to be desired.

"The problem with creating runs is that they have to be done in an efficient manner because Mapper is often functioning as an interpretive language generating user reports," observes Stan Brager, Mapper coordinator for Northrup Aircraft. If these runs are not efficient, "then other users may notice a degradation in their response time," warns Brager. Many Mapper shops, even those that originally permitted end users to write their own runs, have since backed away from that practice. They let only data processing professionals build macro functions.

An informal survey of Mapper users indicated they found the software a good data handler and helpful in boosting programmer productivity. They also agreed that Mapper, when used with the proper controls, is a strong end-user tool.

Mapper was developed "around 1967, before anyone knew what a relational database was," says Tom Flynn. Because the product bubbled up out of an operations group at Sperry's manufacturing plant in Roseville, Minn., it had to fight to get the full attention and support of marketing, an honor it did not gain until 1981.

"Today, the package is a star performer. About 80% of our new customers are buying because of Mapper," estimates Flynn.

But the going has not been easy. New customers often come at the expense of IBM, and IBM has been known to have a

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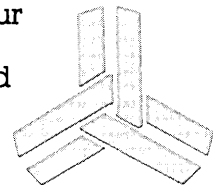
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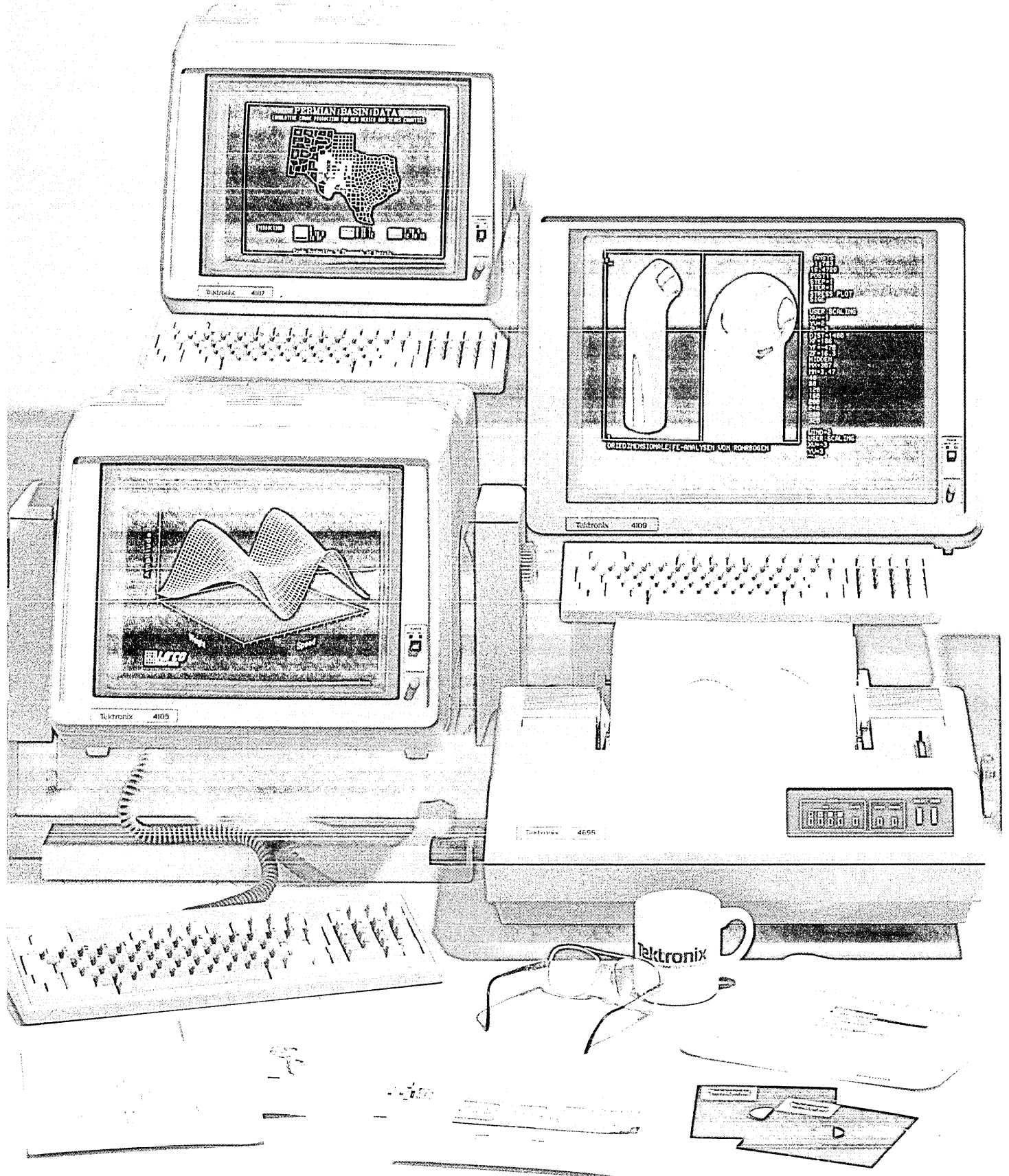
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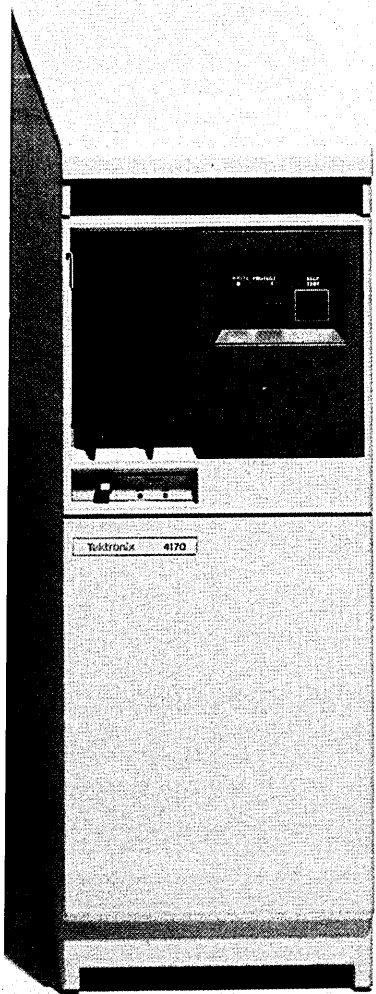
Display and printer output results of the 3-D wireframe plot of the Permian Basin data. The data was generated using the CPM-750, a register-based microcomputer. The data was generated using the VIB-70, a register-based microcomputer.



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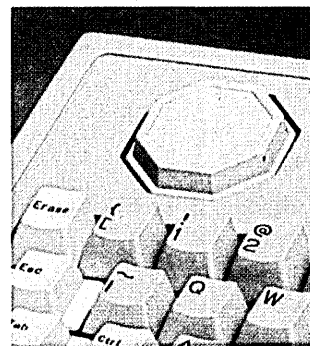
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## NEWS IN PERSPECTIVE

chilling effect on intruders.

"IBM caused us problems by going to upper management," recalls a source in dp at Medtronic Inc., Minneapolis. Medtronic replaced a 370 with a Sperry 1100/60 running Mapper in 1980. "IBM bid a 4300, but every time we went for a demo the 4300 went down."

Seemingly the biggest lack in Mapper so far is its inability to communicate with IBM-resident files. This is due primarily to Sperry's reluctance to attach its machines into IBM systems. One user described Sperry's efforts to implement SNA as moving at a "snail's pace."

Flynn says SNA will be available on Mapper 10 at the machine's introduction next April.

## MINICOMPUTERS

# IBM'S SQUEEZE PLAY

**Traditional makers of minicomputers will have to struggle to compete against the industry leader's new "superminis."**

by Ralph Emmett

Are we witnessing the demise of the minicomputer?

It has become fashionable at recent IBM briefings for the company to portray the future as one of mammoth database mainframes servicing a vast array of personal

computer workstations, with no medium-sized computers to be seen. Unfortunately for minicomputer makers who have traditionally held the middle ground, the absence of minicomputers is becoming a reality in more than IBM's corporate mind.

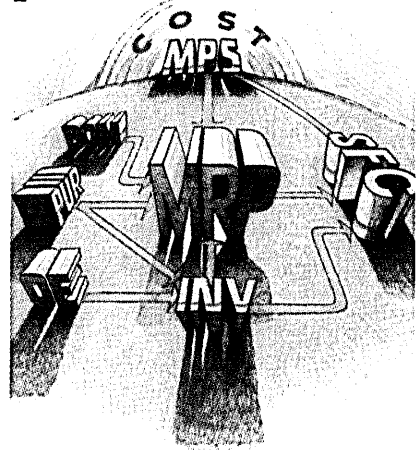
The latest DATAMATION/Cowen & Co. survey of small systems usage in large companies (see p. 160) says it all: personal computers, particularly IBM's, it turns out, are largely usurping the minicomputer in its traditional applications. The mix between minis and micros was 93:7 a year ago, but by next year the personal computer's share would be up to 26%. It is probably only a matter of two or three years before micro shipments exceed the mini in dollar terms.

To make matters worse, personal computers will soon support minicomputer-size, hard-disk storage in the 16MB to 800MB hard disk range. Add-on suppliers are hammering away at the communications and database bottlenecks that prevent direct links between PCs and mainframes.

Other controller boards may enable the PC to function as a 370 on a desk. IBM's Popcorn, expected by 1985, will have etched the IBM 370 instruction set on to a Motorola 68000 board and slotted it into a P.C. Rather than an upward migration trend that mini makers may have been looking for, this development will allow IBM's large customers to cascade their production programs down on to desktop machines.

The rapid evolution of the IBM P.C., as well as the magnitude of its success, has caught the industry (and, apparently, IBM) by surprise and led to some rethinking. Says Peter Lowber of the Yankee Group: "The theory advanced, most notably by DEC's president, Ken Olsen, is that a personal computer explosion will ultimately fuel the growth of minicomputer sales as users in multitask environments come to

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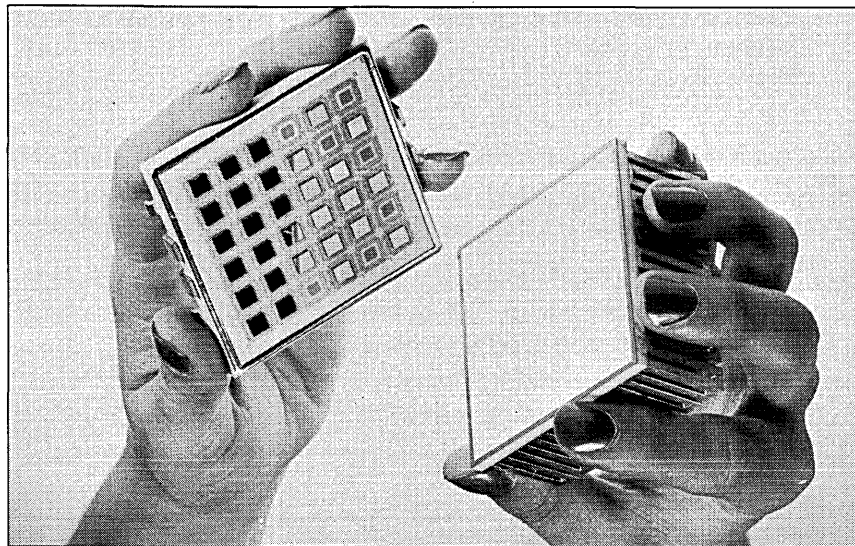
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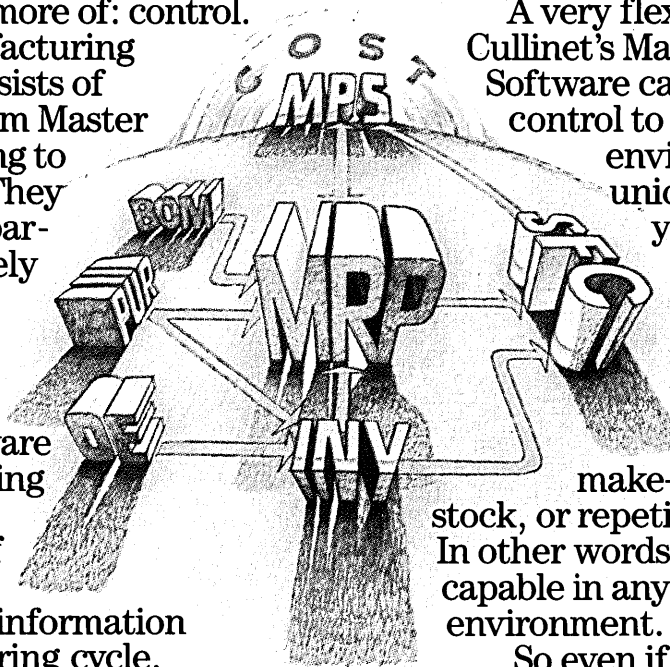
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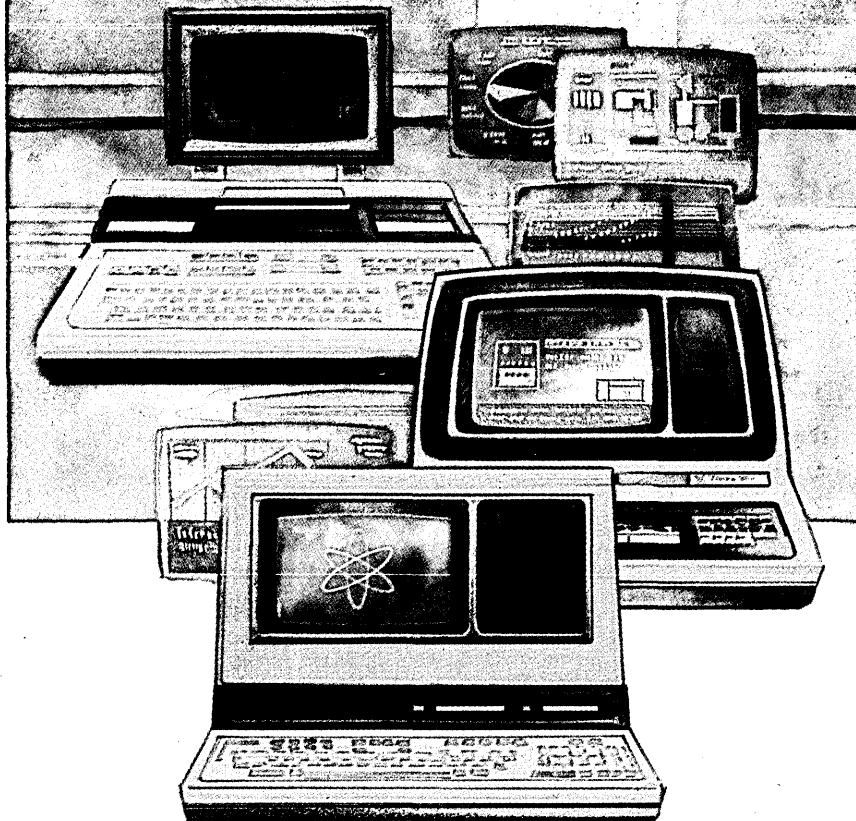
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CIRCLE 30 ON READERCARD

## NEWS IN PERSPECTIVE

demand more from their PCs. While we still subscribe to this view," Lowber said, "the industry's seeming obsession with adding value to the P.C. makes you wonder."

As usual, IBM is covering all the bases—even the middle. "Over the past five years IBM's minicomputer revenues have grown from virtually nothing to \$3.7 billion in calendar '82," reminds Lowber. Growth has soared largely on the back of four products: the Systems /34 and 38, the Series/1 and the 4331. In recent months, IBM has greatly enhanced the Series/1 and upgraded the 34 to a System/36 and, according to sources, is close to announcing a new System/38 (the Model 9). And now, if there ever was any doubt that IBM wants DEC's VAX business, IBM has replaced its 4331 with the aggressively priced 4361, a machine it calls a "supermini."

Observers point out that the two 4361 models (Groups 4 and 5) range from 0.8 MIPS to 1.4 MIPS, and at about \$150,000 per MIPS are clearly on DEC's VAX price/performance curve. In addition, new models of this family carrying it into the workstation levels should be announced next year.

"To add insult to injury," chimes in Robert Fertig of Enterprise Information

### "The industry's obsession with adding value to the P.C. makes you wonder," says Peter Lowber.

Systems, Greenwich, Conn., "the whole [4361] family is aimed at the heart and soul of DEC and the New England mini makers, the scientific and engineering markets."

One could be forgiven for thinking that the mini makers have wandered into the jaws of a metal megalith, and the squeeze is on. It's well known by now that DEC achieved only a 2.8% sales growth last year while competitors did little better in their traditional, middle ground markets. The outlook for the coming year is little better, according to DATAMATION/Cowen numbers: including IBM's growing business, the minicomputer market will grow no more than 14%—and that might be optimistic, the survey says. Clearly the minimakers have to get out of the IBM sandwich. But where can they go?

"They are trying to go both up and down simultaneously," reflects First Boston's Marc Schulman. "By developing powerful superminis they can challenge the low end of IBM's mainframe line where margins are much better. Success in the upper echelons will allow them to fund a challenge in the PC/workstation domains."

Schulman points out that IBM's 3083 Models E, B, and J are the least aggressively priced of its large systems with price per MIPS ranging from \$280,000 to \$350,000 within a 3 MIPS to 7 MIPS spread. In stark contrast, the current supermini

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## NEWS IN PERSPECTIVE

price/performance leader, Data General's 2.2 MIPS MV/10000, weighs in at \$70,000/MIPS. Sources have revealed that six months before the 'MV/10000's spring 1982 announcement, the company had begun work on its replacement, a two-board processor that would pack almost 5 MIPS.

Thus the scene is set—potential technical difficulties apart—for Data General to ship a 5 MIPS supermini for some \$350,000. "To place this in perspective," says Schulman, "IBM's 5.7 MIPS 3083 B is priced at \$1.7 million."

When IBM unveils its Sierra/Trout

mainframe family next year, its twofold price/performance improvement will drop IBM to \$150,000/MIPS for processors that will start at 10 MIPS, sources reveal. This would leave IBM's residual 308X machines functioning as expensive superminis, should the minimakers led by DG achieve their breakthrough.

Talks with engineers at DEC and Prime reveal that each company is working on machines in the 3 MIPS to 10 MIPS range. Of the two, DEC seems to be having more trouble achieving the higher performance levels and recently ditched attempts to build

a 10 MIPS system, Jupiter. Two new VAX machines to replace its 780 and 782s are expected next year. Sources now say that the best of these, the ECL-based Venus, has achieved 3.5 MIPS to 4 MIPS, but at a probable price level of no better than \$105,000/MIP—still well off the Data General curve.

DEC will probably rely on the yet unproven wafer-level integration technology of Trilogy Corporation for any machines larger than Venus.

The major, immediate objective of the supermini challenge from DEC, DG, Prime, HP, and the others is to offer MIS departments the new price/performance levels to help ease their applications backlogs and to encourage development of new applications on non-IBM system.

"But when you are selling to the big 1,000, many of whom are IBM shops, you've got to offer more than just a fast processor and hardware support," warns Yankee Group's IBM watcher, Frank Gens. "You can't just take a scientific/engineering processor—the traditional mini—and offer it as a heavy-duty commercial machine."

"Picture a dragster in dense city traffic, or a racehorse pulling a garbage wagon," says one observer. "There is just

### Data General is working on a \$70,000 per MIPS supermini designed to compete head on with IBM, according to industry reports.

no way these processors were designed to manipulate a ton of commercial dp data."

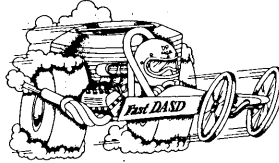
The predominantly New England-based mini makers are out to add new software for communications, database management, and office automation to their scientific and engineering product lines. "Communications," of course, means links to and compatibility with IBM machines.

Office automation has been a major thrust for DEC, Prime, HP, and Data General lately as the companies offer what are known as integrated offerings. The systems are essentially bundled packages that offer a tightly coupled mix of office applications—electronic mail, scheduling, and word processing, for instance—for use by small groups within large corporations.

But software isn't all that these traditionally hardware-oriented companies must enhance: Service and support, both costly endeavors, are just as necessary.

"The name of the game at commercial dp sites is software support," says Walt Smith, founder and head of Prognostics, Palo Alto, Calif., "and here the engineering companies are at a disadvantage with companies like IBM." Smith, whose company tracks the performance of vendors in the service/support area, adds: "Software doesn't break. You don't usually need to go on-site to fix it. It has no inventory of

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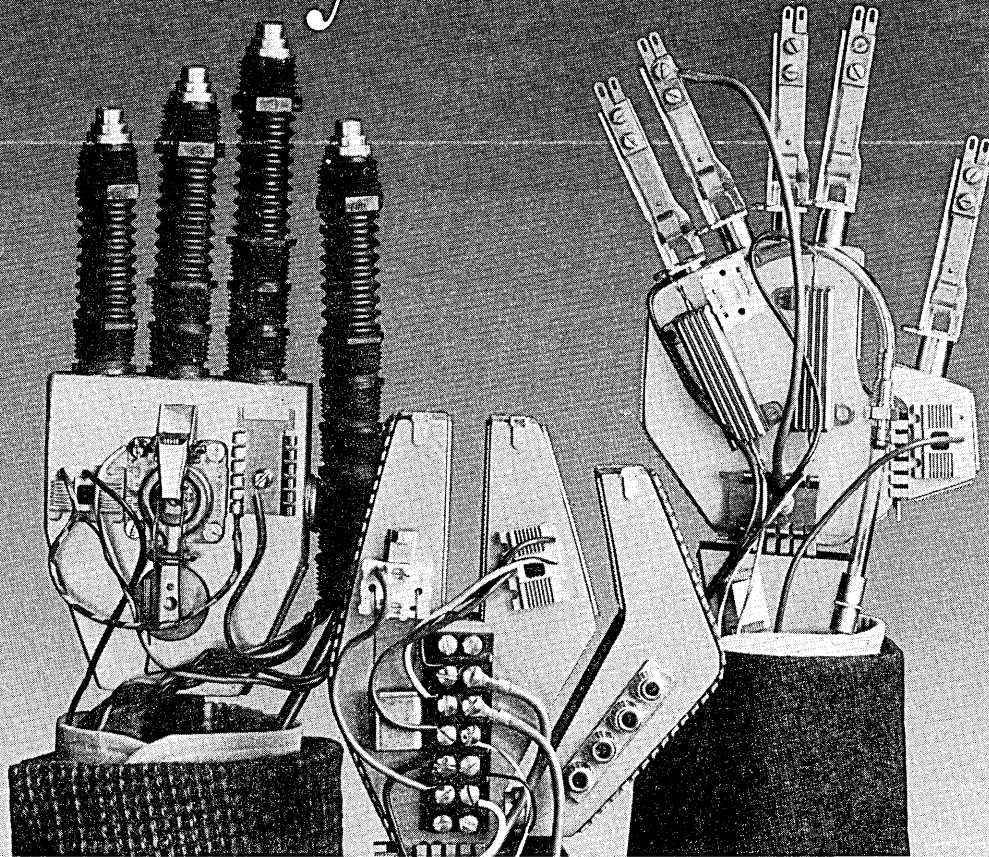
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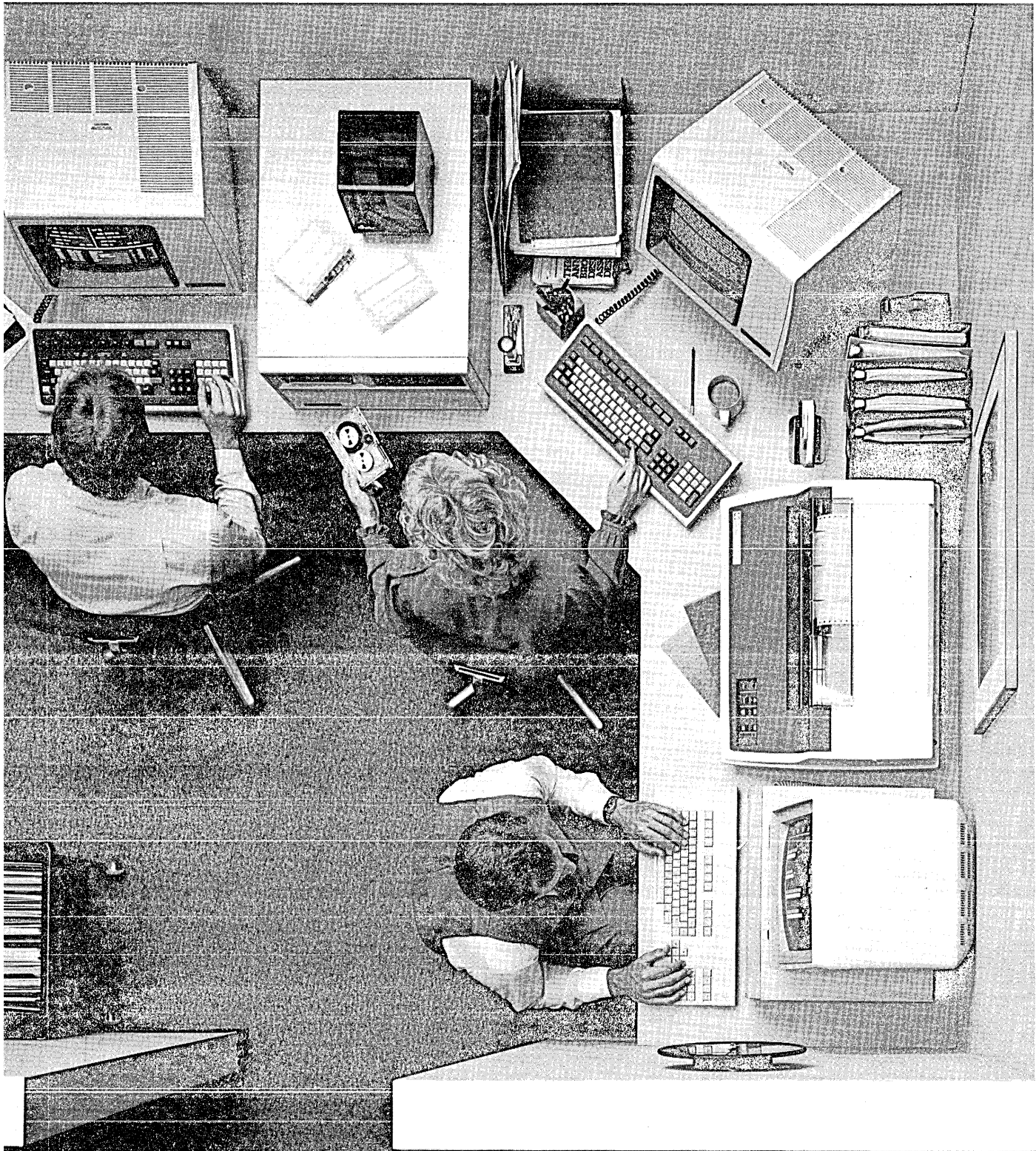
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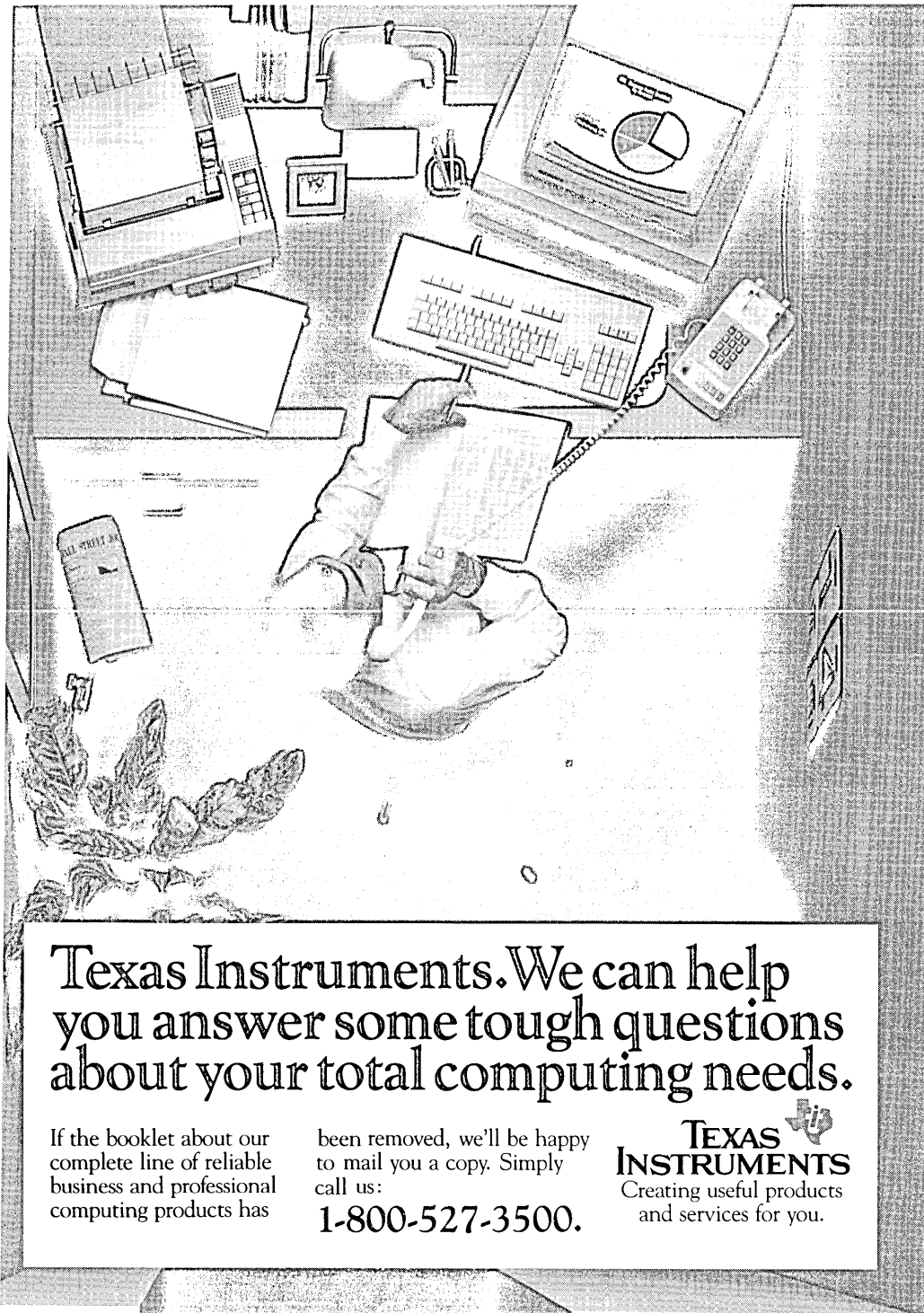
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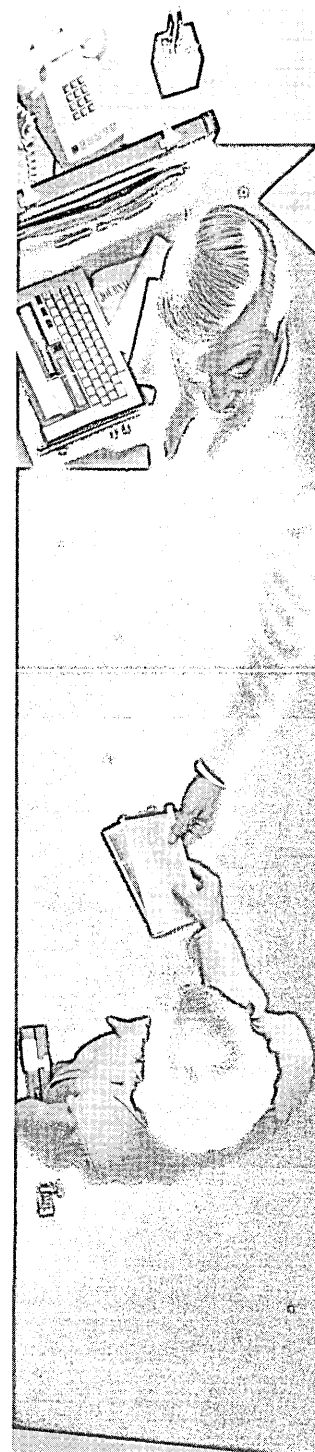


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## NEWS IN PERSPECTIVE

parts—there are just none of the same parameters that apply to hardware support.”

In a Prognostics survey, a vendor's performance is rated on a scale of 10 in both the categories of hardware and software support. The surveys are paid for by the vendors themselves, and so are not published or made available.

“Without revealing too much,” Smith explains, “it can be said that 7.0 out of 10 is marginally acceptable in both categories. Most companies score well in the hardware category while more than half the vendors fall below acceptable levels on software support.”

The DATAMATION/Cowen survey confirmed that poor software support was by far the biggest reason cited by small systems users for switching vendors.

“The problem with these minicomputer companies,” argues Phil Struve, manager for field engineering at NBI, Boulder, Colo., “is that they tend to be technically correct at the expense of the customer. The difference between them and IBM is that they tend to fix the machine, and IBM tends to fix the customer. You can't just graft on a full-service support organization as an afterthought. You have to design new schemes that focus on people and software.”

Perhaps this is the real challenge that faces the mini makers as they make their transition. “We're probably witnessing the death of the engineering company, and with it the traditional mini,” says Yankee Group's Gens. “Whether the industry will accept them in their new form, and whether there is a place for them, time will tell. But for many of IBM's traditional customers, it will certainly require a leap of faith to embrace them in their midst.”

# VM/CMS ON A MINI

**That's what two plug-compatible startups are bringing to market amidst fierce price cutting by IBM.**

**by Ralph Emmett and John Verity**

Just as IBM is lowering its sights to the lucrative supermini market with the introduction of the aggressively priced 4361 and 4381 processors, two minicomputer upstarts have set out on the treacherous road of 370 compatibility.

Canaan Computer Corp. and Spartacus Computers unveiled machines designed to offload VM/CMS timesharing applications intact from IBM mainframes. While the two companies' approaches to the CMS

workstation differ substantially, each is challenging IBM in what some observers say is a very high-risk arena. The plug-compatible business has always been a dangerous one but IBM's recent aggression in the small systems market makes new entries there more risky than ever.

“IBM has already developed a VM/CMS workstation of its own,” states industry analyst Robert Fertig of Enterprise Information Systems Inc., Greenwich, Conn. “There is great risk in entering this market, for even if IBM does not bring out that particular workstation, it has signaled its intentions in that area.”

Nevertheless, still another plug-compatible machine is expected to debut this month when Storage Technology Corp.

## **Canaan and Spartacus plan to attack IBM's VM/CMS timesharing user base, estimated at some 60,000 individuals in the U.S.**

unveils a CMOS logic mainframe designed to replace IBM machines.

To their credit, Spartacus and Canaan have not aimed for broad 370-compatibility but have targeted a small but growing niche of the IBM mainframe market, that of the Virtual Machine/Conversational Monitor Systems (VM/CMS). It is a timesharing operating system that Canaan chief executive Robert H. Bernard claims is growing 40% a year in the U.S., making it the fastest growing operating system on big IBM machines. Bernard estimates that there are about 7,000 VM sites in the U.S. and 3,000 to 5,000 sites overseas. Of those, some 30% are “CMS-intensive”—that is, involve many timeshared CMS users—giving Canaan and Spartacus approximately 60,000 potential end users to sell to.

“People tend to overload timesharing machines,” says Bernard, who helped found National CSS, a VM-oriented timesharing company, in 1967. “That makes for poor response time. Our machine can put the processing into the user's hands and increase productivity.”

VM/CMS is generally regarded as a better performer than IBM's other timesharing operating system, TSO, and is mostly used in program development and scientific and engineering problem solving. CMS is said to offer a more friendly user interface and is easier to use by non-dp personnel.

Canaan's aim is to give CMS users a software-compatible single-user workstation that can run their mainframe applications without recompilation. “We can load an executable core image from the mainframe. We don't need source code,” says Bernard, noting that the process can be run the other way, uploading software from the Canaan machine.

Canaan said it will offer its workstation computer, which includes a high-reso-

lution crt screen and local networking capability, for about \$35,000. Bernard said the computer, using a proprietary 32-bit TTL processor, delivers 200,000 instructions per second, or about four to six times the performance available to a typical CMS timesharing user.

As reported earlier (July, p. 79), Spartacus is offering a multi-user VM system designed for remote operation, if necessary. It is priced in the \$65,000 to \$95,000 range, depending on configuration and peripherals, and is said to support up to 10 users concurrently. The machine's performance is estimated at about 300,000 instruction per second.

Aside from pricing, a significant difference between the Canaan and Spartacus offerings is the system software each company is selling. Canaan's implementation of CMS does not use a virtual machine while Spartacus runs a major subset of the full VM/370 package. Bernard explains that the Canaan machine provides the user with a standard CMS user interface, but its inner workings differ from the VM/CMS package running on IBM mainframes. He claims that the Canaan operating system avoids many VM shortcomings—particularly in the area of file exchange between processes—while maintaining object code compatibility.

Spartacus, on the other hand, is out to fully offload VM systems, according to company founder and president George

## **CMS is generally acknowledged to be an easier-to-use timesharing system than TSO.**

McQuilken, who once worked on VM at IBM. He notes that the Spartacus version of VM has been modified for its new hardware environment and improved in certain areas, but it retains the essence of VM, the virtual machine.

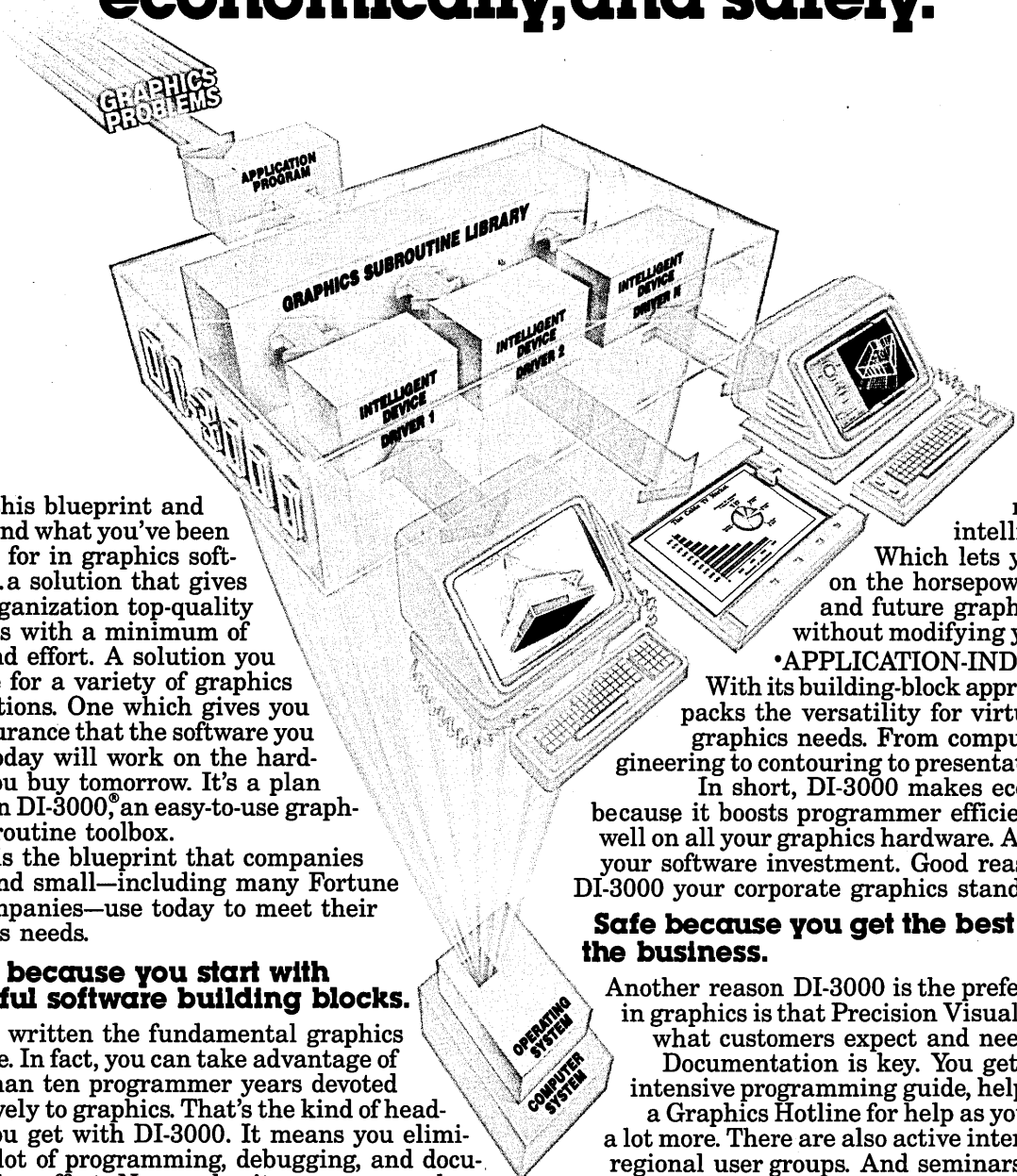
Both chief executives defended their entries into the IBM market, which has become inhospitable to all but the hardest competitors.

Asked if he thought IBM might come out with its own CMS workstation, Canaan's Bernard said, “It's only a matter of time until IBM reacts, but it must do so in the context of the price/performance standards of its large mainframes. IBM won't do anything to damage the high profits it gets from those big machines.”

Acknowledging the existence of a 370 workstation within IBM's development labs, Bernard says his company still has a substantial time window in which to deliver its machine ahead of IBM and prove to users that the one-processor-per-user concept is viable. “IBM is not under competitive pressure to come into our price/performance range. That would interfere with its 4361, which I think is the leading edge of their pricing curve.”



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CIRCLE 35 ON READER CARD

## NEWS IN PERSPECTIVE

"I think they'll use us as a stalking horse," concludes Bernard. "Of course, time will tell. They'll do what's in their best interest."

McQuilken cited the latest DATA-MATION/Cowen & Co. minicomputer survey (see p. 160), which indicates strong interest by users for 370 compatibility in minicomputers. That interest is pronounced in large corporations where distributed processing is popular and where Spartacus plans to focus its marketing efforts.

IBM, of course, has to be careful with its timing of such low-end products so as not to disrupt sales of high-end machines, sources say. The company will

### Spartacus and Canaan are attempting to bring local networking to IBM 370 users.

probably limit the migration of software off mainframes to less costly minicomputers by withholding certain software support on the small machines.

Apparently, this does not scare Canaan's Bernard or his partner Nicholas Pissarro Jr., vice president and chief scientist and former National CSS software consultant. They have raised a total of about \$10 million in financing and are shipping computers on a 30-day delivery schedule. The first machines have gone to Mathematica, a

Martin Marietta subsidiary that sells the Ramis II database system, Aetna Life, and Information Builders, according to Bernard.

The company plans to market the machine directly to end users with a 30-person sales force and also to sign up value-added remarketers who would sell to specific industries such as CAD/CAM, health care management, and database management.

Moreover, Canaan says it could easily implement other operating systems—most likely Unix or TSO—on its machine, giving it a wider appeal than a pure CMS engine.

Spartacus's McQuilken says his company's machine, which is to begin shipping Dec. 1, will appeal to users for its VM-compatibility and for its so-called Knet data communications capability. The network connects Spartacus machines and IBM 370-type systems in what he described as a virtual machine network. Files, commands, messages, and programs may be shared in the network; all the while it appears to the user as if a single machine, the one he is sitting in front of, is in control.

Sources at Spartacus say the company is close to signing a \$7 million deal with CAD/CAM system supplier Computer-vention for the Knet software. That company recently made news by ordering several million dollars' worth of IBM 4300 hard-

ware as replacements for an in-house designed 32-bit processor.

Canaan's computer provides a networking facility, using Ethernet, that facilitates the passing of messages between machines. The Canaan machine also offers windowed graphics, an enhancement over IBM's VM offerings.

## MICROCOMPUTERS

# CAMPUS COMPUTER LITERACY

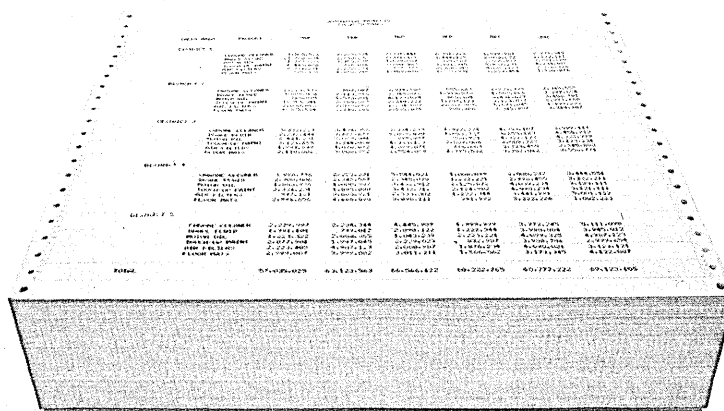
Where college students and professors find themselves equally ignorant.

by Edith Myers

Generally, college students expect their professors to be at least one step ahead of them in the learning process.

Generally, but not always. At least not in the sudden thirst for computer literacy. In colleges across the country, students and teachers are learning computing at the

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same time. In many cases students are learning faster.

"Faculty and administration people seem more resistant to computers," says Nancy Hughes, systems and planning administrator at Pepperdine University, Malibu, Calif.

Pepperdine has a strong commitment to computer literacy. Along with CAUSE and EDUCOM, both nonprofit educational corporations to promote resource sharing among colleges, Pepperdine sponsors an annual Computer Literacy Institute, a week-long event at which faculty members of colleges across the country can get an introduction to computers. Two have been held so far, both at Pepperdine.

"We get people with all different levels of computer knowledge," says Hughes. "Sometimes we have to overcome their fear of computers. We give them hands-on experience and show them what their options are."

Pepperdine's president, Howard A. White, has said that the school's goal is university-wide computer literacy by 1984. Pepperdine did not acquire its first computer until 1970, a small IBM unit used primarily for instruction in the School of Business and Management. In 1972, the university joined a consortium sponsored by the National Science Foundation which made timeshared terminals available to students in each of its

schools and colleges. A Univac 90/60 was installed in 1977 with 20 terminals for academic laboratories. In 1980, 16 Terak microcomputers were acquired for academic computing. By 1981, nearly half of Pepperdine's student body was exposed to some form of hands-on computing.

This past summer, after a six-month review of microcomputers suitable for home use by university employees and students in which 30 vendors participated, a committee of faculty and staff members entered into an agreement with Victor Technologies Inc., Scotts Valley, Calif.,

### Pepperdine is fostering the computer literacy of future students in other ways.

launching a wide-ranging micro-purchase plan. "They [students, faculty, and staff] can get the computers for essentially half price," said Hughes. Before the fall semester had even started in September, some 150 microcomputers had been ordered and original projections of 500 in the first year were being raised.

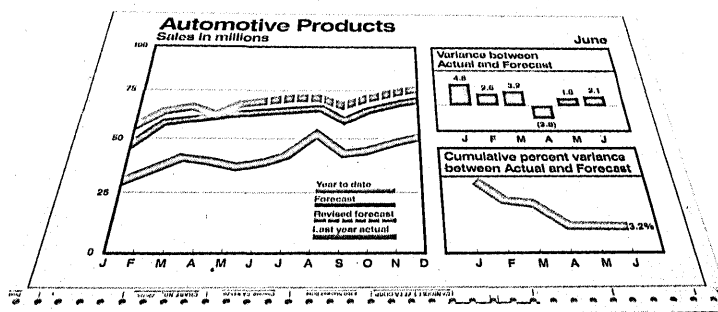
Students who purchase computers will have access from their dormitory rooms on campus to faculty offices, library and other reference networks, and the university's mainframe computer.

Pepperdine is a beta test site for word processors produced by CPT Corp., Minneapolis, and will be the only university to test CPT's new Phoenix, a workstation that combines text editing, data processing, and high-resolution graphics capabilities.

Next month, Pepperdine will install a new Sperry 1100/70 mainframe to replace its Univac 90/80 "This addition, including a fully integrated network featuring electronic mail and electronic file transfer capabilities, will increase by 50% our university-wide communication processing efforts and double our information storage capacity," says president White. "This hardware and software investment of approximately \$1.5 million will include a full decision-support system, Sperry Univac's Mapper, and Sperrylink, a complete software program enabling microcomputers throughout the campus and at our four educational centers to talk to the Sperry mainframe."

Last May, Pepperdine was selected as one of 12 institutions nationwide to participate in an \$8 million computer literacy program sponsored by IBM. Pepperdine and the other institutions were given some \$100,000 worth of hardware and educational software by IBM, which equipped it to serve as a teacher training center for 30 educators from seven local high schools. Fifteen IBM P.C.s were installed at Pepperdine, where the teachers were trained this

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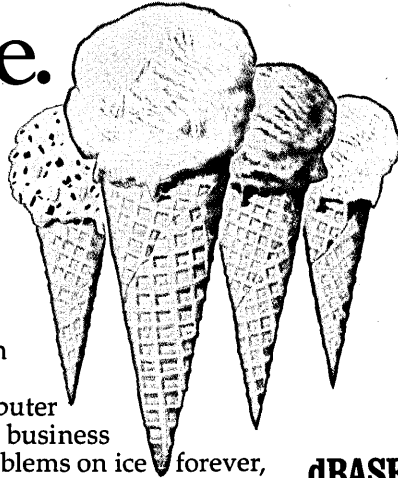
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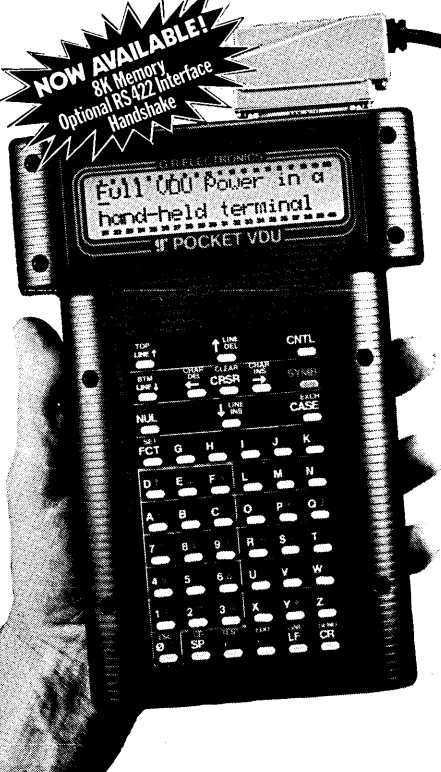


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CIRCLE 38 ON READER CARD

## NEWS IN PERSPECTIVE

summer and where they will return periodically for the duration of the one-year program.

Other teacher training institutions in the program are Los Angeles County Teachers Educational and Computer Center; Santa Clara County Technical Center; San Jose State College, San Jose, Calif.; University of Southern Florida, College of Education, Tampa, Fla.; Barry College for Computer Education, Miami Shores, Fla.; Florida Atlantic University, Boca Raton, Fla.; Polk County Schools, Bartow, Fla.; Putnam/Northern Westchester BOCES (Board of Cooperative Educational Services), Yorktown Heights, N.Y.; Queens College, Flushing, N.Y.; Vassar College, Poughkeepsie, N.Y.; and Broome/Tioga BOCES, Binghamton, N.Y.

An IBM spokesman said the institutions were selected for their proximity to IBM support facilities.

Pepperdine is also fostering the computer literacy of future students. This summer it held a 12-day computer camp on its campus for people ages 12 to 17.

Like Pepperdine, Western New England College, Springfield, Mass., is trying to promote computer literacy among stu-

### "It's a natural considering our name and our philosophy."

dents, faculty, and administrative staff. More than half of the school's 6,700 students are required to use computers in their course work, particularly in business and engineering. Starting this fall, arts and science majors must take a computer course to graduate.

Last fall WNEC inaugurated a program to make it easy for faculty and administrative staff to acquire personal computers and to pay for them under a three-year payroll deduction plan. The college buys microcomputers in quantity from local retailers for an 18% to 20% discount. They are then resold to employees under a lease-buyback agreement. A portion of the net purchase price is deducted from each paycheck. At the end of three years, the lessee can purchase the machine for \$1. The average purchase price is \$3,200.

While some colleges are making it easy for faculty and students to acquire microcomputers, others are making micros an integral part of their programs. At Santa Monica, Calif.-headquartered University Without Walls, a liberal arts university that offers self-designed degree programs to students (called "learners") in far-flung locations, registration on or after Oct. 1 included a Kaypro microcomputer, a disk drive, and communications and word processing software.

"We were raising our tuition anyway, so the computer is just part of the total fee," notes Warren Dohemann, vice president, academic affairs. Students registered

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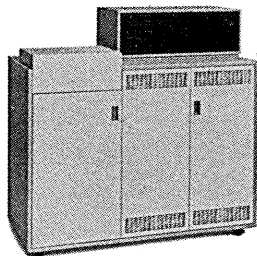
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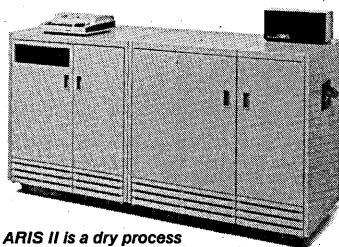
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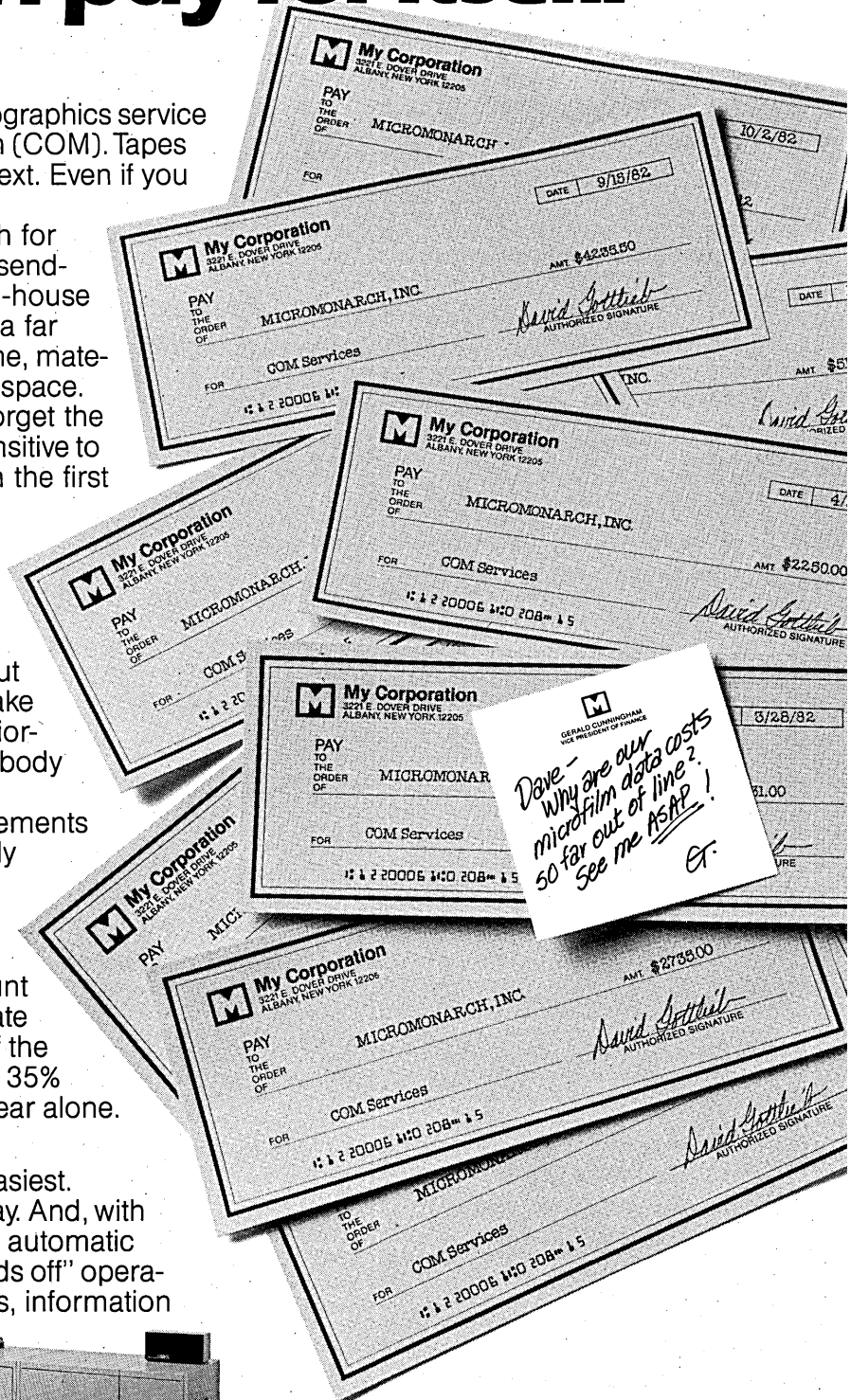
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## NEWS IN PERSPECTIVE

prior to Oct. 1 can get a computer by upgrading to the new fee schedule.

"It's a natural considering our name and our philosophy," adds Dohemann. "We've made a basic commitment to computer literacy. We try to give our students access to a wide variety of information. We spend 70% of our time conveying information. The computer is another resource to do this."

UWW talked to five vendors before deciding on the Kaypro. "It was the best package in terms of cost, availability, and service," says Dohemann. "All core facul-

ty equipment was donated by the company."

UWW works with learners through tutors, core faculty, and program administrators at their own predetermined pace and on their own tailored curriculum. "All of our programs involve writing. With communications and word processing, core faculty can work with student papers in the draft stage. The faculty members can make notes on a paper as it's being written. It will make our communications more efficient. Our students are scattered. They're in Hawaii, Washington, Oregon, California, To-

ronto, Florida, New Mexico, Nigeria, and some are in prison. All we're going to insist on from learners is that they turn the machine on, collect their mail, and turn it off." He hopes they'll do more.

Dohemann emphasizes that UWW is not a correspondence school. "There must be a tutor nearby for personal contact and there must be regular meetings with core faculty. "All the computer will be doing is eliminating our mail communications."

Since UWW tends to attract "the older, mature student," it's giving week-end indoctrinations during which it distributes the computers. "We don't say initially that it's all things to all people. We don't mystify it." At graduation, students may make arrangements to keep their computers but details for doing this hadn't been worked out as the program was getting under way.

At Clarkson College of Technology, Potsdam, N.Y., it's clearer. Some 1,000 freshmen who were issued Zenith personal computers when they registered this fall will be able to take the machines home or to a first job upon graduation.

"The computer is clearly the same kind of tool now that the slide rule and calculator were in the recent past," says Robert A. Plane, president of 86-year-old Clarkson, a private college. "Our goal has always been to provide our young people

**"The computer is clearly the same kind of tool now that the slide rule and the calculator were in the recent past."**

with the skills, knowledge, and cultural openness that are important for their total development. Our trustees decided two years ago that we should integrate personal computing into every aspect of our education at Clarkson."

A committee decided that Clarkson should use a computer based on Intel's 8-bit 8085 and 16-bit 8086/8088 devices. Zenith's Z-100 uses both an 8085 and an 8088 and can run both 8-bit and 16-bit programs.

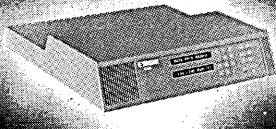
The retail value of each student's machine and software is more than \$5,000. The cost is subsidized by restricted grants so students pay only \$200 a semester and a one-time \$200 maintenance deposit fee.

Clarkson plans to study various schemes for networking the student computers with each other and with its CPU, an IBM 4341 model II.

Micros are clearly pushing the movement for campus computer literacy but mainframes are often involved. At Wooster College, Wooster, Ohio, a broadband data, video, and audio network installed by American Television System and Packet Communications Units, with outlets in all campus residence halls and academic and administrative buildings, permits stu-



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dents and faculty to use personal computers to talk to each other and to a new DEC VAX. Students involved run the gamut from science to liberal arts with an emphasis on the latter.

At Case Institute of Technology at Case Western Reserve University, Cleveland, only science students are involved so far in a program linking some 75 DEC Professional 350 computers to a DEC VAX 11-730 via Ethernet, but the school expects to expand the system to liberal arts students in the future.

In something of a trend-bucking move, Union College, a liberal arts school in Lincoln, Nebr., this semester installed Viewpoint terminals from Applied Digital Data Systems Inc. in its 400 dormitory rooms. The terminals are linked to one of two HP 3000s. All students are required to take an entry-level computer literacy course which includes a hands-on laboratory.

Union has left its options open, though. The Viewpoint terminals can be upgraded to personal computers.

## CPUS IN LIEU OF PCS

**There are ways to answer user demands for personal computing resources that don't involve giving out micros.**

by Edith Myers

As in skinning a cat, there's more than one way to answer in-company demand for microcomputer resources.

One way, of course, is to provide microcomputers. Another is to provide micro-style software on mainframes. One company that offers the latter is Tower Systems International, Irvine, Calif. Tower recently enhanced its OmniCalc spreadsheet program with cell formula entry and support for VM/CMS and TSO environments. Initially, it was designed for CICS environments.

"Users tell us," said Gregory K. Collins, Tower's vice president of marketing, "that with OmniCalc the previous contention for personal computer resources has been eliminated and that they have saved thousands of dollars in what would have been added microcomputer hardware expense."

The latest version of OmniCalc is release 4. "Other mainframe 'Visi-clone'-type products provide the benefits of the micro-based programs, but also contain

many of their shortcomings," Collins said. Instead of retrofitting a microcomputer product to a mainframe environment, we've incorporated the flexibility of the mainframe without the limitations of the microcomputer spreadsheets. People like it because it is easy to use, even for those with no previous computing experience."

He explained the new cell formula entry feature. "Cell formulas mean that computations can be performed directly within a specified cell or cells; these cell formulas can also utilize conditional statements, such as the IF statement, allowing

calculations to be based on other data within the matrix. Up to nine different formulas can be associated with a cell, and computation control is selectable by matrix column or row. OmniCalc also enables the user to simultaneously display all of the cell formula statements for review. Using the Replicate command, OmniCalc formulas can easily be reproduced for an indicated range of cells with minimal effort."

Another company offering microcomputer-style software for mainframe systems is the Mega Group Inc., Irvine, Calif., which last May introduced MegaCalc, a

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## NEWS IN PERSPECTIVE

spreadsheet for IBM users in the TSO environment. Designed for users of IBM 370, 43XX, 30XX mainframes, and plug-compatible systems, MegaCalc can be displayed on 3270-type monochrome or full-color terminals with both vertical and horizontal split screen capabilities to as many as 100 windows. The MegaCalc "data matrix" is 702 columns by 999 rows. Column widths may be varied by a single command.

"Of the software currently available for mainframe systems," said Dr. Alan Cameron, president of The Mega Group, "very little is truly user-oriented,

with users unable, for example, to change parameters, a feature that would greatly enhance individual and company productivity." Cameron said his company has more than 70 customers using MegaCalc. Up-

**"It's what our large users have been asking for."**

coming from his firm are a communications package, graphics integrated with spreadsheet, word processing in a spreadsheet environment, and a filing system.

Northern Telecom has another an-

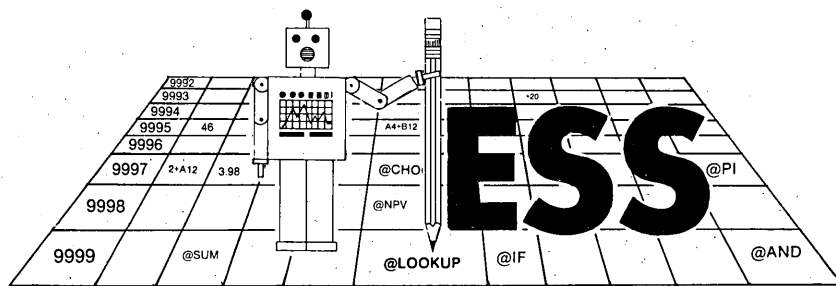
swer to demands for microcomputer resources. It is offering what it calls the "personal computing option" to users of its Model 585, 565, and 445 office information systems. "Two cards with Z80 chips installed in the backplane of a system will turn any terminal on the system into a personal computer," said Robert H. Kill, director of product management for Northern Telecom's Terminal Systems operation in Minneapolis.

By combining Northern Telecom's own Omnitask 4.1 operating system with the CP/M operating system and software applications, he said, terminals function both as workstations for performing information processing tasks and as personal computers. Prices start at \$1,495 for the first set of cards and decrease with additional sets.

"It's what our large users have been asking for," said Kill. "We interviewed users at more than 100 installations before developing the option. We preferred this to hardwiring PCs to the system."

He said the personal computing option allows sharing of data files and peripherals between CP/M and Omnitask applications. "All applications can run concurrently through a 'suspend' feature, which enables an operator to start one task, move to another, and return to the first."

Robert A. Best, vice president of the Corporate Data Systems Dept., Toyota Motor Sales, U.S.A. Inc., Torrance, Calif., has his own way of dealing with requests for personal computers in his organization. "I ask them what they want to do and I show them how it can be done on the mainframe host, how they can use their terminals as if they were personal computers. I've yet to get a request for something I couldn't do on the host."



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CIRCLE 42 ON READER CARD

## VISION SYSTEMS

# MACHINES THAT SEE

**The vision systems industry is finding success selling inspection systems to factories.**

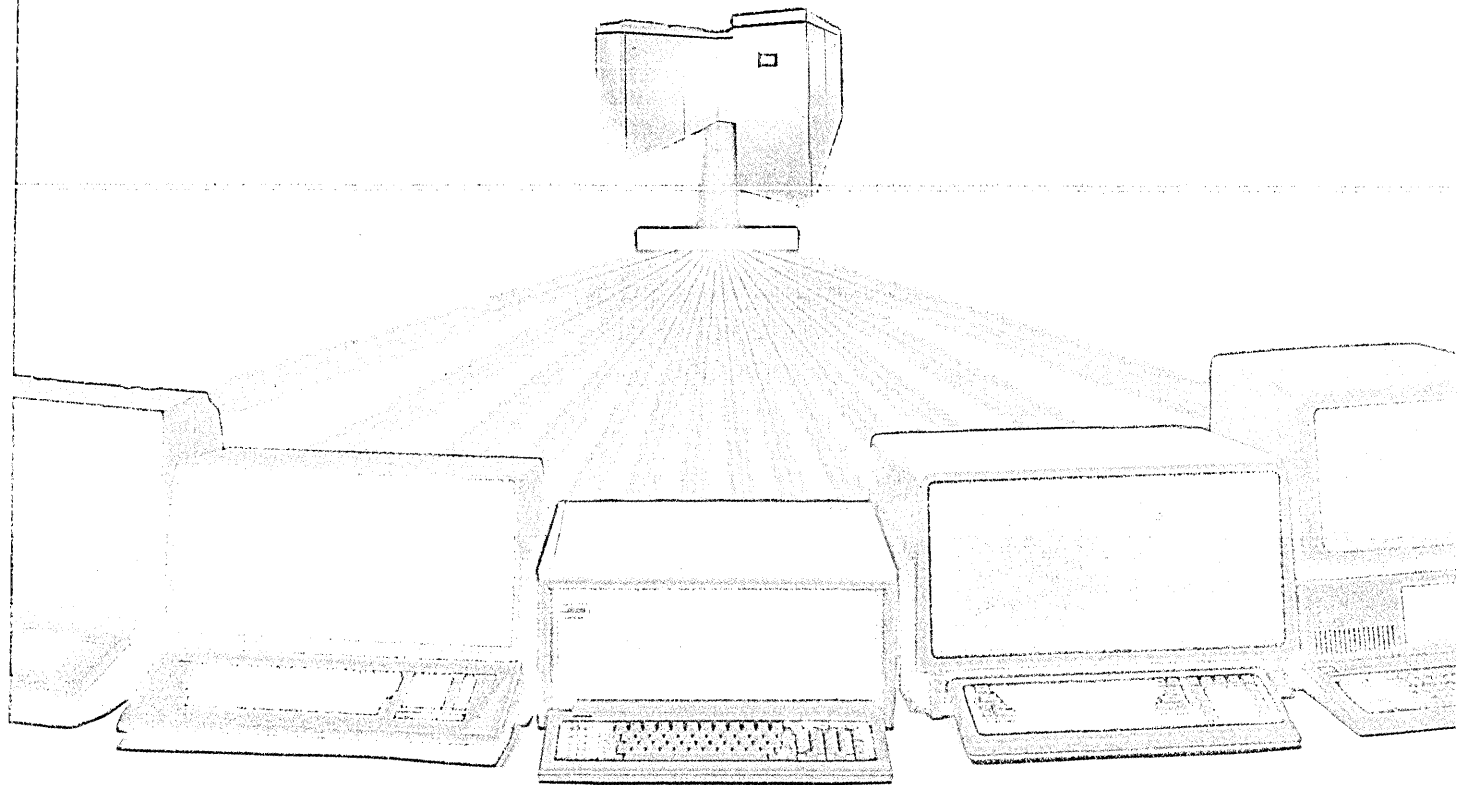
by Edith Myers

Machine vision is moving out of research laboratories and into the real world of industry. There are those who even see it entering the office.

A National Bureau of Standards report predicts that computer vision systems will perform 90% of all industrial inspection activities within the next decade.

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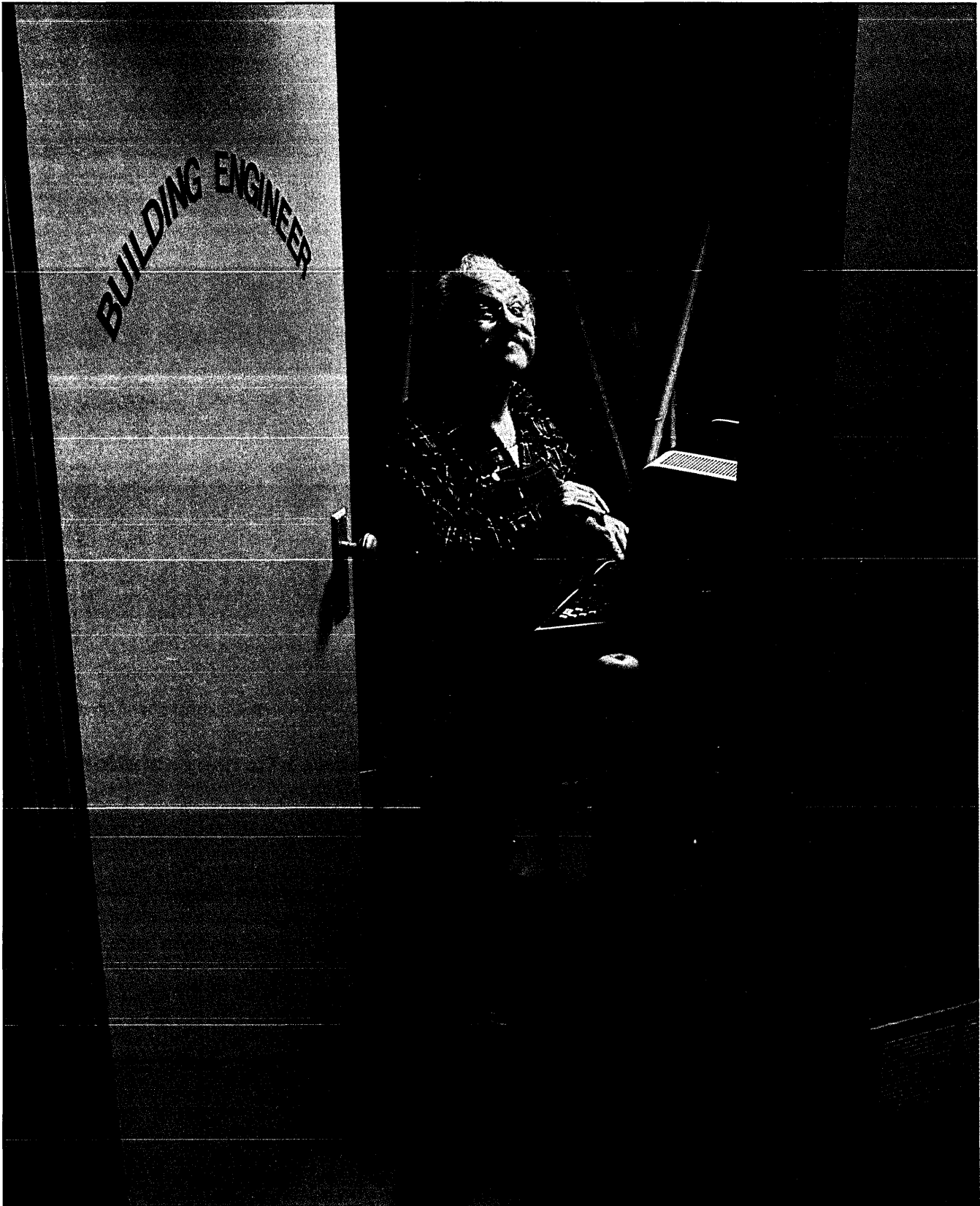
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## NEWS IN PERSPECTIVE

Howard K. Dicken, president of DM Data Inc., a Scottsdale, Ariz.-based consulting firm, sets the market for machine vision systems in 1982 at \$15 million. He projects an increase to between \$750 million and \$1.2 billion in 10 years.

Rarely has such a broad frontal assault from an emerging technology been observed in so many different applications, says another analyst.

Dicken says 95% of vision applications today relate to inspection for quality control and product identification. He says the fastest growing application areas are the integration of vision systems with programmable robots to provide sensing and guidance control.

Richard Miller, a Madison, Ga., consultant, believes inspection, not robotics, will be the fastest growing application for machine vision.

It was a strong belief in the inspection potential for vision systems that gave birth to a Simi Valley, Calif., company that considers itself a pioneer in vision systems.

"We're the oldest," says Dick Hubach, founder and president of View Engineering. Hubach and co-founder Jack Sack came out of Hughes's Research Laboratory in Malibu, Calif., "Basically, we built this company on technology developed at Hughes with the permission of Hughes."

View Engineering was formed as a partnership in 1976 and incorporated in 1977. Part of the impetus for its founding came from a growing realization on Hubach's part that "more money was being spent in industry on inspection than on manufacturing. There was a lot of room for

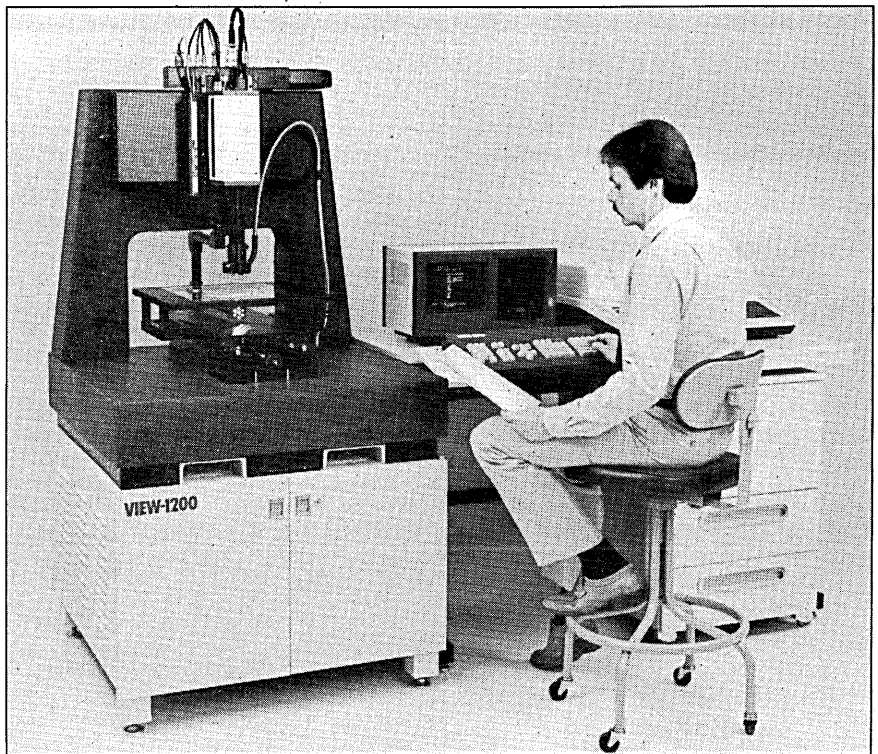
### **General Electric is seen as a formidable competitor, homing in on the potentially lucrative robotics market.**

cost savings in the inspection process." He also decided that principles involved in visual missile guidance could be used in inspection pattern recognition.

View got its first order in March 1977 as a result of a booth at a NepCon show in Anaheim that advertised, among other things, that the company could do pattern recognition. It was a \$10,000 order from a semiconductor manufacturer for a system to monitor probes. "We designed, built, and shipped in 90 days," recalls Hubach. He claims View quickly became the dominant vision system supplier to the semiconductor industry. "The bad news is, it's a limited market."

It's a growing and diversifying one, though. View counts among its customers today such companies as 3M, General Motors, and Kodak. "Kodak has integrated our equipment into their factory computer for total control. They won't even let us see what it's doing."

View is a privately held company



**MACHINE WITH A VIEW:** The model 1200 is View Engineering's noncontact, off-line measurement system, which sells for \$87,500. It measures radii, diameters, centers, and centroids of any irregular shapes, the Simi Valley, Calif., company says.

that has bootstrapped since Day One. "In our first 12 months our total budget was \$30,000," states Hubach. "I lived in a cottage in back of a friend's house and cleaned the pool and shoveled dog manure to pay rent. We had a consultant from Hughes design the electronics for us on a royalty basis and we didn't pay him any royalties for two years."

View today has 130 employees, 40 of whom are in research and development. "Actually, we're more development than research," says Hubach. Last year, he notes, the company plowed 22% of earnings back into R&D and expects to level this off at 15% to 17%. "The next generation of systems already is on our drawing board. We plan to maintain our lead through R&D, our strong dedication to fully integrated systems, and our emphasis on customer orientation."

Her feels a key to his systems' success is the fact that many features are in hardware while other products use software. He also feels View has a different interpretation of the term pattern recognition. "What others call pattern recognition is simply edge finding. Our systems can recognize very complex patterns. They can determine the calssification of a part, store in memory an image for each of several different parts coming down an assembly line, and can search for these patterns through 360° rotation."

View last summer introduced the

third of its 1200 series. It measures radii, diameters, centers, and centroids of any irregular shape; distance, angles, and intersections; and measures along any angle in three axes.

"The 1200 takes three-dimensional measurements in 1/100th of the usual time, increasing productivity, improving product quality, and dramatically reducing scrap," claims Hubach. Price for a standalone 1200, which is 8080-based, is \$87,500, including data gathering unit, granite stand, table control, and video processing electronics; and a systems control unit with disk storage, monitor, and keyboard.

Hubach sees General Electric as his most formidable competitor. "They're serious about [vision systems]." General Electric's Intelligent Vision Systems Operation, Liverpool, N.Y., has several vision systems on the market, including a multiple high-speed, on-line automatic system for inspection of discrete parts and one for noncontact reading of alphanumerics for factory inventory control. Both use a GE solid state camera.

Dicken of DM Data believes the key to the visual recognition market will be, "a highly intelligent, low-cost system [less than \$10,000] for integration with programmable robot arms."

Some companies offer both the robots and the vision systems. International Robomation/Intelligence, Carlsbad, Calif., headed by Larry Goshorn, founder and one-



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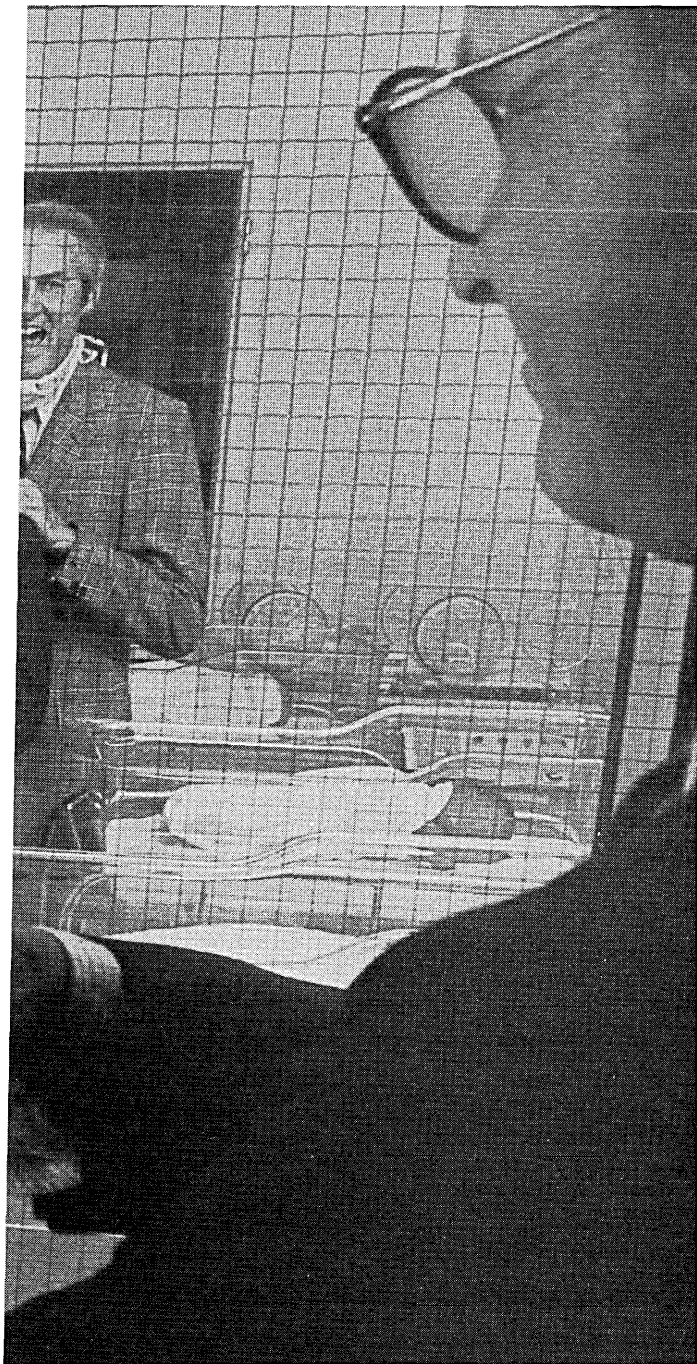
***"To look at it, would you guess it has the  
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The Suit beckoned us closer. "For the VM/CMS users, and there are some 600,000 of them concentrated in big business, financial institutions and government, this little baby means new life for their existing programs and applications."



### **A 'personal mainframe' no less.**

The Chip chimed in. "It is a personal mainframe that provides greater productivity for the individual user, enhances the performance of existing applications, leverages a company's investment in IBM systems and software, and provides access to sophisticated, modern computing environments such as FOCUS™ and RAMIS II™"



—and all at a price affordable by the single user.

We were talking with the Suit and the Chip at their new headquarters in Trumbull, Connecticut. They founded Canaan Computer Corporation in 1981. Prior to that, the Suit, Bob Bernard, was the founder of National CSS, a leader in the development of commercial time-sharing. The Chip, Nick Pisarro, was a major technical contributor there. We asked what makes the Canaan Computer stand out of the teeming mass of new computers.

### **CMS user freed at last.**

"It's simple," explained the Suit. "Recent developments like multi-window graphics and Ethernet™ are giving some buyers of new computers vastly increased capabilities. But as far as the IBM mainframe user has been concerned, these new powers don't exist. The CMS user has had to be satisfied with decade-old technology. With the introduction of the Canaan Computer, that CMS user can now have it all."

### **Multi-window graphics, dedicated interactivity.**

"What we have done," said the Chip, "is develop a machine that provides these state-of-the-art capabilities, and runs the user's IBM mainframe programs with no changes required. So, for the very first time, CMS users, or even non-users who want to take advantage of all that IBM software, can have very high-resolution graphics, networking for shared resources, super interactivity, more computing power than they can ever get on a shared centralized computer—and all in a package the size of a two-drawer file cabinet."

Multi-window graphics, local area networking, a dedicated processor for each user: is there anything else you want the business community to know, we asked?

"Yes," said the Suit. "Our address. So they can write or call for more information. Or to order a machine—they're ready for delivery now. It's Canaan Computer Corporation, 39 Lindeman Drive, Trumbull, Connecticut 06611 (203) 374-5592. Ask for the Suit."

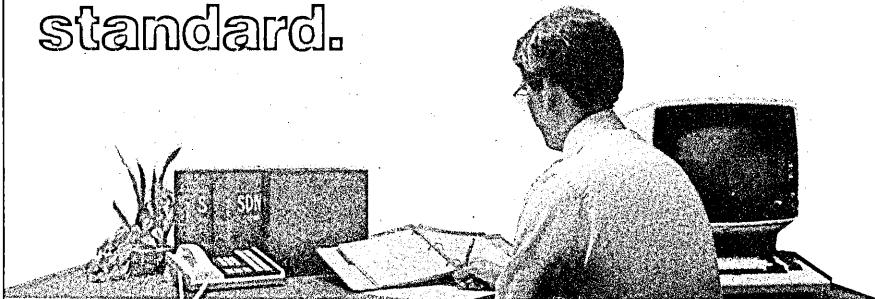


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CIRCLE 48 ON READER CARD

## NEWS IN PERSPECTIVE

time president of General Automation, recently added a vision capability to its line of robots. It takes the form of an add-on package that incorporates a software system to use with existing cameras and robots. Price is under \$10,000.

Automatix, Billerica, Mass., supplies both robots and vision systems assembled from a small number of standard modules. Systems for quality control and automatic inspection sell for \$30,000 to \$80,000.

Another company that combines vision systems and robots is Everett/Charles Automation Systems, Inc., Pomona, Calif. Its visual inspection systems range in price from \$25,000 to \$75,000 and can be integrated with its assembly robot to provide a turnkey parts-handling system.

Machine Intelligence Corp., Sunnyvale, Calif. has a two-dimensional vision system using a solid-state camera for robotic and inspection applications that markets for \$35,000, uses a DEC LSI 11/23 micro-computer, and interfaces with a number of robots. Its latest product is the Model 3030 Intelligent Robot Systems, which is an advanced robot product resulting from a joint venture agreement with Yaskawa Electric

### A host of companies here and abroad have entered the market with varying degrees of success.

Manufacturing Co. Ltd., Japan. Fully integrated, the computer-controlled robot is capable of vision sensing and direct downloading of programs from a control computer. Units are expected to sell for \$75,000.

A somewhat different approach to visual recognition is taken by Robotic Vision Systems, Inc., Melville, N.Y., which has a real-time 3-D vision sensor that uses a low-power laser scan. For the sensors and computer control, the system sells for \$35,000 to \$55,000. When combined with a compatible robot and accompanying software, it would typically go for \$250,000, a spokesman says.

Other U.S. companies supplying only vision recognition systems, which may or may not be adaptable to robots, include: Applied Intelligent Systems, Ann Arbor, Mich.; Cognex Corp., Needham, Mass.; Control Automation Inc., Princeton, N.J.; Object Recognition Systems Inc., New York, N.Y.; Octek Inc., Burlington, Mass.; and Perception Inc., Farmington Hills, Mich.

Several European companies are trying to bring their vision systems to the U.S. market. One is Cambridge Instruments Ltd., Cambridge, England, which sells its \$30,000 Quantimet 10 to oem builders of inspection systems. Image Computer Systems N.V., Schilde, Belgium, is looking for a U.S. distributor for its ICOS 2000 system, and Stonefield Omi-

# HARD FACTS

## ABOUT THE REAL LEADER IN COMPLETE SOFTWARE FOR BUSINESS: RAMIS II FROM MPG



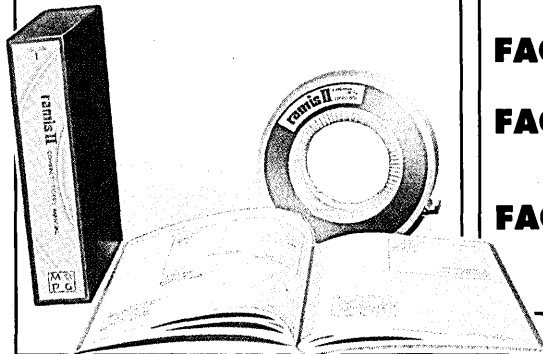
### FACT:

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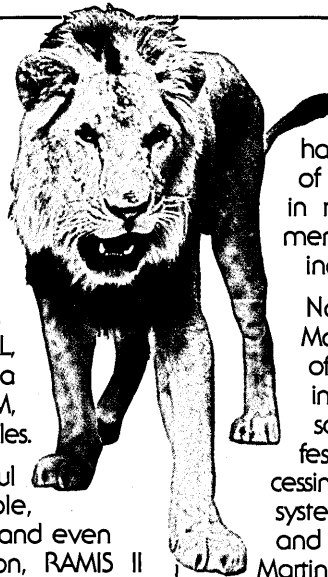
**FACT:** More copies of RAMIS II have been sold than all other 4 GL's combined.

**FACT:** RAMIS II English comprehension responds to everyday English commands.

**FACT:** MPG developed the first practical relational language.

**FACT:** There's no more powerful system for screen-based applications than RAMIS II.

**FACT:** RAMIS II was the first product designed for both application building and Information Centers.



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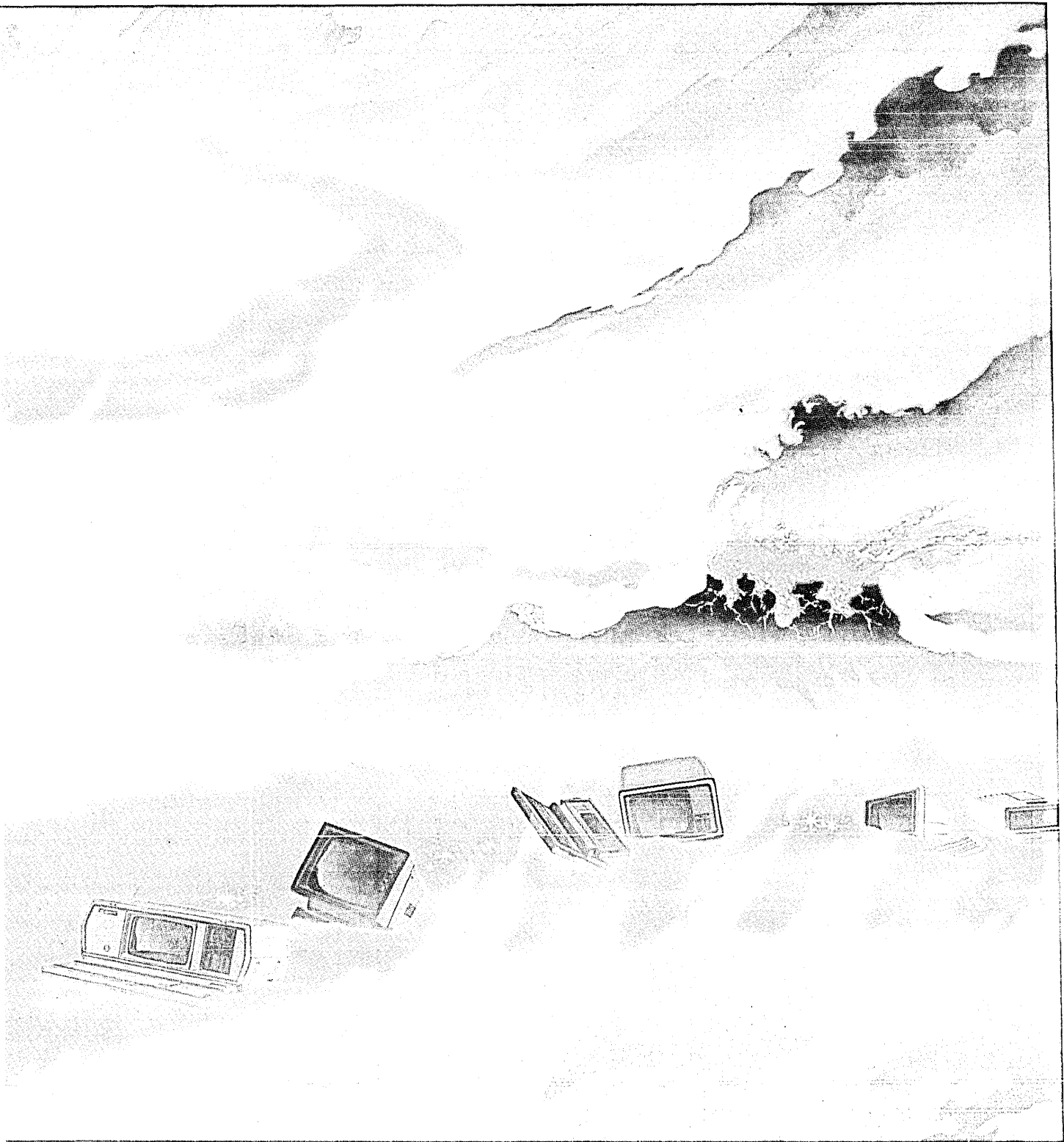
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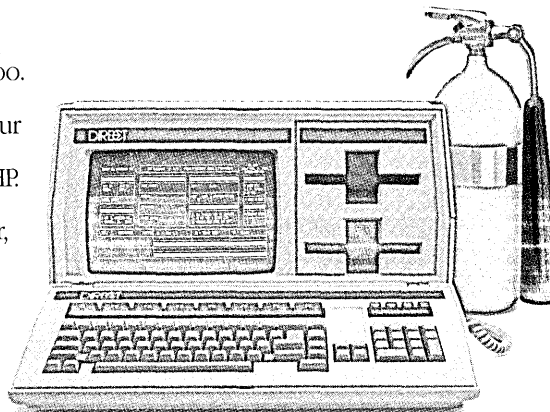
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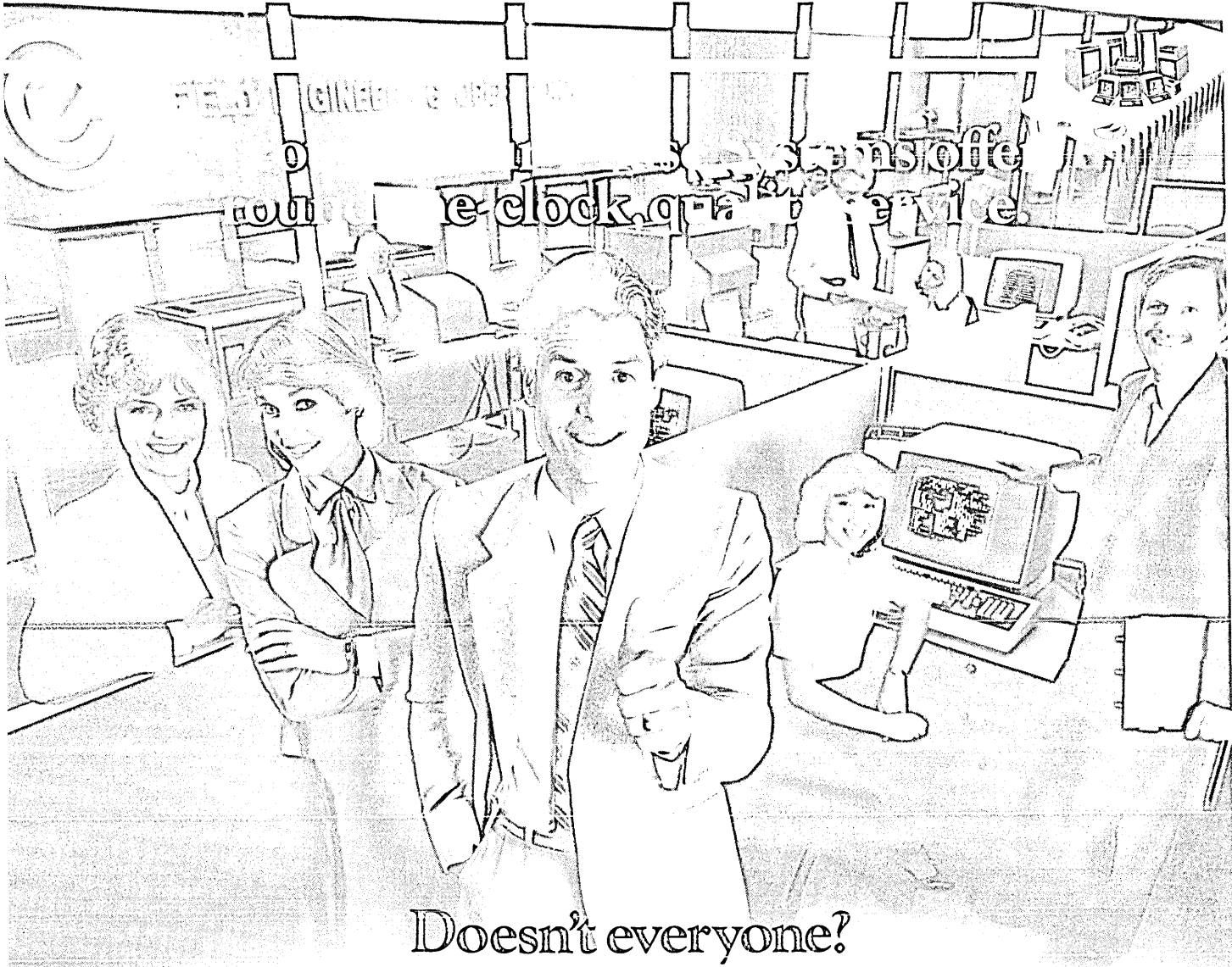
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## NEWS IN PERSPECTIVE

ron Electronics Ltd., Horsham, England, is out to find oem customers for a parallel image-processing system.

Dicken believes that "in this stage of the market development, the successful companies will be those with sufficient financial backing to continue with their investments in the development of new, cost-effective, machine vision products. Most contenders seem to recognize this fact."

View is in fact ending its bootstrapping days. Hubach doesn't want to go public "yet" but in early September he was talking to Merrill-Lynch about a private placement.

# CAMERA FOR A CPU

**Digitizing images with an electronic camera makes many machine-vision applications easier to implement.**

by Edward K. Yasaki

To hand-digitize a detailed map, tracing every line carefully, could take from eight to 10 hours, and there's still the chance that errors will creep into the resulting work. Now, with an electronic digitizing camera, that work can be done in less than three seconds. The effect on productivity can be staggering.

"What we're really doing . . . is eliminating the bottleneck that people have inputting documents into a computer system," says Ron Alper, president of a Newport Beach, Calif., company called Audre Inc. The firm's name comes from its products, which are automatic digitizing and recognition systems.

More than a document preparation and input system, however, Audre's systems are also being used for the inspection of products coming off assembly lines. In the manufacture of keyboards, for example, it is possible to store the image of a master layout; as keyboards are manufactured, a picture is taken of each new unit and this image is overlaid with the master layout to assure that keys were placed in their correct positions. The same technique applies to the inspection of printed circuit boards, where one looks for inadvertent breaks in circuit lines, and to the preparation of schematic and architectural drawings.

The camera being used by Audre comes from Datacopy Corp., Palo Alto, Calif., which has transformed itself from being a contract R&D firm to being a vendor of the digitizing cameras. The company

was founded in 1973 by Armin Miller, the inventor who founded Data Disc in the 1960s to make disk drives. Although Miller is no longer active in Datacopy, the new firm still considers itself a maker of computer peripherals. Its new camera is said to be the "eye of a computer."

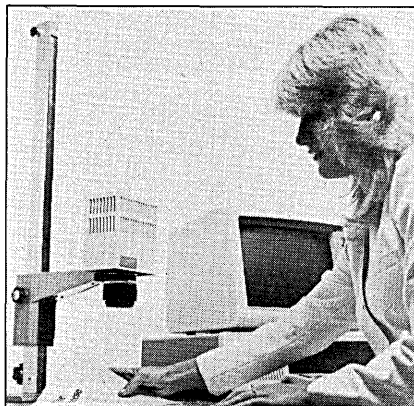
"Our real contribution has been one of making electronic imaging cost-effective," says president Rolando C. Esteverena, who formerly was vice president and general manager of the computer systems division at Zilog. The camera, slightly larger than a 35-mm model, is priced below \$8,000. Using a linear array of 1,728 charge-coupled devices, it exposes an area about the size of a 35-mm color slide, producing a matrix of 4.9 million picture elements. The resolution is expressed as 1,728 by 2,846 elements or pixels, each represented by eight bits that provide up to 256 shades of gray.

For an 8½ × 11-inch document, this translates into a 200 dots-per-inch resolution. The camera, of course, could be moved closer to the page to view only a portion of it, effectively increasing the resolution on that part of the page. And this is true also of three-dimensional objects. A very high resolution can be achieved by changing lenses and focusing in closer.

Explains Audre's Ron Alper, "In inspecting some hybrid circuits that we deal with, which are about an inch by an inch and a quarter, we can get up to about a thousand lines per inch [resolution]," and that makes it possible to reproduce a 5-mil line.

The camera produces a digital bit stream and thus is not to be confused with the Sony Mavica. The latter records on a tiny magnetic disk with an analog signal, which is then transmitted to a home tv set for viewing. "Television cameras are inherently of a lower resolution," explains Esteverena.

The Datacopy camera is appropriate



**EYE OF THE COMPUTER:** Datacopy's digitizing camera is said to enable office workers to enter drawings and other graphics directly into a computer without the use of a keyboard. Prices begin at \$7,850.

for "high-resolution, wide field-of-view, noncontact measurement applications," says Nicholas Bedworth, president of a system integration firm called Microtex Corp. that uses cameras from a number of sources in its image digitization systems. The Cambridge, Mass., firm, which integrates cameras with Digital Equipment minis, has sold its model 7602 imaging system to the Canadian Public Archives in Ottawa. It's used there for viewing microfilm through a microscope to inspect for image sharpness—to determine that the film has been exposed and developed properly.

Microtex systems are also being used for noncontact measurement. A steel plate a mere 12 inches wide could be measured for deviations from flatness to a millionth of an inch, using a holographic technique. A laser projects a pattern of light onto the plate, and distortions in that pattern can be measured to determine the flatness of the surface. Similarly, the 7602, which incorporates the Datacopy camera, is used

**"Television cameras are inherently of a lower resolution."**

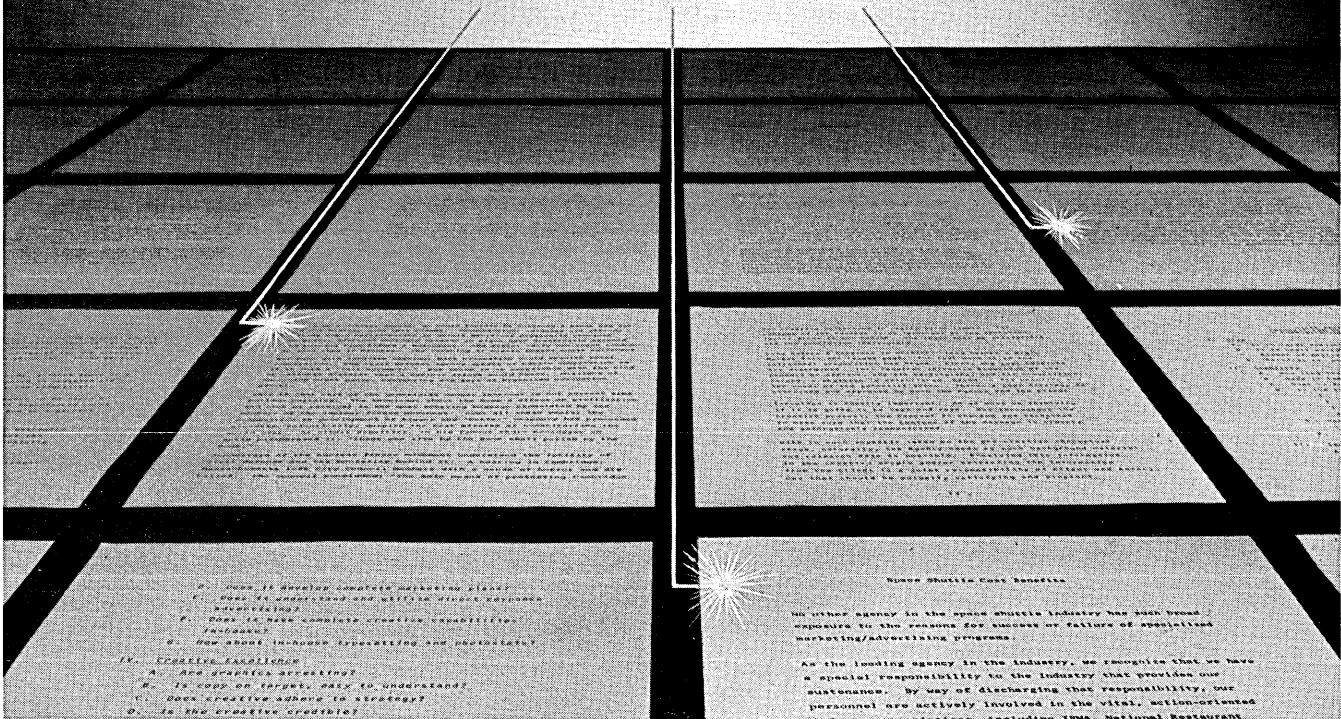
in the aerospace industry to inspect composite materials that increasingly are replacing various metals in airframes.

While the Datacopy camera is capable of producing detailed images of two-dimensional art and three-dimensional objects, it is the office automation market that most interests the company. These applications include electronic document generation, document storage and retrieval, and information distribution. The office automation market also interests Ron Alper at Audre Inc. His workstation, based on a proprietary 16-bit computer with the power that he equates to a VAX, can accept an image from the camera, edit it, add text, and rearrange graphic elements in the production of documents. It can store a document on a Winchester disk or print it out on an electrostatic or a laser printer.

That company has also developed something it calls entity recognition, which takes the raster image from the Datacopy camera and converts it to a vector format. Such a system can recognize lines, curves, solids, and characters, and now it can become a front-end to a CAD/CAM system, as well as to a printing and phototypesetting system.

Datacopy vice president James P. McNaul, seeing applications for the camera in facsimile and similar systems, feels it could become as ubiquitous as other peripherals that are beginning to appear in offices. As prices of those devices decreased, he explains, they began showing up on each floor, then in each department. "You're going to see the same thing," he says hopefully. "You're going to have a basic image capture system. Anybody can walk down

# "Space Shuttle"



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CIRCLE 52 ON READER CARD

## NEWS IN PERSPECTIVE

the hall, put his document down, and capture that image. Then it can be sent through a network to the reproduction center" where that image can be integrated with text. Or the user could call it up on his personal computer. "It just becomes another resource" on a network, he says.

Datacopy recently introduced an interface box for its camera that connects to an IBM P.C. Other personal computers are expected to be attachable in the future, according to Esteverena. He noted that the camera will have an end-user price of \$7,850 and will be sold direct to system integrators and major oems.

The interface, to be available next month, will list for \$795, including software. The company expects to concentrate its marketing efforts on office automation equipment builders.

## TELECOMMUNICATIONS

# CHICKEN LITTLE TALK

**Concern over AT&T's impending divestiture dominated the Tele-Communications Assn. (TCA) conference.**

by Edith Myers

Among telecommunications users and vendors, 1984 conjures up visions of "Ma," not Big Brother.

The imminent breakup of "Ma Bell" was on the minds and the tongues of almost all participants at the annual Tele-Communications Assn. (TCA) conference in late September in San Diego. It was open season for guessing what will happen "after divestiture" or "after 1/1/84."

"All of us have sought and continue to seek information on the divestiture of the American Telephone & Telegraph Company and knowledge of the future operations of the seven new independent companies, ATT Information Systems, and AT&T," said Charles S. Dobruck of White Memorial Medical Center, chairman of the board of TCA, in his opening remarks at the conference.

"The decisions of Judge [Harold] Green will have a definite effect on each and every one of us, not only for what impact [they] will have on the communications budgets within our respective companies, but [for] the critical item of service, when dealing with multiple companies. Jan. 1 is slightly more than 90 days from now and we will be living with divestiture



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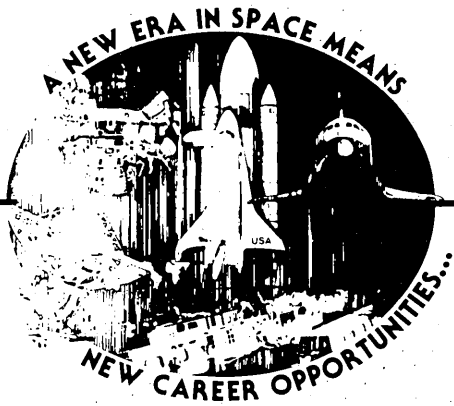
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Space Information Systems Operation

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## NEWS IN PERSPECTIVE

from that time forward."

Ray H. Fentriss, senior vice president of marketing at Satellite Business Systems, McLean, Va., called worrywart talk about post-divestiture "Chicken-Little-type commentary."

"The sky will fall, as you know, on Jan. 1," said Fentriss, "when the American Telephone & Telegraph Company goes through a change such as this country hasn't seen in more than 70 years—not since the breakup of Standard Oil Company. But, just as the energy industry and the economy survived the breakup of Standard Oil, I think we will manage alright after the breakup of AT&T."

Large telecommunications users, said Fentriss, "have been left in the lurch in preparing for post-divestiture. Large users have been accustomed to a single point of contact in arranging for their service requirements. Now, of course, they face multiple points of contact, even if it's just to maintain current services." He wondered if large telecom users will be forced to develop their own in-house telephone companies, "if only to pin-

### "Future communications systems will be measured by how they handle data."

point trouble and to assign responsibility to the appropriate vendor."

Gary Peacock, a vice president of Lincom, Dallas, believes in-house expertise is an answer for small as well as large users. Lincom is a newly created division of Lincoln Property Co., Dallas, organized to provide "an in-house telecommunications consulting service" for tenants in Lincoln Properties' 700 commercial buildings. "With deregulation, our tenants are confused," said Peacock.

Lincom has signed up for the "shared tenant services" offering of Intecom Inc., Allen, Texas, which is based on the company's integrated Business Exchange (IBX S/80T). The IBX, said an Intecom spokesman at TCA, "provides the ability to lease voice and datacom service to businesses in a multitenant office facility."

"We're ready for these changes [expected after divestiture] at GTE," said Jack E. Donnelly, president of GTE Business Communications Systems (BCS). BCS, he noted, was established as a new entity 18 months ago from several previously existing divisions to "complement and strengthen GTE's commitment to total communications, to orchestrate the integration of services. We intend to make computer conversation as easy as people conversation."

GTE announced four new products at TCA. "They all concentrate on data," said Donnelly. "Future communications systems will be measured by how they handle data." The four products are the OMNI S111, an integrated communication system that can switch voice and data simultaneously; a

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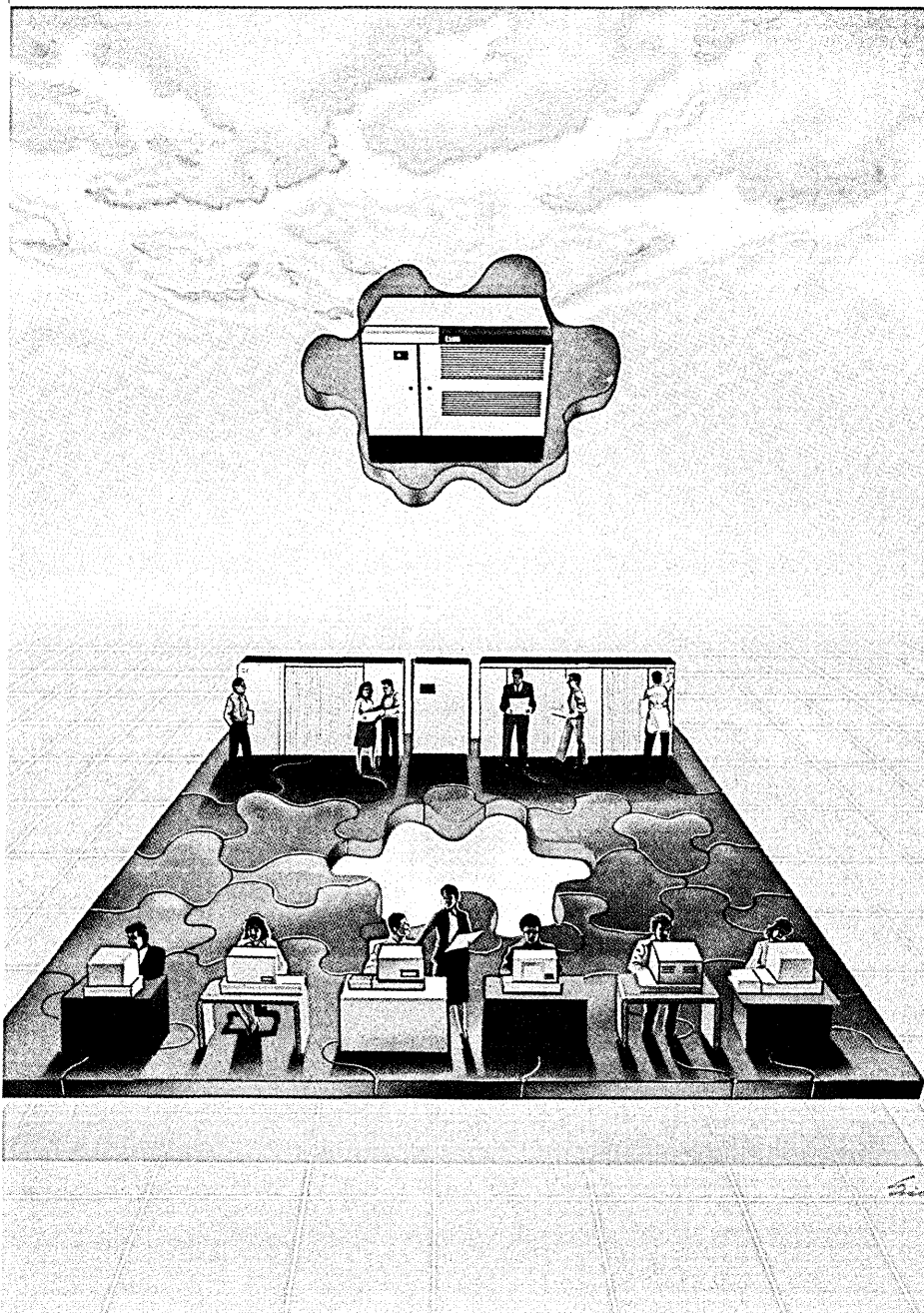
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## NEWS IN PERSPECTIVE

series of programmable featurephones; a packet-switching data option for its OMNI and GTD communications systems; and a voice messaging enhancement for its GTD-4600 communications system.

David F. Hemmings, general manager, Local Area Communications Business Unit, Teltone Corp., Kirkland, Wash., said users at TCA "seemed highly sensitized to the notion [that] they'll be on their own soon, that they'll have to solve their own problems." He said Teltone did more business at TCA than it had done in the preceding 11 months.

Fentriss of SBS said he thinks the pending breakup of AT&T bodes well for private, value-added networks. "The one value-added that will be especially crucial after divestiture," he said, "is the provision of a single-point-of-contact management of a company's telecommunications requirements."

He said he believes "the vast majority of companies will instead want to continue to place their requirements in the hands of one full-service vendor rather than several and to hold that vendor responsible for end-to-end service performance. The fact that there is now a choice as to who that vendor will be does not alter the basic requirement. To fulfill that requirement, the obvious candidates are the private-network vendors that have the necessary resources and commitment."

That the specter of divestiture heightened overall interest in the TCA conference was evidenced by press coverage three times larger than the meeting usually draws. And fliers describing a 465-page, \$3,500 study by Probe Research Inc., Morristown, N.J., on "The Future of the New AT&T, After Divestiture," were gobbled up like the proverbial hotcakes.

## SMART PHONES EMERGE

**A melding of telephones, terminals, and personal computers is producing a new breed of executive workstations.**

**by Edward K. Yasaki**

Advertising campaigns are currently hyping executive workstations based on a personal computer with software for spreadsheets, graphics, personal appointments, and electronic mail. Integrated applications programs that enable the user to see arrays of numbers isolated in cells, elongated as bar charts, and embedded in a memo before

having it whisked away to someone else's desktop, all under the control of a mouse, purportedly offer the executive on the go the chance to get more accomplished and spend less time at his desk.

A recent study of how the middle manager spends his time in the office, however, found that from 60% to 80% of the day is spent communicating, and perhaps only 6% computing. He is most likely to be reading mail, using the phone, or attending meetings. "He's talking to people or to machines," says C.J. Stephens, chief of Basic Telecommunications Corp. "Why is it,

then, that everybody thinks a personal computer is a de facto standard for a workstation?" he asks. "We think that's inappropriate, that they're difficult to use."

Accordingly, the small Fort Collins, Colo., company Stephens cofounded has developed a combination ASCII terminal and telephone that it calls a DataVoice terminal (DVT). It's intended not for people in upper management, who seldom use a terminal or PC, but rather the management layer below. "We looked at this middle manager as the working manager," says Stephens, "the roll-up-the-sleeves

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manager who probably does most of the things in an organization.”

The DVT, based on a Z80A microprocessor and with 16KB of memory, can be connected to a PBX or used at home. It performs many functions found in more advanced telephones, including the storing and forwarding of both voice and data messages and the automatic dialing of a number retrieved from a directory of up to 100 names. In an off-line mode, it also performs simple word processing. The price of a basic DVT is \$2,150, while a model with an integral cassette tape drive costs \$2,500.

A different approach to this kind of office workstation, again with an emphasis on communications, has been taken by a startup called Cygnet Technologies Inc. The Sunnyvale, Calif., company recently unveiled an intelligent phone that is designed initially to be used with the IBM P.C., which serves as an information generating and analyzing engine. Cygnet's Communications Cosystem, which it calls "the other half of your PC," is said to match the personal computer's ability to process information with the ability to gather and distribute it.

The Cosystem, also based on the Z80, is a virtual micro PBX. Not surprisingly, it has many more communications features than the DVT, while being able to function independently and in conjunction with a PC. The user can run, for instance, a spreadsheet on the PC while engaging the Cosystem in a different task. If the screen on the PC is required, the Cosystem performs the interrupt, rolls aside the application, placing the screen image in a buffer until the communications task is completed, and then brings back the screen to continue the spreadsheet operation.

Cygnet is willing to license the use of the Cosystem to software houses and systems integrators. To accommodate vertical-industry software, the Cosystem includes hooks, such as terminal emulation packages for the IBM bisync environment. There's also a small call detail recording feature on the Cosystem, logging all calls in and out, the time, duration, number called, etc. For lawyers and consultants, this could be used

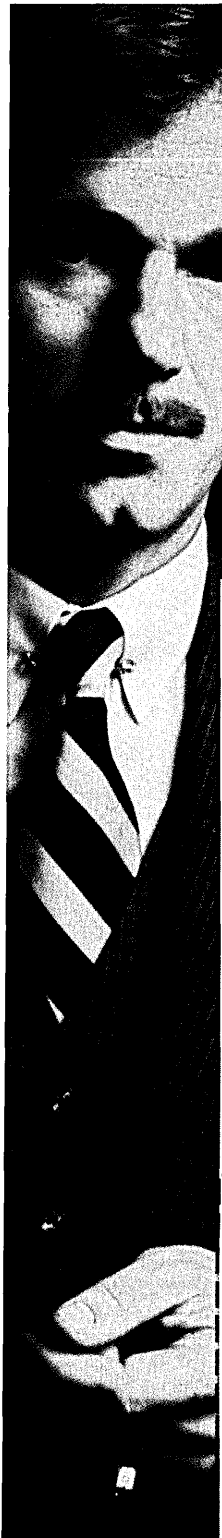
### The terminal and personal computer are inappropriate for upper management, says C.J. Stephens.


for billing purposes, given the proper software. Another feature, called Project, can be logged into and used to record the total time spent on a job or project. The basic price of the Cosystem is \$1,500, sans the PC.

Similar desktop workstations combining telephone with terminal have been announced previously, including the Cypress from Rolm Corp., the Santa Clara, Calif., PBX maker. The Cypress functions as a DEC VT100-compatible terminal or as an IBM 3270 look-alike. As with the DTM and the Cosystem, there are "soft" keys whose functions vary depending on the application.

An obvious problem with an adjunct device like the Cosystem is exactly that: it is an additional device on the desktop, vying for space with the growing array of desktop devices. "A lot of people say, 'Gee, where am I going to put it?'" says Jerry A. Klein, marketing vp at Cygnet. His answer is that the amount of desktop space occupied by the Cosystem is about the same as the average business telephone, so it's an even swap.

One company long sensitive to this issue is Hewlett-Packard, which has been stressing the small footprint of its desktop computers. At HP, too, there is an interest in integrating a phone with a PC, something that could be accomplished without enlarging that footprint. "What's fascinating is that all the electronics to do a far better job of the phone functions than the phone does are already in the personal computer," says HP's Paul Ely. "We just need to harness it." But he refuses to say when such a prod-



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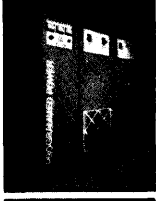
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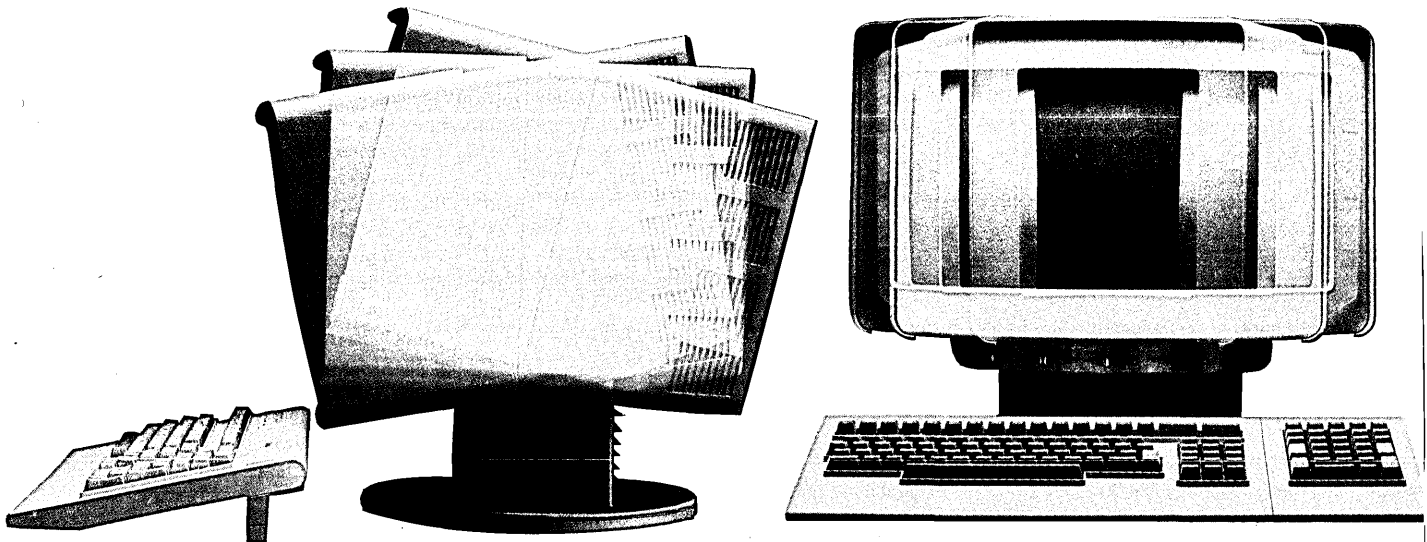
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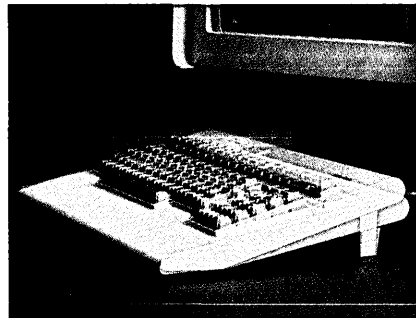
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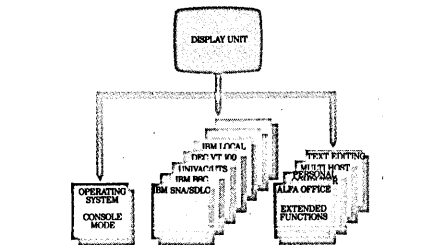


## IT MEETS SYSTEM NEEDS.

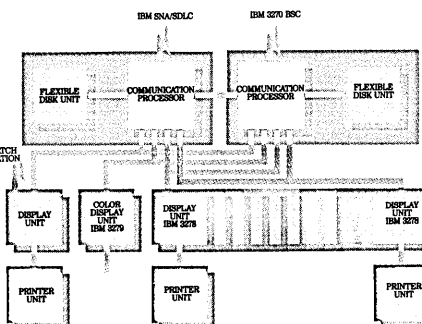
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uct might be forthcoming from HP.

Klein acknowledges that the Co-system is but an interim solution toward the truly integrated workstation—the single desktop package, preferably with a small footprint, performing both the communications functions and data processing. But he doesn't see such a box for at least five years. "Not that it can't be done now," he admits. But it's still not clear what functions in such a workstation are being sought by the buyer, who in turn will not know until he has had the interim product on his desk in real-life situations. Thus the need today is for flexibility in the product. Adds Klein, "The PC provides the core element for that kind of flexibility."

## APPLICATIONS

# HOTELS GO ON-LINE

**Changes in telephone regulations and policies make automation more cost effective for the lodging industry.**

by Edith Myers

The Federal Communications Commission and the telephone company can claim a big chunk of credit for pulling the change-resistant lodging industry into the age of automation.

In 1982 the FCC eliminated phone-call resale restrictions on interstate calls and made it possible for a hotel's telephone department to resell telephone services to guests. On Jan. 1 of this year, the Bell System quit paying hotels a 15% commission on their guests' long distance phone calls.

The result: a boom for phone-call accounting systems. The American Hotel & Motel Association (AH & MA) says its 1983 technology survey showed that well over 2,500 phone-call accounting systems have been installed or are on order, with most of the sales having come in 1982. Interest in the acquisition of phone-call accounting microprocessors was rated highest of all kinds of technology. More American lodging properties ordered phone-call accounting systems last year than had ordered data processing systems in the past 20 years, the AH&MA claims.

The association believes that phone-call accounting systems will continue to be the hot item through 1983 and part of 1984. "Those specialized microprocessor systems have too good a payback to be ignored. The market window will be relatively short term simply because, by sometime

in 1984, the market will have become saturated," says the AH&MA report.

It noted that the 1983 survey showed that call accounting systems of at least 41 companies are now installed in American lodging properties, but only 30 of these companies are still in business. Big among these are American Bell, Conrac Corp., Summa Four, and Western Union.

Al Cosentino, president of EECO Computer Inc., Santa Ana, Calif., says the boom in call accounting systems has been good for purveyors of data processing systems for hotels. "The resistance has always been a lack of cost justification. That's why we could only penetrate large properties. Now cost accounting systems are easy to cost justify and we can tie our systems into call accounting."

EECO is a pioneer provider of property management systems (PMS) for hotels. It has been selling such systems since 1969. When the AH&MA made its first technology survey in 1970, the only turnkey minicomputer installations in the entire lodging industry were two EECO hotel systems in Newport Beach, Calif., and Puerto Rico.

Cosentino says that of some 45,000 hotels in the U.S., only about a thousand have more than 1,000 rooms. These are the ones that were able to cost justify information systems in the '70s. EECO has installed systems in 135 of these larger properties in the U.S. and abroad.

"You have to look at what these hotels need. They have to have systems that will work 24 hours a day, seven days a week, and 365 days a year. They need reliability and redundancy and that's expensive," states Cosentino. He speaks of an EECO system that was installed at the MGM Grand in Las Vegas at the time of its disastrous fire several years ago. Because of off-site backup, the system was up again within 24 hours, "and they never lost a billing." The MGM Grand is still an EECO customer.



AL COSENTINO: "We may come up with a standalone PMS system based on a micro."

In addition to its installations in large properties, EECO has installed shared systems for chains of smaller hotels. Then, early this year, it introduced stripped-down versions of its PMS—first an intermediate system for hotels with 500 to 1,000 rooms, and just last month a smaller system for properties with 100 to 500 rooms.

The AH&MA says some 2,000 properties now have on-site data processing equipment. "Although that indicates a healthy increase [since a 1980 survey] in the use of computers, there clearly is still a

## AH&MA lists 43 vendors of turnkey property management systems.

long way to go, since that represents only 42.1% of survey respondents. For most of the others, the only automated application is payroll, provided by their corporate headquarters or by data processing service bureaus," says the association's report.

AH&MA lists 43 vendors of turnkey property management systems. Most of them are systems integrators; only EECO, IBM, ICL, and NCR offer systems based on their own equipment. The association conducted technology surveys in 1970, 1976, 1980, and this year. The vendor cast through those years has been changed by dropouts, mergers, and acquisitions.

Sigma Data, a leader at the time of the 1980 survey, ceased operations shortly after. N.V. Philips acquired international rights to Sigma Data systems and North American Philips the U.S. rights. Despite separate enhancement projects, both later left the market. Cara got the overseas version and Cutler-Williams, which offers Four-Phase-based systems, attained software rights in the U.S.

Meanwhile the founder of Sigma Data formed a new company, CAMAC, aimed at producing an enhanced system. Before full development, the company was sold to International Data, which completed development and later sold marketing rights to C-Systems, which offers a PMS based on Honeywell computers.

When Fast-Inns withdrew from the lodging market, it sold software rights to its hotel system to four companies, each of which took a different approach. PDPS System Sales started marketing the software with only minor modifications. PDPS's hotel systems are Datapoint based. Heineken, also Datapoint based, modified the Fast-Inns software for the European market. Another Datapoint oem, Encore Lodging, enhanced the original software extensively. A fourth, Marlboro, used the Fast-Inns software as a guideline for restructuring its system to take advantage of newer programming techniques.

A Canadian hotel that had been using the Fast-Inns software hired some former Fast-Inns personnel to develop an en-

## NEWS IN PERSPECTIVE

hanced software package that was marketed by Hospitality Data Systems, which later sold out to Infotel, still another Datapoint oem.

When both Singer and Olivetti left the hotel market, key personnel from the hotel divisions of both companies formed Hotel Data Systems and designed a new package that was supposed to incorporate the best features of both predecessors. ICL, which acquired Singer Business Machines, inherited HAGAS, a hotel system, and modified it for European requirements.

All this volatility has not been en-

tirely negative, says the AH&MA. "The seasoned survivors have steadily improved their systems and the newcomers have learned from the mistakes of the dropouts."

Reservations systems provided most hotels and motels with their first exposure to data processing. AH&MA says changes in central reservations systems have been evolutionary rather than revolutionary.

Compass Computers, Dallas, is the only outside provider of reservation services for chains. AMRES, the only system for independents, recently switched from

being a call-switching system to a computer-based system.

The Westron software package, developed by United Airlines for Westin Hotels, has become the most widely accepted software base for major chain reservations systems. It is used by the Westin, Ramada, Best Western, Days Inns, Holiday Inns, Hyatt, and Quality Inns chains.

Marriott Hotels plans to switch to an expanded Westron-based system in 1984, to facilitate an interface with airline reservations systems. Marriott's present reservation system was expanded in 1982 to permit direct interface to PMS installations at several of its hotels.

A joint venture between Burroughs and AMFAC is developing a central reservation system that is concentrating on the needs of resorts and lodging properties.

Sheraton has expanded its central reservation system worldwide, with satellite computer systems on three other continents. The global system permits any of four computerized centers to confirm reservations immediately for any Sheraton hotel.

Office automation is moving more slowly in the lodging industry. AH&MA's 1983 survey indicates that word processors

**"The seasoned survivors have steadily improved their systems and the newcomers have learned from the mistakes of the dropouts."**

are beginning to be a factor but that full office automation is still in the future.

Within the U.S., probably the most comprehensive program for the development of hotel office automation is Sheraton's Office Automation Project (SOAP). Test sites will be in the Sheraton Center in New York, Sheraton Park Central in Dallas, and Sheraton Grand in Los Angeles. The two-year program is designed to provide word processing, electronic mail, and convenient access to information on convention and other group functions. The Wang-based office automation network will permit communication within each hotel's offices, as well as with the hotel's computer system, with the Sheraton corporate data processing and reservations systems, and with corporate headquarters.

Frost & Sullivan Inc., a New York-based market researcher, says the lodging industry, which has special needs that computer people initially did not understand, favors standalone systems. The larger chains, notes F&S, not only expect automation to improve management reporting and controls but also to handle ancillary services such as housekeeping, room security, and environmental controls.

The AH&MA says multipurpose technology has just started to affect the lodging industry, but new system releases assure that it will have growing importance.



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## NEWS IN PERSPECTIVE

"Newly released telephone systems have the capacity to assist with fire safety, energy cost control, security, data communication, phone-call accounting, and electronic mail. Data processing systems are being expanded to affect every one of those areas. Automatic wake-up systems have been expanded to include phone-call accounting, energy control applications, message registration, rooms management, and fire safety. Master tv antenna systems are becoming the basis for multiple-purpose technology systems that go far beyond the delivery of guest room entertainment."

Micros didn't show up at all in the AH&MA's 1980 survey. The 1983 survey shows that more than 600 are now installed in individual properties or multiproperty headquarters. "It seems certain that use of microcomputers will have a crabgrass rate of growth in the lodging industry in the future," the report states.

AH&MA adds that the smallest property reporting use of a microcomputer was the 24-room Lane Guest Ranch of Estes

### **"It seems certain that use of microcomputers will have a crabgrass rate of growth in the lodging industry."**

Park, Colo., which has developed its own programs for reservations and guest history. The largest reported user of micros is Holiday Inns, which supplements its large central computer installation with 30 personal computers at its executive offices and in individual operating departments. In addition, 48 individual Holiday Inns are using 11 different models of microcomputers.

Of the 43 property management systems now on the market, AH&MA says six new entries are based on pcs.

EECO's Cosentino has plans for micros. He plans to offer them for three purposes: to interface with EECO PMS systems, as standalone business systems, and for use by guests in rooms. There's a possible fourth: "We may come up with a standalone PMS system based on a micro." For the first three purposes, EECO would use existing microcomputers. For the fourth, it would develop its own.

The AH&MA's 1983 report says, "Multipurpose guest room terminals will intrigue the lodging market more than they will affect it in the next couple of years. Original investment costs are still high, and many of the potential services take time to develop."

That's just what Travel Host, a Dallas company, found out as its ambitious plans to install 100,000 hotel room terminals by the end of this year floundered last summer. With only 3,000 units installed, the company stopped taking orders. It cited technical difficulties and "issues of profitability" as reasons for its slowdown, but held fast to a prediction that 500,000 termi-

nals would be installed by 1986. The company claimed to have a backlog of 20,000 terminals.

HotelTech International, Belvedere, Calif., announced in July a contract to install 450 personal computers in the AMFAC Hotel & Resort at Dallas/Ft. Worth airport. Installation will be in December.

The SuiteTalk computer, introduced in June in San Francisco, offers the guest a city guide, fire and emergency information, video games, up-to-the-minute stock quotations, news, and business programs. The system is based on a central host called Concierge. SuiteTalk units in guest rooms will communicate with Concierge via tv cable and telephone lines. A hotel pays \$1,000 a month to lease the Concierge and \$30 a month for each SuiteTalk.

An infinite number of terminals can be connected to a single Concierge because, explains Dudley Warner, HotelTech technical director, "while it appears to guests to be an interactive system, it isn't. It accesses information that is being continually scrolled as with Teletext."

Susan Martel, a founder and vice president of HotelTech, said, "Our network costs will be comparable to The Source and CompuServe. For the cost of a telephone call, guests can communicate with home or office. Access to stock quotations, airline schedules, business software programs, word processing, video games, bridge, and chess will cost the hotel guest approximately \$9 per hour at night and \$20 per hour during the day.

A more imminent and similar installation will be put into a Phoenix area hotel this month by International Anasazi of

Phoenix, which was acquired in September by Visa USA. It's called Pircs (for personal in-room computer system). Using a micro and a keypad and unused channels on the in-room tvs, Pircs will give guests access to hotel amenities like room service, as well as outside databases and their own company databases. In addition, software such as VisiCalc or word processing packages can be downloaded from the hotel's host cpu for use by the guests in the rooms.

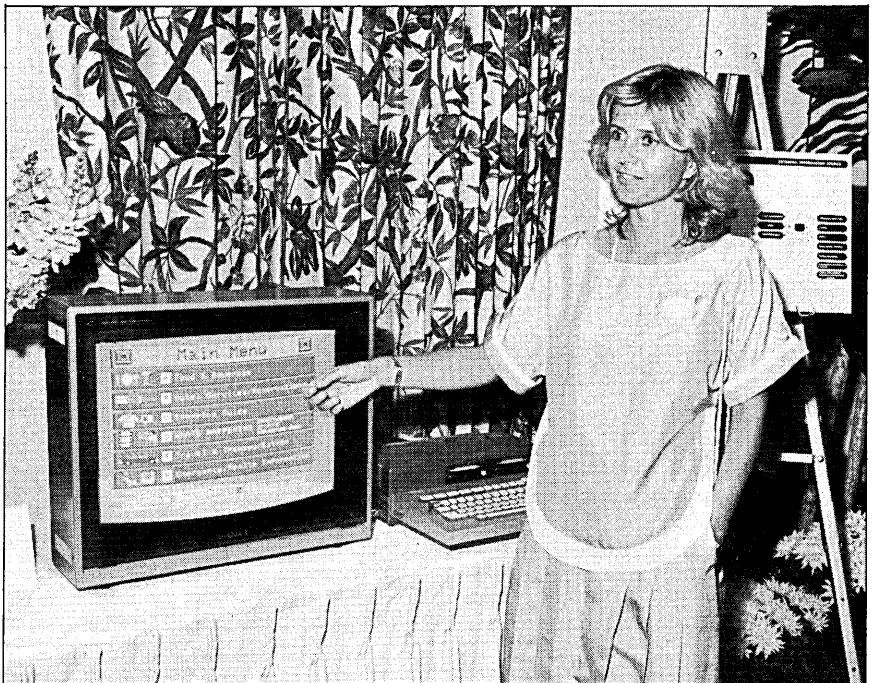
For the cost-conscious hotel industry, both SuiteTalk and Pircs have a revenue producing feature. A hotel can sell

### **A hotel can sell advertising to go along with the information services it provides on local restaurants, shops, and sight-seeing attractions.**

advertising to go along with information services it provides on local restaurants, shops, and sight-seeing attractions.

"This is an entirely new advertising medium, which the hotel controls completely," said HotelTech's Martel. "The potential for advertising revenue is virtually open-ended."

A somewhat more exclusive in-hotel-room capability will be available shortly to tenants of office buildings owned by Lincoln Property Co., Dallas, who also happen to stay at hotels operated by Lincoln. Lincom, a Lincoln subsidiary, has contracted for a shared tenant service network from InterCom Inc., Allen, Texas, which will tie together office buildings and hotels so that traveling tenants can talk to their Lincoln office computers from Lincoln hotels.



SUSAN MARTEL: "This is an entirely new advertising medium, which the hotel controls completely."

## NEWS IN PERSPECTIVE

### BENCHMARKS

**SETTLEMENT:** IBM settled its civil lawsuit against Hitachi Ltd. over allegedly stolen computer design information with an out-of-court agreement that permits IBM to inspect Hitachi computers for the next five years. The agreement also calls for the establishment of a three-member arbitration panel that would deal with any disputes between the two mainframe makers over technology secrets. Industry observers saw the agreement as a victory for IBM, because it will be given a detailed look at Hitachi machines manufactured anywhere in the world.

The settlement was said to have been worked out between IBM's senior vice president Ralph A. Pfeiffer and Hitachi executive vice president and director Hiroshi Asano. The deal calls for Hitachi to pay all of IBM's legal expenses in the civil suit, filed in September 1982, which charged Hitachi with conspiracy, unfair competition, copyright infringement, and racketeering. The settlement, however, does not help National Semiconductor, whose National Advanced Systems subsidiary sells Hitachi mainframes, and which was charged with similar offenses by IBM. Also, as of press time, a similar suit by the U.S. Justice Department against Mitsubishi Electric Corp. was scheduled to go to trial in October.

**NEW CHIEF:** Megatek Corp., San Diego, Calif., producer of computer graphics systems and software, has acquired a new president after having been without one since early this year, when former president Peter J. Shaw bolted the firm to form Syte Information Technology Inc. The new president, Paul E. Huber, was named to the post by Megatek's parent firm, United Telecommunications Inc., Kansas City, ending internal expectations that a president would be promoted from within.

Prior to joining Megatek, Huber served as president and chief executive officer of Summagraphics Corp., Fairfield, Conn., a computer graphics equipment company. From 1975 to 1978 he was president of Mergenthaler Linotype, and earlier was president of Dymo Graphics Systems and held management positions with Electronic Associates Inc.

Shaw's new company, which set up shop very close to his former firm, was founded for the stated purpose of "developing high-performance computer systems based on advanced microcomputer architectures for engineering and scientific applications." Megatek, in pending litigation, is contending that Syte's first product, a workstation, was under development by a Megatek subcontractor when Shaw was still at Megatek, and that Shaw knew about it and acquired rights unfairly.

Syte last June received its initial round of venture capital financing, \$5 mil-

lion from a six-member investment group including Adler & Co.; Lawrence WPG Partners; Bay Partners; InterWest Partners; Welsh, Carson, Anderson & Stowe; and Citicorp Venture Capital Ltd.

Megatek, concurrent with its announcement of a new president, announced price cuts on its 7200 computer graphics system and 1645 and 1650 desktop design terminals. Hiram T. French, marketing and sales vice president, said the reductions were "the direct result of our steadily increasing sales volume, lower component prices, and a number of highly automated production improvements." The Whizzard 1650 engineering terminal, previously priced at \$15,900, is now \$9,900, quantity one. The 1645 went from \$13,900 to \$8,900. The 7200 family's price was cut by approximately 20%, while optional equipment was scaled down from 10% to 50%.

In a third early October announcement, Megatek introduced a high-performance 2D graphics system, the Whizzard 3355, that it says will offer a path for future migration to a fully functional 3D graphics system.

**SQUABBLE:** VisiCorp, which markets the popular VisiCalc electronic spreadsheet, filed a \$50 million fraud and breach of contract suit against Software Arts Products Corp., which developed the product. The suit claims that Software Arts did not abide by a contract to provide upgrades for VisiCalc to run on personal computers other than the Apple II, namely the IBM P.C., Digital Equipment 350, Wang, and Texas Instruments machines. The two companies signed a contract in 1979 under which VisiCorp gained exclusive worldwide marketing rights to VisiCalc. Some 600,000 copies of the program have been sold, making it the most popular personal computing program by far and helping Apple Computer gain its leading share of that market. VisiCorp, which has annual revenues in the \$30 million to \$35 million range, said it wants upgraded versions of the VisiCalc program for non-Apple machines, but Software Arts has been devoting its time to other projects. Software Arts said it will defend itself vigorously.

**LAYOFFS:** Victor Technologies, faced with sluggish sales and high marketing expenses for its personal computer line, let go another 500 employees in September, bringing the total number of layoffs since August to 1,350. Meanwhile, the company is facing three class-action suits by stockholders who claim the company misrepresented its profit potential when it went public last March. The Scotts Valley maker of IBM-compatible personal computers earlier this year reported a second-quarter loss of \$11.1 million and said it expected to report third-quarter losses. The fourth quarter, however, is projected to be profitable, ac-

ording to president Charles "Chuck" Peddle. Victor laid off 500 workers in August, followed by another 350, mainly in manufacturing, in mid-September. The last 500 were let go in late September primarily from sales and support staffs. The company's work force now totals some 1,500 workers, according to a spokesman.

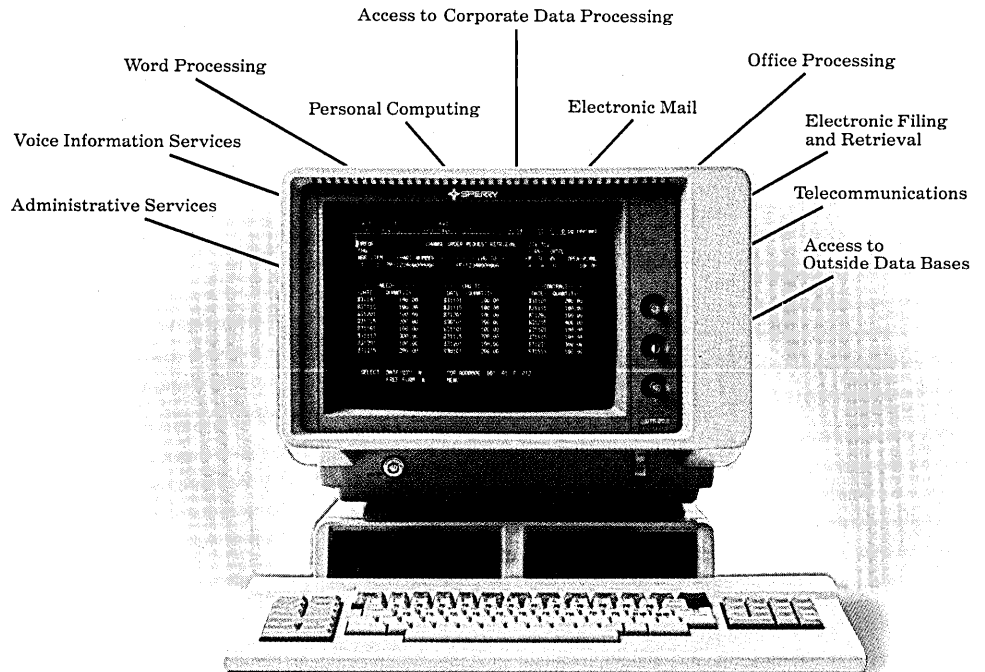
**THIRD WORLD ARM:** Honeywell Inc. said it plans to form a wholly owned subsidiary to manage its third-world distributors and develop import-export trade for developing nations. To be called High-Tech Trading Co., the operation will be headed by Bjorn Bjornstad, marketing vice president for Honeywell Europe S.A. The subsidiary will begin operations in January, distributing Honeywell's full line of computers and controls in some 54 nations. The company will import non-Honeywell electronics products to the U.S. from overseas firms and will help U.S. firms with marketing and distribution in third world nations. The company will start operations with an \$80 million revenue base from existing distributors.

**CONTEMPT:** The Securities and Exchange Commission asked a federal judge to hold Paradyne Corp. in contempt of court on grounds that the company was deliberately hindering an investigation into its winning of a \$100 million order from the Social Security Administration. The SEC has charged Paradyne with fraud and deceit in winning the contract, the largest Paradyne had ever won. Paradyne denied trying to block the investigation and charged the SEC with trying to force Paradyne back to negotiations on a settlement, which were broken off in September. The SEC claimed it was just trying to bring its case to trial but had been thwarted by Paradyne's alleged refusal to make certain employees available for questioning about the matter.

**NEEDS MORE MONEY:** Trilogly Ltd., the corporate vehicle for Gene and Carlton Amdahl's latest computer venture, is going public to satiate its appetite for cash to develop wafer scale integration mainframes. This month it raised about \$70 million from a common stock offering, on top of the \$220 million in loans, grants, and investments from pension funds, venture capitalists, the Irish government, several computer companies, and various other sources (May, p. 62). In its sales pitch to prospective investors, Trilogly founders Amdahl père and fils estimated that their 30-MIPS and up machines would sell for more than \$5 million each, and that Trilogly expects to sell 100 cpus in its first year of production, beginning in mid-1985. Between now and then, the younger Amdahl admitted, the yet-untested technology must successfully survive 4,000 critical events in its development schedule. \*

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It's a personal computer. Time manager. Word processor. Data processor. Link to the corporation, and to the world outside. And it's a critical link to the wealth and immediacy of mainframe information, and the means to project it into the minute-by-minute business day.

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A system beyond conventional ideas of office automation. Beyond words and numbers, voice and image.

Because it doesn't just help people work better.

It helps people work together.

### Information. Not automation.

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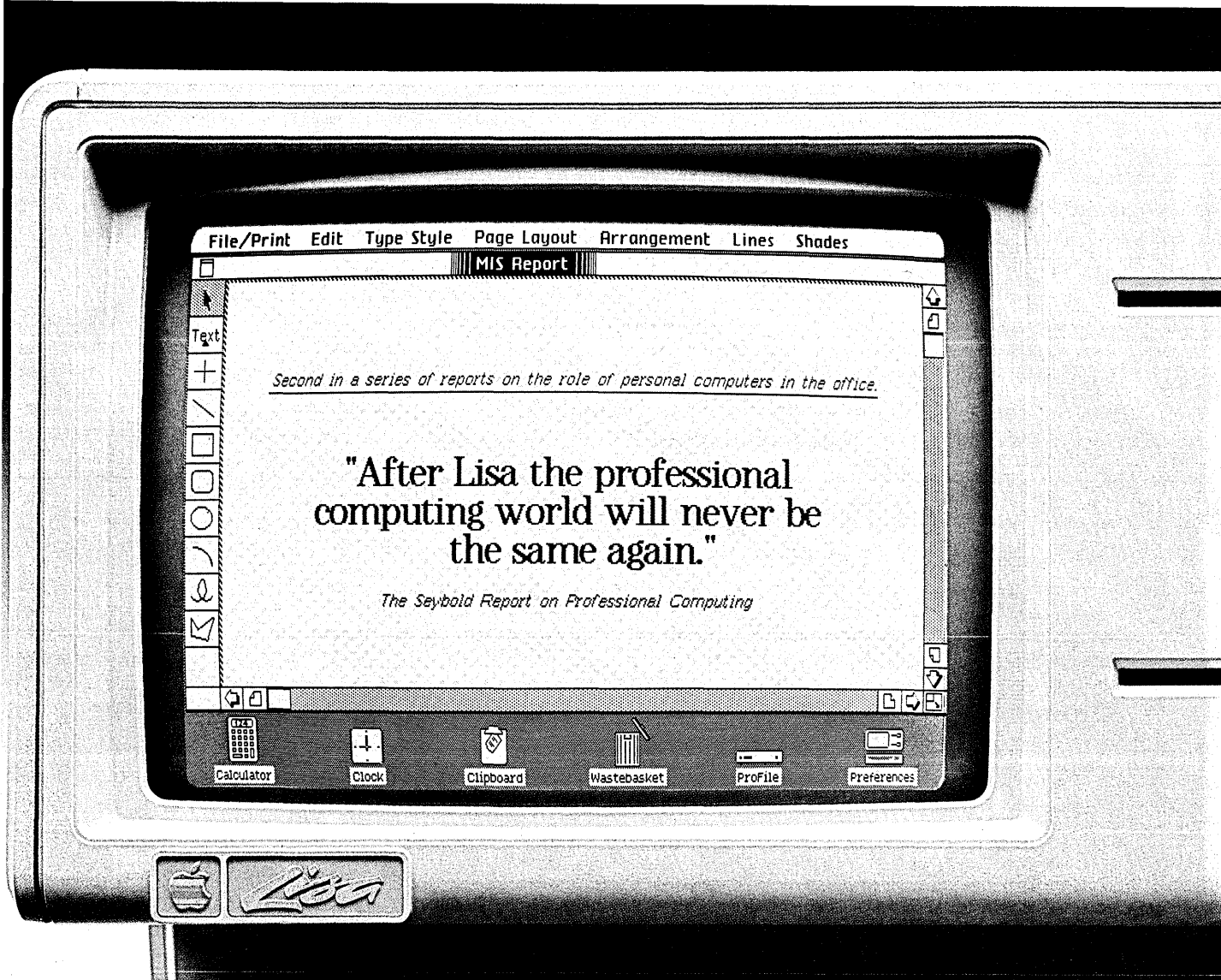
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We understand how important it is to listen.



Apple's new Lisa™ is the world's most powerful personal computer.

Its 32-bit MC68000 micro-processor gives it the processing capability of a mid-range mainframe.

It also has one million bytes of internal memory. And, with a 5-Megabyte hard disk, more than 15 times the on-line mass storage of standard microcomputers.

Given these most imposing credentials, one could get the impression Lisa was designed solely to scare one's socks off.

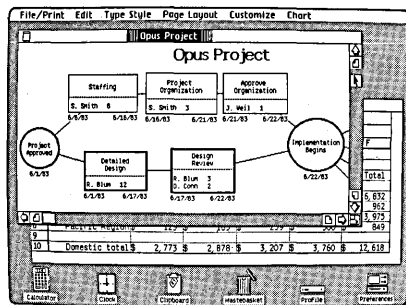
On the contrary.

What makes Lisa totally revolutionary is that, for the first time, all this phenomenal power is contained in a business computer you can learn to use in under 30 minutes.

## 200 years of hard work made it easy.

To tell Lisa what to do, all you have to do is point.

But achieving this simple concept required a totally new



Lisa's revolutionary software lets users perform several applications simultaneously, even "cut" and "paste" them together. The powerful project management program seen here is a Lisa exclusive.

approach to software and 200 person-years of development.

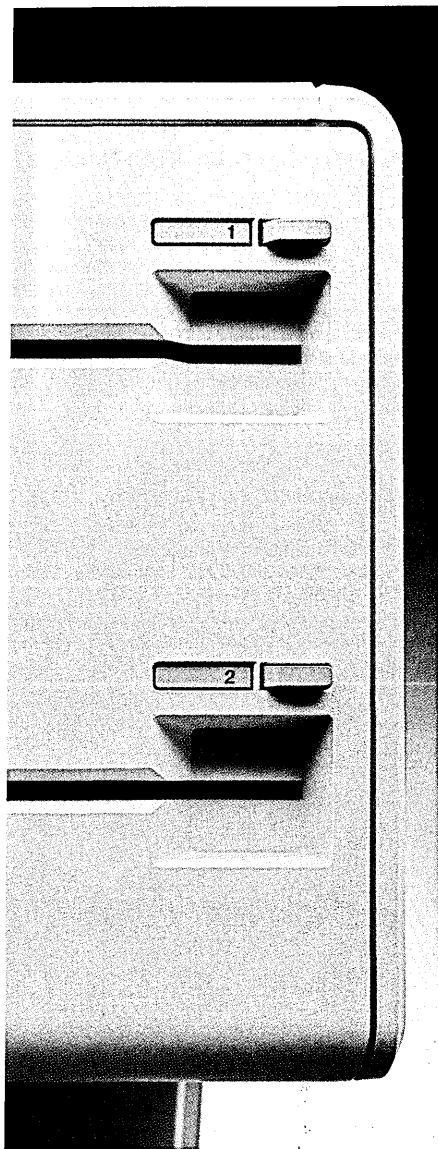
Lisa replaces complex computer commands with symbols

familiar to anyone who's ever worked at a desk.

Even someone who's never touched a computer before can learn Lisa in under half an hour. Versus the 20 hours or more required to unriddle conventional PCs.

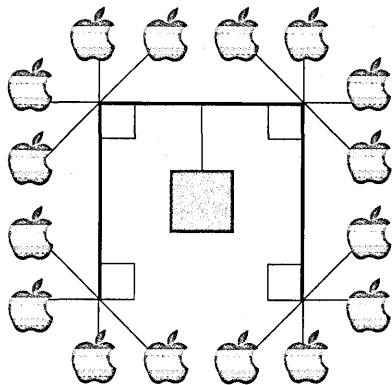
To information managers, that means dramatically reduced training time and increased productivity.

But people don't just learn faster on Lisa, they also work faster. Each of Lisa's powerful applications\* use symbols and commands common to all. So with little practice, users can move from LisaCalc to LisaGraph to LisaWrite without missing a beat. Or use them all at once, "cutting" information from one program and "pasting" it directly into another.



There's even a program — LisaProject — that lets you use the mouse to chart the progress of complex projects, automatically recalculating when deadlines or resources change.

On paper, Lisa is just as exceptional. With its dot matrix and daisy wheel printers, it produces printed materials just as you see them on the screen.



AppleNet, available soon, will let Lisas and other Apples share information, and costly peripherals.

## Powerful connections.

Any Lisa system can become part of a powerful Lisa network through AppleNet, our own low-cost local area network.

It will enable a user to transfer documents from one department to another, so they can be rapidly reviewed. Or modified. Or passed on to other Lisas.

The same network will allow Lisas to branch out to other Apples.\* Or share disks, printers and other costly peripherals.

Using the LisaTerminal program, Lisas can tie into mini, mainframe and other personal computers by emulating VT 100-type terminals. Or, using the Apple Cluster Controller, it can also emulate 3270-type terminals.

In short, one Lisa can do the chores of many terminals. All of which means swifter response times and better distribution of resources.

## Stay on top of new developments.

Lisa's unique user interface enables programmers to develop Lisa-style programs with unaccustomed speed.

But that's not Lisa's only programming attraction.

The Lisa Workshop provides a powerful environment in which to develop COBOL applications. A full screen Lisa-like editor, code generator, and multiple windows make a

visible difference in development times.

Apple will supply all the documentation, instruction, and support a developer will require to integrate applications into the Lisa environment — no matter how sophisticated their information processing needs.

## We support the whole family.

Apple now offers nationwide on-site service for all Apples in conjunction with RCA Service Company.

*The hand operated mouse lets you use Lisa without touching the keyboard. All you have to do is point.*

Plus a host of special services for Lisa — including a toll-free support line.

All of which you may never need.

A diagnostic program called LisaTest instantly isolates any defective board or component.

And the modular "plug-in" design of Lisa's five basic circuit boards and two disk drives allows parts to be replaced in seconds, with just one tool: Your fingers.

For the whole story, call our National Accounts Program at (800) 538-9696.

No matter how large your company, Apple has all the elements to improve your information systems management.

Including Lisa, the computer that makes headlines.



\*With more programs on the way, Lisa's library now includes LisaCalc electronic spreadsheet, LisaList data base, LisaWrite word processing, LisaGraph business graphics, LisaDraw presentation graphics, LisaProject electronic project management and LisaTerminal data communications. For information regarding corporate purchases through our National Account Program, call (800) 538-9696. In Canada, call (800) 268-7796 or (800) 268-7637. Or write to Apple Computer Inc., MIS/EDP Marketing Dept., 20525 Mariani Ave., Cupertino, CA 95014. ©1983 Apple Computer Inc.



First come the spreadsheets, then the need to hook up the small machines to large ones. The picture's sketchy, but it's developing fast.

# THE MICRO-MAINFRAME CONNECTION

by David Ferris

Today's personal computers tend to be rather solitary creatures, not communicating much with the outside world. But the outlook is changing rapidly as end users develop a voracious appetite for micro-mainframe connections. Emulation of 3270 terminals is just the beginning; the next few years will see corporate micros becoming inextricably interwoven with the corporate mainframe and its applications.

Satisfying the demand for these connections will require careful planning, but it will not be impossible. For the dp manager the trend will generate some headaches, both managerial and technical, and also some opportunities.

To start with, consider why users initially install their personal computers. Productivity and direct cost justifications are secondary. People buy microcomputers because they want to do better quality work.

At the outset they are mainly concerned with four application areas: spreadsheets, word processing, database (for screens-driven applications as well as simple ad hoc list management), and simple business graphics. They can get by quite satisfactorily without accessing mainframes, minis, or other micros. But once users become familiar with these initial applications, they begin to see good reasons to make contact with the outside.

Today, the only significant kind of micro-mainframe interconnection is mainframe terminal emulation. A user who wants to access the applications available on the corporate mainframe doesn't want a main-

frame terminal sitting beside the personal computer on his desk. So he installs some mainframe terminal emulation hardware and software, and logs on to a mainframe just as if he were using a dumb terminal. Most of the emulation uses elementary asynchronous protocols, although with difficulty more complex bisynchronous protocols are commonly beginning to be installed.

When you take a close look at why the emulation is taking place, it turns out that there are three main applications. The first kind is access to mainframe timesharing. Many large companies already have personal computing facilities in place on their mainframes, some of which may have been there for a decade or more. Perhaps the best known examples of mainframe personal computing are financial planning packages, such as EPS and IFPS, and end-user oriented file management systems, such as NOMAD, FOCUS, and RAMIS. APL modeling is yet another kind of end-user computing.

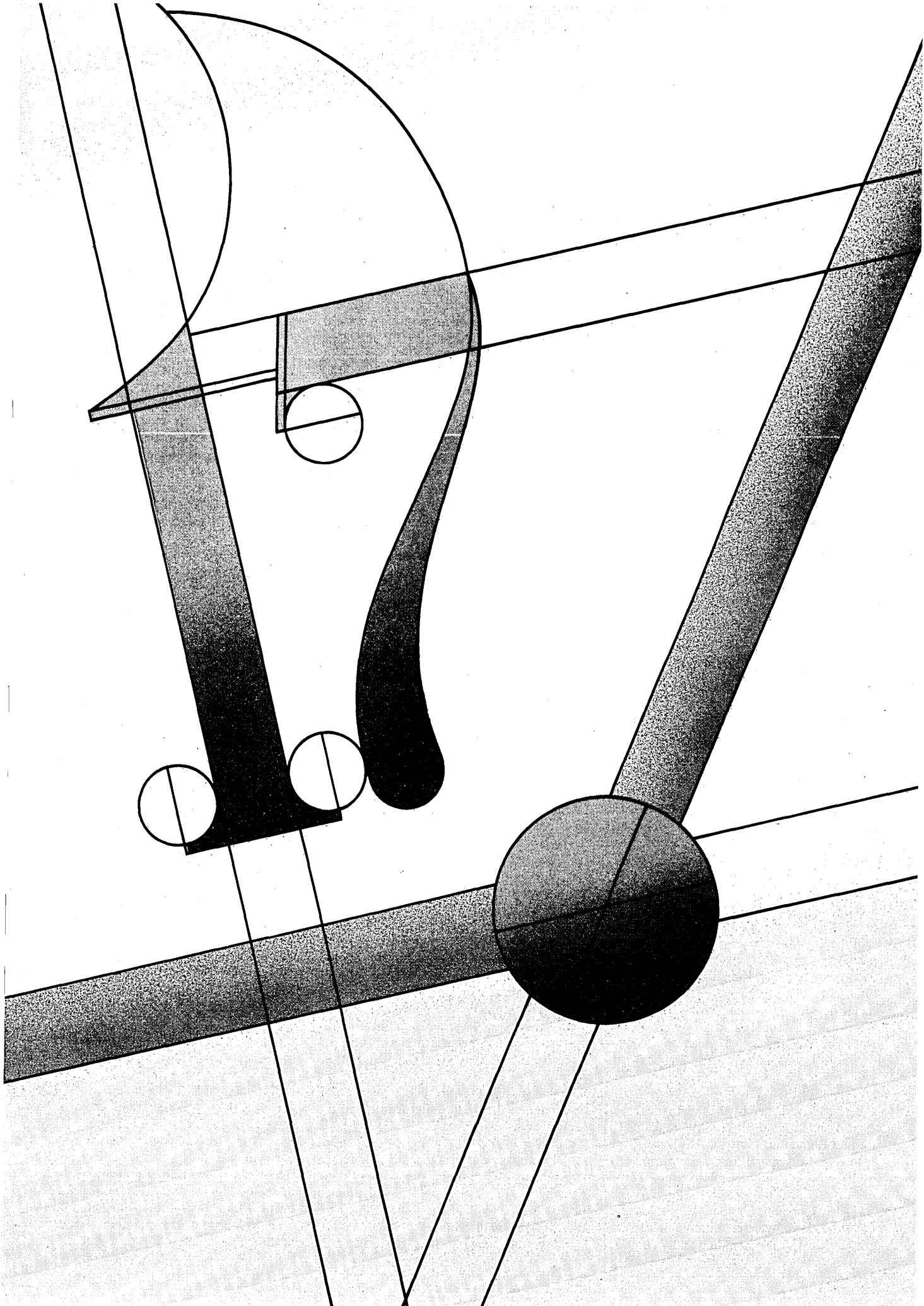
## ACCESS TO EXTERNAL DATABASES

After this comes access to external proprietary databases, such as the Dow Jones, Lockheed's Dialog, and The Source. With their wealth of current information, these can be excellent research tools. They can also be very useful for non-business purposes. Communication in this case has normally been implemented using asynchronous terminals, so here the micro-mainframe communication is done using modems, dial-up lines, and asynchronous protocols.

The last kind of terminal emulation involves turnkey systems developed in-house. Dp shops have spent many years and

millions of dollars building applications that are critical to the running of the corporation's business. Many of these have interactive facilities consisting of menu-driven formatted screens. Transaction processing implementations of accounts payable, receivable, general ledger, and payroll/personnel systems are dp's bread and butter.

These applications contain much of interest, and users naturally reason that be-



## Dp departments are asking if it doesn't make better sense to buy a PC with IBM 3270 emulation, rather than the 3270 itself.

cause micros look like mainframe terminals, they should be capable of accessing such mainframe applications. Unlike access to mainframe personal computing facilities, however, for which the user interface is typically line-oriented, these transaction processing systems are heavily dependent on the processing of complete screens at a time. Thus, terminal communications are normally based on IBM 3270-type bisynchronous protocols rather than the asynchronous protocols common among timesharing applications.

So for the moment, most personal computer access to transaction processing applications involves some sort of protocol conversion. This may be done in software, or in some intermediate hardware box. The personal computer uses an asynchronous protocol, which is then converted to a bisynchronous protocol before accessing the mainframe applications.

This shoestring method of connection is beginning to be replaced by direct bisynchronous emulation. Unfortunately, the mere availability of plug-in bisynchronous boards and associated software doesn't solve the problem. Many dp departments find themselves spending a lot of time getting the different components working together, particularly when communications equipment has been provided by independent suppliers. Time will help smooth out the incompatibilities.

It's interesting to note that this form of emulation seems to be slowing sales of IBM's 3270 terminal. Most go-ahead dp departments are naturally asking themselves if it doesn't make better sense to buy a personal computer with 3270 emulation, rather than the 3270 itself. There isn't much difference in price, but a personal computer is obviously able to provide far more function.

One further kind of micro communications deserves mention, although it often doesn't involve a mainframe. This is a very rudimentary form of electronic mail. Word processing packages, of course, are widely used, and the penetration has just begun. It's often held that wp packages won't be used much by managerial and professional staff. Their clerical support staff will be the users. But conversations with a wide variety of users indicate that many are finding it worthwhile to reach a level of keyboard fluency adequate for the use of these programs. This is perhaps confirmed by the fact that computer programs such as MicroSoft's Typing Tutor and Lightning Software's Master Type, which teach typing skills, have become extremely popular among micro users.

One of the main reasons for the spread of personal computer wp is the fact that time saved by delegating typing to a secretary is lost in proofreading and waiting for

turnaround. Consequently, memos and documents are commonly being entered by secretaries and then directly corrected by the user. Many users are entering the documents themselves.

Some of these documents are destined for colleagues at remote locations, whether a mile distant or across the country. Sending the text in the mail involves printing it out and giving directions to secretaries. On the other hand, electronically transmitting the document by dial-up lines requires relatively little effort, and obviously the delivery time is far shorter.

Setting up the appropriate modems and communications software is extremely difficult for the end user but much less of a challenge for the data communications professional. Users either send their documents directly to each other, or via some store-and-forward facility on an intermediate computer, such as The Source, so that the recipient can pick up the mail at his convenience.

### THE NEXT FIVE YEARS

This generally takes place over ordinary dial-up telephone lines, and it lets users have access to mainframe personal computing, proprietary databases, or—via async-to-bisync conversion—to fundamental corporate teleprocessing applications. There's a trend toward direct bisync terminal emulation, and also a basic kind of electronic mail.

These connections are certainly useful, but they only scratch the surface. The next five years will see a number of exciting developments:

- Micros will become very active front-end and back-end processors for existing large-scale corporate mainframe applications.
- Micros will become major users of in-house data communications networks.
- Micros will frequently call upon mainframe facilities—especially the central database—to assist their own specialized applications.

The first example of closely coupling personal computers to existing mainframe applications can be seen in the current replacement of data entry terminals. These are typically shared logic systems, such as those supplied by Mohawk Data Sciences and Four-Phase, and they are in danger of being made redundant by the micro, in much the same way as the 3270.

To see how this is happening, consider one company our firm recently studied, an international food processing and canning firm that has many geographically distributed plants. A typical plant has about 200 temporary workers on the various production lines, and every day the hours they've worked must

be fed into a data entry station.

The data entry is done in the plant office, staffed by a plant manager and several clerical workers. When this has been done, and the data has been validated, it is batched overnight to the corporate mainframe. A mainframe system then updates the general ledger, produces manpower reports for plant management, and, periodically, cuts checks.

This usage is perfectly standard, of course, and doesn't involve micros. Consider, however, the fact that the actual time to do the data entry is quite short: a couple of hours a day. Consider also that the plant office can make very good use of a micro. The plant manager can use a spreadsheet, for example, to plan and revise budgets, and to plan and schedule the work force requirements.

He and his clerical staff can also use a simple list processing system, such as PFS:File (from Software Publishing Corp., Mountain View, Calif.), to store and retrieve information on temporary workers. Word processing software will help in mass mailings to temporary employees as they are needed, and in preparing long reports to management that go through a series of iterative improvements.

It's pretty clear that the plant manager can cost-justify his investment, and it's equally clear that his micro is perfectly able to support data entry software. The mainframe needn't be affected by the use of a micro instead of a dedicated data entry station, because a micro can talk to it using RJE data communications protocols. The plant office can use a micro for data entry in the morning, and at other times for word processing, spreadsheet, database, and terminal emulation functions.

The financial implications of this multifunction micro usage are interesting, as well. The plant manager will probably get a micro in any case, because of the spreadsheet, database, and word processing packages. So the additional cost of the data entry station amounts to the expense of installing and configuring the data entry software. He could even insist that the data entry application take its equal share of the equipment cost, in which case the hardware and software (excluding configuration and training time) costs about a quarter of the system price. Today, a powerful micro with 10 megabytes of hard disk and a letter-quality printer goes for about \$8,000, so at the most the data entry hardware costs about \$2,000.

The replacement of data entry terminals indicates how micros will be used as front ends to mainframe applications. In such cases, no change at all may be necessary to the mainframe software. A more complicated case will be the use of micros for certain back-end functions.

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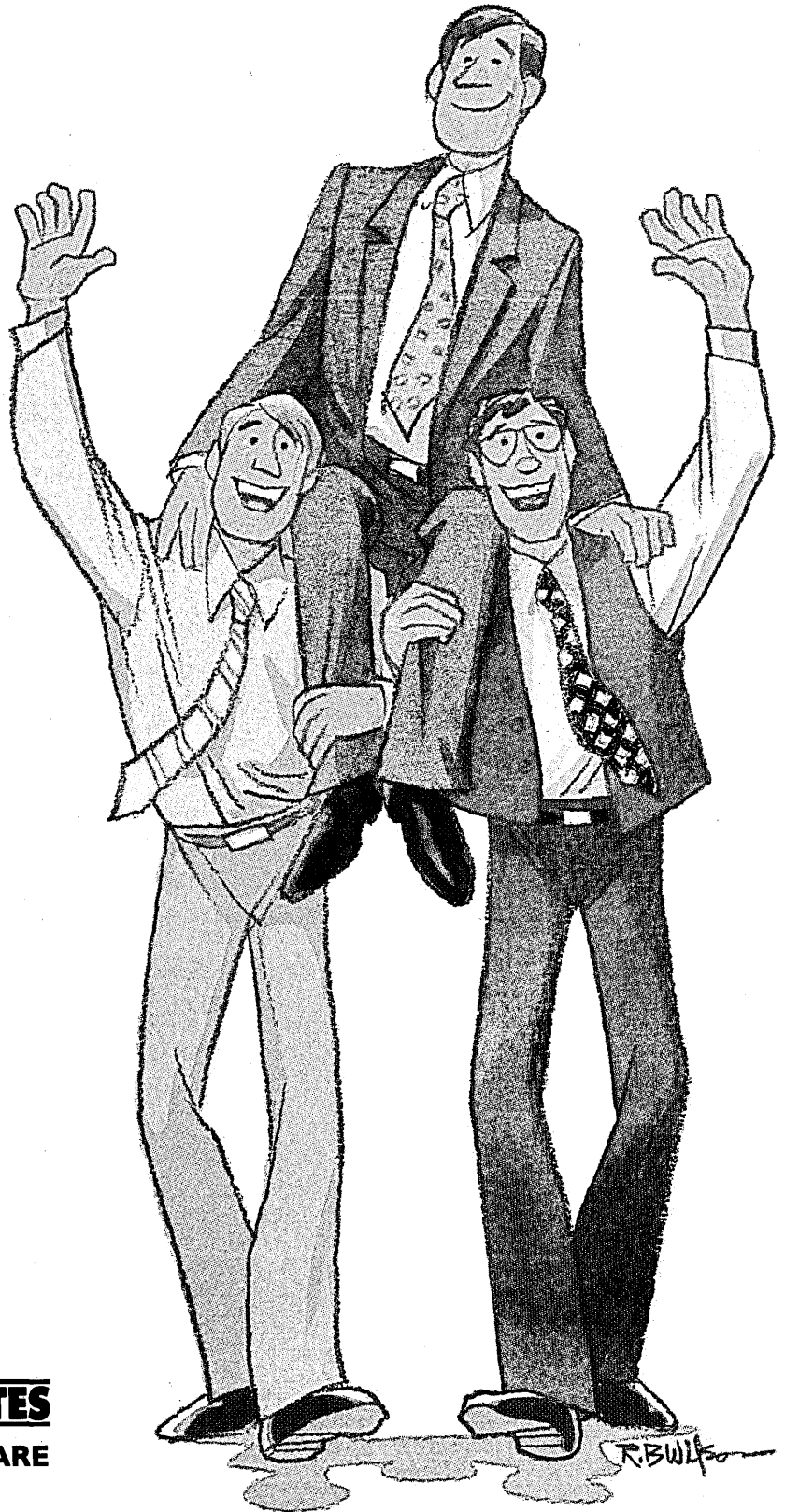
Our *Advanced Business Software Series* consists of separate components which independently provide powerful, specific solutions and together combine to form comprehensive business systems for every operation in your company.

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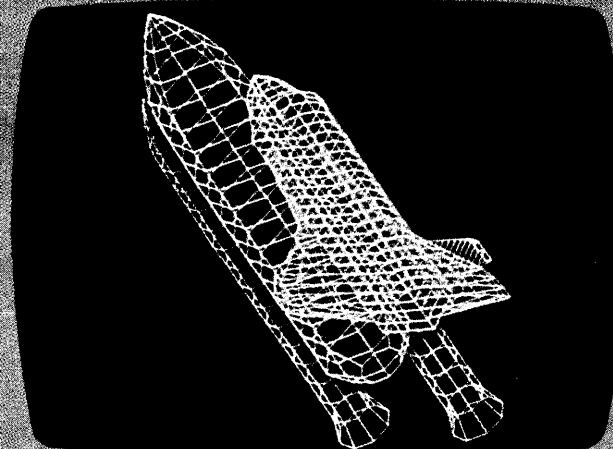
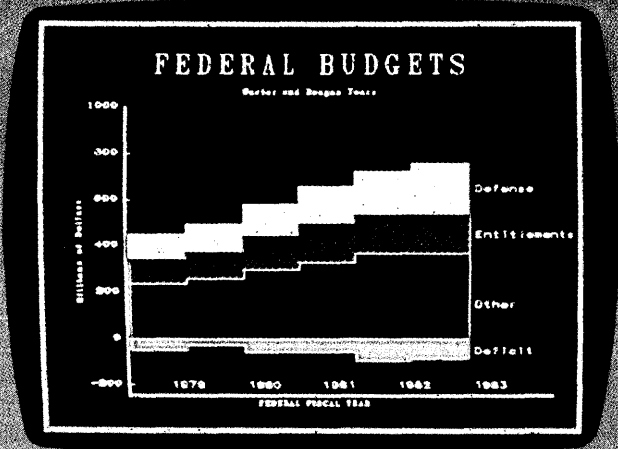
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You're in for a nice surprise. Because when you buy our new Envision 215 Color Text/Graphics terminal you'll also get color alphanumerics. Free.

## WHAT YOU DON'T KNOW

What you might not know is that our new 215 is a low priced terminal with two distinct and very usable talents.

It's an intelligent color graphics terminal which also happens to be a high quality color alphanumerics terminal. But this didn't happen by chance.

We designed both capabilities into the same terminal for one very important reason. You. And quite frankly it makes a great deal of sense because now you don't have to buy two terminals when you want to create color graphics and color alphanumerics. Our new 215 does both exceedingly well.

## DID WE GIVE OUR 215 TOO MUCH GRAPHICS CAPABILITY?

Before answering, you should know our 215 is the ideal color graphics terminal for an amazingly large number of applications.

In business, scientific and engineering our new 215 tackles complex color graphics with aplomb.

There's actually a good chance you'll run out of ways to use our 215 in your particular job long before it runs out of color graphics capability.

That's because it's supported by ISSCO, Megatek, Precision Visuals and SAS Institute graphics software.

We also made it compatible with the Tektronix® 4014 which means our 215 is supported by a host of other graphics software packages.

## SHARP. PUNCHY. VIVID. COLOR GRAPHICS

You don't have to be an art major to create striking graphics with our 215. You can create vivid 8-color graphics from a palette of 64 colors.

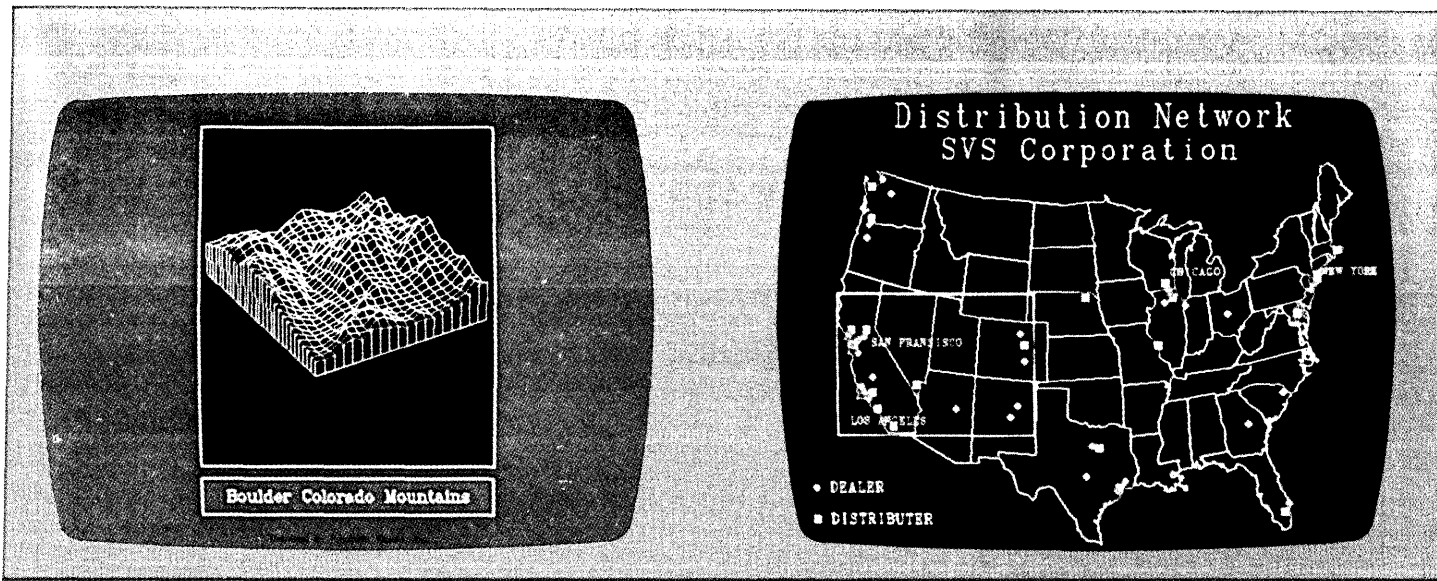
The vivid part comes from the fact that our 215 has a high resolution 640x409 display.

It also supports vector drawing in a 16K x 16K virtual address space. All of which means the graphics you create are sharp. Punchy. And vivid.

When you need color graphics in a hurry, our 215 provides complex polygon drawing, vector drawing and fill primitives as standards. And screen copies are easy because our 215 is compatible with our Envision 430 Color VectorPrinter™.

And there's more!





Five different line types are available for vector drawing. Two character fonts are provided. And both fonts can be drawn at four different angles in 16 different sizes.

If all of that's still not enough, don't forget our 215 is also a very versatile color alphanumeric terminal.

**INDEPENDENT COLOR ALPHANUMERICS MAKE OUR NEW 215 DOUBLY VALUABLE**

We gave our 215 independent memories for graphics and alphanumeric so you can display them separately. Or together.

We also made it VT-100® compatible with programmable soft keys and menu configuration.

You can make characters double width and double height and display 132 column information for maximum viewing.

You can also mix foreground and background colors to highlight different types of data.

**A ONE YEAR WARRANTY ON ALL OUR COLOR TERMINALS**

When you buy our new 215 we won't forget you. Matter of fact, you'll probably want to know more about our entire family of color graphics terminals. For example, our advanced 230 terminal gives you a local display list for interactive design applications.

Every terminal we make comes with a full one year warranty.

And because they're fully compatible, you can upgrade from one Envision terminal to another as your needs grow. Speaking of needs, you're



**ONE RED HOT OFFER YOU SHOULDN'T PASS UP**

We think you'll be impressed with our 215. But don't just take our word for it. Pick up your telephone and call us about a free demo. Or send us the coupon. You'll not only see that our new Envision 215 is a great color graphics terminal. It's also a great color alphanumeric terminal. Best of all, the alphanumeric are yours. Free.

So show a little sporting interest and take us up on our offer. You'll get a red hot demo and a chance to buy two color terminals-in-one. At a price that makes our competitors green with envy. Send us the coupon or call. Envision, 631 River Oaks Parkway, San Jose, CA 95134, (408) 946-9755 or Telex: 176437.

Display samples courtesy of: Megatek and Precision Visuals, Inc.

**OK, ENVISION... I CAN'T PASS IT UP. PLEASE CALL ME FOR A DEMO.**

NAME \_\_\_\_\_

TITLE \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE, ZIP \_\_\_\_\_

PHONE \_\_\_\_\_

going to like the human engineering aspects of our terminals almost as much as the capability they give you.

Our 215 for instance is small and ergonomically designed with a detached compact keyboard plus full tilt and swivel convenience. And cursor control can be mouse-driven for optimum operator convenience.

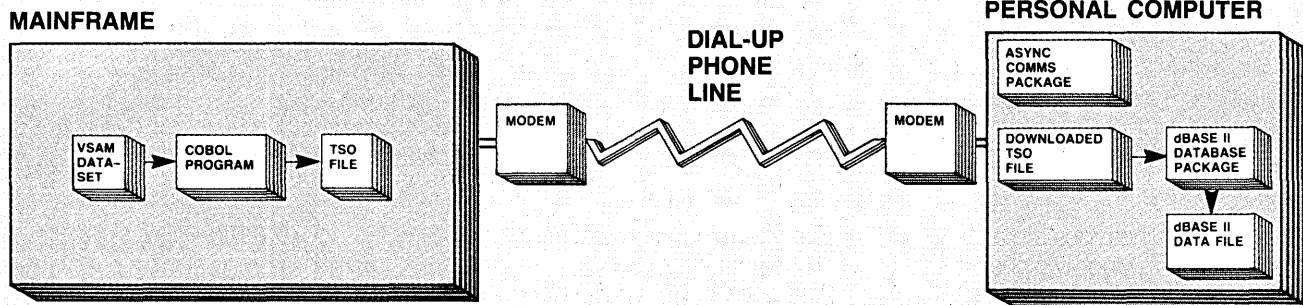
**Envision**

CIRCLE 63 ON READER CARD

# Shared logic systems are in danger of being made redundant by the micro.

FIG. 1

## MICRO-MAINFRAME DATA DOWNLOADING



In this example, VSAM data must be downloaded to the dBase II application generator on a PC. Using today's tools, some effort is necessary to implement a suitable interface. The kind of arrangement required follows:

1. An applications programmer writes a COBOL program to transfer VSAM data into a TSO file, TSOFILE.DATA.
2. An applications programmer familiar with dBase II defines a personal computer file called DOWNLOAD, whose structure corresponds to that of TSOFILE.DATA. He does this using dBase II's CREATE command.
3. The personal computer user emulates a tty-type

terminal using a modem and a standard asynchronous communications package, and logs into TSO. Using the file transfer utility that comes with the async package, he downloads the TSO file. To satisfy dBase II conventions, the downloaded file must have TXT as suffix, so it is renamed TSOFILE.TXT.

4. The user then disconnects from the mainframe.
5. The user then gives two dBase II commands to read the downloaded file into a dBase II file:  
USE DOWNLOAD (i.e., open the DOWNLOAD file)  
APPEND FROM TSOFILE SDF (reads in the file, appropriately converting the formats).

Possibly the least painful of these is the speedier distribution of better quality reports. The main thrust here is not that reports can be sent over communications lines for local printing, but that once the report has been sent to the user, he can quickly inspect and edit it prior to final distribution to his colleagues.

To see why this is important, note that many a report is submitted so that a user can extract information from it, or use it and then redistribute it. Reports are frequently long (e.g., 4 inches of printout), or in a format that isn't quite what the user wants. So the data are often extracted and retyped, or cut and pasted, or redistributed in a form the user really doesn't care for.

If the report is distributed electronically, however, the user can make his changes using a word processing package. Technically, this is trivial: most word processing packages can read a standard ASCII print file produced on a mainframe, though restricting them to reports in this format doesn't take advantage of their more powerful features. With his word processor, the user can now add footnotes, change headings, and delete data as he sees fit.

This may or may not affect productivity, but it certainly has a great effect on the appearance and quality of the materials he passes on. It also greatly speeds up the overall distribution time. Once the changes have

been made, the user can simply have the report typed on a local terminal. It's a lot faster than going through the traditional iterative cycle of alteration, typing, and proofreading.

### DATABASE DOWNLOAD

The next type of micro-mainframe connection is more complicated, and uses a more sophisticated kind of distributed processing. It concerns cases where the main application is developed for the micro, and runs on the micro, but where the micro needs access to data on the central corporate database. These micro systems tend to be small, specialized systems that previously couldn't be cost justified on a mainframe or minicomputer, but that are now viable on a micro, using high-level software development tools.

To illustrate, let's return to the food processing plant. Suppose the manager of the plant's office wants to build a computerized database of all local temporary employees. This could probably be done with a very simple end-user-oriented list processor such as PFS:File or CardBox (from Caxton, London, U.K.), but in this example we shall assume that the more programmer-oriented dBase II (from Ashton-Tate, Culver City, Calif.) is used. This product provides a quick although somewhat inelegant way of defining the database structure and data entry and query screens. It can also be used to define ad hoc

queries and reports to meet the needs of the moment as well as standard periodic reporting requirements. For example, the manager can explore various hypotheses to discover the causes of absenteeism, and can profile the kinds of people who end up being long-term, productive employees. If an employee is out sick, the manager can easily query the database for the right replacement.

Thus, simple personal computer database systems can be useful tools. But data entry can be a problem. If the plant has employed several thousand temporary workers over the last few years, entering the data into the personal computer will be a laborious and dreary task, and one prone to error. Obviously, the thing to do is to download the required data from the mainframe, unless, as was the case at the food processing plant, the data have already been conveniently entered for the payroll application.

For the moment, some technological gymnastics are necessary to extract the appropriate subset from the mainframe's database and download it into the personal computer application's data files. Fig. 1 shows one way this can be done. For the sake of the example, the mainframe data are assumed to be stored on a VSAM file. The company also runs IBM's timesharing option (TSO).

Fig. 1 makes it clear that downloading mainframe data in this way requires the application of quite a lot of skill: probably a

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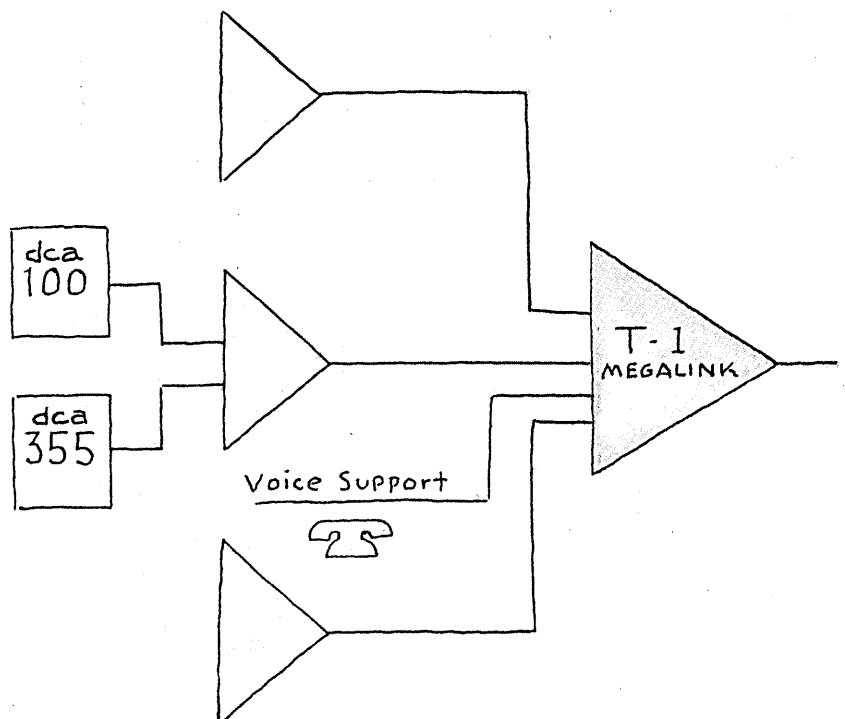
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## It is common knowledge that spreadsheets have been a major catalyst for personal computer penetration into corporate environments.

systems programmer, an application programmer, and even the database administrator. Various independent vendors have spotted a market opportunity here, and now every self-respecting mainframe package vendor is eagerly making announcements about downloading tools that will be available sometime in the future. For the moment, most of these should probably be regarded as ideas that appeal to the vendors' directors of marketing rather than as clearly defined products currently in beta test.

### EASIER TO DOWNLOAD SOON

In any event, the outlook is, sooner or later, for downloading to be a less laborious process. One recent announcement that's of interest is of a product called VisiAnswer, from Informatics, Canoga Park, Calif. It is not yet ready for general release, but the version we have tested offers powerful extraction facilities against a variety of mainframe data organizations, including IMS, DL/1, TOTAL, IDMS, Adabas, VSAM, and ISAM.

The database administrator does much of the work, telling VisiAnswer how to extract fields from the database in such a way as to present the user with what looks like a flat file. According to Informatics, the fields can in fact be drawn from different records, transparent to the end user. The user then selects the fields he needs, and the particular records to be downloaded, using the sort of Boolean logic most interactive query systems contain.

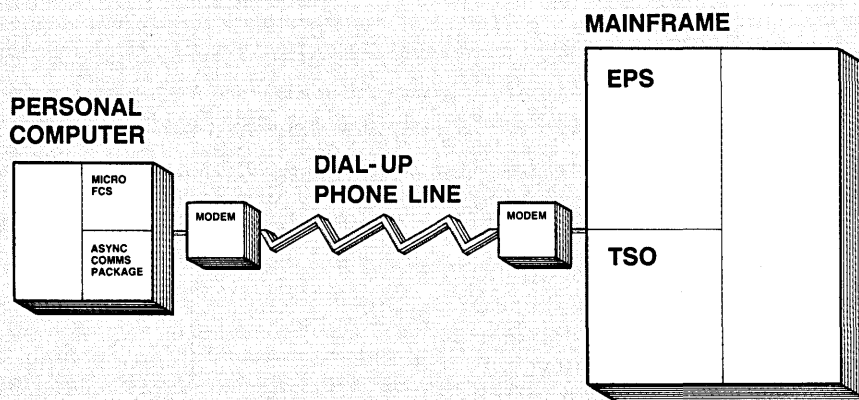
Worthy of note is the product's ability to let a micro user extract data on an ad hoc basis from a full-blown structured DBMS—i.e., one in which there are different, interrelated types of data—without forcing the user to know about the database navigation.

Architecturally, though, we think VisiAnswer has some surprising features. The emphasis is on downloading data straight into a VisiCalc spreadsheet, which seems to be putting the cart before the horse. One of the destinations of downloaded data is the spreadsheet, but it would seem to make more sense to first put the data into a micro database. They can then be further processed, and distributed when necessary to other micro packages such as a word processor, graphics processor, or spreadsheet.

McCormack and Dodge has also made an interesting announcement. The firm has cooperated with Lotus, of Cambridge, Mass., the makers of 1-2-3, to produce PCLink, which allows micro users to do ad hoc extractions from VSAM files, using McCormack and Dodge's own interactive query language. The data is put into a simple ASCII print file, and is then downloaded to the micro. 1-2-3 can then read in the file, as can dBase II. While PCLink is not as general pur-

FIG. 2

### MICRO-MAINFRAME FINANCIAL MODELING



A branch office manager of a multidivisional company uses a personal computer running Micro-FCS, the micro version of the mainframe EPS financial planning package. Micro-FCS is used to enter and correct financial data, without incurring line and mainframe connect charges. At the end of each week, the new data file is uploaded to the mainframe for consolidation into the central corporate model, a large affair that cannot be supported by today's micros. Typical user procedures are straightforward. For example:

1. Branch managers use the Micro-FCS editor to capture financial data and store it in binary format on diskette. It is stored in a row and column format specified by the EPS support group.
2. At the end of each week, the branch manager uses Micro-FCS' REPORT command to convert the data file from its binary format into ASCII format. He then sends this to a TSO file on the mainframe, using a modem and an asynchronous communications package.
3. A staff financial planner using EPS on the mainframe uses its REPORT command to translate the ASCII file, and others like it, back into binary format.
4. The financial planner then gives standard EPS commands to consolidate the fresh financial data with others like it that have just been received and converted back into binary format.
5. Multilevel consolidated reports are then automatically generated by EPS.
6. Copies of consolidated reports can then be passed on to management, and appropriate subsets can be downloaded back to branch managers for immediate display.

pose as VisiAnswer in the kind of mainframe data organizations it can handle, the downloaded files appear to be more accessible to applications packages on the micro.

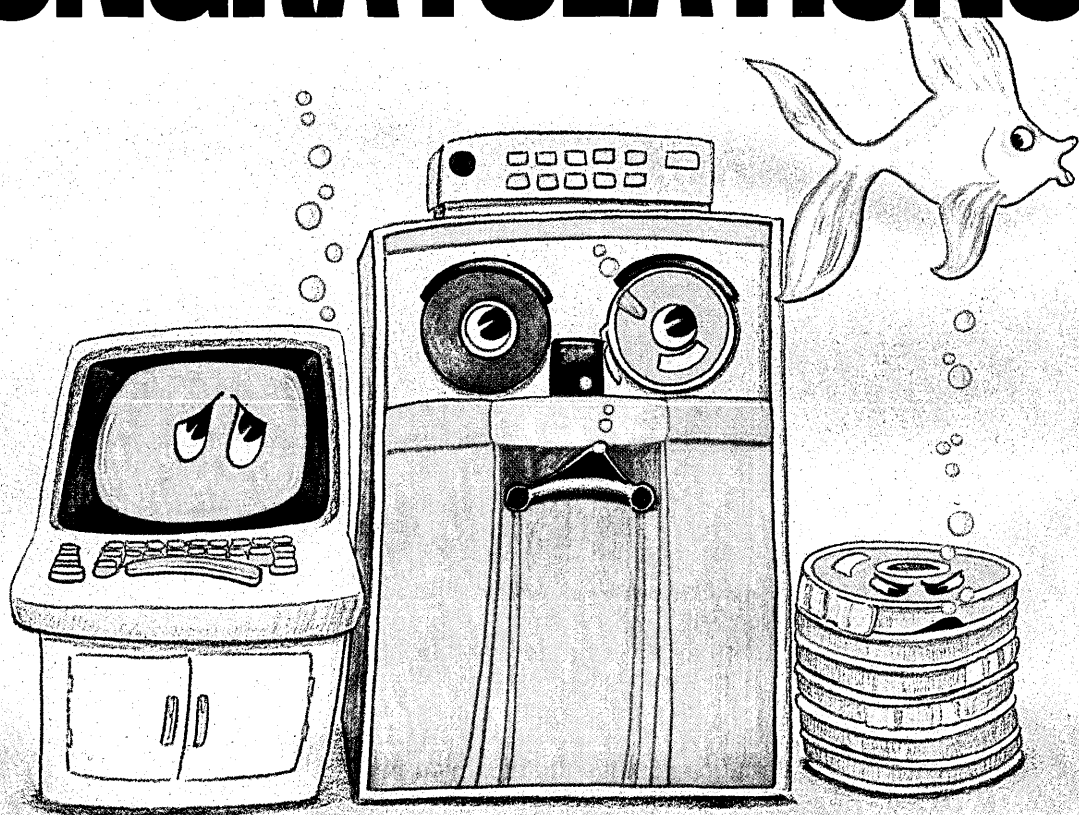
This article has addressed the need for downloading mainframe data to personal computer databases. Spreadsheets on personal computers also need to get at mainframe data, and it is no accident that VisiAnswer is closely tied to VisiCalc, and that McCormack and Dodge are emphasizing their association with 1-2-3.

We have found that spreadsheet preparation on a mainframe, as output from existing administrative and operational systems,

makes a lot of sense for many organizations. Consider again the plant managers of the prior examples. They are currently receiving mainframe-generated printed reports on their weekly and monthly manpower requirements, and similar budgetary forecasts. We found that plant managers were keying data from these reports into corresponding spreadsheet models they had developed, and were then what-iffing on their budget and staffing requirements.

In some cases this rekeying of data is laborious. There is certainly no technical objection to the mainframe generation of a report in spreadsheet form, rather than in print

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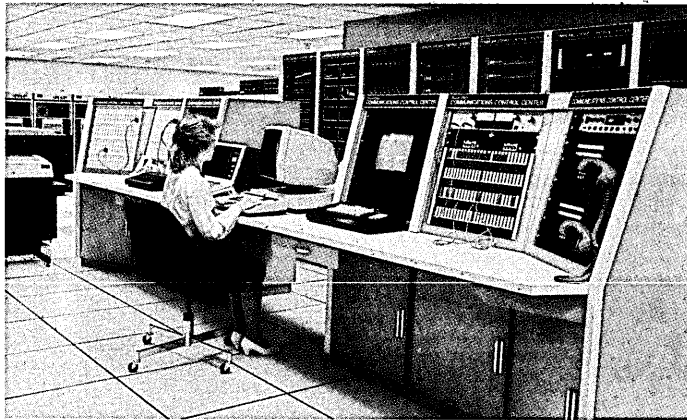
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## Data communications is a nasty business for end users.

image, so we expect many mainframe systems to be enhanced in this way in due course.

It is common knowledge that spreadsheets have been a major catalyst for personal computer penetration into corporate environments. Their big brothers—financial planning systems such as EPS (from EPS Inc., Windham, N.H.) and IFPS (from Execucom, Austin, Texas)—are used by a much smaller community. These users, however, are important—generally senior staff with top financial or strategic planning responsibilities.

These sophisticated financial modelers are also pushing for micro-mainframe connections, as is illustrated in Fig. 2. It looks as if mainframe financial models are likely to be downloaded in a variety of ways, sometimes to spreadsheets, and sometimes to micro versions of the financial planning package. Uploading of models will occur, too, although the kind of consolidation available on spreadsheets is way too primitive for any serious corporate financial planner.

### MORE ACTIVITY TO COME

Thus far we've discussed some of the leading and most obvious kinds of micro-mainframe interaction that are pending. A lot of other types will also occur; other areas of future activity include

- Downloading and uploading of other kinds of models, notably PERT/Critical Path Analysis.
- Electronic mail. This can save a lot of "telephone tag" time, as mainframes provide a convenient store-and-forward facility.
- Use of mainframes for data sharing. Local networks are still lacking in the provision of adequate data sharing facilities. Distributed database technology is also inadequate, despite the optimistic but misleading claims of various vendors. Mainframes and minis will often end up serving a database machine

function for separate micros.

- Access to expensive peripherals. Micros need to use these from time to time: e.g., a \$200,000 laser printer for large mailings; fast line printers for long printouts; or a graphics plotter for large, high-quality drawings. Such devices will often be kept at the corporate data center, under mainframe control.

The implementation of these micro-mainframe interconnections will require skill, but not skills that are unavailable to the dp community. Further, the task will become easier as standard building-block tools are released. What seems to be the most exciting aspect of these developments is not so much the technical issues, but rather the business opportunities they bring for dp.

The fact is that today, most personal computer users don't really understand systems development. They don't realize that as the portfolio of applications grows, so do the problems of integration of these applications and the underlying database. Nor do they understand that it pays to spend a lot of time at the design stage and in making sure that an application is properly documented.

They notice that dp will quote \$200,000 and six months to implement an application, and they notice that they can develop the same application far more cheaply on a micro. What they aren't aware of is that two years hence, when they have a number of systems running on their micros, they will hit exactly the same kind of systems integration problems that slows down dp.

But rightly or wrongly, the view that personal computers are the panacea is currently a common one, and it's temporarily resulting in poor PR for a lot of computing professionals. The pending demand for micro-mainframe communications may well be an opportunity to change that, as users are forced to come to dp for assistance. Data communications is a nasty business for end

users. As soon as they try to do any form of communications with the outside, it becomes obvious to them that they need implementation help from an expert. Only the dp shop is familiar with the details of the corporate network, and can configure the hardware and software required.

The same is true for database problems. Only dp can advise on what mainframe data is available, where it is located, how to get to it, and its interpretation. And when micros are used as front-end and back-end processors for existing mainframe applications, only dp can enhance the mainframe systems accordingly.

By carefully determining the primary future requirements for mainframe-micro connections, dp professionals are therefore in a position to offer a number of related services that will be of great value to end users. These include:

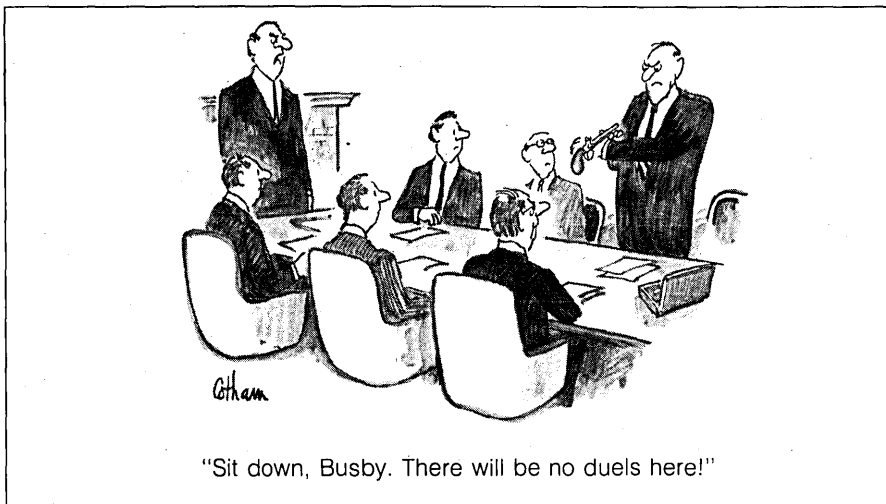
**Training.** Dp can offer end-user classes on how downloaded data can be fed into various micro packages using different data formats; on what mainframe data is available and how to extract it; on how a user can determine when to use a mainframe financial planning package and when to use a simple micro spreadsheet; or on the advanced features of a terminal emulation and file transfer package.

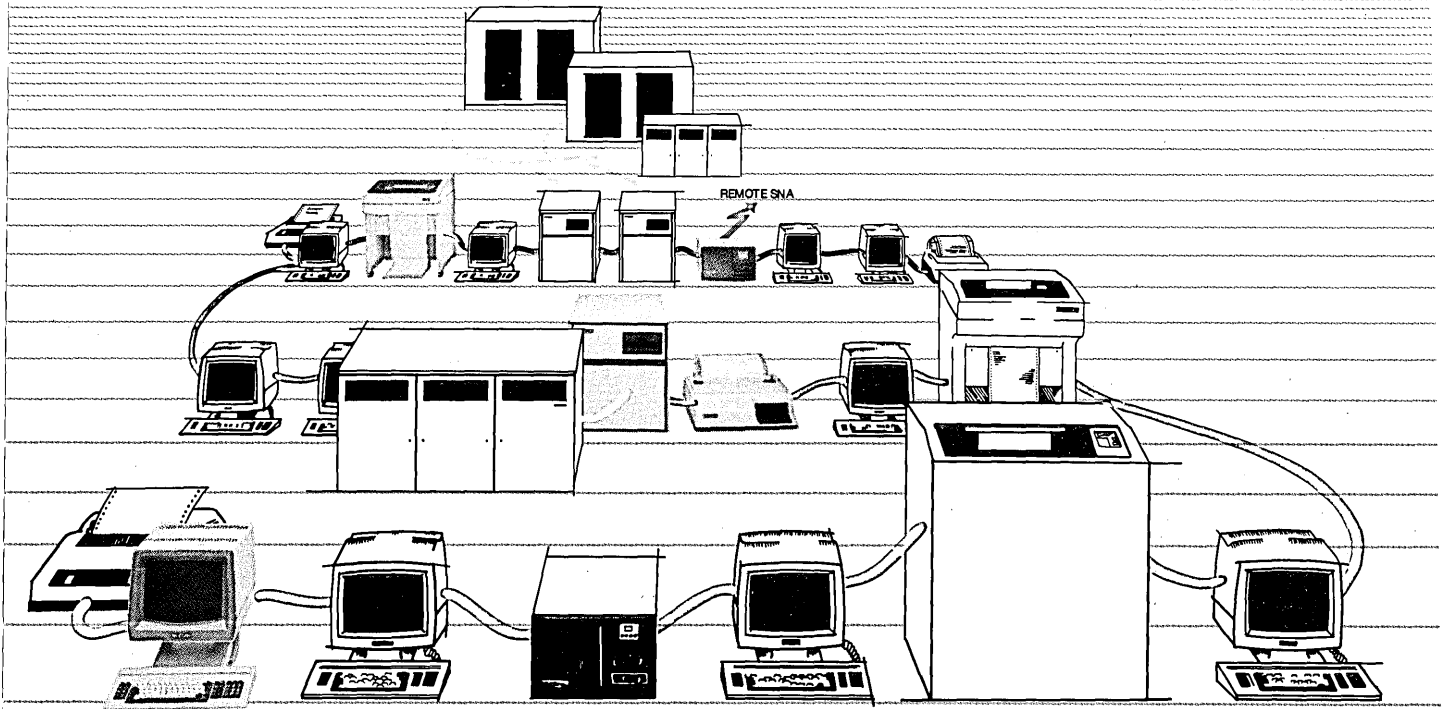
**Installation assistance.** Users must have help in configuring communications hardware and software.

**Postinstallation support.** Over the long term, users will need a lot of help on communications issues. Sometimes these will be obscure and highly technical, such as a new release of the operating system causing transmission problems, and sometimes they will be mundane, such as how to exchange documents between different text processors.

And concerning the bottom line, things also look as if they will take a turn for the better. Currently, it's difficult to charge users for micro support. Users think they can get all they need for free, or very cheaply, from the retailer or local consultants. As their appetite for mainframe access sharpens, they will soon develop a better understanding of the limitations of existing support, and more realistic levels of chargeback will become acceptable. Personal computer support need not be the matter of charity it is for dp today.\*

David Ferris is chairman of Ferrin Corp., a San Francisco and London-based company providing professional services, training, and sales to MIS organizations in the area of personal computing. The firm's work includes analysis, information center planning, implementation advice, and postinstallation support.





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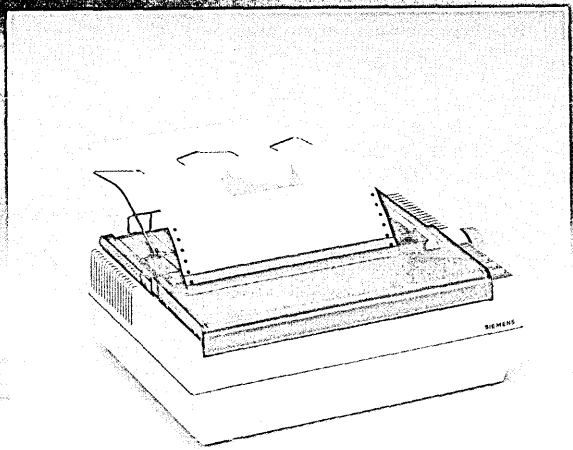
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**A look at some products that connect micros to mainframes.**

# IN SEARCH OF MISSING LINKS

**by Jan Johnson**

If anthropologists searched for missing links the way software vendors do, there would be vast fleets of Land Rovers descending upon Olduvai Gorge.

But while Nobel prizes are nice, as motivators they can't compare with the millions of dollars to be made in the burgeoning business of hooking up microcomputers to mainframes. In the past year, all that hypothetical money has produced a blizzard of activity. There have been introductions, announcements of intent to introduce, announcements of intents to announce, and a spate of rumors. Mainframe software vendors, micro software vendors, combinations of the two, and a number of startups are rushing to move personal computers into the mainstream of corporate information processing.

That's why the list you are about to read is out of date. It can best be thought of as a snapshot taken on Sept. 21, 1983; companies that hadn't announced a product by then aren't included (though they may have been on the verge, like Computer Associates, Jericho, N.Y.; and ADP, Clifton, N.J.). The situation will no doubt change a lot in the next few months. We plan to track it closely.

The products described here vary widely. Some are full-blown, integrated packages that make mainframe data available for a number of micro applications. Others are only a cut or two above terminal emulation. Either way, the intent is to tell enough about each product for readers to decide whether it warrants further investigation. All the data come directly from the vendors.

## **APPLIED DATA RESEARCH, Princeton, N.J. ADR PC**

### *Facilities on mainframe*

ADR companion products needed on mainframe to match the ADR/PC products.

### *Facilities on micro*

ADR/PC: Empire, decision support tool that interfaces to ADR/Empire on the mainframe side and Vision Calc and Vision Graph on the PC side; Email; Datacom, a micro version of ADR's relational database management system, ADR/Datacom/DB; Roscoe, a program-development tool for OS; VOLLIE, a program-development tool for DOS; SignOn, provides automatic sign-on (after initial user sign-on) for mainframe entry; Link, communications software; Editor, a full-screen editor; Vision, Vision Calc, Vision Word, and Vision Graph.

### *Operating environment*

IBM host with OS, DOS, CICS. IBM P.C. with P.C./DOS.

### *Link to mainframe*

Automatic dial-up to mainframe and 3270 emulation via a coax interface board.

### *Access path to mainframe software*

Through CICS to any ADR mainframe package that user is authorized to go to.

### *Data selection and transfer*

Menu-driven approach. Selection criteria are built off-line on micro. Then link is made to mainframe and request sent. Query executed against ADR/Datacom/DB and production data; data pulled off and automatically brought down to P.C. and stored in ADR/PC database. Using PC-based Datacom/DB package, can print, sort, display, or transfer data to Vision applications.

### *Data uploading*

Can upload entire calc model into ADR/Empire. At present, cannot update database directly.

### *Security*

User is issued individual disk that contains user-specific information, and also has to log on and give password at beginning of session. Password is validated at micro and at mainframe level.

**Announced:** June '83

**Commercial delivery:** 1984

**Installed base:** 0

### *Cost*

ADR/PC software to range from \$500 to \$1500; individual prices not yet established. Vision, with mouse and three basic applications, available for combined price of \$1,710.

**FOR DATA CIRCLE 375 ON READER CARD**

## **CULLINET, Westwood, Mass. INFORMATION DATABASE, CULLINET PC SOFTWARE**

### *Facilities on mainframe*

Information Database (IDB), with full access to IDMS-R.

### *Facilities on micro*

Cullinet Personal Computer Software, including a spreadsheet, financial modeling, a relational database manager, graphics, document processing, and electronic mail.

### *Operating environment*

IBM host with OS/MFT, OS/MVT, OS/VS2, DOS/VS, DOS/VSE; IBM P.C. with P.C./DOS.

### *Link to mainframe*

3278 emulation (Irma board) into 3274/6 controller.

### *Access path to mainframe software*

User makes calls to the IDB, which contains a series of summarized files. The IDB has access to any production database or file structure, IDMS-R, IMS, and outside database sources, such as Dow Jones.

### *Data selection and transfer*

Menu driven, user specific. Data specific to user appears on the screen. The menu contains predefined lists of data on mainframe and data on P.C. Mainframe data are color highlighted. User builds a query by walking through several menus. Query then sent to mainframe via IDB, which acts on it. Another keystroke is required to pull the data back down and store them in the micro's database system.

### *Data uploading*

Uploading is basically a save command. If it is old data, the system recognizes that the data came from the IDB and automatically sends it back. If they are new data, the user specifies whether they are to be saved to a local or remote site. Mainframe files cannot be updated unless the database administrator writes a special program to take data stored in the IDB and move them out to the production database.

### *Security*

Two-stage security, password based. Each user has a personalized disk containing sign-on information and file access information. A user's log-on is validated at the micro level and the mainframe level.

**Announced:** April '83

**Commercial delivery:** Late '83, early '84

**Installed base:** 0

### *Cost*

IDB on host \$75,000; P.C. software \$1,000 per copy, discount pricing.

**FOR DATA CIRCLE 376 ON READER CARD**

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#### Hardware Self-checking Causes a Breakthrough in Service.

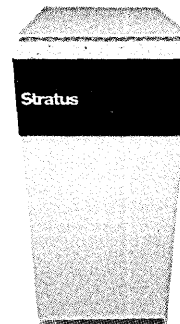
Each Stratus/32 tests itself EIGHT MILLION TIMES A SECOND while it executes your programs, so faults are detected BEFORE they corrupt your data. And when there is a failure, there's no need to rush to call your Stratus service technician. For one thing, the failed component has a partner that continues operations as usual (without slowing down the system), so there's NO DOWNTIME. In addition, repairs can be made WITHOUT STOPPING THE SYSTEM. It is so easy to repair a Stratus/32 that our service is provided at about one-half the average price charged by other computer manufacturers.

#### \$140,000, Software Included.

\$140,000 buys you a complete four megabyte 32-bit system with 60 megabytes of disk storage, magnetic tape drive, and system SOFTWARE. If you like our hardware, you will be even more impressed with our software. (A common reaction among our users.) Briefly, our software offering includes VOS (a virtual operating system), transaction processing, networking, IBM communications, data management system, interactive forms

builder, symbolic debugger, COBOL, Basic, PL/I, Fortran, Pascal, word processing . . .

To get more information call us at 617-653-1466. The computer you can count on has arrived.



## **Stratus**

CONTINUOUS PROCESSING™

Now that the world relies on computers it needs a computer it can rely on.



**INFORMATICS GENERAL,  
Canoga Park, Calif.  
ANSWER/DB, VISIANSWER**

*Facilities on mainframe*  
Answer/DB:

*Facilities on micro*  
VisiAnswer and help screens.

*Operating environment*  
IBM-MVS, DOS/VSE IBM P.C., IBM  
XT with P.C./DOS.

*Link to mainframe*  
Autodial, async to dial-up modem on  
host port, error checking provided.  
Soon to come—bisync and SDLC.

*Access path to mainframe software*  
Through Answer DB to anything An-  
swer/DB can access.

*Data selection and transfer*  
Menu driven, user specific, query  
defined off-line on the P.C. A dp-de-  
fined glossary stored on micro tells  
users what objects they have access  
to. Often-used queries can be pre-  
defined by dp and stored as an en-  
try to the glossary. Otherwise, to  
build a query, a user has to know  
where the data are stored on the  
mainframe. There are multiple steps  
to go through to build a query. When  
query is completed, sent to main-  
frame where request is processed in  
batch mode. Dp defines cue assign-  
ments based on password.

Single command calls data  
back to micro, where they are stored  
to disk. Data sent in VisiAnswer for-  
mat, so from disk data can be load-  
ed into any VisiCorp. applications.

*Data uploading*  
No uploading capabilities.

*Security*  
Provides password validation at mi-  
cro and mainframe levels.

*Announced:* April '83

*Commercial delivery:* Mid-November  
'83

*Installed base:* 0

*Cost*  
Typical configuration of 50 P.C.s, in-  
cluding software for micro and main-  
frame (monthly subscription rate),  
\$1,000 per PC, or total of \$50,000.  
Further breakdown of pricing not yet  
available.

**FOR DATA CIRCLE 377 ON READER CARD**

**INFORMATION BUILDERS INC.,  
New York, N.Y.  
FOCUS, PC/FOCUS**

*Facilities on mainframe*  
Traditional Focus package on the  
mainframe.

*Facilities on micro*  
PC/Focus on the micro with all the  
features of the mainframe package  
including shared relational data  
structure, graphics, statistics, finan-  
cial modeling, screen editor, nonpro-  
cedural report writer, and transaction  
processing language.

*Operating environment*  
IBM host with CMS, TSO, CICS, IMS/  
DA; IBM P.C. with P.C./DOS.

*Link to mainframe*  
ASCII, async dial-up package. Soon  
to have bisync, SNA/SDLC and 3270  
emulation (Irma board) to the host.

*Access path to mainframe software*  
Through CMS or TSO to Focus and  
all files it can access, such as IMS,  
ISAM, VSAM, or IDMS.

*Data selection and transfer*  
Use existing file extract capability  
within focus. Retrieved data are held  
in on-line monitor, then sent to micro.  
User must enter name of file to be  
moved, where to move it, and de-  
cide what to call it when it arrives.

*Data uploading*  
Same question-and-answer se-  
quence, but data are directed from  
PC to mainframe this time.

*Security*  
Password-based, checked at main-  
frame level. Security goes down five  
levels to value within field. Encryption  
also available on mainframe Focus.

*Announced:* May '83

*Commercial delivery:* June '83

*Installed base:* 400

*Cost*  
Mainframe Package, one-time license  
fee between \$66,000 and \$120,000  
depending on options. Month-to-  
month fee \$1,680 to \$3,000. PC/Fo-  
cus \$1,595 per copy; in quantities  
over 75, \$950.

**FOR DATA CIRCLE 378 ON READER CARD**

**MANAGEMENT SCIENCE AMERICA,  
Atlanta, Ga.  
EXECUTIVE PEACHPACK II,  
GRAPHICS PEACHPACK,  
ADMINISTRATIVE PEACHPACK**

*Facilities on mainframe*  
One or more MSA on-line systems.

*Facilities on micro*  
Interfaces to Lotus 1-2-3, PeachCalc,  
PeachText, Business Graphics, List  
Manager Personal database; tele-  
communications to link to other mi-  
cros and PeachLink to link to main-  
frame systems. Administrative Peach-  
Pak combines mainframe access  
with word processing. Graphics  
PeachPak allows users to produce  
color graphs of mainframe data.

*Operating environment*  
IBM host with OS, DOS, SSX, CICS,  
IMS-DC, IDMS-DC, TSO, CMS, ICCF,  
and others. IBM/P.C., IBM/XT with  
P.C./DOS.

*Link to mainframe*  
Autodial into mainframe protocol con-  
verter, which goes into host port and  
can handle multiple phone lines. Or  
3270 emulation (Irma board) into  
controller.

*Access path to mainframe software*  
Through host on-line monitor into any  
MSA or non-MSA application running  
under the monitor. Queries go  
against line data, real time.

*Data selection and transfer*  
Menu driven, template features. User  
can store a series of query templates  
on the micro. Predefined queries are  
called up and sent to mainframe.  
Data are queried, retrieved, and re-  
turned to micro and stored to disk in  
real time. At the micro, data can be  
formulated for all Peachtree applica-  
tions, for dBASE II, Lotus 1-2-3, Visi-  
Calc, and into DIF.

*Data uploading*  
Data can be uploaded in MSA tran-  
saction format to MSA applications or  
in standard 80-byte transaction for-  
mat to on-line monitor. It is up to the  
dp manager to define how updating  
will take place.

*Security*  
Password-based; resides on the  
mainframe side as part of the stan-  
dard operating procedure.

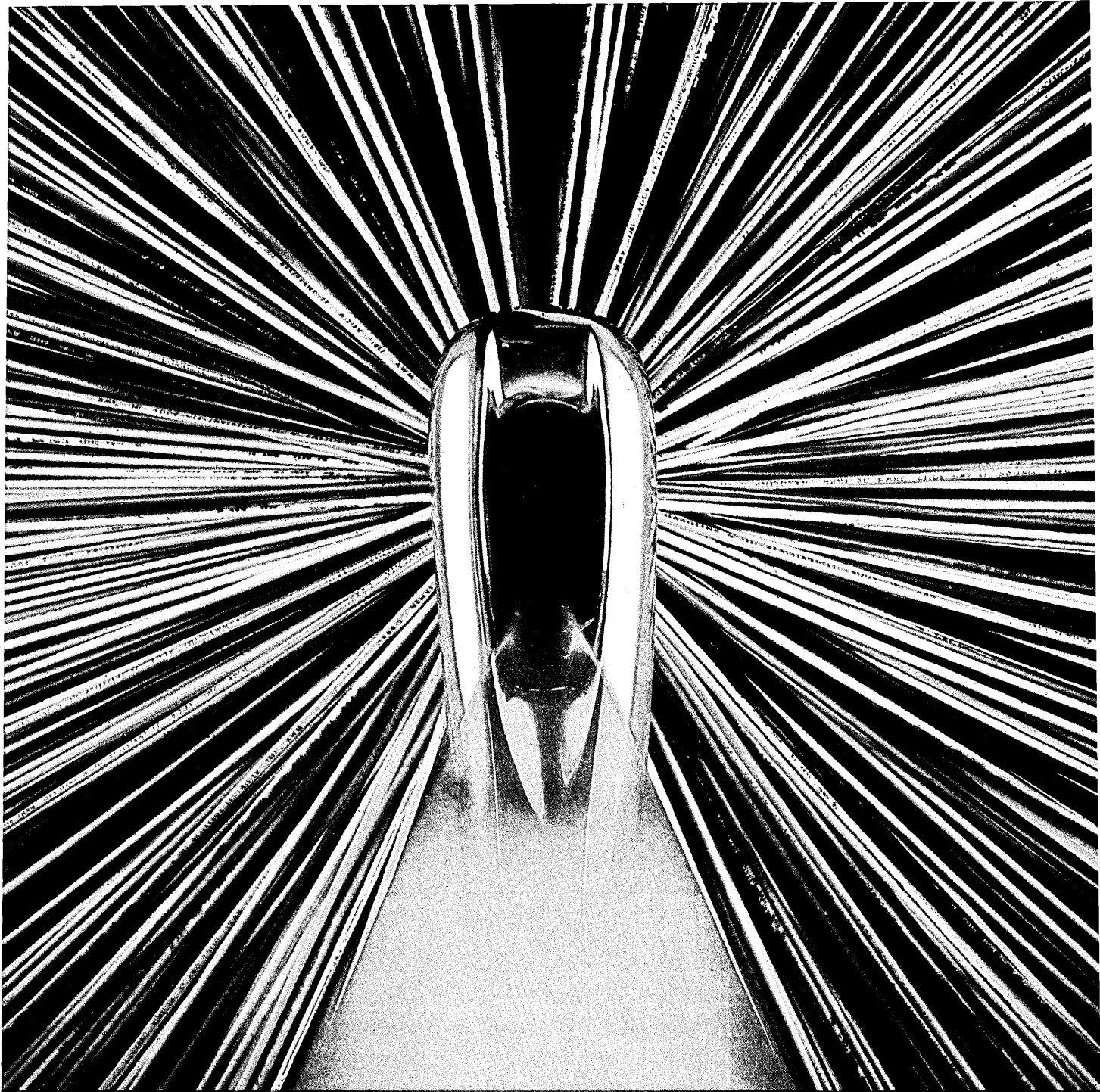
*Announced:* August '82 (Executive  
Peachpack II, Sept. '83)

*Commercial delivery:* Jan. '83 (Ex-  
ecutive Peachpack II, Sept. '83)

*Installed base:* 72 Exec. Peachpaks

*Cost*  
Executive PeachPak II \$6,000;  
Graphics PeachPak \$3,000; Adminis-  
trative PeachPak \$1,500. Quantity  
discounts available.

**FOR DATA CIRCLE 379 ON READER CARD**



## When we thread the needle, communication costs less.

The 3M Videodata® Broadband System carries thousands of messages on a single cable. It's an information utility that's cutting communication costs for 250 companies worldwide.

One cable is threaded through a factory or any spreadout institution. Up to 10,000 information sources can be connected. Computers, word processors, TV monitors and more can handle data simultaneously and never interfere with each other.

Our system can cut installation and expan-

sion costs in half compared with the cost of routing and re-routing conventional two-wire hookups.

Hearing the needs of the information age has helped 3M pioneer over 600 products for the voice, video and data communication field. We make everything from computer diskettes to high-speed translators that put computer data on microfilm.

And it all began by listening.

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Or call toll-free: 1-800-33M-HEAR  
or 1-800-336-4327.

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CIRCLE 69 ON READER CARD

# 3M



**McCORMACK & DODGE,  
Natick, Mass.  
PC LINK**

**Facilities on mainframe**

PC Link, provides access to M&D applications as well as non-M&D applications, does summary on data before download, and provides communications to micro.

**Facilities on micro**

PC Link, provides communications to host and formats host data into ASCII text format.

**Operating environment**

IBM host with OS, DOS, CICS IBM/P.C. with P.C./DOS

**Link to mainframe**

3270 emulation (via Irma board)

**Access path to mainframe software**

Through CICS to any sequential or VSAM file or M&D application.

**Data selection and transfer**

Menu-selection process to define query. Facilities provided so that dp can predefine query and user need only call up the name of the query. Data are downloaded to disk in ASCII text format. To move to application, choose from menu listing various applications on micro; that application is automatically loaded. Load data according to application's requirements.

**Data uploading**

PC Link asks whether downloading or uploading and prompts for necessary information, such as name of file to send and name of file sending to. At mainframe, can set up different file names for different kinds of data or send to one file name all the time. It is possible to do real-time update to production file, but dp controls who does this and what kind of data are involved.

**Security**

Password-based, dp controls upload. Access to mainframe data defined by applications on mainframe.

**Announced:** August '83

**Commercial delivery:** October '83

**Installed base:** 2

**Cost**

\$25,000 blanket charge for mainframe version of PC Link.  
\$2,500 per micro, quantity discounts available.

**FOR DATA CIRCLE 380 ON READER CARD**

**OMNAR CORP.,  
North Hollywood, Calif.  
PC INTERFACE**

**Facilities on mainframe**

Data format program for WordStar, VisiCalc, and Lotus 1-2-3.

**Facilities on micro**

Communications package and ability to send PICK commands.

**Operating environment**

Host with the PICK operating system; IBM P.C. with P.C./DOS

**Link to mainframe**

Auto dial-up to specific port on host; P.C. looks like PICK terminal to host.

**Access path to mainframe software**

Through PICK operating system to any applications running under PICK, using PICK commands.

**Data selection and transfer**

No special extraction features. Uses PICK query capability to define data; user has to know data. Prior to leaving the mainframe, user can specify that data be formatted for WordStar, VisiCalc, or Lotus.

**Data uploading**

Give PICK a file name and PICK automatically stores record in that file or replaces old data with updated data. PICK provides file retrieval and file store controls.

**Security**

P.C. interface provides port-function security; port on host limited to certain functions. Primary security resident in PICK operating system.

**Announced:** August '83

**Commercial delivery:** August '83

**Installed base:** 12

**Cost**

Host package \$1,895;  
PC package \$99

**FOR DATA CIRCLE 381 ON READER CARD**

**ON-LINE SOFTWARE INTERNATIONAL, Fort Lee, N.J.  
OMNILINK, OMNIMICRO**

**Facilities on mainframe**

OmniLink: On-Line's PC Link facility; Electronic Mail, Document Exchange, OmniQuery

**Facilities on micro**

OmniMicro, includes file transfer, file reformatter for Lotus 1-2-3, and Data Interchange Format (DIF), MicroQuery, database handler integrated with application development package, wp, spreadsheet, graphics.

**Operating environment**

IBM host with OS and DOS, CICS; IBM P.C. with P.C.-DOS. Wang host with VS or OIS and On-Line's Document Exchange Package.

**Link to mainframe**

4 ways: 1) Async direct, one port per P.C. 2) Async to 3278 protocol converter, multiple P.C.s into converter 3) 3278 emulation (Irma board) into 3274/6 controller 4) IBM's SDLC board emulating 3274/8 onto multi-drop line to host.

**Access path to mainframe software**

Through CICS to any file.

**Data selection and transfer**

Provides a query language and menu-driven view of the mainframe data; user does not have to know where data are stored. An OmniLink request goes against live data files, strips out data to a holding file in CICS, converts that data to P.C. flat file format, then ships the data to the P.C. disk. OmniMicro prompts user for an application and reformats the data to be compatible with the specified application.

**Data uploading**

Uploaded as flat file to CICS. Dp controls updating by generating CICS transaction to read or update production files. Also, upload to electronic mail and distribute to other P.C. sites.

**Security**

Two levels of security based on user password and defined by dp. Dp is provided a utility for defining unique logical views to mainframe data for each user or class of user.

**Announced:** April '83

**Commercial delivery:** September '83

**Installed base:** 0

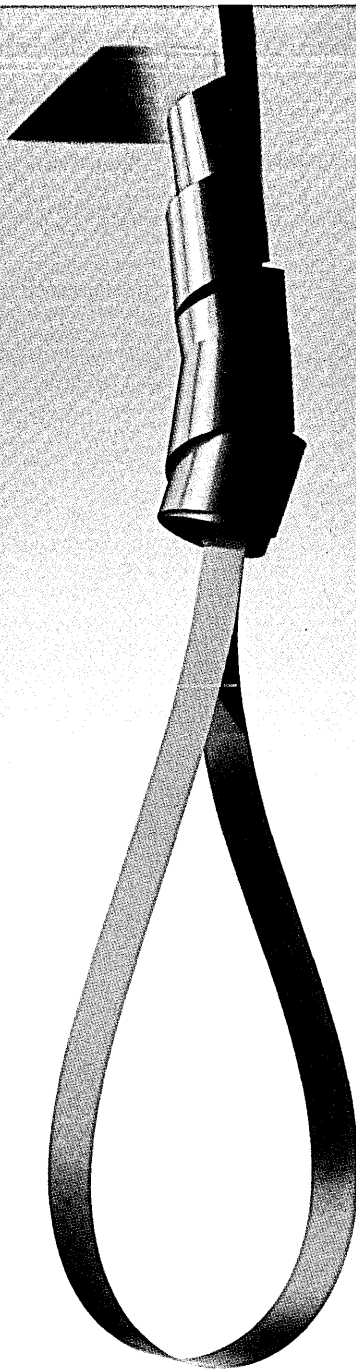
**Cost**

OmniLink, all modules—\$35,000 for OS and \$28,000 for DOS, through Nov. 30.

OmniMicro \$650, quantity 100, and over through Nov. 30

Document Exchange for Wang—OIS: \$2,500 each cluster, and VS \$5,000.

**FOR DATA CIRCLE 382 ON READER CARD**



# So what's a few inches of bad tape?

"Tape's tape," you say.

That's true unless the tape you write on now can't be read later. Then things could get really hung up.

Sure, tape's the last thing you want to think about; but it's often the first thing you hear about when things go wrong. So start off right.

With Memorex.<sup>®</sup>

Every inch of Memorex computer tape is tested to give you the greatest data security. And while some companies scrape away imperfections — calling it "certification" — we'd rather reject them. To keep you on the safe side.

Now Memorex has two newly formulated tape products that take our well-known quality a step further. Both are engineered for durability and

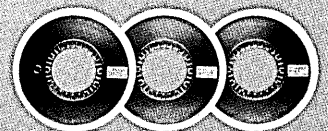
dependability in the critical 6250 bpi and 1600 bpi worlds. And each is backed by a 25-year warranty.

**QUANTUM<sup>®</sup>II.** Our new premium tape features higher output and that extra margin of safety for your critical data. It's write/skip free at 6250 bpi.

**MRX<sup>®</sup>V.** The new high-output, multi-purpose tape provides excellent value and dependability.

Don't take chances with your data. Trust it to Memorex Tape. We won't leave you hanging. For more information, call 800-222-1150.

**MEMOREX**  
A Burroughs Company



**SIMWARE INC.,  
Ottawa, Ontario, Can.  
SIM3278, AZPC 2**

*Facilities on mainframe*  
SIM3278: converts ASCII to 3278 mod 2.

*Facilities on micro*  
AZPC 2: provides file transfer and 3278 emulation.

*Operating environment*  
IBM VM/CMS and MVS/VTAM with NCP and NTO or NPSI. Any ASCII crt with a 24-line by 80-character screen.

*Link to mainframe*  
Autodial and go to mainframe in ASCII TTY mode. Connect to SIM3278 program. From that point on appear as a locally attached 3278 model 2 terminal.

*Access path to mainframe software*  
3278 emulation to CMS

*Data selection and download*  
Provides no data extraction facilities, only data transfer. Prompts for file name, file type, and disk drive location on PC. File sitting in CMS is shipped to PC disk in 3270 block mode. PC automatically acknowledges each block.

*Data uploading*  
From PC operating system call up AZPC 2 program. Select target host from menu, auto dial to host, sign on as a 3278 terminal. Identify file name, file type, and drive on PC, and file name and file on host and hit function keys.

*Security*  
No security provided by Simware package.

*Announced:* SIM3278, April '83  
AZPC 2, June '83

*Commercial delivery:* same

*Installed base:* 170 installations of SIM3278  
70 installations of ASPC 2

*Cost*  
\$6,500 per mainframe for VM,  
\$12,000 per mainframe for  
MVS/VTAM  
\$750 per mainframe for AZPC 2 (un-  
limited PC access)

**FOR DATA CIRCLE 383 ON READER CARD**

**TOMINY INC.,  
Cincinnati, Ohio  
DATA BASE-PLUS**

*Facilities on mainframe*  
Logical database structure, screen handler, print handler, query/report writer, DATA BASE plus programming language, and an integrated set of business applications.

*Facilities on micro*  
DATA BASE-PLUS and business applications ported down to micro and include application development features.

*Operating environment*  
IBM host with CICS; IBM P.C. with P.C.-DOS; Altos with Xenix; Onyx with Unix 3.8.

*Link to mainframe*  
Relies on hardware vendor to provide communications access method.

*Access path to mainframe software*  
Through CICS to DATA BASE-PLUS.

*Data selection and transfer*  
No special extract features. Dumb terminal style access under the control of CICS and DATA BASE-PLUS. A data manipulation language message is sent from DATA BASE-PLUS on the micro to CICS and into DATA BASE-PLUS on the mainframe. Data are returned in ASCII format.

*Data uploading*  
No special upload features for files. Upload messages through CICS to DATA BASE-PLUS.

*Security*  
Password protection to two levels, same as on the mainframe product DATA BASE-PLUS.

*Announced:* January '83  
*Commercial delivery:* January '83  
*Installed base:* 350

*Cost*  
DATA BASE-PLUS on the host \$49,000; DATA BASE-PLUS on micro with application development features \$7,350; business applications on micro \$1,000 per module (8 modules).

**FOR DATA CIRCLE 384 ON READER CARD**

**VM PERSONAL COMPUTING,  
New York, N.Y.  
PLEASE, RELAY**

*Facilities on mainframe*  
Please understands Relay protocol, does error checking on incoming data, and initiates data transfer.

*Facilities on micro*  
Relay is an asynchronous communication package with a full screen editor and error checking. It enables the micro to do four tasks at once: send, receive, print, and edit.

*Operating environment*  
IBM host with VM/CMS; IBM P.C. with P.C./DOS.

*Link to mainframe*  
Autodial link to host, async to shared port.

*Access path to mainframe software*  
To CMS, then under the control of CMS.

*Data selection and transfer*  
Provides no data extraction facilities, only data transfer. Have access to all CMS commands to create CMS file. Then use Please facility, entering name of file and file type to be moved. Data sent down in ASCII text format, binary format, or hexadecimal to P.C. disk.

*Data uploading*  
Contact Please facility on host, give file name and file type. At host, file stored in CMS. There is also a special Relay option called Store and Forward. It allows users to upload data created in most any P.C. application, such as VisiCalc, and hold the data in CMS. Other P.C. users can be notified of this file name, so that they can then call host and download the file to their P.C. The Store and Forward facility can also be used to back up a P.C. disk.

*Security*  
Only what's available within host applications.

*Announced:* Relay, April '83; Please, August '83

*Commercial delivery:* same.

*Installed base:* Relay, 1000; Please, 30

*Cost*  
Relay \$149 retail, quantity discounts available. Please \$1,495 and second purchase half price.

**FOR DATA CIRCLE 385 ON READER CARD**



# “My old mainframe and my new word processor aren't on speaking terms.”

Stop the shock...with Exxon office automation.

Today, many companies are shocked to discover that their electronic office machines can't talk to one another.

## A shockproof system

That's why Exxon's products are designed to be part of a fully integrated, communicating office system.

## Exxon speaks your language

With communications options, our information processor can interact with most mainframe computers —and even function as a 3270 terminal. So it's easy to access your corporate data base, and retrieve the data you need.

In fact, you can even gain access to countless libraries of information, such as Dow Jones News/Retrieval® and THE SOURCE.™ Or even send information via the Telex/TWX® Network.

## Build a shock-resistant office

Exxon's fully integrated line of information processors, controllers, and impact or ink jet printers work together to create one of the most flexible office systems available.

## For more information

Call 800-327-6666, or write Doug Brunson, V.P. Marketing, Exxon Office Systems, P.O. Box 10184, Stamford, CT 06904.



**EXXON** OFFICE SYSTEMS

**The future...without the shock.**

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CIRCLE 71 ON READER CARD

# THE DIFFERENCE EXPANDABILITY

*The importance of expandability in a small business computer system cannot be blown out of proportion.*

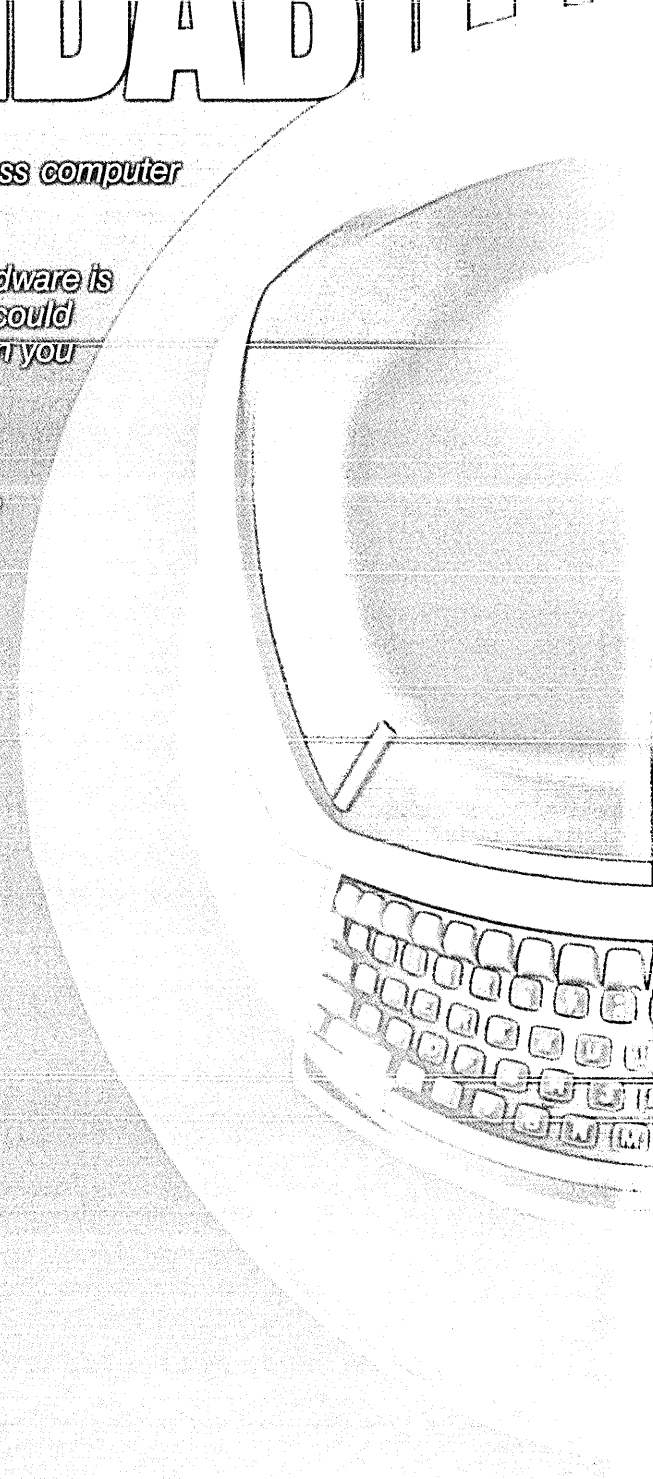
*However, the facts can.*

*And the fact is that while much of today's hardware is expandable, the software isn't. Which means you could end up spending even more for new software than you did for hardware.*

**We stretch your budget. Not the truth.**

*Alpha Micro won't make you change software as you grow.*

*You can go from one to over forty users. Let different people do different things at the same time. Add to your word processing or customer*





# CE BETWEEN VAND HOT AIR.

*files. Even do complex tasks like inventory control and order processing.*

*We don't leave you flat when it comes to support, either. Our international network of dealers and factory trained specialists will give you all the service and support you'll ever need.*

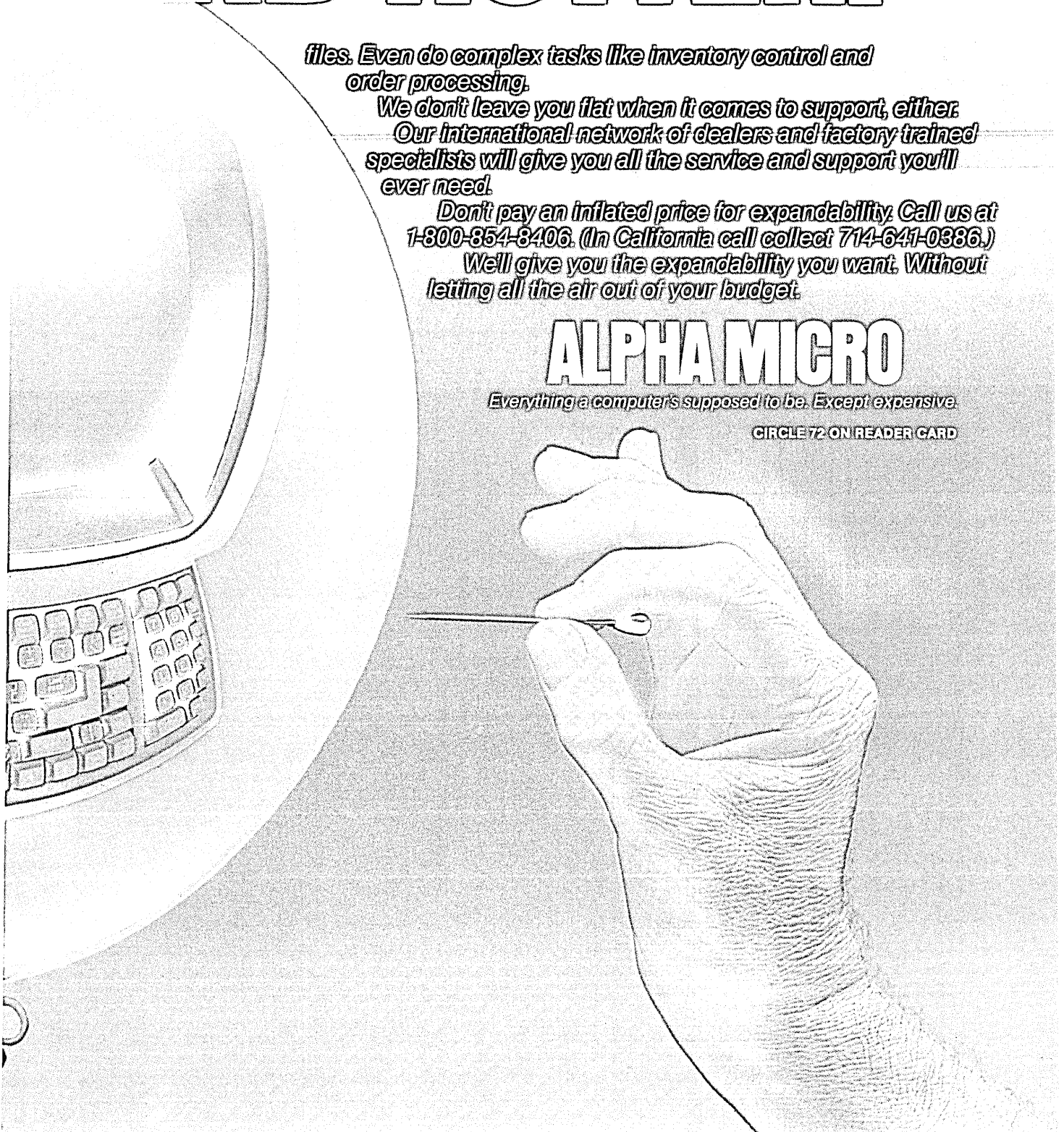
*Don't pay an inflated price for expandability. Call us at 1-800-854-8406. (In California call collect 714-641-0386.)*

*We'll give you the expandability you want. Without letting all the air out of your budget.*

## ALPHA MICRO

*Everything a computer's supposed to be. Except expensive.*

CIRCLE 72 ON READER CARD



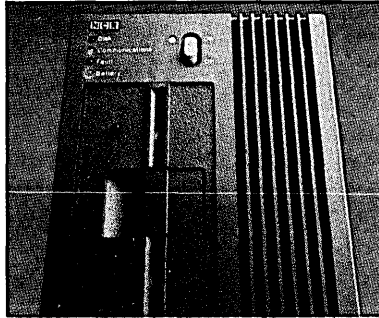
# 1983. A Very Good Year.

**NCR introduced the Tower,  
a UNIX™ based microcomputer  
with the power of a mini.**

NCR designed the Tower for UNIX, today's de facto operating system standard for multi-user 16-bit microcomputers. Then NCR made a number of enhancements to make the Tower easy to use at any level of computer sophistication.

NCR added a full featured, menu-driven database that you create in English. The Tower can be programmed in BASIC, Pascal, COBOL, and FORTRAN as well as UNIX's own language, "C". Spreadsheets, word processing and color graphic software are available now from NCR as well as from third-party UNIX software developers.

The Tower can communicate with any existing computer system from desktops to mainframes. Communications capabilities include SNA, X25, RBS, Tower-to-Tower, and Tower-to-Terminal networking.



The Tower. A lot of power in a 29" x 27" x 7" box.

Optional add-ons include a streaming tape drive for disk storage backup.

The Tower has power. Internal memory can be expanded to two million bytes, external storage from our standard 30 million to over 200 million. Its operating speed is an impressive 10 MHz. NCR enhancements include detailed diagnostics, battery backup, error correcting code and a new memory management system. A typical four-user configuration, including operating system and the "C" language, would cost only \$16,495.

The Tower is in volume production now.

In 1983 NCR introduced more new data processing products than any other high tech company. We wanted to get a good start on our second hundred years. For more information call your local NCR office, or 1-800-CALL-NCR. In Ohio, 1-800-543-4470.

**NCR**

Shaping the way business  
does business for 99 years.

**CIRCLE 73 ON READER CARD**

Up to 16 users can access the Tower at the same time.

UNIX is a trademark of Bell Laboratories.



**Dp managers report headaches and frustrations when trying to link PCs to the mainframe.**

# ADVENTURES IN MICROLAND

## **A DATAMATION staff report**

As if data processing managers didn't have enough to contend with, now television advertising is giving them a headache. The IBM commercials for its Personal Computer are raising end-user expectations way beyond what the machine, and the dp manager, can deliver. "The Charlie Chaplin approach to microcomputing—you just push a button and see a profit projection—doesn't exist now, and it won't for a long time," complains Alan Gross, formerly a product consultant at International Paper and currently technology planning specialist at securities dealer Smith Barney. "Our people read all the hype and go out and buy a personal computer, thinking it'll be user friendly and run like gangbusters," sighs Pete van Ogle, capacity planning manager at the Fireman's Fund Insurance Co. "Then, when they try to develop some useful applications, they drown out the machines, because they are not very fast." What the users need—easy access to the MIPS power of a mainframe—becomes the problem.

How to connect micros to the corporate mainframe is the number one item on dp managers' project lists, according to a recent survey by Data Decisions (see "Micros at Big Firms: A Survey," p. 160). Out of 1,000 large company sites queried, 74% reported that they expect to support micro to mainframe access in 1984. "The most important step in the future of dp shops is the linking of micros to mainframes," asserts Gross.

Vendors of software, peripherals, and mainframes are rushing to fill the void, but dp managers are not exactly ecstatic about the offerings. "There's been a lot of announcements, but nobody's package has come to fruition," claims Gary Wood, manager of office systems at the Mutual of New York (MONY) life insurance company. More than a dozen companies have introduced micro to mainframe links, usually involving a combi-

nation of software and printed circuit board firmware, but none yet meets all the requirements of dp managers contacted by DATAMATION in an informal survey. "A lot of the communications and file linkages aren't there yet, not so much in terms of the machines talking to each other, but in terms of file structures," contends Gross.

Dp managers say they have encountered a series of trade-offs, compromises, and Band-Aid approaches to the micro to mainframe interface, and they blame IBM for the confusion. "What we're really lacking is a sense of direction from IBM," exclaims Wood of MONY. "The success of the P.C. took IBM by surprise, and they haven't had the chance to give it the support products."

Many dp managers support terminal emulation for the corporate PCs, Apples, and what-have-you, calling it a stopgap measure with many deficiencies. One of the most popular terminal emulation packages, according to dp managers, is from Technical Analysis Corp., a subsidiary of Digital Communications Associates Inc. The Tennessee Valley Authority (TVA), MONY, and many others are using IRMA, a PC board, and coax interface with a mainframe via a terminal controller, either in an asynchronous or bisynchronous mode. In addition to viewing mainframe data on the micro's screen, a user can also download the data into the micro's memory disk.

Overall, dp managers told DATAMATION that they react to terminal emulation packages as if they were Listerine—they taste terrible, but they're the best available now. "It's very inefficient and it requires a separate applications package for the mainframe to download," complains Wood of MONY. "The comm links are very slow," groans Gross of Smith Barney. "To transfer half a megabyte file over asynchronous lines at 1,200 baud would take at least half an hour."

Until recently, about 25% of the 100 PCs spread over TVA's seven state service

areas were linked to the headquarters mainframes using the IRMA package. Bisynchronous telephone lines transmitted the data at 4,800 baud. "We didn't go out and direct the users to put these links in," states Dan Shannon, branch chief of adp policy, planning, and requisitions. "In fact, the users were beating down our doors to put them in." Dissatisfaction with the emulation approach led TVA to install a protocol converter to switch the micro's signals to SNA/SDLC.

## **PROBLEMS WITH LINKING**

Others are equally frustrated. Linking personal computers to a mainframe with a Teletype terminal emulation "is a crummy way to get data," alleges Larry Woods, manager of dealer systems research for Deere & Co. "Data transfer is line by line and asynchronous with little error checking. That is something to consider if you're passing data back and forth and you drop a bit and change the number of zeros in a figure."

High-speed communications are not needed, says Shannon of TVA. Five Apples were connected to mainframes at TVA's Chattanooga headquarters using the Teletype emulation before the SNA protocol conversion, "but speed was not a problem," he says. "There's no need for high-speed communications between those users and the host computers." TVA uses a 3705 front-end processor between the hosts, the protocol converter, the micros, and other terminals.

Returning micro data to the mainframe is even more difficult than downloading, notes Earl Mott, an in-house consultant for Deere. Dumb terminals never had on-site storage, he says, so they were never expected to send a stream of data back to the host, other than the amount on the screen. There may be a block transfer mode for the 1,920 screen characters, "but that's not too convenient for file transfers," he adds.

## "We've got a lot of upset users," says Wood of MONY.

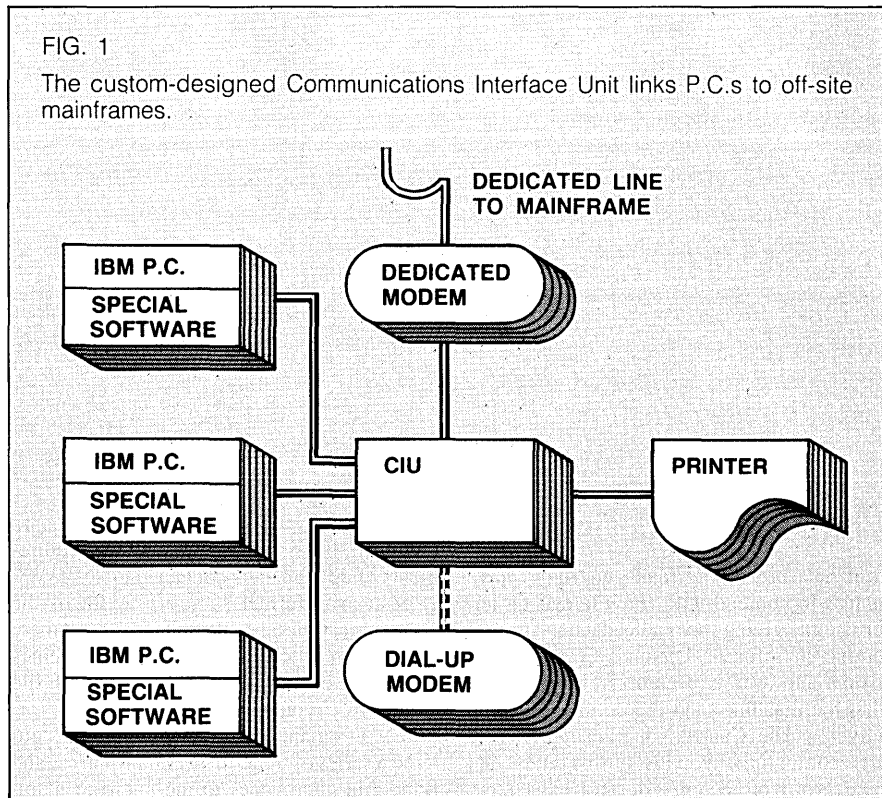
Less than spectacular results of terminal emulation attempts are hurting many companies. Wood of MONY reports that the introduction of a new life insurance policy package was delayed when a PC network could not function as expected. The firm had to resort to a combination of 5110 terminals and TSO, losing the critical local computer power. "We've got a lot of upset users," Wood reports.

Pitfalls by the dozens await dp managers. The IRMA link works only on systems with IBM network controllers, according to Mott of Deere, not with the controllers made by others. "Some years ago IBM defined the protocol between the 3705 and its controller," he recalls. "But it did not define the protocol between controller and the tube. A plug-compatible controller business grew and, now, maybe only 5% to 10% of our controllers are from IBM. The rest are from Courier and the IRMA board, and others won't work with anything but IBM."

Consider the adventure of Ken Davies, dp manager at Topaz Electronics, San Diego. Trying to link a diverse assortment of CPM micros to an HP 3000, he learned that CPM formatted data are incompatible with the MPE operating system on the minicomputer. "The micros always transfer the file in the CPM format, which you can't use on a mainframe," sighs Davies. "And when you try to transfer a file down to the CPM machine, it tries to convert the data to CPM, which you may not want." The link is not ideal between an HP minicomputer and HP personal computers like the 125 and 120 models, Davies avers, because the HP desktops log on as terminals, not as PCs. "It's very friendly as a terminal, but when you want to transfer a file down, it's not usable."

### MICRO TO MAINFRAME MARRIAGE

Vendors say they are trying, but admit that it takes quite a lot of knowledge to make a successful micro to mainframe marriage. "A number of our users have been able to work with the CPM file format," insists an official of Direct Inc., a Santa Clara, Calif., manufacturer of one of the brands of 8-bit micros used at Topaz. "Once the file is received in the mini, you can run it through an HP file copy utility and readjust it to any record size you want." The CPM handles 128-byte records, and the file copy utility adds or deletes some terminators, or other format massaging, to mesh the file formats. "We're caught in a situation where we have so many users out there using so many different packages that we're not necessarily familiar with," the official explains. "So we provide a general solution and then work with the customers on an individual basis." Davies says Direct was not completely



successful in "working" with his problem.

While many, perhaps most, dp shops have tried the 3270 emulation approach, a few have ventured to adapt other network schemes, such as TSO or RJE. Wood of MONY "doesn't recommend" the 3777 terminal and RJE package, because of the limited file data transfer, though it has been used at MONY in an emergency. Says van Ogle of the Fireman's Fund: "You can use a TSO interface, and then dummy the PC into a 3270 terminal. The only trouble is that you have to write TSO programs." Fireman's opted for a protocol converter for the 3270 tie to a 3705 controller for the more than 100 micros used by its staff.

Several new concepts merit serious attention, say dp managers who have micro to mainframe links in beta test situations. GTE Sprint Communications Corp. uses the IBM XT for complex order entry tasks at its smaller offices. A software package developed by DataSystems Software Corp., Canoga Park, Calif., performs well, company officials say. "We require a lot of validation, a huge amount of editing before data are sent to the headquarters," says Janet Kino, an official in the dp office. She awards the software, and the vendor, the ultimate accolade: "They've never disappointed us."

City National Bank of Beverly Hills reports that the combination of an in-house developed software package, called Data+, several off-the-shelf packages from Distrib-

uted PC Systems, Encino, Calif., and a special modem from Solution Software Systems, Mount Prospect, Ill., moves data up as well as down in a financial transaction network between City National and other banks. "Users can get anything they want and do anything they want," enthuses Nell Cox, senior vice president of City National. "We've had no trouble making it work."

A star network design reminiscent of a local area network scheme is the key to TeleVideo Systems' micro to mainframe connection in beta test at Deere. To communicate to the remote host, one of the micros on the net becomes a controller; this "lead" micro runs a 3276 terminal controller application program. Mott reports that "weird things" happened during system testing: an analog test loop generated an intermittent failure, due not to a faulty connection but to the system's configuration. Explains Mott: "To get from our TeleVideo location we have to go through a short-haul modem and a multiplexor. The synchro was in the modem next to the multiplexor, not the modem next to the micro," and the location of the synchro modem was causing the failure.

Another approach to the ideal micro to mainframe tie is to invent your own box. A timesharing and data processing firm specializing in servicing managers of pension fund assets, called Shaw Data Services, New York, introduced its "communications inter-



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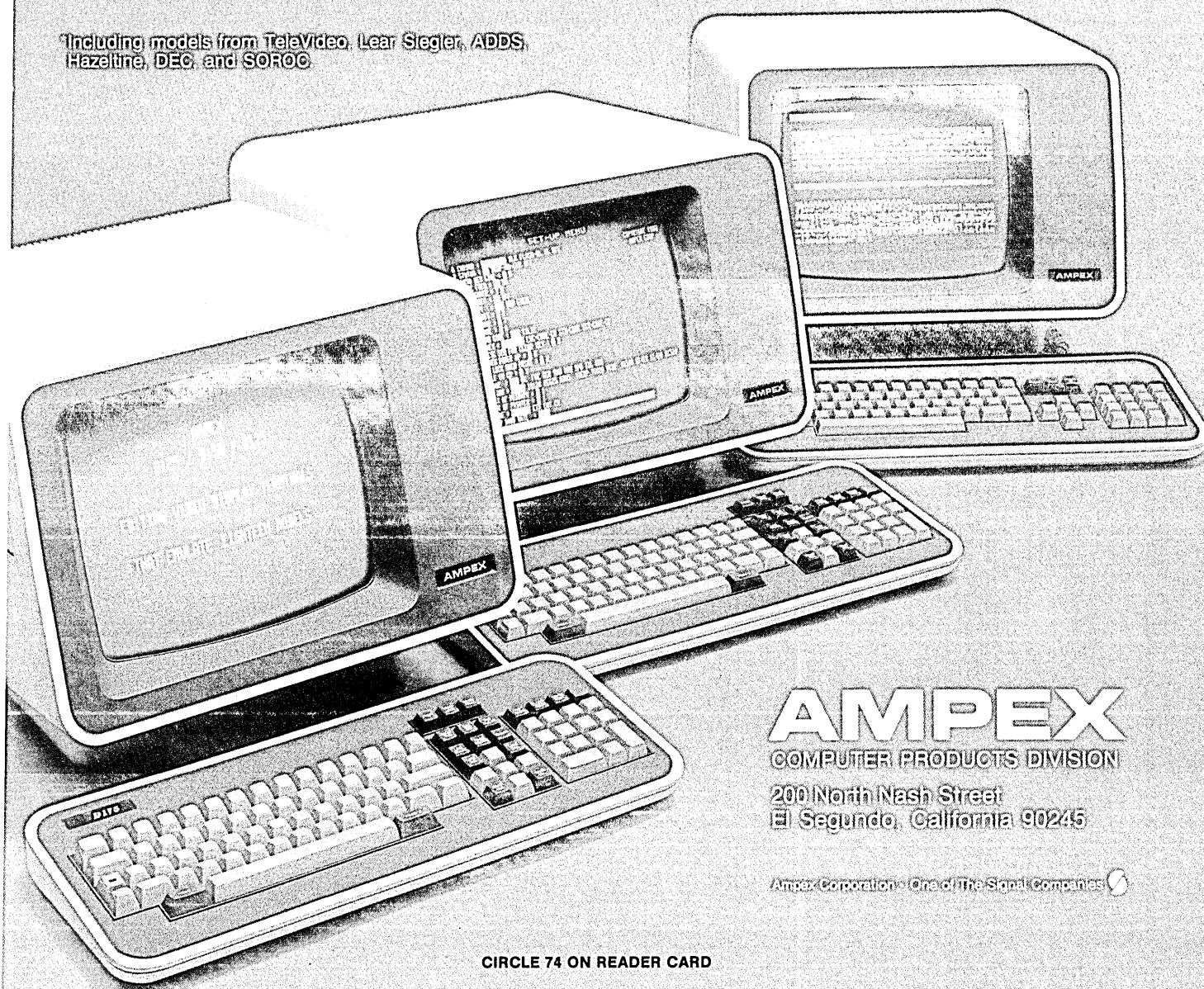
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## "Users can get anything they want and do anything they want."

face unit" last summer. Each black box contains a microprocessor and hard disk memory as the link between the client's PCs, the Shaw databases, and dial-up services. Data files are supposed to move up and down the system when it is finished, but as of midsummer there were a few bugs to work out. "There are a lot of query problems, and we can't massage data on the PC yet, just view it on a screen," complains one of the 100 clients who have signed up for the CIU. While refusing to disclose details about the CIU, such as the name of the New Jersey manufacturer, Shaw Data claims that the system's full capabilities will be operational by mid-1984.

### CONCERNS ABOUT ACCESS

Several firms refuse to consider full micro to mainframe links because of data integrity concerns. "Personal computers are just that," explains William Synott, vice president for edp at the First National Bank of Boston. "They are personal aids to help managers manipulate their own personal data." Access to the user's particular database can only be done on an approval-first basis. "Even then, he can only access a copy in a read-only mode,"

comments Synott. "He can't write against production files."

Confusion and concern over micro to mainframe approaches is at the point where venerable old COBOL has a role. Larry Woods of Deere notes that a package called RM/COBOL has real advantages. "You can offload some of your COBOL development projects from the host to the micro," he says. "With the RM/COBOL generator on the micro, you can generate the COBOL, compile it, test it all on the micro, and then send that code to the host. All the host has to have is a run-time module." At best, though, COBOL is not the answer for end users with a 1-2-3 spreadsheet package and an urge for corporate data.

Indeed, Woods is the first to admit that the solution to the problem must come from IBM. "Coordinated code between micro and host will not be good until IBM comes along," he says. "I would like to have the PC as an integral part of the network of the host, but to have that I need a good package designed to run in that environment—something that tightly integrates IMS and the micro software." When Big Blue will produce that ideal package, a micro SNA, remains to be seen.

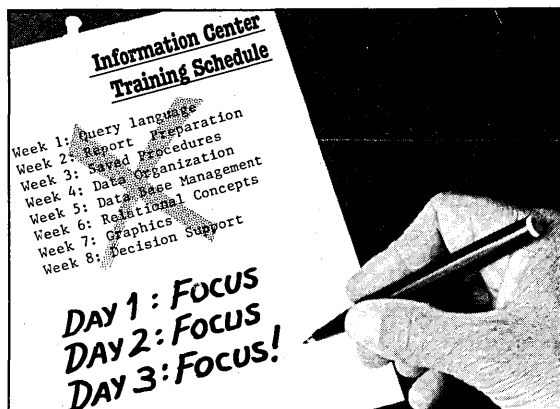
Users slogging through the micro to mainframe swamp are aware that IBM may choose not to develop a superduper software solution to their problem. Thousands of 3270 terminals become extinct if IBM makes it easy for the PCs to talk and listen to mainframes. There are other negatives, too. "IBM is not making a dime off of the PC packages other vendors are selling," notes Woods. "In fact, that package [the micro link] allows the PC to take some load off of the host, and that takes money out of IBM's pockets."

Until IBM offers such a solution, some dp managers will postpone their micro to mainframe effort. "I don't want to be the first to use something new," cries a veteran of many other milestone adventures in dp land. "We know the technology exists, but I'm going to wait until others gain experience with it. I know IBM says it exists today, but I'm going to wait for three years. Then everybody will have it, and it will be safe." \*

This DATAMATION report was researched by staff editors Ralph Emmett, Jan Johnson, Larry Marion, Edith Myers, Willie Schatz, and Ed Yasaki and was written by Mr. Marion.

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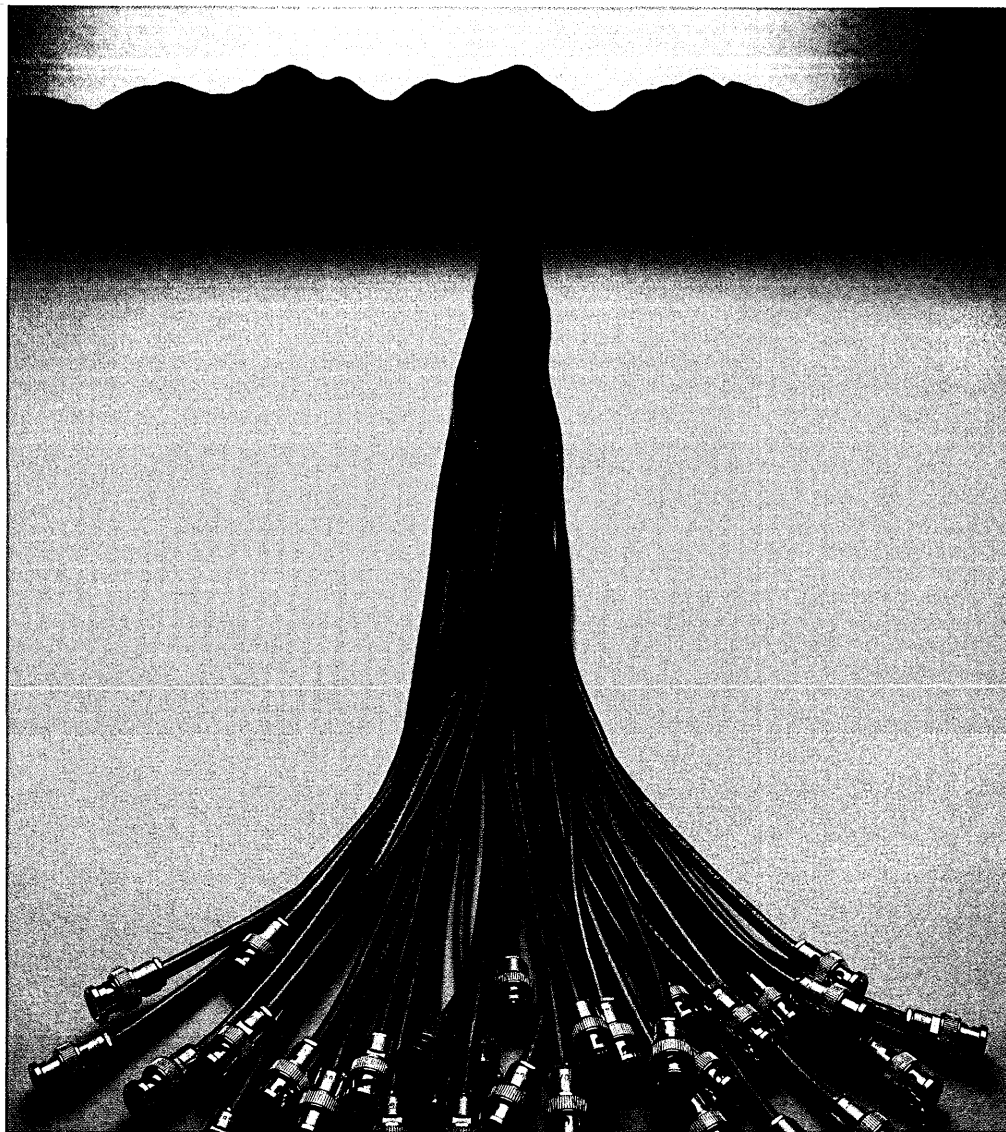
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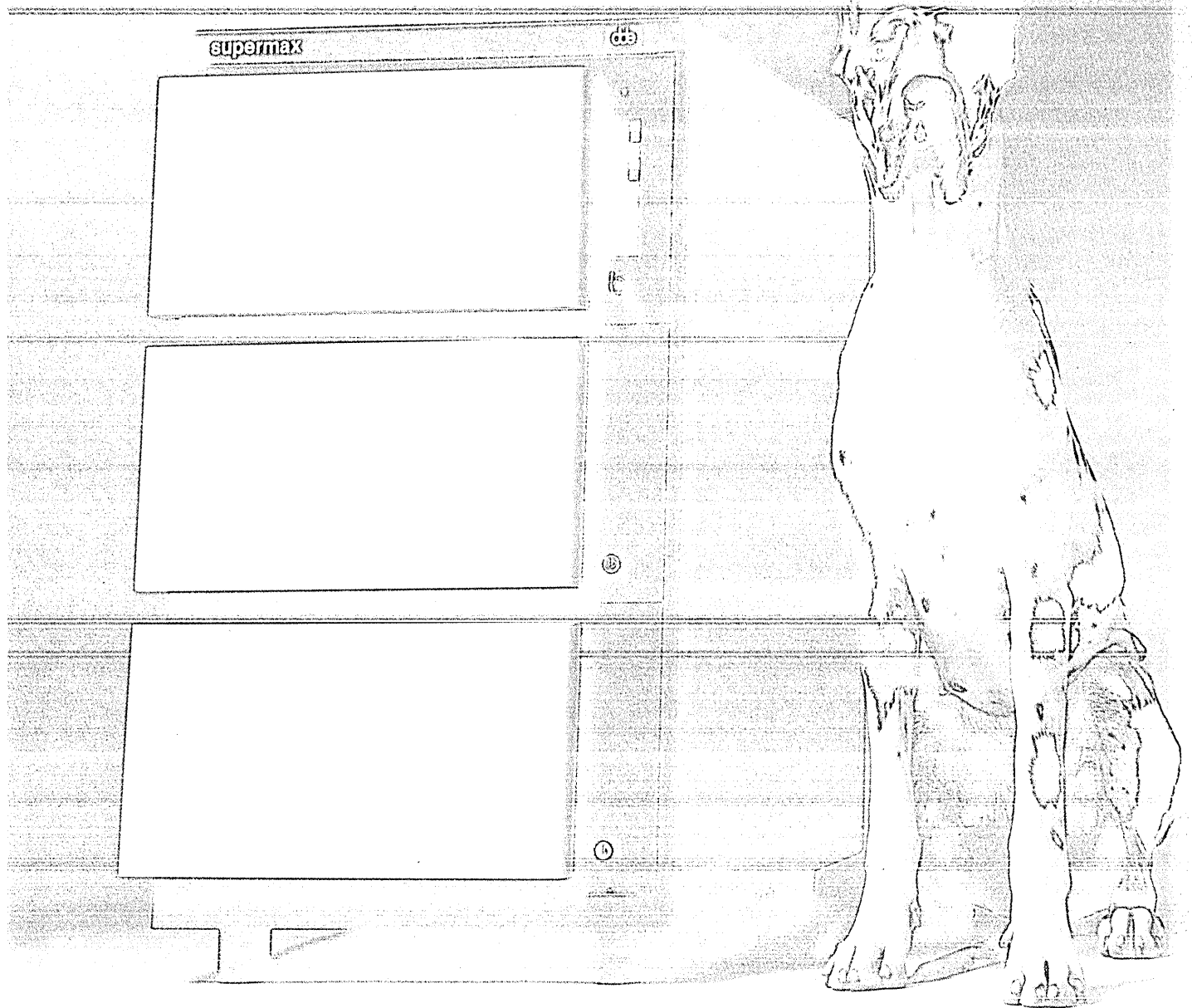
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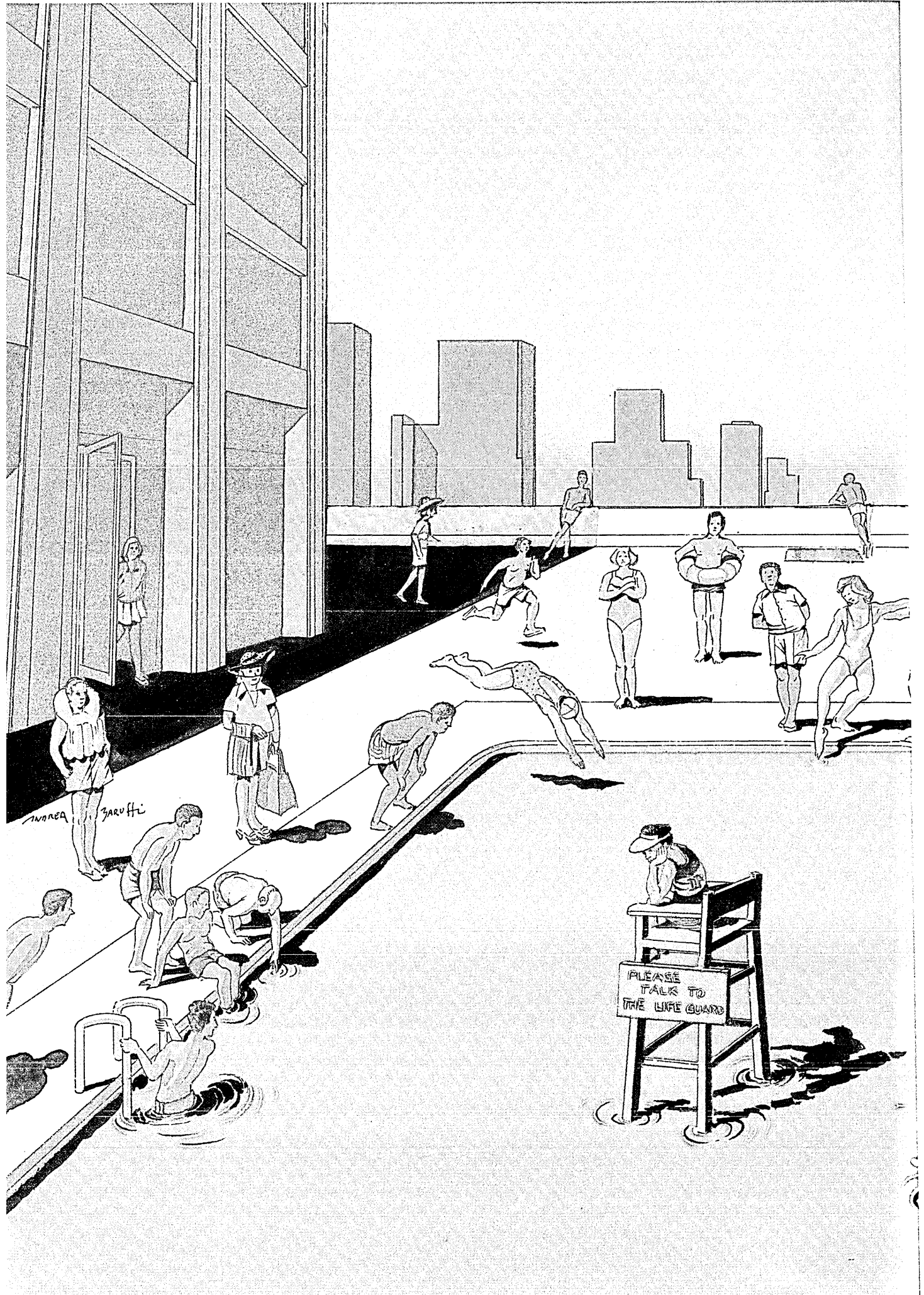


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When end users take the personal computing plunge, dp managers find the water more roiled than ever. But it says here they expect to make things work swimmingly.

# MICROS AT BIG FIRMS: A SURVEY

by Data Decisions

Corporate employees, as everyone knows, have embraced personal computing with a passion, and the trend is expected to accelerate. But for the corporations, and especially for their dp departments, the little machines still seem to raise more questions than they answer. What, exactly, are micros accomplishing today? What might they accomplish tomorrow, and how will organizations get there from here? And what role do dp managers expect to play as their companies make fundamental changes in the way they handle information?

For answers to these and other questions, Data Decisions recently surveyed dp managers at a thousand corporate and institutional installations. The results overturn some perceptions on the use of personal computers in big companies and on the attitudes of the professionals who dictate their use.

The installations surveyed represent a cross section of American business; the top three categories were manufacturing, financial/insurance, and transportation/utility. The average number of employees at these sites was over 1,900, and all own or lease computer equipment with equivalent monthly dp rental charges in excess of \$50,000. (For more detail on how the survey was conducted, see box, p. 174)

The questions were designed to find out how and where personal computers are being used in large installations and to explore the attitude of the dp manager toward their use. The survey went out to dp managers at 2,000 organizations. Over 50% responded, often with lengthy comments and other indications that this is indeed a critical topic. The respondents were opinionated and interested. They were also knowledgeable; even for the most difficult questions concerning current usage patterns, over 80% of the participants responded. Their answers provide some startling insights into what is im-

portant in the corporate use of PCs.

The attitude of the data processing organization has a major influence on the use of personal computers in large corporations. While there is some indication from their comments that certain dp managers are merely accepting the inevitable, in most cases the attitude is overwhelmingly positive. A solid 59% of the dp managers reported that they were favorably disposed to the use of personal computers by non-dp personnel. An additional 34% were "somewhat favorable"; 4% were somewhat unfavorably disposed, and only 2% had strong objections. This favorable attitude is fortunate since 82% of the managers reported some personal computers in use at their locations.

Participants were asked to disregard their own attitudes and list what they saw as the advantages and disadvantages of PC use. The most significant benefit, cited by 44% of the respondents, was improved management or professional productivity. One way dp managers expect micros to address this problem is by taking over a "backlog of small but useful applications needs that cannot be addressed by data processing professionals, because the volume of applications is too great." Another manager felt that the micro's chief value lay in its "ability to be interactive and experiment" in cases where the user can't define the exact boundaries of the job. Computer literacy was also cited as an avenue through which productivity could be improved, underscoring the almost universal attitude of dp managers that computers will play a vital role in all aspects of corporate operation in the years ahead. "The personal computer will familiarize users with computer concepts," suggested a dp manager who strongly supports using personal computers.

Some comments on computer literacy suggested that dp managers were not altogether sorry to see users experience the problems that come with computers. One respondent noted that "users would get more

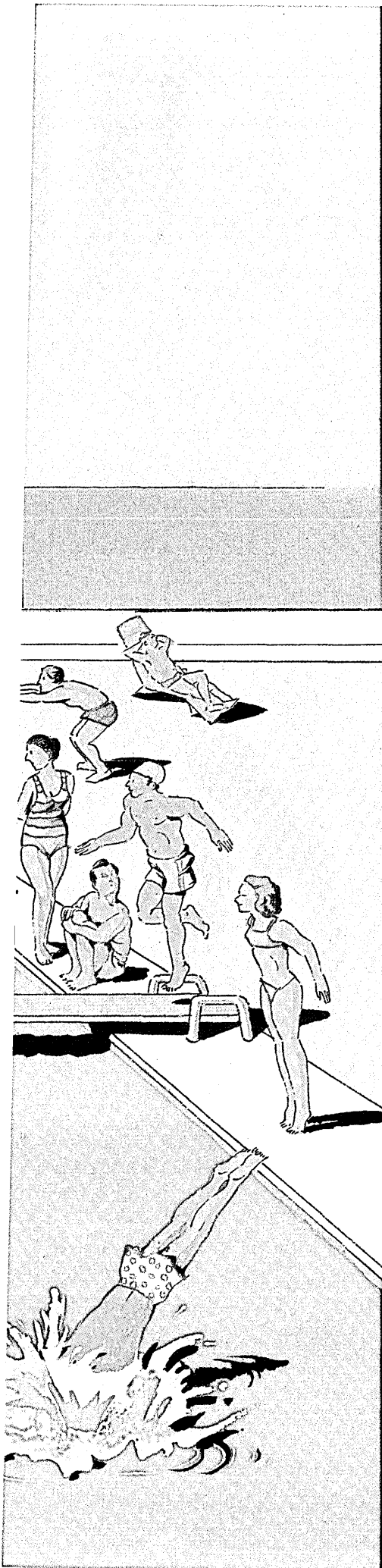


ILLUSTRATION BY ANDREA BARUFFI

# Data security and control of sensitive information ranked as the top problem anticipated by dp managers.

familiar with data processing problems, frustrations, capabilities, etc., which in itself will help to promote better feelings and better understanding of data processing." Programming was an area of particular sensitivity. Working out their own applications, according to one manager, "makes users aware that all applications are not simple."

A second major benefit is felt to be a reduction in the dp workload, both from a programming and an operations perspective. Twenty-nine percent of the dp managers felt that the growth of personal computer usage would reduce the workload of the dp department. However, they had few concrete examples of exactly how this reduction would take place. One manager reported that "certain editing tasks now performed on the mainframe" could be offloaded, suggesting that personal computers might serve as local transaction editors.

## CONCRETE IDEAS ON COST CUTS

In the area of programming services, the ideas on how costs might be reduced were more concrete.

One manager expected micros to "assist with development of those applications that don't require access to mainframe data—sales forecasts, budgets, and maybe some modeling." Where dp development resources are significantly overextended, dp managers suggested that personal computers could help by absorbing most local applications.

Dp managers are also conscious of the advantages of personal systems for ad hoc applications. "They are easy to use where there are limited amounts of data involved," one manager reports, "so the results usually come quicker." In all, 28% of the managers saw quick access to needed information as a potential benefit. Having their own systems will give users "quicker, more personalized results." The use of spreadsheet packages to answer "what if" questions was a frequent favorite application.

The favorable attitude toward personal computers is mirrored by a general expectation that their use will ease the burdens of the dp manager in the long term. Fifty-nine percent of those surveyed felt this to be true, the same percentage that favored the use of personal computers in their corporations. An almost equal number, 60%, however, felt that their jobs would be made more difficult in the short term, primarily because of user unfamiliarity with the program and data controls that form the core of most dp department procedures.

Data security and control of sensitive information ranked as the top problem anticipated by the dp managers, with 40% expecting difficulties in these areas. "It's a security risk," one said bluntly. "Failure to audit

FIG. 1

### ROLE OF DP DEPARTMENT IN PURCHASE BY USER DEPARTMENTS (%)

| ROLE  | CURRENT <sup>1</sup> | EXPECTED IN ONE YEAR <sup>1</sup> | IDEAL <sup>2</sup> |
|---|----------------------|-----------------------------------|--------------------|
| Mandate which system to buy   | 18                   | 19                                | 20                 |
| Participate in decision   | 48                   | 57                                | 70                 |
| No official voice but promote dp department as source of information/advice | 16                   | 11                                | 8                  |
| No official voice; offer information/advice only when asked                 | 9                    | 3                                 | 1                  |
| No role   | 3                    | 1                                 | *                  |
| No answer   | 6                    | 9                                 | 1                  |

<sup>1</sup>Base: other departments are using PCs.  
<sup>2</sup>Base: all respondents  
 \*Less than 0.5%

their data or test their results will result in bad numbers," predicted another manager who expected short-term problems. A third manager, who reported being only "somewhat favorable" to personal computer use in the company and who expected this use to complicate the dp manager's job even in the long term, suggested that "their use will cause a serious loss of control over a valuable corporate asset—data."

Inconsistency of data and of the reports produced from it worries 19% of the respondents. "Confusion due to duplicate data is going to be a problem," one manager explained. The reason for this confusion? Lack of organized dataflow and audit trails. "PCs can lead to mass managerial confusion, because no one knows where the numbers came from." Dp managers also fear a certain amount of "number merchandising." As one put it, "We're going to see a proliferation of different interpretations of the same data."

Waste and cost issues were the third major area of concern, with 18% of those surveyed believing that the user was likely to waste money on the wrong purchase or misuse the equipment once it was installed. "Users tend to say 'just make it work' without a commitment to learn and understand—they want to be button pushers versus data processors," went one comment. The lack of data processing savvy is expected to result in a simplistic approach to the systems: "they'll use the device as an expensive adding machine," or "it will become a toy rather than a tool."

Related to the issue of waste is the issue of duplication of effort. Review committees to evaluate and approve individual departmental applications were not much in evidence, and once equipment was in place,

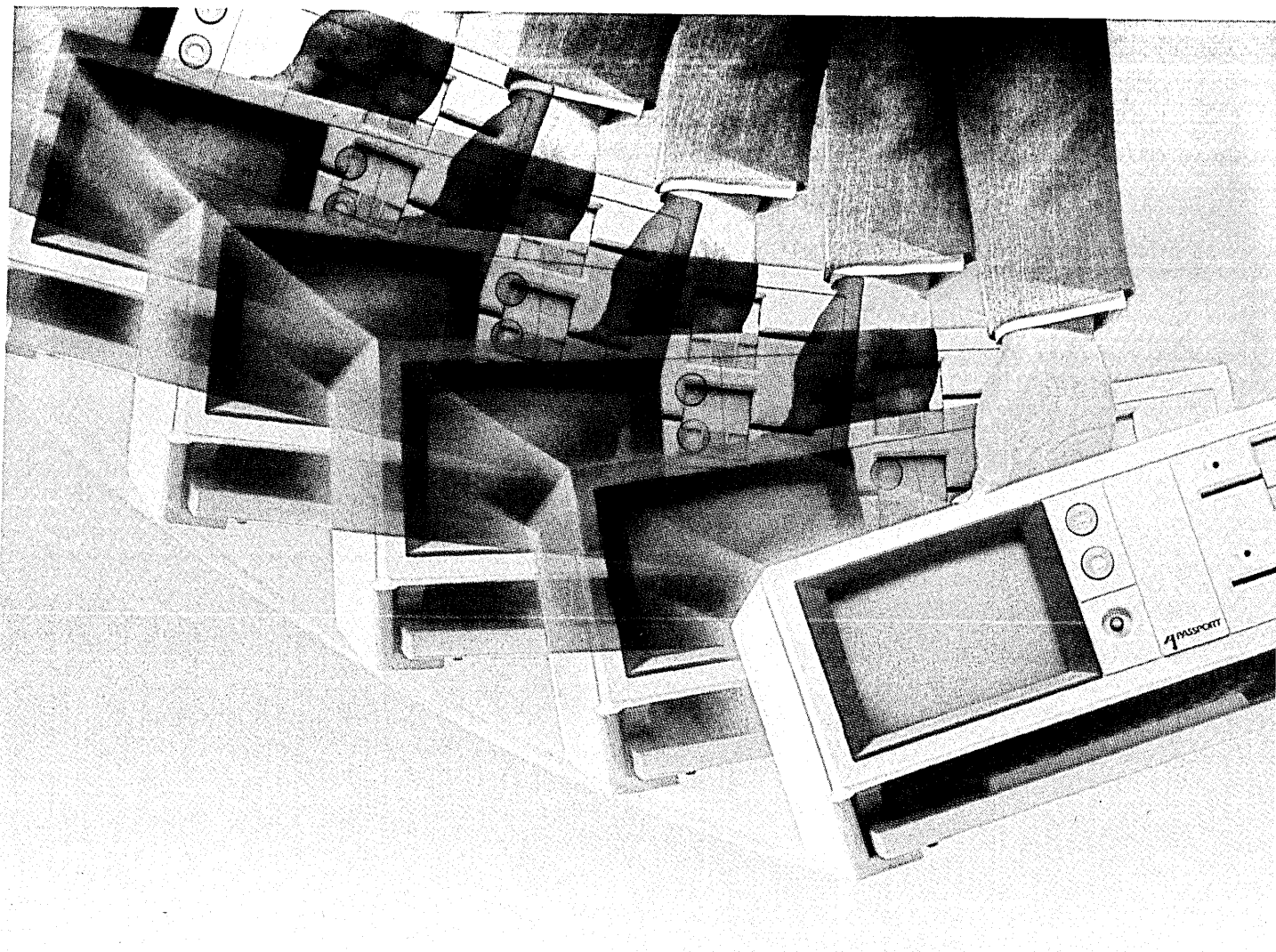
this lack was felt to lead to redundant development. "The disadvantage is that everyone will try to do their own programming instead of performing the jobs they were hired to do. Duplication of effort will result," said one respondent, and 17% of the managers agreed.

## BUYING: A DELICATE BALANCE

The purchase of a personal computer in a large corporation can reflect a delicate balance of influences. Users may feel that the dp organization wants to retain control over all corporate computer resources and resent dp input into what they see as a local purchase decision. Corporate management, concerned about the possibility of purchasing inferior or unsatisfactory equipment, may encourage users to seek professional advice from the internal data processing staff. "The capabilities of personal computers are oversold by the media," explained one manager.

Most managers are aware of both the responsibility to advise the user and of the natural resistance to having purchase policy dictated. While 70% of those surveyed felt that dp managers should "participate in the decision along with the manager of the acquiring department," only 20% felt that the manager should mandate which systems could be acquired. Only 9% felt that their role in the decision process was unnecessary; 8% believed that an active effort to promote the dp department as a voluntary contact point was required, and 1% felt that the dp organization should offer advice or information only if asked (see Fig. 1).

Results were less rosy when the "ideal" was compared with the current role and the role expected within one year. Progress toward the ultimate goal of participation



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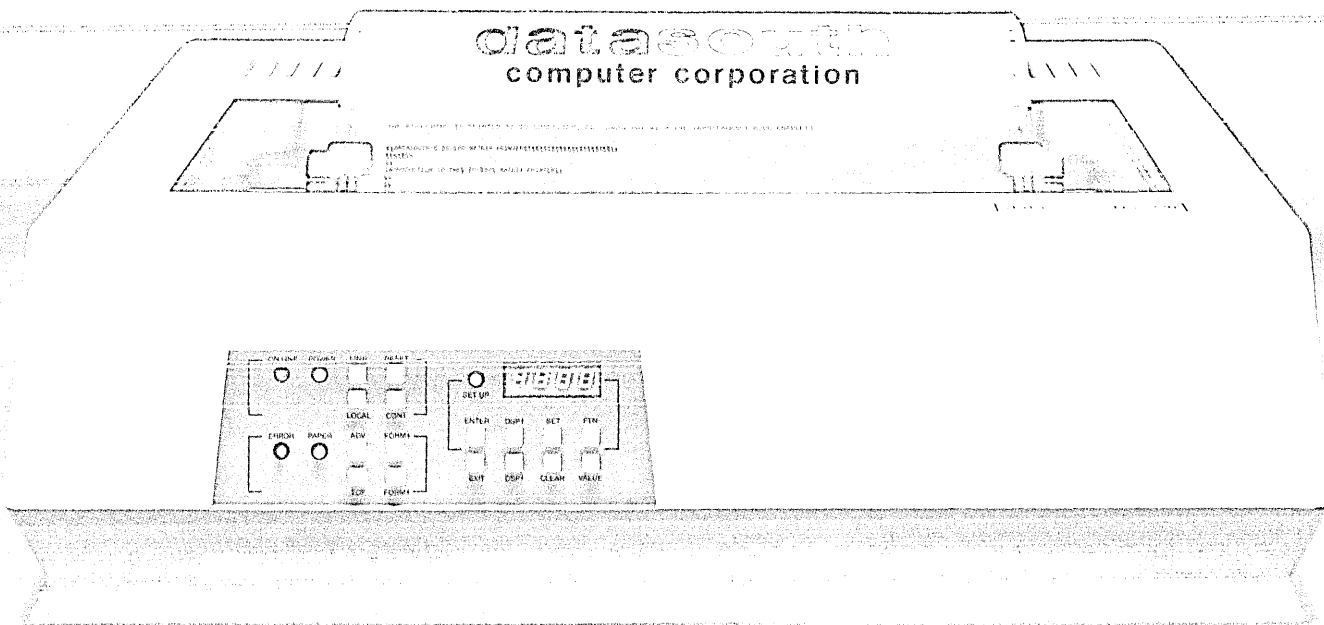
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## Interaction between PCs and mainframes or minis is clearly regarded as the wave of the future.

can be measured by a shift in role from the unofficial "influence," which conjures up images of meetings in cafeterias and smoke-filled rooms, to a formal joint responsibility. Within one year, three out of four managers expect to take an active role, but currently nearly one in ten limits involvement merely to answering questions if asked.

Where the dp manager has input to the decision process, that input usually takes the form of guidelines. Seventy-three percent of those surveyed provide a list of recommended makes/models, and the same percentage offer selection guidelines for users. Slightly over half (56%) offer guidance on the languages the systems should support. This response is significant because it may constitute acceptance of a user programming role by a majority of dp managers and, perhaps, contradict the assumption that end users are to be relegated to packaged programs such as word processors and spreadsheets.

What factors do the dp managers consider most important in the selection of minis? Fig. 2 shows what proportion of the dp managers rated each factor very important and what the average score was for each.

Analysis of the responses suggests that dp managers' primary concern is that the system selected be suited to the initial application. Software support for it (the most important factor) and ease of system use (the second) would combine to provide the user with an easy transition. The next level of concern involves expansion/upgrade capability for both hardware and software and the so-called "management issues"—compatibility (by only a slim margin of 54% to 44% the majority of managers feel that the result of a selection process will be a single vendor to serve all user needs), vendor reputation, service, and training. Cost and technical features, such as memory size and disk capacity, are considered the least important factors.

In summary, the dp manager's attitude toward the decision process is often refreshingly nontechnical. As one respondent put it, "Get them something they can use now so the system will cost-justify, be sure it can be adapted to other applications, then worry about traditional dp factors."

The actual role played by the dp manager seems to fall short of the goal of being a full participant in the purchase decision. Many managers were not even aware of which employees used personal computers at their installations. Only 25% felt they knew where all personal computers were being used; 33% could account for most of the systems, 21% for some. Three percent said there are PCs at their sites, but they don't know where or how they are being used; 8% were not sure whether systems were in use or not, and 13% were sure that none were.

FIG. 2

### IMPORTANCE OF SELECTION FACTORS

| SELECTION FACTOR  | % RATING FACTOR AS VERY IMPORTANT | AVERAGE SCORE (1-5) |
|---|-----------------------------------|---------------------|
| Available software packages for current applications            | 65                                | 4.57                |
| Ease of use   | 56                                | 4.48                |
| Compatibility with existing mainframe, mini, or micro computers | 56                                | 4.37                |
| Availability of large number of software packages               | 53                                | 4.35                |
| Vendor reliability/reputation                                   | 48                                | 4.30                |
| Quality of service available                                    | 44                                | 4.24                |
| Expansion/upgrade capability                                    | 34                                | 4.07                |
| Quality of training available from vendor/seller                | 25                                | 3.72                |
| Compatibility with existing PC peripherals                      | 23                                | 3.66                |
| Current use of same model by others in company                  | 21                                | 3.62                |
| Cost of system  | 17                                | 3.54                |
| Ability to get service from another vendor already on site      | 13                                | 3.14                |
| Amount of processor memory                                      | 12                                | 3.55                |
| Mass storage available  | 12                                | 3.43                |

FIG. 3

### INFLUENCE IN DECIDING WHICH PCS ARE ACQUIRED BY NON-DP DEPARTMENTS (%)

| DECISION MAKER                       | INFLUENCE  |             |                |           |
|--------------------------------------|------------|-------------|----------------|-----------|
|                                      | GREAT DEAL | FAIR AMOUNT | LITTLE OR NONE | NO ANSWER |
| Data processing department           | 47         | 29          | 17             | 7         |
| Manager of the individual department | 36         | 39          | 18             | 7         |
| Individual user(s)                   | 26         | 38          | 26             | 10        |
| Central purchasing department        | 6          | 14          | 69             | 11        |

One reason for this lack of knowledge may be related to the issue of budget purchase authority. The dp department in a large organization is unlikely to be the direct source of funds for the purchase of personal computers. Forty-three percent of the managers at sites where other departments use personal computers say they are always paid for out of the user department's budget; another 24% indicate that this is usually the case.

Although this undoubtedly influences

how much say the dp department has in the purchase of personal computers by user departments, when it does play an advisory role, its influence is appreciable. Fig. 3 shows how dp managers perceive their comparative influence.

The acceptance of dp input into the decision process is not the only place where reality trails expectations. Dp managers were asked to identify the areas where the dp organizations *should* provide user services, and

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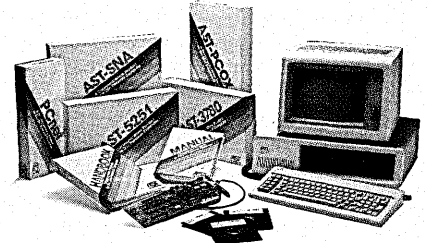
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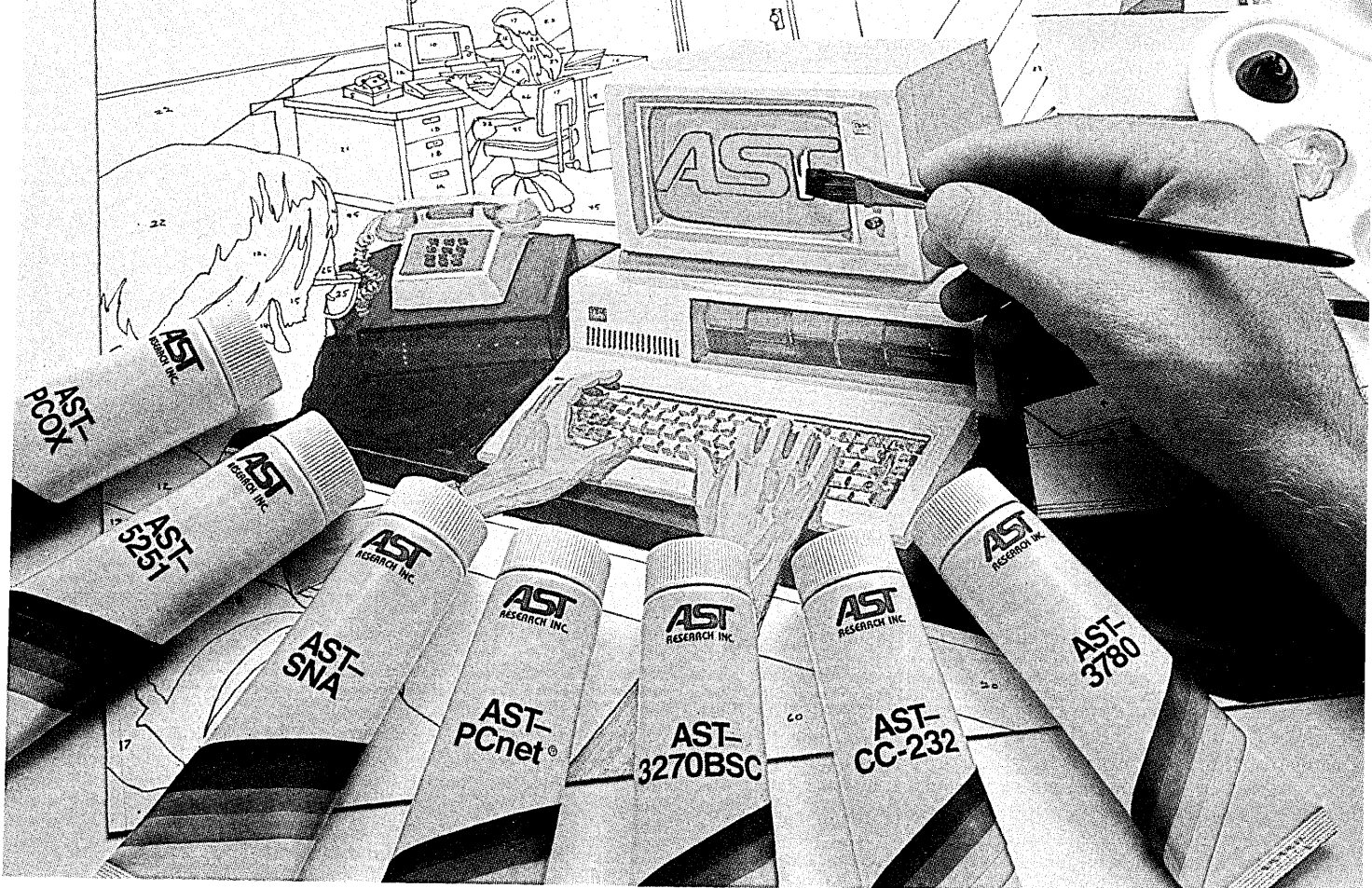
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## Although computers are moving into the executive suites, they are not moving out of the lab.

then those they service currently and those they expect to support within a year. The views shown in Fig. 4 indicate the role dp organizations feel they should play in the after-purchase support of personal computers and offer a glimpse of the dp manager's views on general policies in the use of PCs.

### FALL SHORT OF GOALS

Dp managers fall short of their goals in all areas, but nowhere is the difference more dramatic than in central database support. Interaction between personal computers and the installation's mainframe or minicomputer is clearly regarded as the wave of the future, with nine out of 10 dp managers advocating that the department help PC users access central databases. Currently, however, only 44% of the managers at sites where non-dp departments use PCs claim they are able to provide this service. On the other hand, 74% expect to do so within a year.

The very high score given to the issues of central data access also reflects the dp managers' views on the future role of personal computers. A clear separation of functions is expected, with the PCs providing remote processing services against a centrally maintained and supplied database. A PC may thus replace an intelligent terminal, providing remote access but also offloading some processing functions.

This relationship is confirmed by the managers' perceptions of the effects of personal computer selections on the use of intelligent terminals. When asked how often they recommended personal computers in an application where an intelligent terminal would have been recommended two years ago, 21% reported having done so frequently and 41% occasionally. Only 28% rarely or never did so.

The replacement of intelligent terminals raises issues of protocols and compatibility at the connection level. Some dp managers felt that insufficient attention was paid to the problem, and they foresee a heavy penalty for this failure. "Incompatible equipment," reports one dp manager, "will stymie eventually tying everything together in a network." Another is more specific: "There's a real danger if you don't control the protocol used. We happen to be an SNA shop!"

Uncertainties about the role of the dp organization do not seem to be affecting the rate at which dp managers in large companies expect their use of personal computers to expand. When asked what trends in usage they anticipate, 72% of the respondents predicted internal dp department use would increase, while 88% thought other departments' use would rise.

The fact that dp managers are more

FIG. 4

### USER SERVICES PROVIDED BY THE DP DEPARTMENT (%)

| SERVICE AREA                     | SUPPORT NOW <sup>1</sup> | EXPECT TO SUPPORT FROM NOW <sup>1</sup> | SHOULD SUPPORT <sup>2</sup> |
|----------------------------------|--------------------------|---|-----------------------------|
| Training and consulting          | 63                       | 69                                      | 88                          |
| Identifying application packages | 59                       | 61                                      | 69                          |
| Providing central data access    | 44                       | 74                                      | 90                          |
| Bringing up new applications     | 30                       | 39                                      | 40                          |
| Hardware maintenance             | 24                       | 30                                      | 44                          |
| None of the above/no answer      | 22                       | 16                                      | 3                           |

<sup>1</sup>Base: other departments are using PCs

<sup>2</sup>Base: all respondents

FIG. 5

### USE OF PCS IN SPECIFIC DEPARTMENTS

| DEPARTMENT      | % REPORTING PC USE | AVERAGE NUMBER IN USE |
|-----------------|--------------------|-----------------------|
| Data Processing | 91                 | 5                     |
| Accounting      | 67                 | 4                     |
| Research        | 44                 | 9                     |
| Marketing       | 36                 | 3                     |
| Manufacturing   | 27                 | 5                     |
| Personnel       | 26                 | 3                     |
| Sales           | 21                 | 7                     |
| All Other       | 46                 | 8                     |

likely to foresee growth in PC applications outside their own departments than within does not mean that PCs are considered unsuitable for the dp organization. When they were asked to provide a profile of the current use of personal computers within their corporations, 91% of the dp managers at installations where PCs are currently in use reported use by the dp department. This was the highest percentage of any corporate department.

Fig. 5 shows the extent to which personal computers have moved from use as specialist tools into the mainstream of the business. When the managers at sites using PCs were asked whether and how many personal computers were used in specified departments, the response demonstrated a significant growth in nontechnical areas. However, the numbers also show that though computers are moving into the executive suites they are not moving out of the lab.

If the use of personal computers can be classified by department, it can also be classified by the job level of users. One key question in the growth of personal computer use is the extent to which the systems are

FIG. 6

### PC USE BY JOB LEVEL (%)

| JOB LEVEL           | DP DEPT. | NON-DP DEPTS. |
|---------------------|----------|---------------|
| Middle Management   | 63       | 67            |
| Clerical            | 38       | 47            |
| Upper Management    | 24       | 22            |
| Professional, Other | 21       | 20            |

being applied directly to high-level decision support. Penetration of the higher management levels by PCs is, in part, a tribute to the effectiveness of recent software designed for management use. While clerical use of systems is by no means unknown, management support applications now dominate. Both

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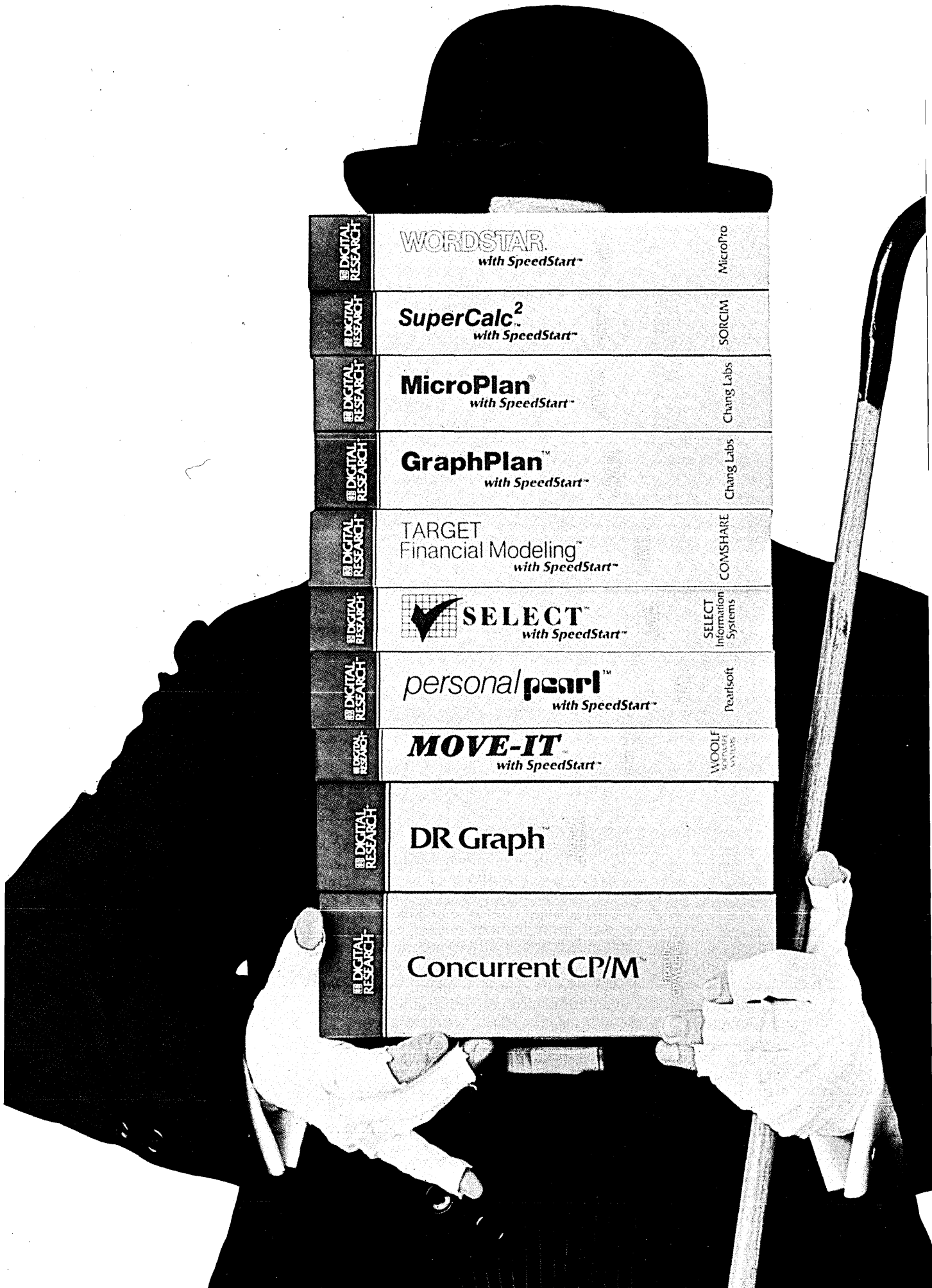
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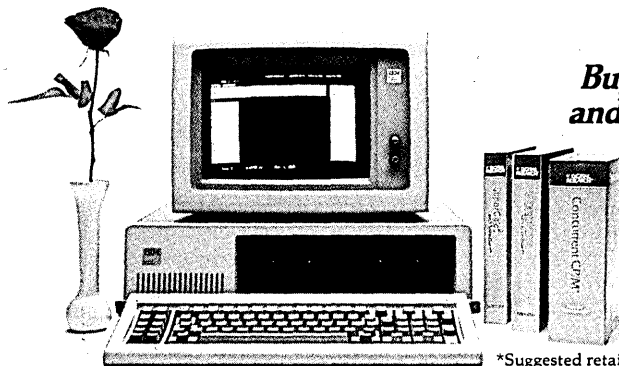
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## Comparison of current usage with that expected within a year does not suggest a major shift in applications.

outside and within the dp organization, the PC is clearly a management tool.

Are the uses to which personal computers are put satisfying the expectations of the dp manager? The managers had expected PCs to improve productivity, reduce mainframe workload, and provide faster access to data. What specifically is being done with the systems, and what is expected within the next year?

As shown in Fig. 7, use of personal computers is expected to grow in all areas except the catchall undefined category. The most dramatic growth areas are all related to the substitution of personal computer power for mainframe power, and the highest growth rate is expected in the area of offloading small programs and related data from the main computer.

If this prediction is correlated with the fact that the majority of personal computer users are expected to be management personnel, it indicates an expected increase in the demand for management decision support applications. The fact that so much is expected of personal computers in the area of replacing programs currently run on mainframes may explain the willingness of dp managers to recommend which programming language should be selected by end users.

Word processing and graphics production, applicable to both management and clerical users, are also expected to show significant growth in both data processing departments and user areas. Replacement of outside timesharing services, while not impressive in total expectations, nevertheless shows a very high growth rate. Since this area represents a direct cash outflow to a corporation, it could provide cost justification to fund the further expansion of personal computer use. Comparison of current usage with that expected within a year does not suggest major shifts in applications; the attitude is "the same things, but more of them."

**PROBLEMS CREATING STANDARDS** The expected rapid growth in PC use has many dp managers worried about standardization. "There is a potential lack of equipment standards," one manager suggested. "We'll have a proliferation of micro vendors in a company and dp will have to support them all," explained another. However, while a bare majority (54%) of the respondents thought their companies should standardize on a single make of personal computer, a substantial (44%) want to acquire more than one make in order to take advantage of different vendors' strengths.

Competition among vendors has been intense, especially since the introduction of the IBM Personal Computer. A survey of the dp managers on the equipment currently in place both within the dp organization and in

FIG. 7

### CURRENT VS. ANTICIPATED USE (%)

| FUNCTIONS  | USES OF PERSONAL COMPUTERS |             |        |             |
|--|----------------------------|-------------|--------|-------------|
|  | DP                         |             | NON-DP |             |
|  | NOW                        | IN ONE YEAR | NOW    | IN ONE YEAR |
| New applications not suitable for mainframe        | 41                         | 54          | 73     | 82          |
| Word processing                                    | 39                         | 53          | 55     | 71          |
| Production of graphics                             | 26                         | 48          | 36     | 65          |
| Offload current applications                       | 24                         | 54          | 30     | 69          |
| New applications that would have gone on mainframe | 22                         | 36          | 51     | 63          |
| Bring outside timesharing under in-house control   | 5                          | 16          | 21     | 33          |
| Other  | 17                         | 15          | 14     | 13          |

FIG. 8

### PC BRANDS IN USE: PRINCIPAL MENTIONS (%)

| MANUFACTURER         | FREQUENCY REPORTED |                 |
|----------------------|--------------------|-----------------|
|                      | WITHIN DP DEPT.    | IN OTHER DEPTS. |
| IBM                  | 55                 | 57              |
| Apple                | 25                 | 46              |
| Radio Shack          | 10                 | 23              |
| Digital Equip. (DEC) | 4                  | 10              |
| Hewlett-Packard      | 5                  | 9               |
| Commodore            | 2                  | 7               |
| Osborne              | 4                  | 6               |
| Wang                 | 3                  | 5               |
| Texas Instruments    | 2                  | 4               |
| Xerox                | 2                  | 3               |
| Victor               | 1                  | 3               |
| Altos                | 1                  | 2               |
| Heath/Zenith         | 1                  | 2               |

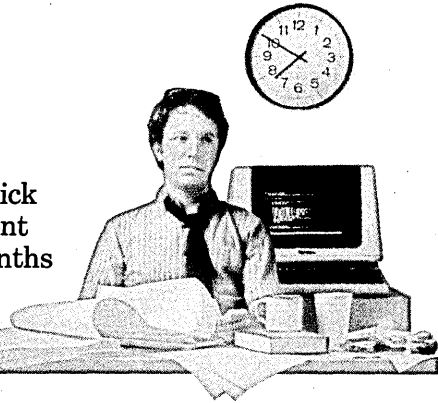
other departments provided not only an indication of brand preference among the very large corporations, but also showed the extent to which standardization is currently in effect (see Fig. 8). Non-dp departments are clearly less committed to a single vendor. While the IBM P.C. is used by more than twice as many dp departments as any other brand, it has a much narrower lead among non-dp departments. Dp departments were also less likely to experiment with new systems. The DEC computer was more than twice as common in non-dp departments.

It is difficult to interpret these differences. If the non-dp use of micros represents an earlier trend in purchase, when little control was exercised, the diversity could be construed as the result of uncoordinated purchasing.

Another possible reason for the number of vendors is the failure to integrate personal computers with other systems. In the average dp department using PCs, 58% of the machines are used only as standalone systems; in other departments the number is even higher—79%. These high percentages

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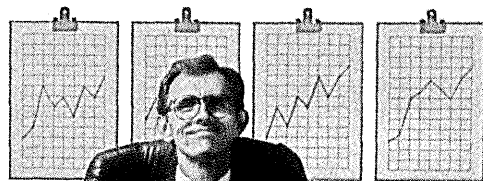
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# There has been a dramatic increase in the use of personal computers in large corporations, the survey shows.

almost belie the fact that a full 90% of the dp managers rated providing access to centralized data as an objective of their organization. Perhaps providing central data access is a philosophical goal rather than a practical one; only 7% of the dp managers felt that providing users with assistance in networking or communication was a reasonable goal for the dp organization.

The survey of large corporations clearly shows a dramatic increase in the use of personal computers and indicates that the major beneficiaries of the systems will be management and professional personnel. The expected surge is already being watched by the software suppliers, and the sudden increase in all-purpose executive packages that combine word processing, database, spreadsheet, and other applications is one result.

The effects of the growth in corporate America's personal computer use are overwhelmingly perceived to be positive—increasing productivity and providing users with faster access to results. But in the short term, major problems in employing these little powerhouses may occur. Some are a natural result of a sudden increase in the perceived benefits of the systems, spurring an explosion in purchasing without providing time to establish a framework for their selection and acquisition. One dp manager ruefully compared the task of guiding personal computer selection to that of "directing an avalanche."

Some of the frustrations felt by dp managers are reflected in their comments and in the majority view that personal computers in the hands of end users will make their jobs more difficult in the short term. Many dp managers view the user community as lacking in computer knowledge (probably true), somewhat hostile toward the dp organization (almost certainly true), and therefore inclined to go it alone, given the chance. This latter fear seems groundless in the large businesses—there is simply too much at stake and everyone realizes it. While one dp manager is concerned lest the "hotshots attempt to make micros do what we are doing well on a larger system," the majority seem to realize that the user managers have no time to become a dp department, even if they had the inclination.

Unfortunately, lack of familiarity with even the most fundamental concepts of data processing can be as damaging to the decision process as deliberate obstruction of corporate data processing policy. This fact makes the centralized control of PC purchases vital if a cohesive, cost-effective corporate information policy is to have any hope of long-term success. While administrative controls may be a partial answer to the immediate problem, the dp managers seem to agree that the best answer is strong dp support for a rational policy of selection and use.

## METHODOLOGY

The object of this survey, which was designed by Data Decisions and conducted by Beta Research Corporation, Syosset, N.Y., was to collect information on the use of personal computers in an institutional or corporate environment.

The universe for the survey consists of installations that have purchased or leased computer equipment with equivalent monthly rental fees that exceed \$50,000. These installations were identified using the database maintained by Computer Intelligence Corp., La Jolla, Calif., a sister company of Data Decisions. At the time the sample was drawn, the universe consisted of 3,226 sites (7% of all U.S. sites in the entire Computer Intelligence database).

A random sample of 2,000 sites was selected on an nth name basis. On April 22, 1983, questionnaires were mailed to the data processing manager or MIS director at each site. A \$1 incentive and postage-paid return envelope were included in the mail-

ing. On May 18, a follow-up mailing was made to all nonrespondents. A total of 898 mail returns were received. During the weeks of June 20 and June 27, 1983, telephone interviews were conducted with 103 nonrespondents, bringing the total number of responses to 1,001, for an overall response rate of 50%.

The organizations surveyed represent a good cross section of U.S. dp sites:

|                      |     |
|----------------------|-----|
| Manufacturing        | 25% |
| Financial/insurance  | 18  |
| Transportation/util. | 8   |
| Retail/wholesale     | 7   |
| State/local govt.    | 7   |
| College/universities | 6   |
| Non-mfg. business    | 4   |
| Communication        | 3   |
| Federal govt.        | 3   |
| Medical              | 3   |
| School district      | 2   |
| Professional         | 1   |
| Other                | 13  |

## CENTRAL CONTROL OF DATA

It appears that the greatest challenge faced by the dp organization, and therefore by the large corporation, is the provision of central data access through mainframe-microcomputer networks. Lack of central control and inconsistent data were rated as serious problems, and 90% of all dp managers felt that central data maintenance and supply should be a key part of the dp department support policy for small computers. Yet, according to these same managers, standalone systems outnumber networked systems by over two to one, a wide margin.

Will the manager of the future use personal computers to digest and display the kinds of high-level information required for supporting major corporate decisions, or will that manager become more and more isolated by a mass of unconfirmed and uncorrelated data? As one dp manager put it, "How many different monthly sales figures can possibly be correct? Only one, obviously. But that's not how many we are going to have."

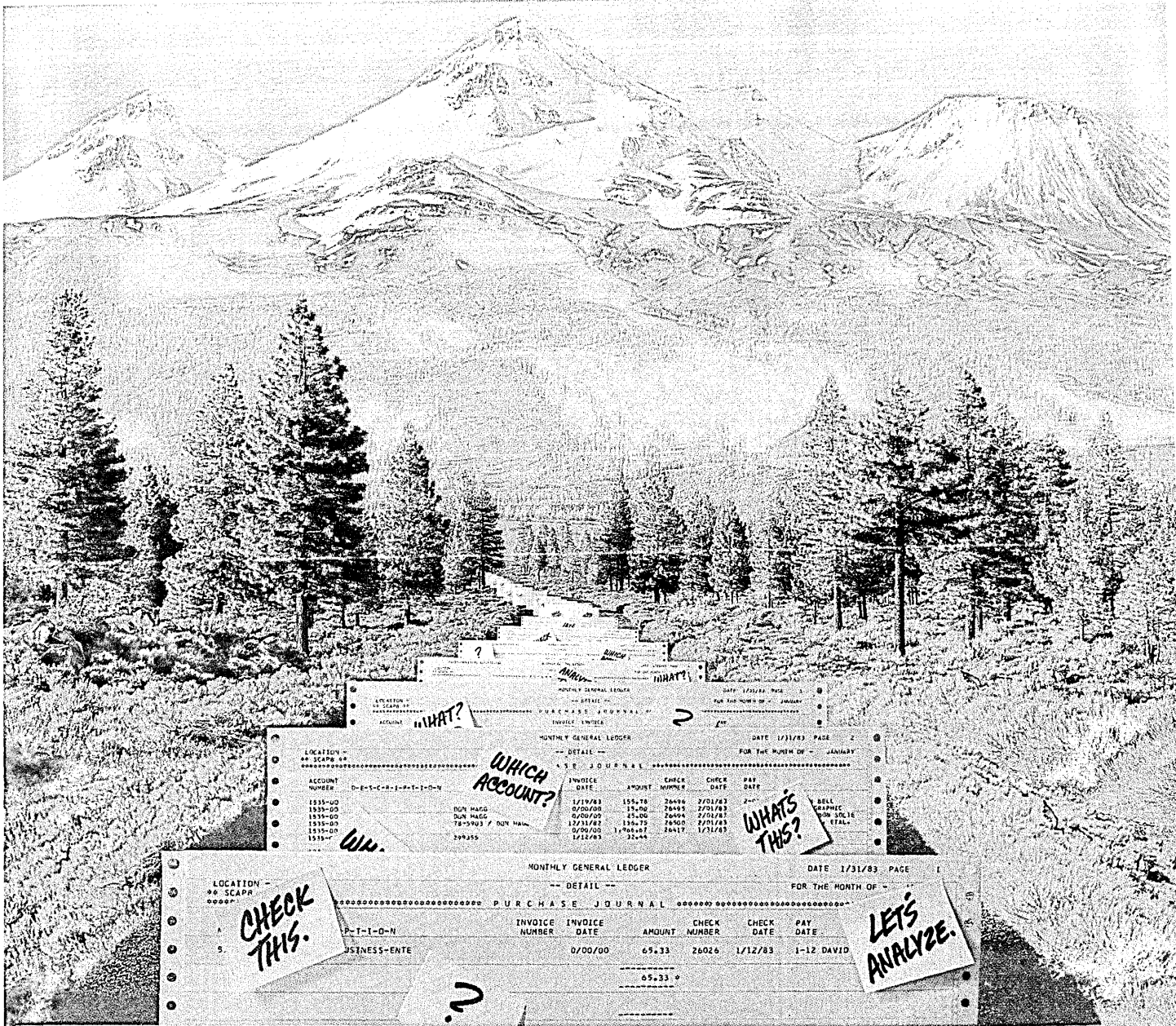
The personal computer revolution, like other computer revolutions before it, will be assimilated into the back office as well as the boardroom. By providing offerings in the microcomputer area, large system vendors such as IBM and DEC tend to tie together the user's information-management components. The success of the "you got the big one from me, now get the small one from me" strategy is obvious in the growth of the IBM P.C. from its introduction in 1981 to an estimated annual production of 600,000 units only two years later. That success is already

changing the attitudes of other vendors, and even software companies are hurrying to provide offerings that integrate mainframes and micros into a package so tight it is difficult for the user to know where the information is and which system is handling it. If today's average non-dp user in a major corporation is uncertain about the alternatives, the trend toward product integration in the market is so well publicized that it will be hard for such a person to remain so.

The dp manager, for all the suspicions about the attitude and level of expertise of the user, is a professional at information management and is prepared to admit that the small computer has a large place in the corporation. As one manager put it, "Because of the complexity of our 'groups' of programmers, our standards, our procedural red tape, small jobs sometimes become bogged down. Faster turnaround could be helpful to many departments and to the company as a whole." With luck in the short term and with the proper planning and strategic foundations for the future, the personal computer seems assured of a major place in America's biggest businesses. \*

Data Decisions is a research and consulting firm that publishes monthly updated information services on computer systems, communication systems, and software. It also provides custom research studies and on-line access to information on the full spectrum of information processing products and services. For specific information, contact Data Decisions, 20 Brace Road, Cherry Hill, NJ 08540; (609) 429-7100.





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**E.F. Hutton says that shared logic, and not personal computers, is the wave of the future.**

# OFFICE AUTOMATION WITHOUT MICROS

by **Bernard A. Weinstein**

We have experienced, as have many organizations, a strong demand from the field for office automation and personal computing services. This demand has taken many forms. Some of our securities salesmen, called account executives or AEs, bought personal computers. Some bought PCs and didn't know what to do with them. Many branch offices made inquiries about word processors and word processing. Some offices had standalone systems. Some users were simply trying to follow the latest fad. Others had genuine needs.

We did not want to merely satisfy the immediate needs or placate the squeaky wheels. Instead of buying microcomputers for the 10,000 or so professional users in our organization, we sought a system for the long haul—one that could satisfy our entry level office automation and personal computing needs, for sure, but also one that would provide for our future requirements in these areas and support a variety of operational and administrative functions as well. Our objective was a system with a life cycle of at least five to seven years. In short, we wanted to be on the leading edge, not the crumbling edge, that characterizes the upward migration of microcomputers.

After two years of internal analysis, we selected Data General as the vendor for a worldwide office automation system. Our order for almost 400 discrete office systems, at a cost in excess of \$40 million, is one of the largest office automation contracts ever awarded. Indeed, it was the largest computer purchase in E.F. Hutton's history—larger, in fact, than all previous computer purchases combined.

The Branch Information Processing System, or BIPS, is a multipurpose system supporting office automation and personal computing applications for 6,000 salesmen and their support staffs in 380 field offices around the world. Tied together in a private telecommunications network, the system will touch almost all segments of the firm when installation is completed next year. It will quietly revolutionize how we do our busi-

ness. It makes fundamental changes to everyday tasks: some are simplified, some modified, others completely eliminated.

The typical configuration is as follows: a 32-bit minicomputer, the MV4000, at each branch office, with a minimum of two megabytes of main storage. Supporting the cpu is a 354MB Winchester disk drive and a 15MB tape cartridge. Several crt workstations for support personnel, as well as the existing Bunker Ramo terminals used by securities salesmen, are tied to the cpu. A minimum of two high-speed, dual-mode printers support both correspondence and draft-quality output at each office.

The office automation and personal computing services provided by BIPS to the salesmen include electronic mail, electronic filing and administrative support functions such as electronic calendars, automatic appointment scheduling, and other time-management services. Decision and sales-support operations, such as query and report generators, graphics, electronic spreadsheets, and customized models, are also included. Word processing will be provided via the crts, since the AEs will not be typing their correspondence.

## AVOIDING POTENTIAL ERRORS

The word processing functions greatly simplify the task of typing error-free memos and letters. An on-line dictionary is provided to automatically flag misspellings—with a choice of four languages. A list-processing feature allows the branch office to generate personalized correspondence-quality form letters to clients and prospects. Multiple copies of securities research reports can be rapidly produced, all with first-copy quality, thereby reducing photocopying costs.

Administrative messages, such as internal memos, are typed directly at the terminals for transmission over the network, taking the burden off the branch's wire operator. Source data entry is done so that the point of origin of the input becomes the point of entry. Forms are typed once for both local and headquarters data capture. This approach is more efficient, and avoids potential errors.

Under BIPS electronic mail, each user has an electronic mailbox for memos, wires, and telephone messages. A flashing indicator on his display signals when mail has arrived. If a return receipt was requested by the originator of the message, a confirmation is automatically generated once the recipient accesses the message. Mail may be flagged as urgent and as confidential. Urgent mail causes a special indicator to light up on the recipient's display. Confidential mail may be viewed only by the recipient, even if the recipient has given general access to an aide.

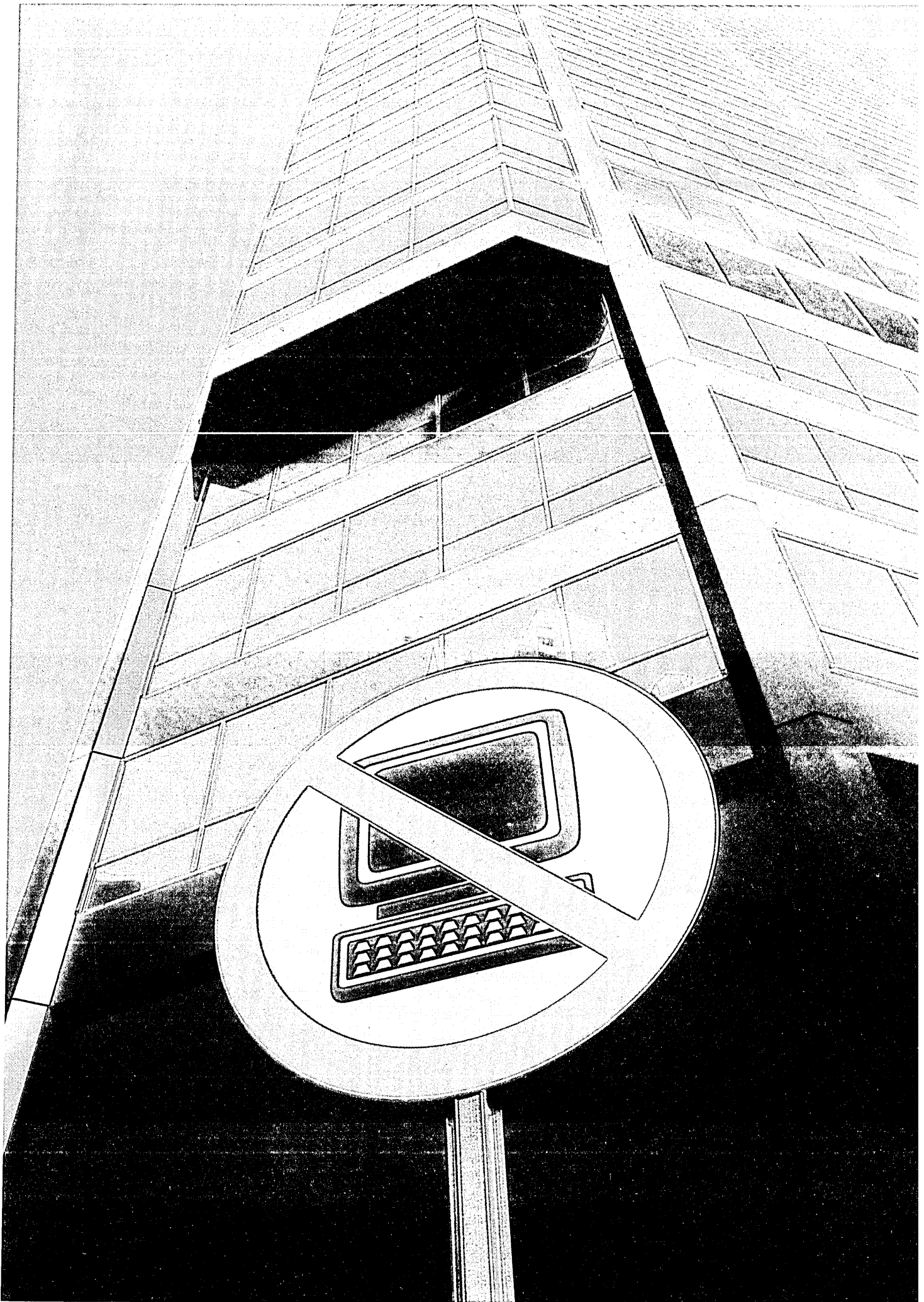
The local database support of BIPS permits the branch office to maintain and process a variety of customized files and reports including analyses of employee records and manpower reports, operations statistics, account executive and branch office errors, and account executive gross production by product.

In the personal database, account executives are able to maintain customer profiles, portfolios, and records—all of the files formerly kept manually. By using the system's sophisticated query and search facilities, an AE can filter accounts for product suitability or qualify prospects by criteria that he, himself, selects.

Our goal in planning, designing, and implementing an office automation system was not to transfer current manual procedures "as is" to the new system, but rather to do a "bedrock up" systems analysis of all branch office procedures. We realized that only in doing so would we fully exploit the power of the system as a genuine resource for the firm. Yet we wanted a branch office system that would be compatible with existing telecommunications and information processing systems. We did not want 400 local systems operating autonomously, but rather a global system. This seamless system would serve the firm as a whole and function as an integral part of the principal and existing data processing base of the firm.

Today, the network is comprised of more than 600 Teletype terminals for order entry and administrative messages and more than 6,000 dumb terminals for the account executives. It is controlled by an IBM 3033

PHOTOGRAPH BY STEVE COOPER



# The entire orchestra plays together using the same sheet music.

central processor under Telecommunications Control System operating software. Two other IBM central processors, a 3033 and a 3083, provide backup.

In addition, there are 34 Data General Eclipse 2/130 systems in 26 regional sites, each with databases of between 96MB and 192MB. These computers operate in concert with the central computer to provide sales support information such as research reports and stock market commentaries for the AES.

BIPS is a system solution, based on a carefully conceived long-term strategy. We were careful to shun shortcuts and piecemeal responses—"Band-Aid" solutions—to user demands for personal computers and office automation. We took a comprehensive system approach, embracing the entire gestalt of the firm's office automation and personal computing requirements, both in the present as well as in the future. BIPS is not grafted onto the firm's current operations, but organically integrated.

The BIPS design affords us a number of concrete advantages over approaches utilizing personal computers.

## NEED FOR FLEXIBLE SYSTEM

First, our requirement was for a state-of-the-art system with sufficient horsepower and capacity, and the expandability to avoid running out of cycle or storage two or three years out when new office applications were inevitably put onstream.

Secondly, the hardware, operating system, and application software all had to be modular in design to facilitate expansion. The basic pattern of system evolution at Hutton is rock on rock—rarely do we reset to

zero and start over.

Third, we wanted to have a migration path to larger systems without reprogramming. Today, many personal computer users find themselves all dressed up with no place to go because their systems lack upward compatibility. Or, to put it another way, Apples don't grow into pineapples.

The 32-bit superminicomputer satisfied all these performance and growth requirements. In fact, until the MV4000 model was announced, Data General was not really in the running in the BIPS competition. The 32-bit machine, executing 600,000 instructions per second, was twice as powerful as the next best performing processor proposed to us. It can easily be expanded beyond our basic configuration of 2MB of main storage to 8MB. With several larger versions of the cpu also available, it afforded us the latitude of upward migration, if necessary, to large processors in the same family—without costly reprogramming.

Another design point was that the system be multipurpose rather than dedicated to any one single function. Many firms have responded to demands for OA and personal computing services by installing a few special purpose PCs here, a few word processors there. This is a mistake, as these are areas where the whole is definitely greater than the sum of the parts. In an integrated, multifunction environment, the different functions complement one another, greatly enhancing their individual values. For example, word processing is a natural adjunct to electronic mail, and electronic filing is a natural adjunct to both.

The multi-user, shared-logic approach provides for better utilization of sys-

tem resources, since they are pooled, than a standalone approach. This makes possible better price/performance.

Managing the system is also facilitated by the shared-logic approach. It is far easier to maintain common databases with consistency between systems, than it is to cope with every user having an individual system and very likely personal conventions, the typical situation with micros. The entire orchestra plays together using the same sheet music.

BIPS also fits within the mainstream of our evolutionary systems development. It *had* to, because we did not have the luxury of beginning with a blank slate. Many of the knowledge workers in our organization, such as account executives, already had terminals on their desks before BIPS.

Our fundamental strategy is to build rock on rock, allowing flexibility in the framework of our plan to take advantage of unforeseen innovations that may later prove attractive. We try to keep our options open so that we can be technologically opportunistic. In this way, we don't have to rebuild the whole house to add a wing . . . or a hot tub.

## IMPROVING OFFICE CAPACITY

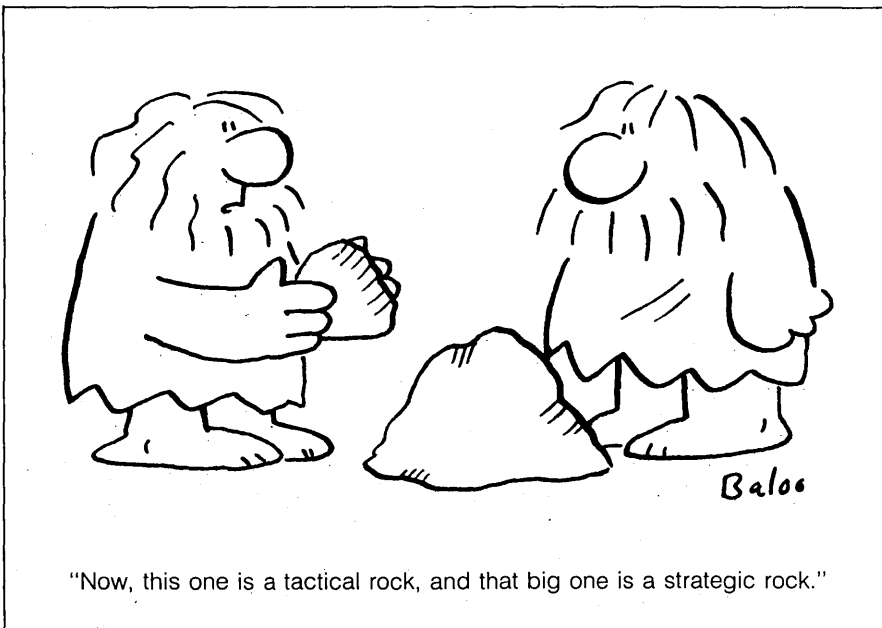
Moving to office automation for the firm's branch offices is part of a goal to increase account executive sales production, without adding more sales support or operations personnel. This is not accomplished by hiring MBAs or PhDs to support the broker. The answer is automation—it enables us to handle a higher volume of sales with the same level of personnel. By leveraging the existing capacity of the office, we can sell more securities.

Also, superior information technology is crucial to differentiate a brokerage firm from its competitors. Not only does it attract new customers, it also aids recruiting—innovative information technology attracts salesmen to the firm.

With the new BIPS office automation system, we focused on function, not hardware. The fully integrated design provides word processing without the limitations of word processors, and personal computing without the drawbacks of personal computers—and far more besides. The office of the future at Hutton is now. \*

Bernard A. Weinstein is first vice president of E.F. Hutton & Co., a Wall Street brokerage, responsible for corporate communications and branch information systems. He is also founder and president of International Brokerage Information Systems Inc., a Hutton subsidiary that provides financial information services and systems.

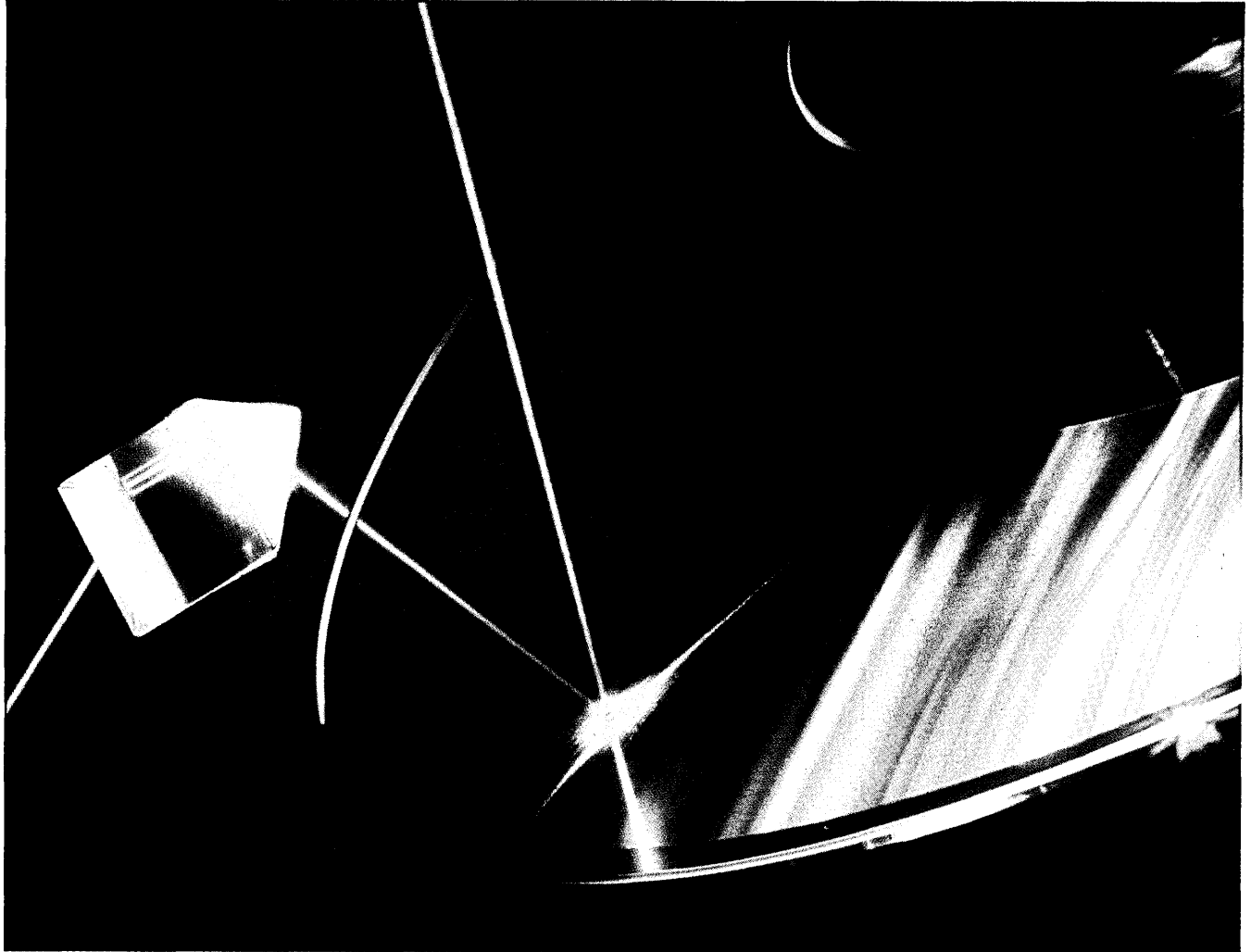
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The new 7600 Optical Storage Subsystem  
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**An information revolution that affects you and your customers.**

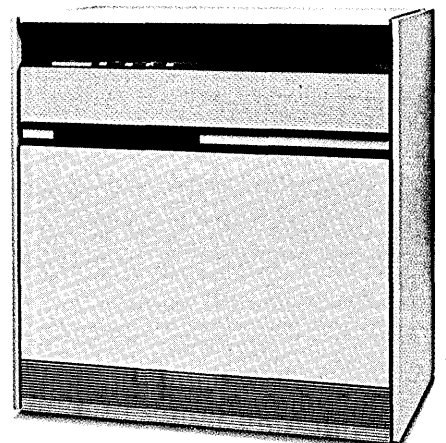
Thanks to the new optical technology, a single cartridge can now hold huge amounts of data — four gigabytes to be exact (that's 4-billion characters).

Much more than any other storage device. And by giving you instant access to your information, it is also a more efficient records management tool. By collecting and processing records as well as images, you can now add new dimensions to your customer services.

**More information gives you the edge.**

The new 7600 Optical Storage Subsystem revolutionizes the entire information storage and retrieval field. More importantly, it's the new tool that lets you conduct business based on solid experience. And it gives you a competitive edge you can rely on.

For an evaluation of your information storage needs, contact:  
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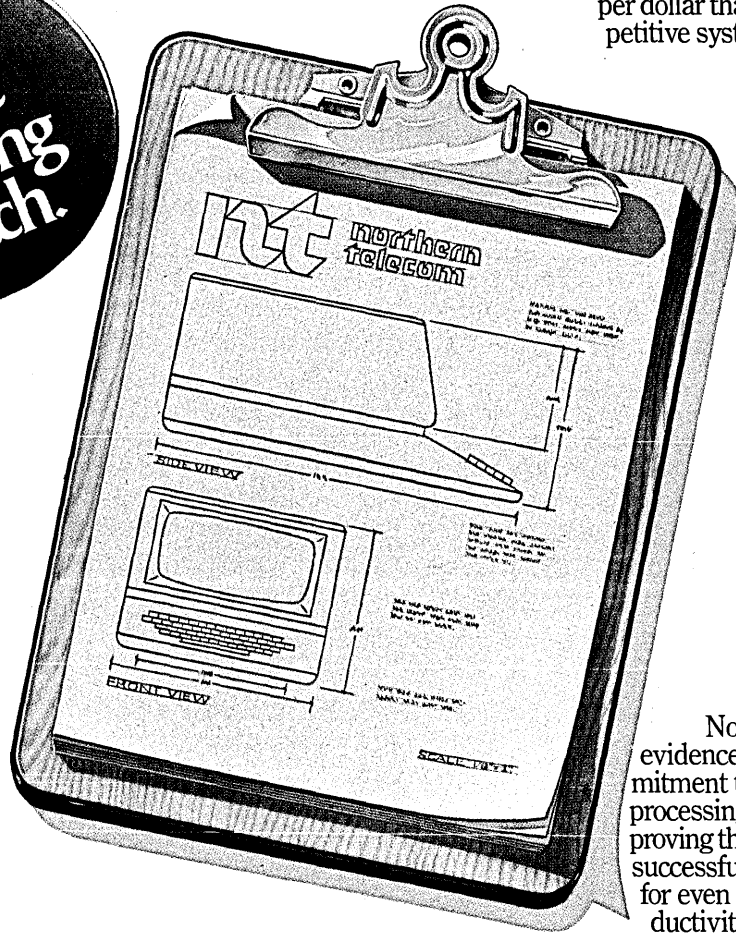
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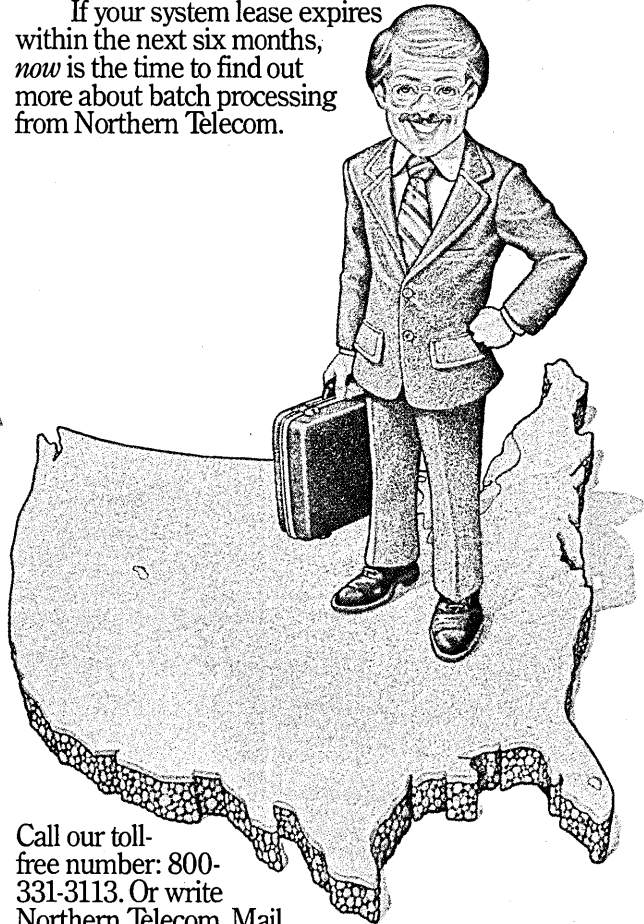
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**ing batch!**

With portable computers seemingly falling out of the sky and expectations soaring, manufacturers and users face significant issues in their use.

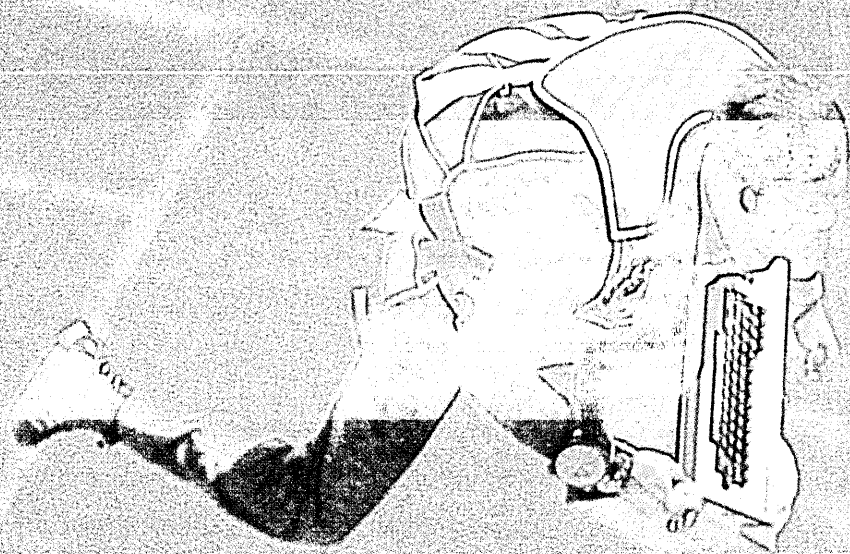
## PORTABLE COMPUTING: HOW HIGH CAN IT FLY?

by Michael Tyler

An architect in Saudi Arabia uses a Kaypro portable computer to design buildings halfway around the world from his office. A moving van operator keeps a Kaypro in his van so he can complete necessary paperwork during rest stops. Economists at the Federal Reserve Bank in Atlanta take notes when they travel on Radio Shack TRS-80 Model 100 portables, then transmit the notes back to headquarters from their hotel rooms; in exchange, they can pick up electronic mail sent from home. The Army uses GRIB Compass portable computers in battlefield command and control simulations. Lending officers at the First National Bank of Chicago bring Compasses along when they travel to borrowers' sites. The Stanford University Medical School uses Osborne portable computers to monitor the nourishment intake of premature infants. Almost everywhere you look, in fact, it seems there is a portable computer.

In the entire brief history of computing, there has never been anything like the explosion in sales and technology of the portable computer. The market has grown from nonexistence early in 1981 to over \$300 million in 1982, according to most analysts, and shows signs of continued growth. Within five years, say some observers, fully 20% of all microcomputers will be portable; by 1987 the market could top \$1.5 billion, accord-





## Many firms have discovered that a single portable can be shared among several employees.

ing to Venture Development Corp., a Wellesley, Mass., market research firm. Others, such as Infocorp in Cupertino, Calif., and Future Computing in Richardson, Texas, are less optimistic but still see the market growing 10-fold in the next four years, to over \$3 billion.

But let's face it. The term "portable computer" just doesn't mean very much anymore. These days, you can be pretty much assured that a portable computer will have some sort of handle or carrying case, that it will have some electronic circuitry to enable it to perform specified calculations, and that it will have an assortment of keys or buttons that lets the user convey instructions and information to that circuitry.

That's not very much. Of course, almost every portable computer offers something more than that, and some offer a great deal more. That's the problem with portable computers. In the two years since Adam Osborne created the market with his Osborne 1, so many different devices have been introduced under the rubric of portable computer that the term has lost its functional value.

Many analysts and other observers try to get a handle on the market by subdividing it, but there are no clear ways to do that. Portable computers vary widely in price, features, power, size, and bundled software. They are used in an equally wide variety of ways, by a wide variety of people.

Still, there are some trends that can be seen in the portable computer marketplace. For one, there seems to be no such thing as a recreational portable computer; virtually every application written for a portable computer is business oriented. And two thirds of all portable computer purchasers have had some exposure to computing, according to John Hoffman, president of Business Investment Computer Systems, a consulting firm in the Chicago area. Half already own a desktop personal computer, while the other half's experience is limited to the office or school.

The last third of portable computer purchasers have no experience at all with computers, which means that fully two thirds of all portable computer purchases are by people who do not own any other computer. Many of these people are using portable computers in exactly the same way they would use a desktop computer. "It's your best dollar value," says Michael Finé of Bundy Typewriter Co., a Philadelphia retailer. "If you're looking for a no-nonsense computer for your office, with word processing, a spreadsheet, compatibility to other micros, or other things, a portable is a really good buy."

"Portables are a better value than any other kind of computer," agrees Hollister Moore, sales manager for Collander Data Products, an office equipment dealer in

Philadelphia. "Most of our customers buy for the value rather than for the portability."

### REPLACE DESKTOP COMPUTERS

Clearly, one application of portable computers is as a direct replacement for desktop computers; the portables often cost less money, take up less space, and reduce the number of boxes, wires, and plugs that can clutter a desk. But the portables can also perform better than some desktops. Anthony Morris of Morris Decision Systems in New York City, for example, favors the Compaq portable computer over the IBM Personal Computer. "The Compaq is fully IBM compatible, and it has addressed some of the design failures of the P.C. appropriately," says Morris. "It packs the same functionality in a smaller package, and it costs 10% to 20% less than the IBM in similar configurations." The Compaq is manufactured by Compaq Computer Corp. in Houston, Texas.

Other applications of portable computers take advantage of the machines' relative ease of movement. Many firms have discovered that a single portable computer can be shared among several employees, an arrangement that costs thousands of dollars less than providing each employee with her own personal computer. Early indications are that the enforced sharing of computers does not necessarily reduce an employee's work time with the computer. A recent study by the Yankee Group, a Boston market research firm, showed that over two thirds of all desktop computer users work with their computers less than a half hour a day. The other 7½ hours the computer sits idle.

One company that has such a sharing program is Kidder Peabody and Co. Inc., a New York investment brokerage. There, about 50 users share 12 GRID Compass computers. "We're committed to having enough computers so that everyone who wants one can get one and be able to use it in his own office, with his own telephone and other materials," says Gordon Sollars, who is in charge of the program. "But if you use it only 25% of the time, you don't need it in your office 100% of the time."

The company has set up a central location at which the Compasses are stored and doled out on a first-come, first-served basis. Users take the machines back to their offices, returning them when their computer tasks are completed. Sollars says the company also allows users to check the machines out overnight or for accompaniment on business trips. "The machines cost a lot of money, and I don't want them sitting idle. But if they're fully utilized, then they're worth the price they command."

Many observers and vendors agree

that the majority of portable computers are used strictly within the office, either as dedicated personal computers or as shared machines. But if they can be moved around an office, they can likewise be moved out of the office. In fact, the most glamorous applications for portable computers are those in which the user brings the computer into the field.

In many cases, though, once you've gotten the machine out the front door of your office building you realize why the majority of applications don't involve moving the computer great distances. "In our office, we use a Compaq just as if it were an IBM on wheels, but we don't move it very far," says Lee Greenhouse of E.F. Hutton in New York. "I took one across the street once, and boy, was I tired. When I travel I don't carry nearly as much luggage."

Some portables weigh as much as 35 pounds, and even in the most compact packages that can get wearisome. "Most of them are heavy," says Moore, who sells the Kaypro, Columbia, and Zorba portables. "You could put one in your car and take it home, but I wouldn't want to run through gate E-12 at O'Hare with one."

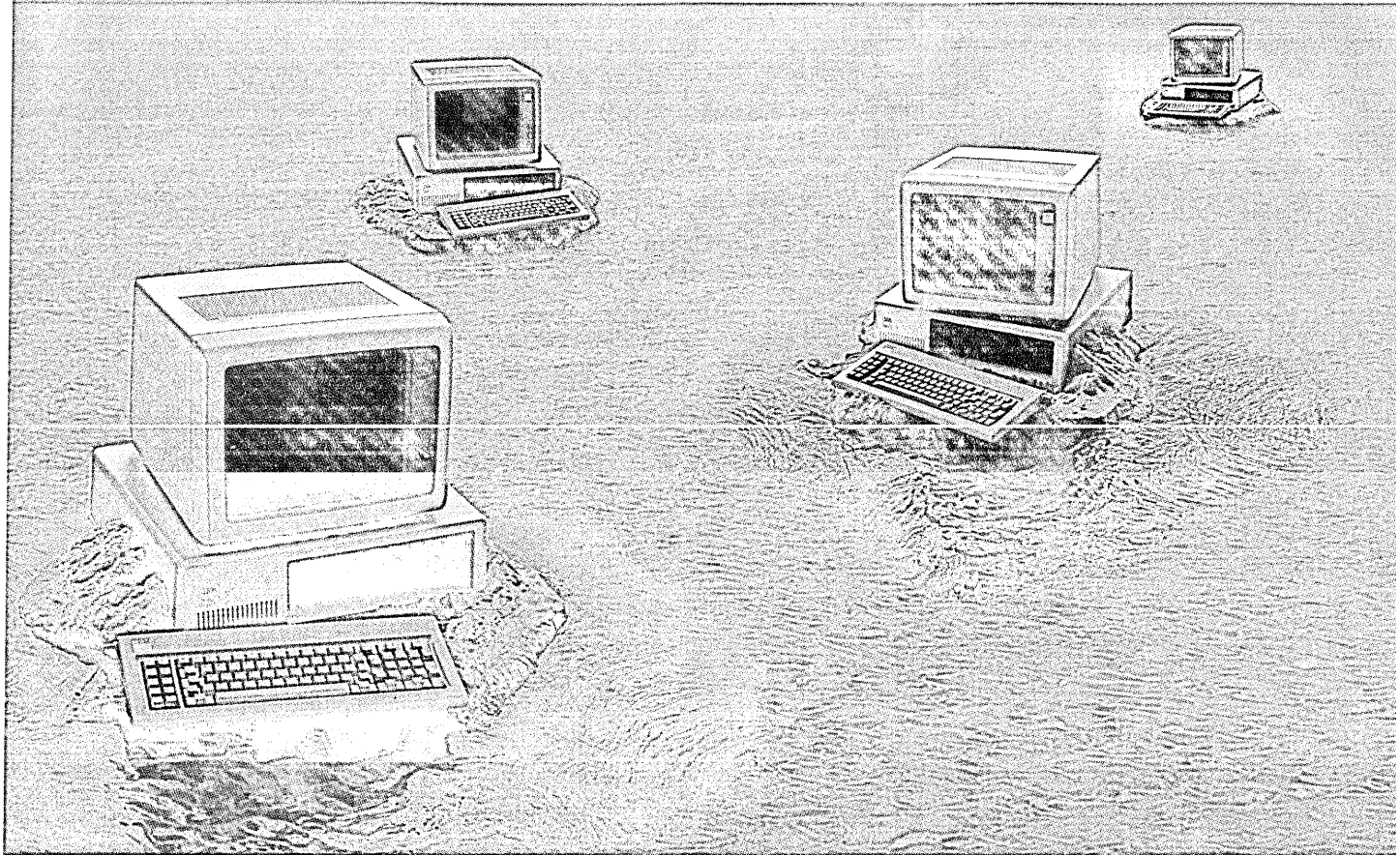
Yet, can't you just imagine yourself as O.J. Simpson, sprinting through an airport with a computer dangling at your side? Such applications are precisely the kind that portable computer vendors initially presented in their sales pitches. "An executive won't carry around a portable computer and work on an airplane, even though that's the way they played it up," says Paul Nesdore, an analyst with Datapro in Delran, N.J. "That kind of portability just isn't in demand." That partially explains why Osborne Computer was forced to file for bankruptcy Sept. 14.

Nonetheless, the variety of applications that involve carrying a computer out of the office is indeed remarkable; some believe that it will become the only way to do business in the near future. Says E.F. Hutton's Greenhouse, "The computer is a tool for thinking, and if you do your thinking in different places, you have to carry your tools with you."

### USED FOR FIELD SALES

Perhaps the most common application that involves carrying the portable computer out of the office is in field sales, particularly in the insurance industry. A salesman can work at the customer's location developing an insurance plan appropriate to his needs, and then calculate the exact price of the plan on the portable computer; the insurance company's latest rates can be stored in the unit. The salesman no longer needs to tie his portable terminal into the company's host via the customer's

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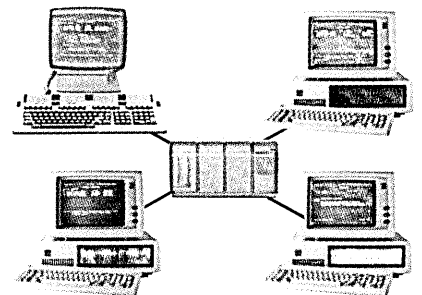
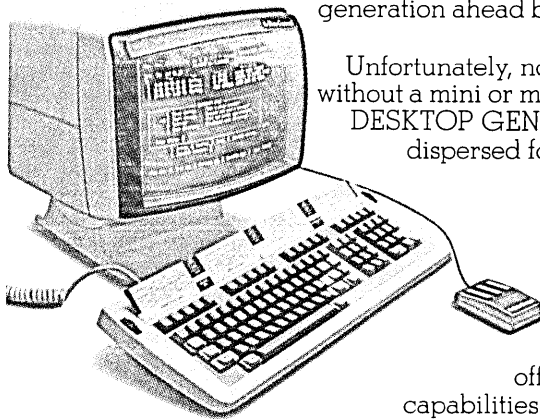
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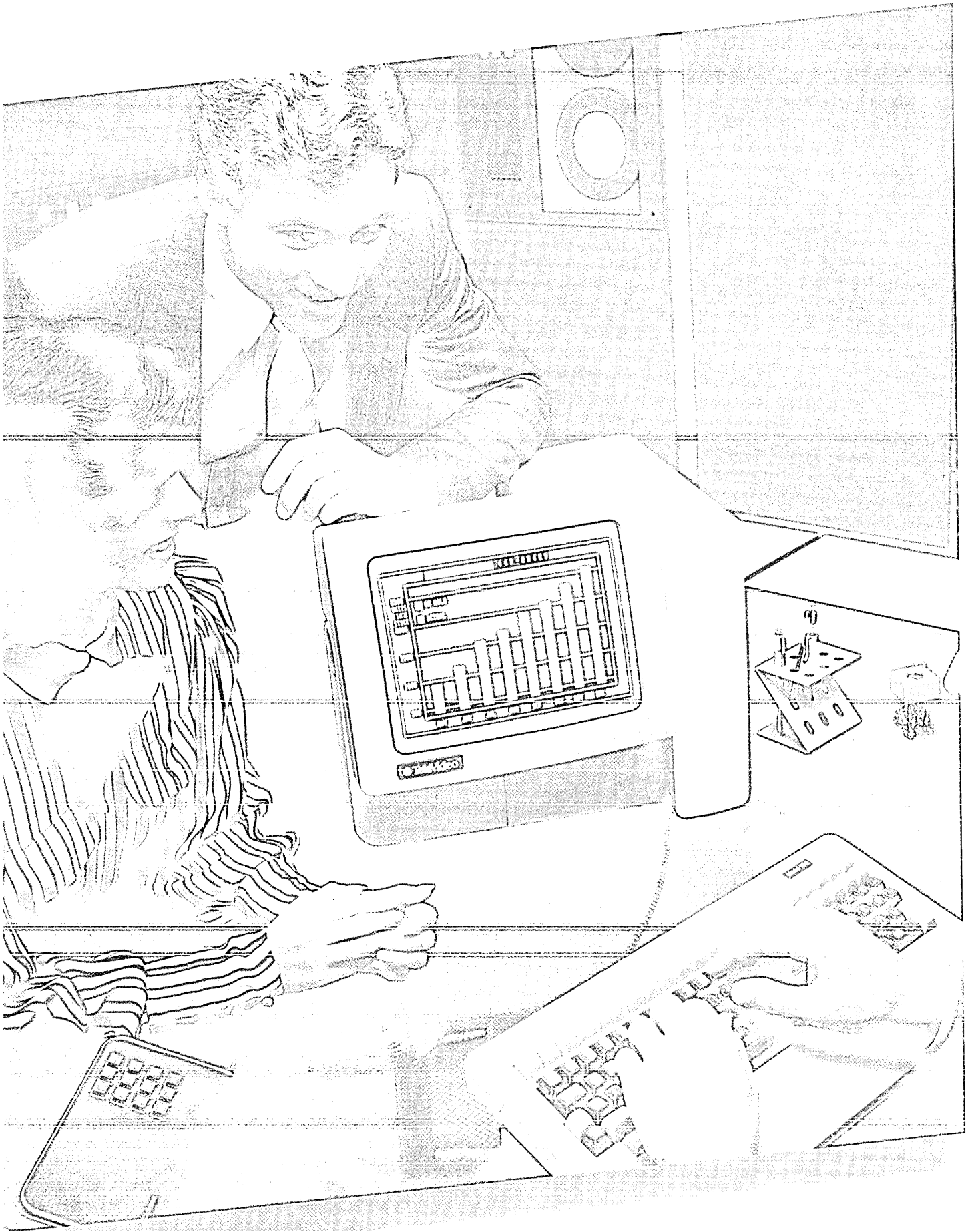


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The 970 takes the lead in utilizing the advantages of the ANSI code structure. It's 32 non-volatile function keys literally automate ANSI code command entry. Other features include VT-100 compatibility, block mode operation, block graphics and attributes and a totally reconfigurable keyboard.

An RS232 printer port with built-in buffer is standard. All this is packaged in the 970's unique vertical convection cooling tower. It protects sensitive circuitry without the noise of conventional fan-cooled construction.

In terms of operator comfort the 970 has no equal. The keyboard with ten-key accounting pad is ergonomically designed with a naturally contoured palm rest and sculpted keys. The non-glare 14 inch screen allows maximum readability in either the 80 or 132 column format. And you can display double-high, double-wide characters on the same fatigue-free background we've been applauded for throughout the industry. Screen tilt adjusts at a touch to further fight operator discomfort.

Of course, as with all TeleVideo terminals, 970 service is available nationwide from General Electric Instrumentation and Computer Service Centers.

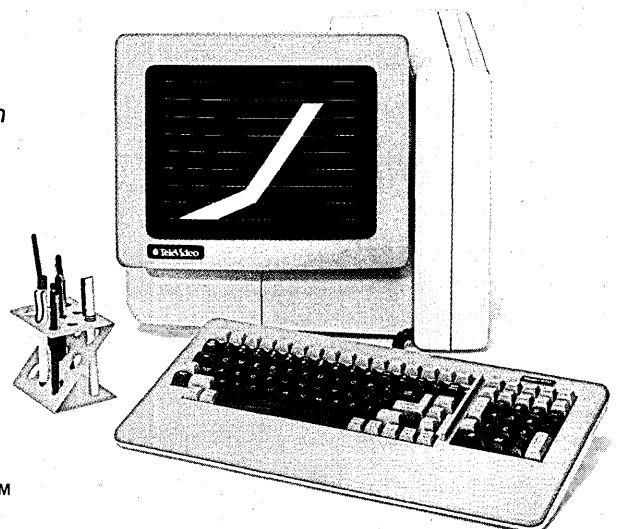
The 970. A combination of power, ease of use and TeleVideo reliability at a time you need it most. The ANSI boom is here. Get in on it with the TeleVideo 970.

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GET IN ON THE BOOM.™



## TELEVIDEO® TERMINALS

TeleVideo Systems, Inc.

## "Price sells, not portability. If the Osborne 1 at \$1,795 weighed three times as much, it would still have sold just as many."

telephone, and he certainly no longer needs to ask the customer to sit tight for a few days until he gets back to the office and calculates the rates.

Similar applications can be envisioned for data collection in market research and warehouse management; for field auditing in public accounting; for note-taking in journalism and any other field in which writing must be done away from the office; and in other areas in which data are entered into the machine in the field and analyzed either in the field or in the home office.

Education is another application for portable computers. Students are finding that portable computers allow them to study in more places, and educators are finding the machines to be useful teaching aids. Class Associates, for example, is a Connecticut-based provider of computer literacy seminars. The firm uses Kaypro computers in its seminars across the country because they're easier to move into and out of the classrooms, says Jim Griffin, a principal with the firm. When the company puts its seminar on a paddle wheel steamboat on the Mississippi River this month, it intends to bring the Kaypros along.

Yet the most exotic applications may very well be under way within the U.S. government, which Morris Decision Systems says is the largest single buyer of portable computers. Sources say that the Federal Trade Commission has about 400 portables; the War College has 500; and the Postal Service, the Navy, the Customs Department, and the FBI all have significant numbers.

Perhaps the most singular is a military application developed by BDM Corp., a McLean, Va., systems integrator. The com-

pany has developed a GRID Compass-based system for battlefield command and control operations to facilitate air-land coordination in locales where U.S. forces might be significantly outnumbered. According to Richard J. Matlack, president of Infocorp, BDM is developing software and hardware that would allow the Compass to communicate over single channel radio to send and receive tactical information. Interestingly, the functions required in the battlefield resemble traditional office automation functions, such as message handling, word processing, and database management. For example, a company commander might want to call up an enemy tank menu to enter the number of tanks, identified by type, that have been spotted in his sector of operations. The data would be transmitted to a command post for consolidation, and orders then sent back based on a situation analysis.

Yet with all these potential applications, both exotic and mundane, portable computers still have their limitations, which in the end may prove crippling. The most important stem from a complex three-way trade-off that each manufacturer must evaluate: with current technology, it is impossible to manufacture a small, powerful, and inexpensive portable computer. Or, more accurately, it is impossible to build one as small, as powerful, and as inexpensive as users want. As Greenhouse says, "In 1983 the technology is there for portables to provide 90% of what users want; but in 1984, people will want more, so that even though the technology has moved forward it will still lag behind demand."

Some vendors have decided that price is the least important of the three constraints,

and have developed machines that are praised by industry observers as technical marvels but that cost upwards of \$4,000. GRID's Compass, Gavilan Computer Corp.'s Gavilan 1, and Sharp Electronics' PC-5000 all fit that bill. While users such as Sollars at Kidder Peabody are willing to pay the \$8,000-plus price tag for a single Compass, others are skeptical. "As a general purpose productivity computer with its own software, GRID is simply priced too high," Morris says. Datapro's Nesdore elaborates, "I can't believe they can predict high-volume sales on it. The Compass is a beautifully engineered piece, but they made a bad marketing decision. Not many executives can afford it."

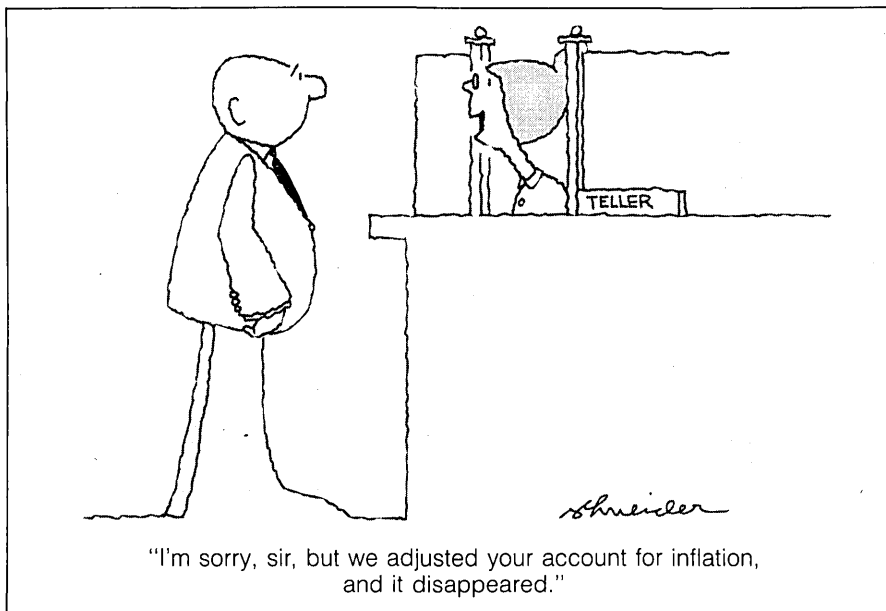
### SOME KEEP PRICE TAG LOW

Other vendors have concentrated on keeping the price tag low, under about \$3,500; some portable computers retail for less than \$1,000. For these vendors, the trade-off becomes one of power versus size. Manufacturers such as Radio Shack, Epson, and Convergent Technologies have introduced computers that cost under \$1,000 and can easily fit inside a briefcase, but they are not fully featured. "The Epson is nothing more than a portable word processor, and the TRS-80 has a text editor and some BASIC and not much else," says David Rossien, a systems analyst with Merrill Lynch & Co. in New York. "They are not general purpose computers."

Ken Deats, a Radio Shack salesman in Philadelphia, says the model 100 would sell in significantly better volume if it had some spreadsheet capability, and even users who bought the machine primarily for its word processing and built-in modem agree. Ira Mayer, a free-lance journalist who has used both the Epson and Radio Shack units for taking notes and writing articles, says, "They both do enough to be worthwhile, but I'd like to see more calculating capabilities. They aren't even powerful enough for me to do anything longer than a single article." And many Computerland stores do not stock the Epson machine because it is not versatile enough for business use, a spokesman said.

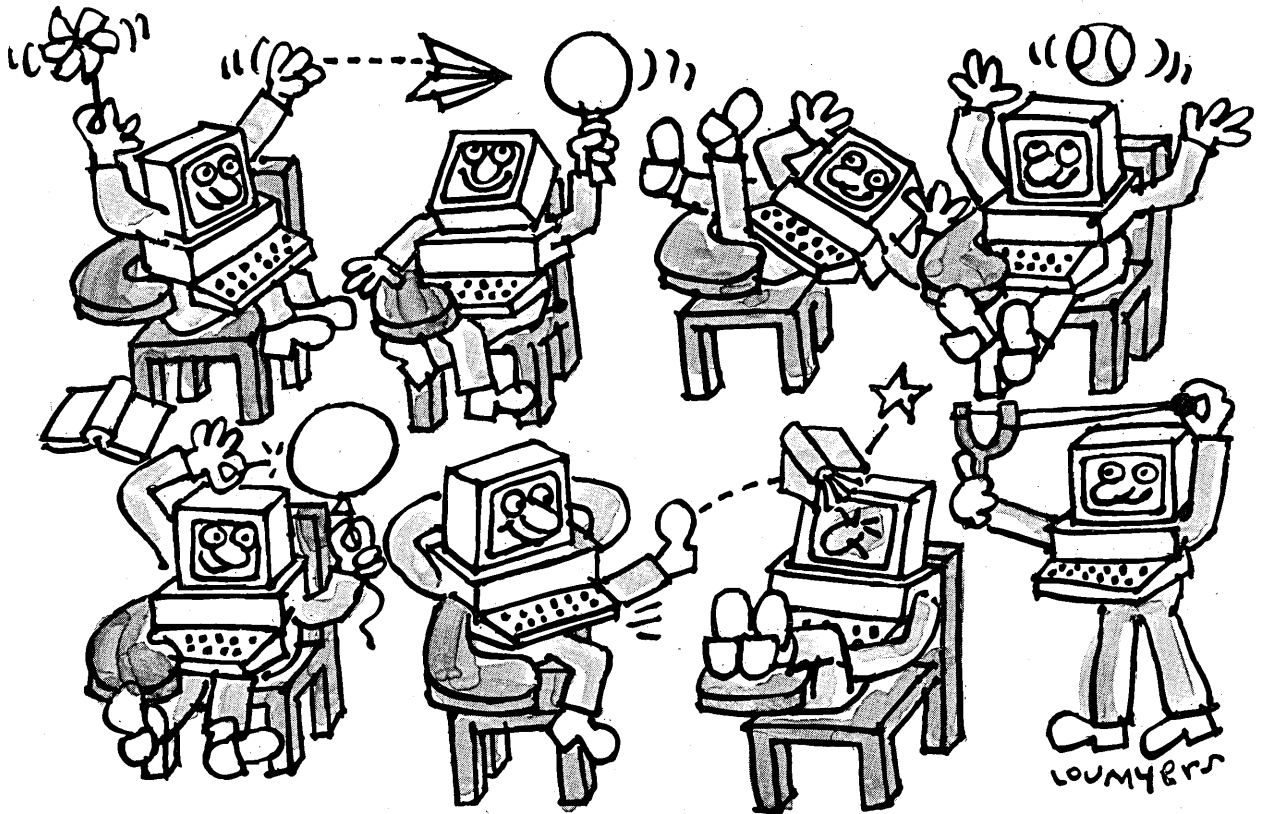
With Convergent Technologies' new WorkSlate computer, introduced in August, the problem is the reverse. The device is designed to be a spreadsheet machine, with little word processing expected. While the unit has received acclaim for its ability to perform spreadsheets and other mathematical applications in a very small package, the lack of other software limits the number of places in which it can be used. "WorkSlate is not for everyone," Greenhouse says. "It's designed for a specific kind of user and it's very suitable for that segment of the market."

These smaller portables are also limit-



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## "I want a computer I can leave in my briefcase even if I don't think I'm going to use it, like an umbrella."

ed by their displays. Because they are passive, the 8- or 16-line liquid crystal displays consume much less power and demand much less space than conventional cathode ray tubes or even electroluminescent screens. But this cost savings can have an adverse effect on a user's ability to make the most of the machine. "If you can train your thinking and your eye to adapt to the size of the screen, then it could be useful," says Paine Webber analyst Barbara Isgur. But even Deats concedes that "the display is very limiting, especially for word processing. If you're used to working with a 25- to 30-line page, it's tough to switch to an 8-line screen."

In facing the critical three-way trade-off, most manufacturers have elected to sacrifice neither cost nor power, but size. The Compaq and Columbia VP portable computers offer some degree of IBM compatibility, 16-bit processors, disk drives, high resolution monitors, communications ports, and other features for under \$3,000. In the less expensive 8-bit world, the Kaypro II, 4 and 10, Telcon Zorba, Otrona Attache, and many others have essentially put a cheap handle on a full CP/M computer.

These vendors have sold hundreds of thousands of computers in the last year, though perhaps not because of their portability. "Price sells," says Nesdore of Datapro. "If the Osborne I at \$1,795 with 64KB of memory and all that bundled software weighed three times as much as it does, it still would have sold just as many. The price was wonderful."

Moore of Collander Data Products agrees. "The Kaypro is a little like a Volkswagen Beetle. It's a cult computer. It's not the fastest or the fanciest, but, except for graphics, it can do anything any other 8-bit computer can do."

These computers, however, typically weigh between 25 and 30 pounds and are rather bulky. Moreover, despite manufacturer assurances to the contrary, some models do not fit under an airplane seat—and even if they do, the passenger's knees and chin often become intimate travelers. (Eastern Airlines places a limit of 7½ × 17 × 19 inches on packages placed under the seat. American and United Airlines are more generous, allowing packages of up to 9 × 13 × 23 inches.) Journalist Mayer recalls one instance in which he was traveling with his model 100 and happened to sit next to someone with a Kaypro. "He looked at my Radio Shack and said, 'Gee, that looks so much easier.' I'm used to carrying a typewriter, and I know how hard it is to lug something like a Kaypro around. It's not easy."

Jim Griffin of Class Associates feels, however, that the Kaypro itself presents no real problem to transport. "The only time we

have a problem is when someone wants to bring home a printer, too. Our office has nine people and three Kaypros, and there's never one here in the evening. We sign up and fight over who has higher priority."

Nesdore of Datapro counters, "These machines are not portable but transportable, and that's a big difference. I don't think the transportability is worth the things you give up."

Paine Webber's Isgur agrees. "The transportable computers can't survive as they are. They must get smaller if they want to attract new buyers. I would think very hard before buying a transportable computer. If I were limited in money and could only buy one computer and it had to be used in several locations, and it had to have disk storage, only then do I think the transportable computer makes sense."

### SOMEONE ALWAYS OBJECTS

In the end, it seems that no matter how a manufacturer approaches the price-size-power trade-off, a significant portion of the marketplace will object. The inability to combine all three features in a single package has so far frustrated many users, leading some analysts to question the future of today's booming business.

Rossien, who has been evaluating portable computers for Merrill Lynch's end-user departments, says, "I don't think portables will change the way people do business until they can carry it like an umbrella. To me, an umbrella is truly portable. You can take it with you even if you're 98% sure that you won't need it, because it's no effort. And when you use the umbrella, it works. That's what I'm looking for in a portable computer. I want something I can just leave in my briefcase so that if I decide to work at home I have it, and if I don't work at home I haven't wasted any effort carrying it around. And when I use it I have the full capabilities of my office computer."

Similarly, Alan Brittner of ARCO, in Los Angeles, says, "General purpose portable computers are going to have to get a lot smaller and lighter before I would consider them truly portable. If you can't carry it easily in your briefcase, with room for other things, then it's not very different from a desktop computer."

Portable computer manufacturers face key decisions outside of the price-power-size trade-off. Prime among them is the issue of compatibility to other microcomputers. Most of the large portables have either CP/M or MS/DOS compatibility, and the Compaq and Columbia VP machines are advertised as being fully compatible with the IBM P.C. There is even a portable manufactured by Andromeda Systems, Canoga Park,

Calif., that provides full DEC LSI-11 compatibility.

But compatibility imposes certain limitations on a manufacturer. Display formats need to be standardized, interfaces to peripheral equipment must be designed to match interfaces in much bulkier equipment, software needs to be integrated, and so on. While the designers of large portable computers have little problem incorporating 5¼-inch disk drives, standard processors, and other components, the makers of the smaller computers face a dilemma. A Z80 or an 8086 processor, for example, consumes far more power than a CMOS processor, but as yet there are no Z80 or 8086-compatible CMOS processors available in shipping quantities. Similarly, a computer small enough to fit on an airplane's tray table is not going to be able to include a 5¼-inch disk drive, but using a 3½-inch drive (Gavilan), bubble memory (Compass), or program micro cassettes (WorkSlate) means that no generic software can be used.

Sacrificing generic software can be a major detriment to a system, since the primary advantage of CP/M or MS/DOS compatibility is that a user with one computer in his office can use a second, portable computer at home or on the road and employ the same program and data diskettes. Even among the many people for whom a portable is their only computer, compatibility has advantages, although they might be more psychological than practical. Says Sollars of Kidder Peabody, "We started from scratch, with no investment in CP/M or MS/DOS or any other micros, so we had no problem there. But it's comforting to have MS/DOS compatibility anyway in case someday we want to make use of it."

Collander Data Products' Moore elaborates, "A lot of people order Columbia VPs because they are IBM compatible. That's an important feature just because it's IBM and because it's seen as the latest technology. Many people want that even if they don't need it."

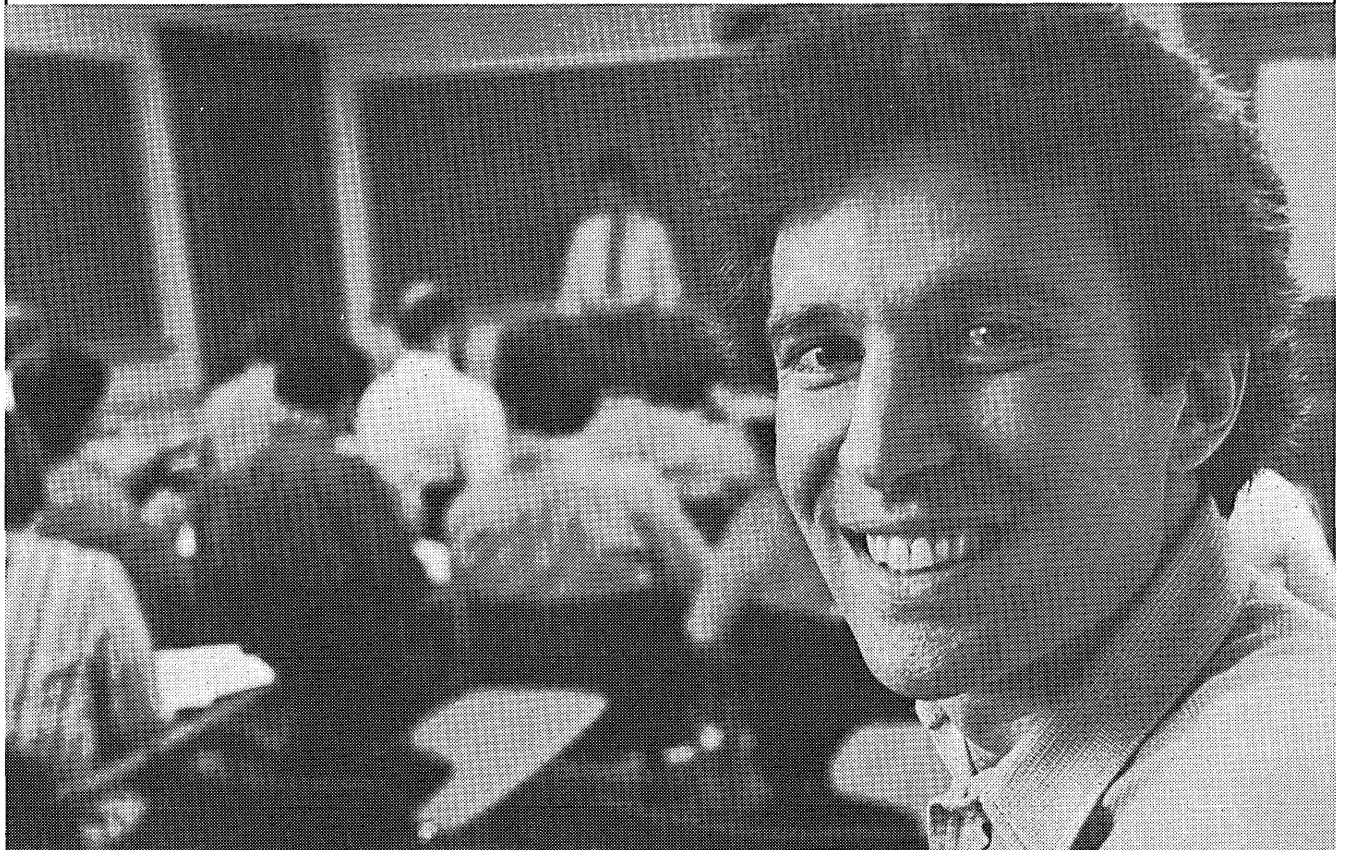
All of which raises the question of when, or if, IBM plans to introduce a business portable computer. Some established microcomputer vendors, such as Televideo, Epson, Convergent Technologies, and Radio Shack, have already entered the portable arena, but most other well-known micro manufacturers have yet to do so. Analysts expect that situation to change.

### A LITTLE LIKE A WAR FRONT

"I see it a little like a war front," explains John Hoffman of Business Investment Computer Systems. "The established vendors are opening up new markets and expanding so rapidly that



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## The dim prospects for general purpose portables reflect users' changing attitudes as well as changing technologies.

other new markets are appearing in gaps. As these gaps are opening, the pioneers like Adam Osborne are filling them in; but sooner or later the established vendors will close their own gaps." Hoffman believes IBM and Apple, among others, are awaiting a shake-out in portable computers, similar to IBM's strategy before entering the personal computer market.

When IBM and other well-financed companies enter the market, say analysts, startups like GRID, Gavilan, Kaypro, and others will find the competition overwhelming. Says Datapro's Nesdore, "I can't see how these startups can survive. They have more guts than I do, because if I were using my own money to take on desktops on a much lower scale, I'd fear the giants on my tail."

With IBM and others possibly in hot pursuit of the multibillion dollar portable computer market, where can the little guys hide? Several analysts suggest vertical markets. "You need to find a niche application that has a small user community where there's no competition," Hoffman says.

Nesdore explains, "Vertical markets may improve the startups' odds for survival, because it takes the giants a while to get

around to the vertical markets. The startups can get a jump on the giants if they're smart, but they don't seem to be too smart. Vertical markets could at least lengthen their lives long enough for someone else to buy them out."

Users agree. "I like the philosophy behind WorkSlate," Greenhouse of E.F. Hutton says. "Individual users don't do very many applications—they do one or two and don't care about the rest. Manufacturers have to exploit the fact that there are many users. They have to segment the market, because general purpose portable computers are already Neanderthal."

The dim prospects for general purpose portables reflect changing attitudes on the part of users, as well as changing technologies. Company policy at several user installations discourages their use, says Harold L. Baeverstad of Sundstrand Corp., Rockford, Ill. "No one should take work home," he says. "If you have company work to do you should do it at the company."

Rossion of Merrill Lynch also doubts there is much of a market for portable computers used at home. "The ceo of Exxon is not going to carry 23 pounds home. He will

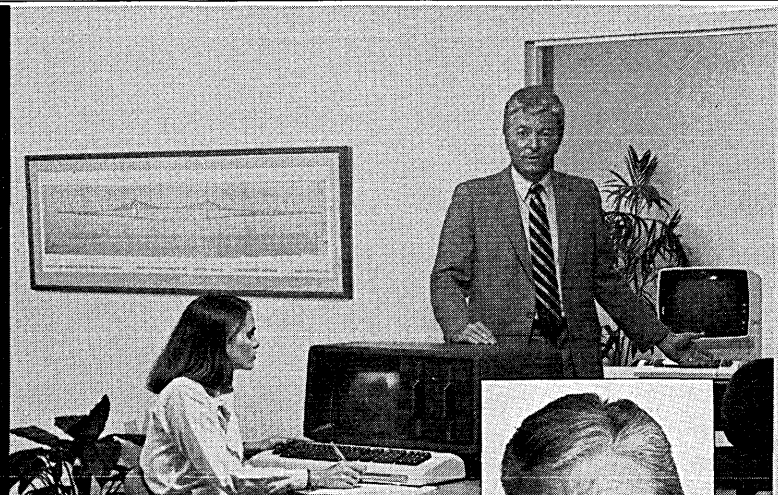
have one computer at home and one at his office. People who need to do work at home are usually important enough to a corporation that they can get a home computer. Other computer users don't work at home and don't need a portable computer."

Even traveling on the road, the classic portable computer application, may find less room for portable computers. Brittner says that ARCO and many other companies are developing teleconferencing systems to reduce employee travel, thereby reducing the need for portable computing capability.

The ball seems to be in the manufacturers' court. If the portable computer business is to live up to the forecasts of 10-fold growth over the next four years, the manufacturers need to determine precisely which applications are needed by which users, and to what extent.

They also need to determine which applications and features are no more than extraneous circuitry in a package designed for compactness. They can no longer sell portable computer technology as a novelty or as a technology; they must now concentrate once again on solving specific users' specific problems. #

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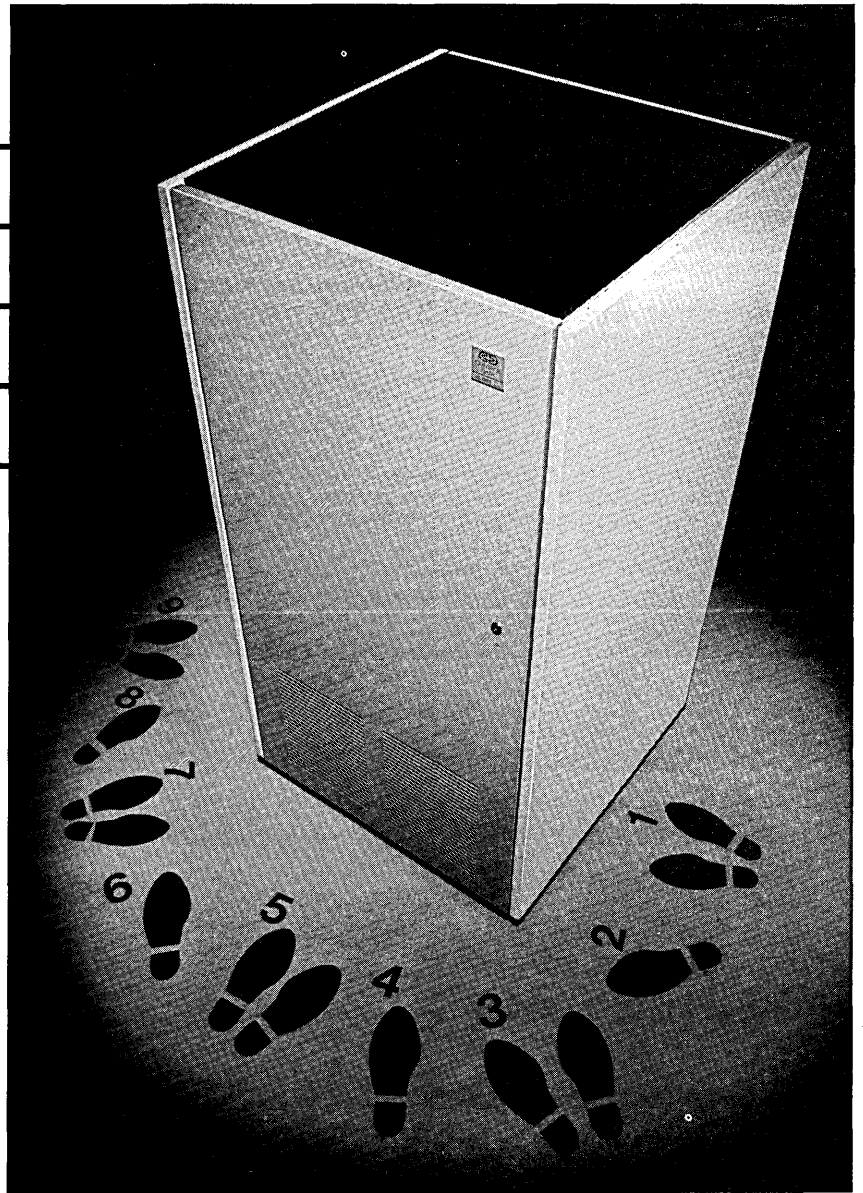
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**More than 100 computer-oriented companies have gone public in the last year, and there're more to come.**

# AN EXCESS OF MONEY

**by Larry Marion**

"Those guys were more interested in shipping product than in fixing its problems," grumbles the president of a small manufacturing company in Southern California. He bought an office automation system from a company that went public earlier this year, before its software was ready. "We finally went to them and asked for the Unix utilities, so that we could fix the problem ourselves," says the disgusted customer.

Many dp managers have faced a similar problem, or have at least muttered a few oaths about the new desktop system bought from a startup company anxious to bolster revenues to raise money on Wall Street. For the dp managers besieged by salesmen selling yet another 16-bit microcomputer, there's bad news on the horizon: the proliferation of computers is likely to get worse over the next two years, because the public is eager to buy stock in computer companies, even those that are relatively unproven. "A lot of companies are getting funded which shouldn't, due to an excess of money," says venture capitalist Benjamin Rosen, who raised \$85 million to invest in new companies.

In the past 12 months through early September, 115 computer companies succeeded in selling stock to the public, according to a search of Securities and Exchange Commission files by Securities Data Co., New York. The underwriters of the computer stock offerings collectively pulled in roughly \$2.4 billion from investors or their own accounts; dozens of other computer companies went public without an underwriter making a firm commitment to sell the shares. The record-breaking number of new computer stocks was part of the stock market craze for high technology—about one quarter of the "firm offer" initial public sales of stock over the past year were for computer companies, according to Securities Data.

The average new computer company had \$19.5 million in revenues in the 12 months prior to the public offering. It showed \$2 million in net income and sold about \$21 million in stock. However, there was a wide

range of operating histories, because companies that went public earlier in the bull market cycle were older and more established. For example, the largest computer company to go public, TeleVideo Systems, received \$113 million from its offering, and had almost \$100 million in revenues in the year prior to the March offering. It's been in business for six years.

Newer companies did not have wonderful profits to brag about, only the potential for earnings. Of the 115 companies to go public, less than half had decent profits—52 were solidly in the black, 39 broke even or had small losses, and 29 had substantial losses, according to Securities Data.

Many of the new companies with only red ink on their books took advantage of the seemingly insatiable appetite for new computer company stocks, many market observers say. "After the stock market run-up in prices and premiums, computer company owners couldn't afford not to go public," opines Terence Quinn, an analyst who specializes in emerging growth companies for Dean Witter Reynolds, the brokerage subsidiary of Sears, Roebuck. "In the first six months of the rally, companies with five years of experience went public. Now, the companies going public did not intend to go public this early, but did so just because they can get rich quick."

## **SKY-HIGH PRICES PAID**

Indeed, some of the prices paid by the public are astounding. The average P/E, the traditional measure of value, was 58 for these companies. In other words, the price per share was 58 times the earnings for the preceding year. By comparison, the average multiple for all public companies is about 13, and 15 to 27 for large computer companies like IBM or Wang Laboratories. By another measure of stock price value—the premium paid over the per share tangible assets of the company—the prices were even more outrageous: while most high-tech stock sells for a "book" value multiple of six or less, the average premium for the new computer firms was 30. "The compa-

nies offering stock for high multiples are displaying considerable chutzpah," notes Frederic Withington, vice president at Arthur D. Little, Cambridge, Mass.

The \$2.4 billion in cash raised by the new companies will find its way into product designs to be introduced over the next few years, further complicating the choices to be made by dp managers. The explosion in microcomputer products on the market, 361 by one recent count, is nothing compared to what some see on the horizon.

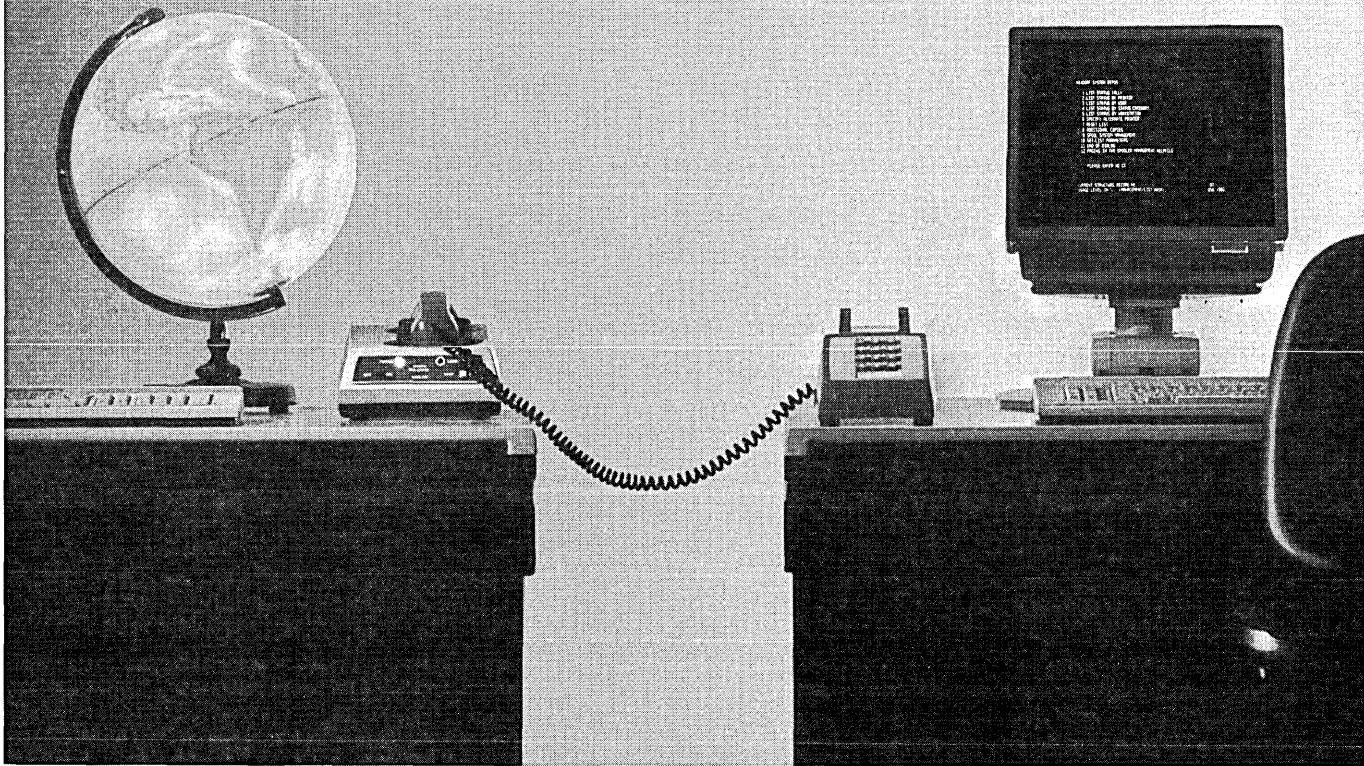
The number of new desktop computer design proposals won by Intel and its 16-bit microprocessor chips is mind boggling. Currently there are between 600 and 700 companies buying the two 16-bit cpus, the 8086 and the 8088. "We are shipping several hundred thousand 8088s per month," claims Andy Verhalen, product manager at Intel. Half of the 8086 and 8088 designs, but most of the production volume, is for personal computers, he says. Company officials concede that there are "production shortfalls" of the key chips, but claim production is being stepped up dramatically.

The next generation of 16-bit microchips, the 25% faster 186 and 188, are being designed into new products at the rate of more than one a day, according to Tony Barre, Intel marketing manager. "We already have 400 product designs locked up and we expect to have 1,000 by the end of the year," he says. About half of the designs are for workstations, the other half for intelligent controllers. Convergent Technology's Mega-frame controller and n-gen workstation are two of the hundreds ready to appear on the market. Intel says that its production of the new chips will exceed that of the current generation by 1985, indicating that dp managers will have about a year to digest the 8086 and 8088 boxes before the 500 or so of the next generation are introduced.

The odds for the survival of these companies and their products are subject to debate. Rosen insists that "there is room for this type of activity as long as there are no standards in the marketplace." With market demand growing at 30% to 40% per year, he



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## Software companies often go public in order to build an acquisition war chest.

FIG. 1

### TEN LARGEST COMPUTER COMPANIES TO GO PUBLIC IN LAST 12 MONTHS

| DATE     | NAME OF COMPANY                   | TOTAL AMT<br>(\$MIL) | REVENUE<br>LATEST<br>12 MOS<br>(\$MIL) | NET INCOME<br>(\$MIL) | P/E     | PREM<br>OVER<br>BOOK | COMPANY<br>DESCRIPTION         |
|----------|-----------------------------------|----------------------|--|-----------------------|---------|----------------------|--------------------------------|
| 3/15/83  | <b>Televideo Systems</b>          | 113.                 | 98.5                                   | 12.7                  | 50.0    | 26.44                | mfg video display terminals    |
| 3/4/83   | <b>Fortune Systems</b>            | 110.                 | 26.0                                   | -3.2                  | —       | 27.86                | mfg/mkt desktop computer       |
| 3/3/83   | <b>Apollo Computer</b>            | 88.0                 | 18.1                                   | 0.3                   | 1,100.0 | 32.70                | mfg/mkt/service computers      |
| 4/27/83  | <b>Telerate</b>                   | 80.0                 | 51.9                                   | 14.5                  | 54.1    | 66.19                | oper computer financial syst   |
| 3/23/83  | <b>Victor Technologies</b>        | 78.8                 | 123.4                                  | -11.3                 | —       | 10.85                | mfg/mkt microcomputer          |
| 6/30/83  | <b>Wicat Systems</b>              | 72.0                 | 25.3                                   | -4.1                  | —       | 63.05                | mfg/mkt microcomputer syst     |
| 11/4/82  | <b>Altos Computer<br/>Systems</b> | 69.3                 | 57.4                                   | 6.4                   | 38.2    | 16.53                | dvlp/mkt microcomputer<br>syst |
| 6/2/83   | <b>Priam</b>                      | 65.5                 | 51.2                                   | 1.2                   | 170.0   | 18.10                | mfg/mkt disk drives            |
| 5/27/83  | <b>Norsk Data</b>                 | 56.6                 | 85.6                                   | 7.1                   | 41.9    | 4.07                 | mfg/mkt minicomputers          |
| 12/10/82 | <b>Quantum</b>                    | 51.3                 | 29.8                                   | 4.1                   | 20.1    | 10.90                | mfg/mkt disk drives            |

SOURCE: SECURITIES DATA

FIG. 2

### TEN MOST EXPENSIVE NEW COMPUTER COMPANY STOCKS

| ISSUE<br>DATE | NAME OF CO.                  | TOTAL<br>AMT.<br>(\$MIL) | \$PRICE/<br>SHR | NET<br>INC<br>(\$MIL) | PRICE/<br>ERNGS |
|---------------|------------------------------|--------------------------|-----------------|-----------------------|-----------------|
| 3/3/83        | <b>Apollo Computer</b>       | 88.0                     | 22.00           | 0.3                   | 1,100.0         |
| 6/1/83        | <b>Daisy Systems</b>         | 31.0                     | 15.50           | 0.4                   | 221.4           |
| 6/3/83        | <b>Micropolis</b>            | 40.2                     | 17.00           | 0.7                   | 170.0           |
| 6/2/83        | <b>Priam</b>                 | 65.5                     | 17.00           | 1.2                   | 170.0           |
| 6/30/83       | <b>Avant-Garde Computing</b> | 30.1                     | 16.00           | 0.3                   | 123.1           |
| 8/26/83       | <b>Stratus Computer</b>      | 36.0                     | 12.00           | 0.9                   | 100.0           |
| 3/25/83       | <b>Masstor Systems</b>       | 48.0                     | 16.00           | 1.3                   | 100.0           |
| 6/24/83       | <b>Margaux Controls</b>      | 24.8                     | 16.50           | 0.7                   | 97.1            |
| 7/12/83       | <b>Micro D</b>               | 32.0                     | 16.00           | 0.8                   | 88.9            |
| 7/12/83       | <b>Perfectdata</b>           | 9.2                      | 8.50            | 0.2                   | 77.3            |

SOURCE: SECURITIES DATA

adds, there will be enough customers for awhile.

Others take a less sanguine view. "In five years 20% of these new companies will be operating in some independent form," estimates Withington of ADL. "Another 20% will have gone bust, and the rest will get a little bigger and then sell out to a bigger com-

pany that is trying to diversify." Another venture capitalist estimates that one out of 20 new companies will survive. A study by the SEC after the 1960 to 1961 boom in new companies found that three years later, only 20% remained profitable.

The \$64,000 question, of course, is, Which ones will survive? "The marketplace

is a quagmire, with an overabundance of new entrants," observes Stephen McClellan, vice president of Salomon Bros., a Wall Street investment banking and stock brokerage firm.

Certain market segments, though, are less crowded. The high-end workstation market, with price tags of \$20,000 and up, is an area with relatively few players. Alexander Stein, senior industry analyst at Dataquest Inc., Cupertino, Calif., notes that Apollo, Perq Systems, Charles River, and several other companies in that market category will thrive if they can maintain strong ties with major systems vendors such as Calma, Applicon, and Computervision. "It's a small market, growing 25% to 30% per year from less than \$1 billion today," says Stein. "That will level off and stabilize."

A more competitive marketplace, Stein notes, is what he calls the Unix box business. He counts 70 companies making microcomputers using the Motorola 68000 chip or other high-performance micros, and the Unix operating system. Fortune Systems is one of the companies that is fighting for market share, as the sector's annual growth rate has slowed to 25% from 45%. "These companies are starting to feel the competition," he says.

The crush of competition is heaviest in the "IBM emulation" market, with more than 100 personal computers that run Microsoft's MS/DOS or PC/DOS software. "The market is growing at a tremendous rate because

of IBM capacity limits," Stein notes. Over the next few years, he warns, IBM's production will expand rapidly and could significantly diminish the market for the P.C. clones. "Remember the early days of the VT100?" Stein asks. "Others came in when DEC had limited production, but after DEC went into volume, they got hurt. The uniqueness of some of the clones will keep them around, but the high growth rate will diminish and those that haven't diversified won't survive."

The shakeout in the portable computer category is already happening. Osborne Computer Corp. is bankrupt. "There are few barriers to entry in the portables business, with a short product cycle," notes Stein. "Osborne fell victim to the life cycle and cash flow perils—it couldn't get enough cash out of its current products, due to price competition, to keep new products coming."

## COMPANIES REPORT TROUBLES

Other companies are reporting troubles as well. Victor Technologies, Vector Graphic, and Fortune Systems reported losses over the past few months. Other companies, such as Altos and Convergent Technologies, have warned that earnings over the next few months will be less than in the past, and nowhere near the levels investors expected when they paid the high premiums for the stock. Company officials insist that their firms will be healthy and will survive the inevitable shakeout.

Software companies that were no more than a gleam in someone's eye a few years ago are now part of a massive industry consolidation. New starts like On-Line Software and Hogan Systems are making joint venture agreements or buying other companies to broaden their product lines as fast as possible. "Many small software companies are using the money from the public offerings to buy other companies," notes Quinn of Dean Witter. "Essentially, they are using the stock offering cash to build war chests."

Picking the probable survivors is a tough chore, whether you are an analyst, venture capitalist, market researcher, or dp manager, but several rules of thumb are considered valid. "Any company that we put money into must have an aggressive new product policy," notes Rosen. "A new company typically needs to expand its product line in three to four years," explains Withington of ADL. "Of the 80% of the companies that won't make it, half will sell out due to the lack of an encore, a second big product."

A full line of me-too products is not a recipe for success, though. Proprietary technology is crucial, notes Quinn. McClellan points to Masstor Systems as an example of a company with long-term prospects, owing to its proprietary technology in the relatively

## EASY COME, EASY GO

The Kay family of Solana Beach, Calif., lost a quarter of a billion dollars over the summer. They didn't lose it in a Las Vegas poker marathon, but on Wall Street. In early July they offered to sell shares in their portable computer company, Kaypro, for up to \$18 per share; therefore, their holdings of 28 million shares would have been worth \$504 million. But after intense negotiations, pension fund managers and other investors refused to pay more than \$10 per share. The value of the Kay family stock dropped to a mere \$280 million on paper.

Instant riches are still possible on Wall Street, regardless of the losses suffered by Texas Instruments, Mattel, and the Atari division of Warner Communications. The ardor for new computer stocks has made millionaires out of many executives of computer systems firms and their peripheral companies.

Last year a limited partnership led by former Wall Street analyst Benjamin Rosen and Mostek founder L.J. Sevin invested about \$2.3 million in Lotus Development Corp., the Cambridge, Mass., company that produced the 1-2-3 integrated software package for the IBM P.C. A few weeks ago the company went public, and the market value of the shares held by the Sevin-Rosen partnership was between \$46 million and \$53 million, or a 15-fold profit in little more than a year. The liquidation value of the partnership's portion of the company's assets was \$1.7 million.

There are scores of overnight millionaire stories. Phil Hwang, founder of terminal and desktop computer maker TeleVideo Systems, owned 29 million shares of his company, each valued at \$18, when it went public in March. On paper his holdings were worth \$520 million.

Many longtime investment analysts and computer industry observers were shocked at the high per-share prices set for these companies. In many cases, the liquidation value of the company on a per-share basis was less than a dollar per share.

Lotus priced its shares at \$13 each when the company's liquidation value was 48 cents per share as of June 30. TeleVideo's tangible book value was 68 cents per share when the price was set at \$18. When Kaypro sold 4 million shares of stock at \$10 apiece in August, the value of the company at that time was little more than 20 cents per share. In the past, investors were willing to pay a high premium in return for the higher

earnings growth and stock market price potential of new high-technology companies. Unfortunately, as many wags note, the offering prices not only discount the future, but the hereafter as well.

The offering price for the stock of new companies is determined in a series of private negotiations between the Wall Street brokerage houses and their customers. The resulting price is a balance between supply and demand, though the relative valuations dropped during the summer after several high-tech stocks lost some of their glitter in the wake of the losses posted by TI, Atari, and others.

"The prices are lower now, because there's less euphoria in the marketplace and a lot of the stocks are selling below the offering price," explains Rosen. The number of deals is slowing down, he adds, because only the quality companies can attract premium prices. "The lower quality deals are in trouble."

One company that recently tried to go public but faltered was Androbot Inc., a manufacturer of several types of consumer robots. In June the company offered to sell stock for up to \$12 per share, seeking an infusion of \$1.5 million in new working capital. But the offer was withdrawn in September, explains a company official, "due to market considerations." One money manager avers that the company's poor financial health was more of a factor. "I was shocked to see this as a deal," he said, "and further shocked that Merrill Lynch would be associated with it." First-rank brokerage firms like Merrill Lynch usually take only the most successful companies as clients; Merrill Lynch officials declined to comment.

Technically, Androbot was bankrupt when it tried to sell stock. Although it had sold nearly 700 robots earlier this year, the company had less than \$400,000 in assets compared to almost \$3 million in liabilities as of March 31. Only loans from Nolan Bushnell, the founder of Atari and now the godfather of several Silicon Valley start-ups, including Androbot, keep the company above water; in fact, the company's San Jose office space lease is personally guaranteed by Bushnell. If Androbot's stock offering had succeeded at \$12 per share, Bushnell's holdings would have been worth \$37.7 million. He may have a long wait to see that money.

—L.M.

uncrowded market for large storage devices.

When a dp manager considers dealing with a new company, a checklist of what to look for should include a close scrutiny of its prospectus. Companies going public without a history of earnings should be avoided. Managers should also look for senior company officials with experience at big companies in a related field, and for big name venture capitalist backers.

The president of that small manufacturing company in Southern California said he was aware of those considerations before he bought the software-deficient office automation system. The vendor had promised to fix the problems with revised software, but the customer is still waiting. That particular vendor, like others, tried to use the public offering cash to cover over its mistakes of the past, alleges Stein. It couldn't.

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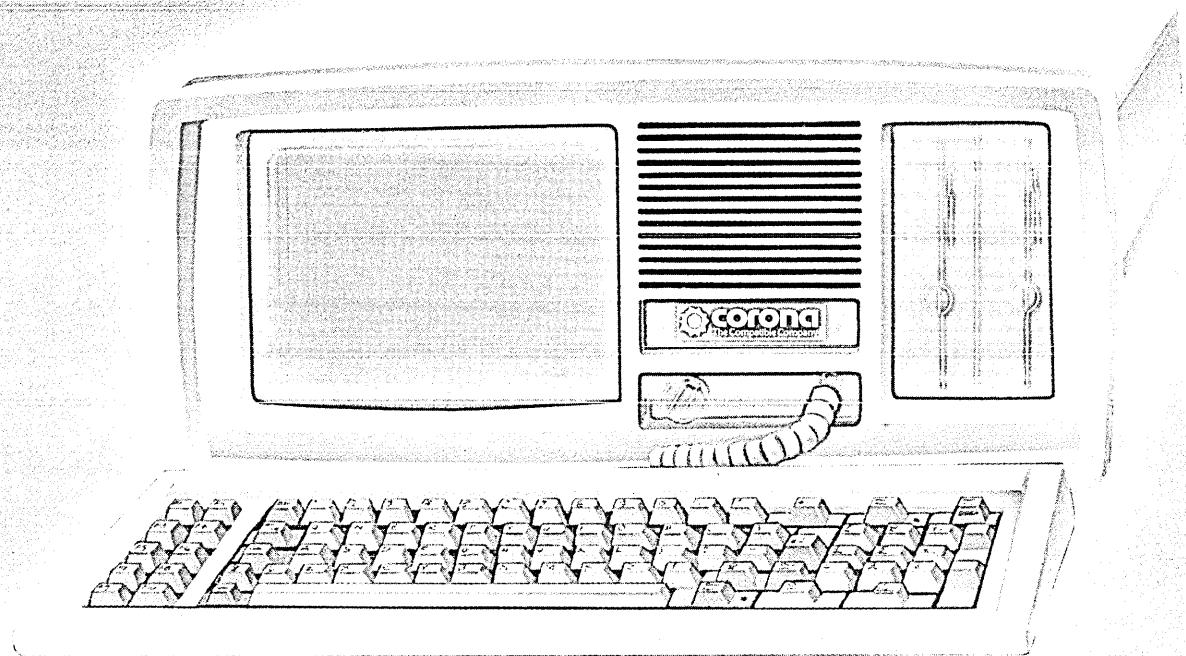
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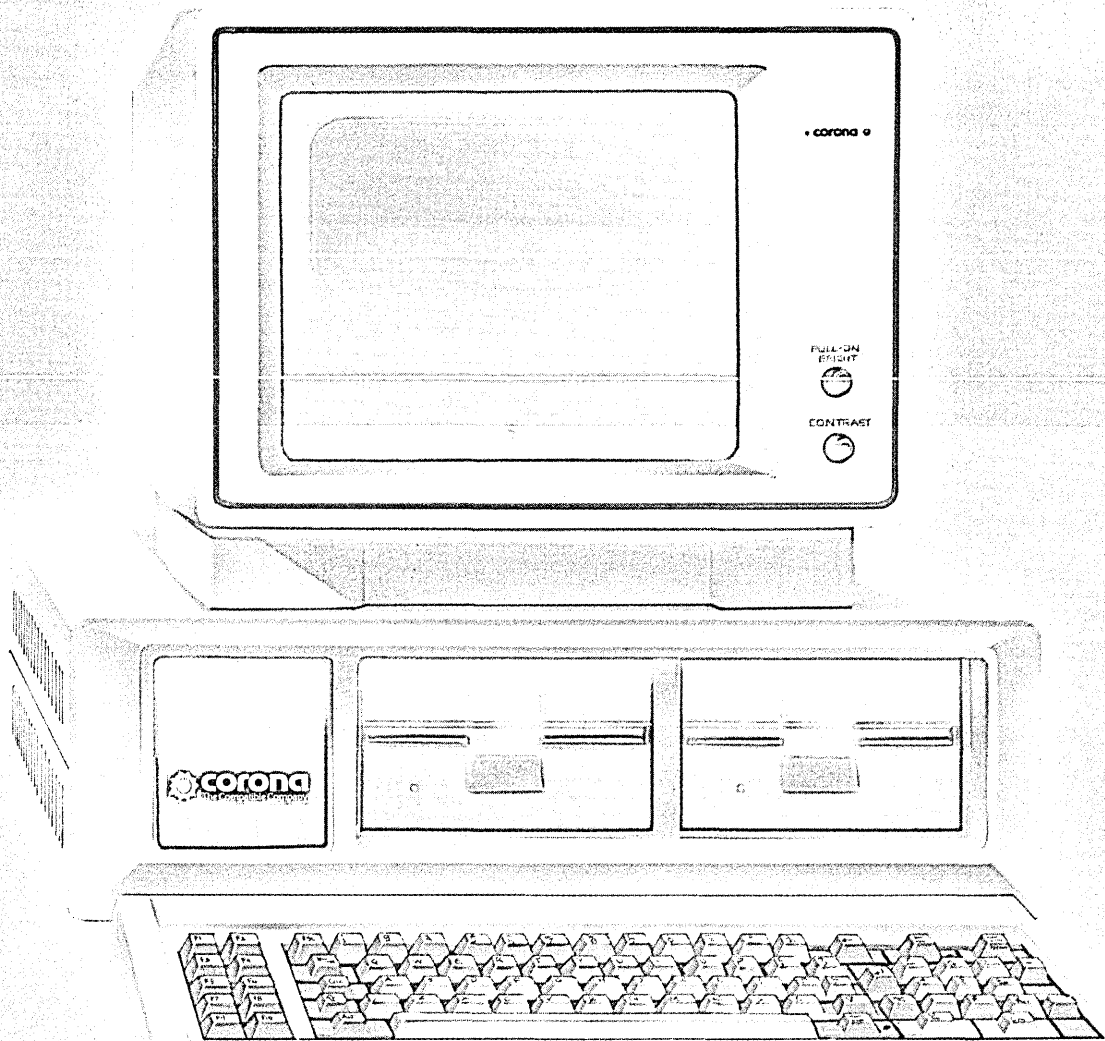
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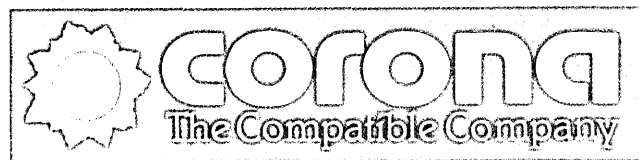
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**Overwhelmed by the multitude of educational options? Here's how to get the most for your money.**

# A GUIDE TO DP TRAINING

by Janet Dight

Jim, an analyst with a major manufacturing company in the Midwest, just returned from a four-day systems analysis and design course in San Francisco. "San Francisco was great," he said, "but the course left a lot to be desired." The problem? "The course was too basic, and the instructor was really boring. By the third day I was counting the number of times he said 'umm' between sentences, just to entertain myself." Then he smiled and added, "But San Francisco was terrific. I had some of the best meals I've ever eaten."

Instead of buying training, this company paid \$1,883 for Jim's four-day vacation. The registration fee was only \$695; the rest of the cost covered airfare, hotels, meals, taxis to and from the airport, taxis to and from restaurants, long-distance calls to the office, and entertainment (taking the instructor out for drinks).

Figure in the salary paid to Jim while he was away, at an additional \$134 per day, and your grand total comes to \$2,553. Not exactly what Jim's manager had in mind when Jim waved the seminar brochure under his nose and said, "It's only \$695." That didn't seem like a bad price for a four-day course, and besides, Jim had been working his tail off for the past six months and deserved a break. Jim would have been happier if his manager had given him a check for \$1,883 and told him to go home for a week.

In the rush to keep up with rapid changes in the data processing field, training seminars are being offered and attended by hundreds every day, but many of these courses fall far short of the attendees' expectations. Yet it doesn't have to be that way. With a little planning and some careful purchasing techniques (most of which you can delegate), you can get more for your training dollar, you can find good courses and reduce the cost of attending them, and you can have more training money to spread around and better-trained people to show for it.

There are two basic types of training courses—the public seminar and the in-house seminar. The public seminar is, of course, where you receive a brochure in the mail and are enticed by the razzle-dazzle sales copy, so you sign up, send in your money, make your hotel and airline reservations, and attend the course. With an in-house seminar, you receive a brochure in the mail and are also enticed by the razzle-dazzle sales copy, whereupon you commandeer 15 or 20 of your people, reserve your conference room for four days, put the instructor up at a nearby hotel, and sponsor the course.

This is frequently the extent of any research, investigation, and planning that goes into purchasing training. So companies end up like Jim's—with disgruntled, untrained employees and a big dent in their training budget.

But training is a buyer's, not a seller's, market. As the list at the end of this article shows, there are dozens of dp training firms out there, and probably many more that we didn't uncover in our search. Anybody who can afford a desk and a telephone can be in the training business. Consultants, colleges and universities, nonprofit organizations, for-profit organizations, professional societies, hardware manufacturers, and software manufacturers all offer seminars. With the U.S. just coming out of a recession, these organizations are hungry. Training is the first budget item cut when the economy turns sour, and training firms have been feeling the pinch for several years now. They're eager for your business and willing to work with you on price. You can negotiate with them on almost anything and save a lot of money.

But first let's talk about quality. It doesn't matter how little you pay for a course if it isn't any good. The quality of your training experience is determined by two factors: the instructor and the course materials. Course materials are secondary, because a good, knowledgeable instructor can overcome mediocre course materials, but the most excellent course materials in the world

cannot redeem a bad instructor.

Data processing and training are two separate and distinct areas of expertise. Finding people who can handle both these tasks well, and who have the time and inclination to teach seminars, is the toughest problem facing training companies. There simply aren't enough qualified instructors to go around. That's why so many of those scores of dp courses are taught by inadequate data processors, inadequate teachers, or both.

You get a good course only when you get a good instructor; hence, determining the quality of the instructor is the first priority. Never rely on the seminar sales brochure when judging an instructor's ability. Those slick, glossy sales brochures are just that—sales brochures. They are written by well-paid copywriters whose sole purpose is to convince you that you can't live without their product. They are designed to make the course and the instructor irresistible. In reality, the course and the instructor may offer nowhere near the value touted by the brochure.

Brochures are usually full of quotes: "The best course I've ever taken."

"The instructor was extremely well informed."

"We'll be sending more of our people to this course."

If there's no person or company name attached to a quote, it's probably because it was made up by the copywriter. Even if the quote is from a vice president of a Fortune 500 company, are you sure she had the same instructor you're going to have?

Some companies put a large picture of the course author or instructor in the brochure with a glowing description of his or her impressive teaching and credentials. Then the small print will say, "This course is taught by Dr. So-and-So, or one of our other fine instructors." One of our other fine instructors? In other words, you have no idea who is going to teach the course, and depending upon how far ahead it is scheduled, the training company may not know either.

PHOTOGRAPH BY STAN FELLERMAN



# Finding people who can—and will—handle both data processing and training well is the toughest problem facing companies.

## KNOW YOUR TEACHER

Never register for a course until you know who the instructor is and have obtained at least three references for three different courses he has taught. Not just any three courses, but three sessions of the course you plan to attend. If the training company declares that even though this is the first time he's taught this course he's still a seasoned instructor who often teaches for them, tell them you'll pass. An instructor who does an outstanding job teaching a programming course may be over his head in a networking course. An instructor who teaches computer center management may be bored (and boring) teaching a structured testing class. Unless you can get three references for the same instructor for the same course, don't sign up. Don't be a guinea pig for a trainee instructor.

In getting the references, be sure to ask for people who are at or near your professional level. A junior programmer who takes an advanced project estimating class won't be able to give you an accurate evaluation of what the course can do for you. Decide in advance what you want from the course, then specifically ask the references if they believe the course can accomplish those goals for you.

People sign up for public seminars with a variety of expectations and for a variety of reasons, many of which have little to do with education. Everybody likes to get out of the office now and then; everybody enjoys going off to exotic cities; and everybody likes the prestige of being sent to an expensive training program.

Even if your objective is education, public courses are limited as to how much they can provide. The most you can realistically expect from a public course is the opportunity to refresh your skills, pick up a new idea or two, gather information on a new topic, or just have the chance to meet with other professionals in your field. Most trainers feel that if they can get one or two points across that will help you do your job better, they have succeeded. If you attend a public course expecting to become an expert in the subject or if you send an employee and expect his behavior to change in three or four days, you'll be disappointed. Don't send an argumentative employee to a user relations course hoping he'll act friendlier towards the marketing department when he gets back. He won't. The best you can hope for is a better understanding of the seminar's topic, not an improved job performance. Most people leave a seminar enthused, ready to do it all differently when they get back to the office. But, when they return, habit and peer pressure usually force them right back into the same old groove.

Given that public seminars are not an in-depth or particularly productive training experience, you want to keep costs as low as possible. The most obvious place to cut back is travel and lodging. Jim's little foray to San Francisco was two thirds expenses and only one third registration fee. Had Jim attended a course in his home town, the company could have saved almost \$1,200 and sent another two employees to the same course. You don't have to fly across the country to get good training; many firms offer courses in or near your home city.

Scan the list at the end of this article for organizations located in your geographical area. Call or write them and ask for a schedule of courses held near you. Ask to be put on their mailing list. If you're in Little Rock and you get a brochure for a course in Seattle, find out if the course will be held closer to you during the next year. There is no need to go to a seminar in February if waiting until October will save you \$1,000.

Colleges and universities are a good source of dp seminars, but it wasn't possible to include all, or even many, of them in our list. You or one of your subordinates should call schools within a two-hour radius of the office and find out what courses they offer. To avoid confusion with regular college classes, ask for information about professional development seminars and contact their continuing education department, computer science department, and their school of business. In large schools, all three departments may offer seminars without really knowing what the other departments are doing.

## PAY ONLY FOR GOOD COURSES

The next best way to save money on public courses is to pay only for those that live up to expectations. If the course isn't right for you once you get there, if it's too advanced or too elementary, if the material or the instructor isn't any good, leave as soon as possible and get your money back. On a two-day course you should leave by lunch the first day if you expect a refund. On three- to five-day courses, you can probably stay through the first day. When you leave be sure to notify the instructor that you are dropping out. Ask him to note on his attendance sheet when you left and why, and stay long enough to watch him make this notation. Then contact the training firm as soon as you can and tell them exactly when and why you dropped out, ask for a refund, and confirm your request in writing. If you haven't paid for the seminar yet, so much the better. Just ask them to cancel your invoice.

Never pay for a course beforehand if you don't have to. Most firms don't require payment in advance; a purchase order or purchase order number is usually sufficient for

registration. It's much easier not to pay an invoice than to try to get your money back. If you have to pay in advance, tell the training company you will bring the check with you. If the course is good, give the instructor the check. If it isn't, take your check and go home.

Don't let the training firm talk you into transferring your registration to another course instead of receiving a refund. If you did your homework, checked the references on the course and the instructor, and the course was still no good, you should stop doing business with that company. There are too many other training organizations out there to give any of them a second chance.

Another advantage to local courses is that dropping out of a bad course is easier. In Jim's case, he knew by the end of the first day that the course wasn't for him. Had it been in his home town, he would never have attended the second day, let alone the third or fourth. But he was in San Francisco and wasn't about to come home. Besides giving up that great trip, how would he explain to his boss that he wasted \$700 in expenses to find out he signed up for the wrong course? If you do drop out, you will probably get your registration fee back, but you will never see your expense money again.

Be aware of the company's cancellation policy. Almost all training organizations have a deadline for cancellations, beyond which only part or maybe none of your registration fee will be refunded. When you find out what the cutoff date is, circle it in red on your calendar. If you don't cancel in time, the training firm may let you change your registration to another course at another time or even let you substitute another member of your company, but they won't relieve you of paying the cancellation or registration fee.

When you register, watch out for the favorite sales ploy of training organizations—the "team" discount; enroll three people and a fourth goes free (or enroll three or more people and take a 10% discount). That sort of thing. Don't let these sales games influence your purchasing decision. Dragging another person along to get the discount saves you a few hundred dollars but may cost you much more in expenses and lost working time. If you have enough people to get the discount, fine. If you don't, forget it.

But if you have more people attending than the discount structure specifies, you might be able to use the team discount to your advantage. If you can get a 10% discount for three people, you might get a 15% discount for five people. If you have a larger group, hold out for a larger discount. If the registrar won't budge, go over her head. Smaller training firms are especially interested in your business and will work with you on fees.

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## INFORMATION SERVICES

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## Like public courses, in-house seminars have many hidden costs.

Keep track of the courses you and your staff members attend. Don't use the trial-and-error method of finding good courses. Some department managers like to have each of their people attend a different course from a different company, a sort of informal market survey. Unless you are in the market research business, this is a waste of time and money. If you find a good course, enroll others in it the next time around. Sending additional people to the same course provides a continuity of training when you can't afford an in-house course or don't have enough people for one.

Set up a simple tracking and rating system to steer clear of bad courses and toward good ones. Assign someone who is in the invoice payment or course registration pathway to manage the system, someone like a bookkeeper or secretary who is aggressive enough to prod staff members and get the necessary information. A card file works well. Group the courses by topic, because topics are easily remembered long after the training organization and course title are forgotten. List the name of the firm, address, phone number, name of instructor, dates, location, and cost. Include the names of the people who attended, and get them to rate the course as 1) would recommend, 2) would not recommend, or 3) would recommend with reservations (and list those). Then briefly state for whom the course is best suited and what can be accomplished by taking it. You might want to cross-reference by company so you can track good companies and poor ones. Training firms are like any other supplier: if you find a good one, stay with it. Work with the company and develop a relationship. If they don't offer all the courses you need, ask them for recommendations. A quality organization will know of other quality firms.

### USING IN-HOUSE SEMINARS

You are entitled to have higher expectations of in-house courses than of public seminars. A course that is held exclusively for your department or company can make major changes in the way your staff functions if you set specific goals and have the material tailored to meet those goals. Your staff members can help each other use the new techniques after the seminar is over and reinforce the learning process for each other.

To make an in-house class worthwhile, you must have the interest and cooperation of those who attend it. Staff members who refuse to take it seriously or, worse, think it's an affront to their intelligence and ability can totally undermine the usefulness of a course. These people will argue with everything the instructor says and will frequently and loudly point out that they are already doing what the instructor is teaching, or the material at hand doesn't apply to their situation. They'll wander in and out of class and leave instructions with their assistants that they can be interrupted for any reason.

Most instructors, even good ones, find this hard to deal with. Do they tell the offender to sit down and shut up or to leave? Do they risk offending a paying customer? It's up to you to prevent these problems from happening. Don't coerce someone into attending your seminar. It's an invitation to disruption. If the person truly believes he doesn't need the course, he won't learn anything if you force-feed education to him. If someone is backlogged with work, your four-day workshop may force him into working nights or weekends or missing deadlines, and he won't happily attend the course.

Once the class starts, post a sign on the outside of the door that says "Class in

session—do not disturb. Please tape any messages to the door; they will be handled at the next break." Pass the word to other staff members that you expect them not to interrupt the seminar, and that their problems must wait until the class breaks for coffee, lunch, or the end of the day.

Location has a big effect on the level of interruptions. Whenever possible, hold the course at a nearby hotel, where phone calls from the office won't disrupt the class. A hotel meeting room and coffee and Danish will cost you less than 10% of what you're paying for the seminar and will be well worth the investment.

Like public courses, in-house seminars have many hidden costs. Not only do you have the costs of what attendees could be doing if they were back at the office, but with a major portion of the department gone, those left behind may not function efficiently. Ask yourself before scheduling an in-house course: "Is this worth bringing my department to a halt for three or four days?"

Quotes from training companies can be deceptively low as well. For example, "This course is only \$4,500, plus expenses. If you have 25 people in the course, that's only \$185 per person—far less than the \$695 registration fee you'd spend if you sent them to a public course. And materials are only \$20 per student."

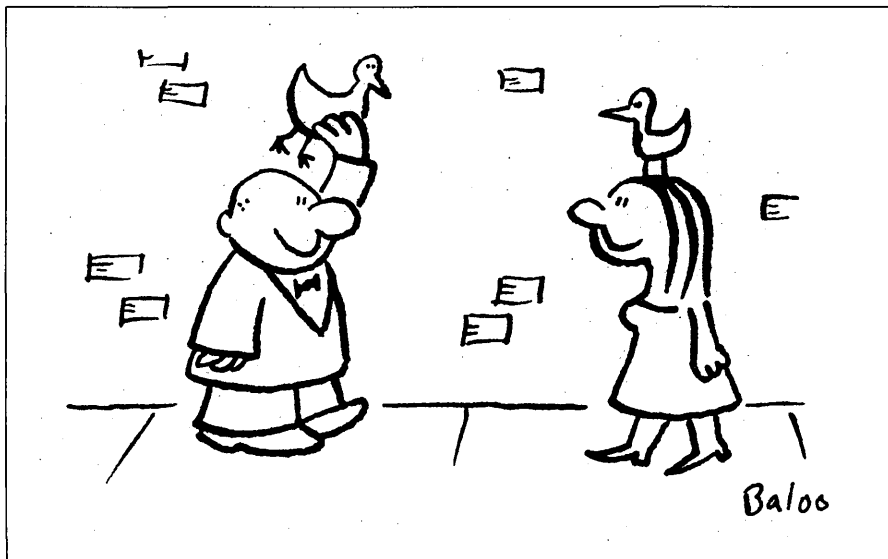
So what is it really going to cost you? There's \$4,500 in seminar fees, \$500 for materials, \$524 for the instructor's airfare, \$120 for his meals, \$24 in taxis to get him to and from the airport, \$32 in taxis to get him to and from his hotel to your building, and \$325 in lodging costs for him—a grand total of \$6,025. "Plus expenses" and materials adds another 34% to the seminar's price tag.

But you can drastically reduce these costs because all in-house quotes are negotiable. Do all of the following:

Bargain on the cost of the seminar itself. Tell the company their prices are too high and see if they'll come down.

Ask them to throw in course materials at no charge. If they won't, ask to make your own copies of the seminar materials. Most seminar workbooks cost less than \$5 to print, but you get charged \$20 or more for each of them. Offer to send the training firm a letter guaranteeing that you will make only enough copies for the students in the course and that you will honor all their copyrights.

Request that your seminar be coordinated with another one in your geographical area (you'll need to be flexible on dates) so you can split the instructor's airfare. It's not uncommon for training firms to schedule courses back-to-back in the same area and charge both clients full airfare to increase the profit margin.



# SHARP COMPUTER

## SHARP'S NEW LINE OF PERSONAL COMPUTERS

Sharp's new line of personal computers is designed to give you the most powerful, reliable, and easy-to-use computer system available. The new line includes the Sharp PC-1500, PC-1600, and PC-1700. Each model offers a wide range of features and options to meet your needs.

The Sharp PC-1500 is a powerful personal computer with a built-in monitor and keyboard. It features a high-resolution display and a fast processor. The PC-1600 and PC-1700 offer even more power and flexibility.

Each Sharp personal computer is designed to be easy to use and easy to expand. You can add a printer, a mouse, or other peripherals to your system.

Sharp's personal computers are available in a variety of configurations and options. Contact your local Sharp dealer for more information.

For more information on Sharp's personal computers, call 1-800-541-5500 or write to Sharp Electronics Corp., P.O. Box 204, Wayne, NJ 07470. Sharp's personal computers are the most powerful, reliable, and easy-to-use computer systems available.

## AVAILABLE OPTIONS

- 15" MONITOR
- 16" MONITOR
- 17" MONITOR
- 24" MONITOR
- 32" MONITOR
- 48" MONITOR
- 64" MONITOR
- 96" MONITOR
- 128" MONITOR
- 192" MONITOR
- 256" MONITOR
- 384" MONITOR
- 512" MONITOR
- 768" MONITOR
- 1024" MONITOR
- 1536" MONITOR
- 2048" MONITOR
- 3072" MONITOR
- 4096" MONITOR
- 6144" MONITOR
- 8192" MONITOR
- 12288" MONITOR
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## Many training firms will provide a limited amount of free customization. Ask for it.

If you hold your class at a hotel, make sure the instructor stays at the same place. Make the hotel reservation for him and get your corporate discount, or ask the hotel sales manager if he will give you the room at no charge.

If the class is at your office, have one of your employees pick the instructor up on his way to work and drop him off on the way home.

Whenever possible, use a local instructor or one who lives within driving distance. If you must fly an instructor in, remember that flights from Chicago to Cleveland are much cheaper than those from San Diego to Cleveland.

Absolutely refuse to pay travel time unless you are demanding a top-notch instructor from a distant location. Seminar fees already include padding for travel time.

Don't pay for the instructor to take taxis to and from your city's finest restaurants; he can eat in the hotel he's staying at. Offering to pay per diem is usually less expensive than giving the instructor free rein in a restaurant. But don't pay full per diem if you are providing lunch with your seminar.

### GET ITEM COSTS IN WRITING

Above all, get your quote in writing for every item. Make sure you've specified the instructor and have agreed in advance on cancellation penalties. If you're not satisfied with the quote

when you get it, rewrite it and send it back for approval.

Never pay the in-house fee up front or even at the end of the seminar. Agree to pay the fee within 30 days, but don't pay until you know you've gotten your money's worth.

You can also save money by holding your seminar during the training industry's slow seasons. During the spring and fall, business is plentiful and the best instructors are booked up. If you schedule during the slow periods, you can bargain more on price and get your pick of instructors. Try to schedule your course anytime during the summer, from late December to early January, or any week that contains a major holiday like Thanksgiving, July 4th, Labor Day, and Memorial Day.

Negotiate. Be hard-nosed. When you bring the training firm around to where they are considering not doing the course for you, you've reached the right price.

One item that you should pay for, though, is course customization. All training firms will tailor your in-house course to fit your firm's needs. Don't spend \$6,000 on a course without spending a few hundred dollars on course customization. You'll get much more value for your time and money.

Many training firms will provide a limited amount of free customization. Ask for it. If your situation is unique or complicated, ask for more. The firm can tell you how long it will take to modify the course and give

you an estimate of cost. Don't pay more than a fourth or a third of the daily instruction rate for a day's worth of customizing. In other words, if the course fee is \$1,500 per day, \$500 per day is plenty for the instructor to sit in his office and rewrite the course.

Even if you don't feel the need for course customization, have a good long telephone conversation with the instructor to outline your needs, what you expect your people to get out of the seminar, what type of people will be attending, etc. Do this at least a week before the seminar takes place. To have the instructor come in an hour or two early on the first day doesn't give him enough time to digest this information and adjust his presentation accordingly. Ask for a copy of the course materials at least a month in advance, and thoroughly review them and discuss each section with the instructor. Tell him how the material pertains to your department's needs and what problems you hope to solve.

Like anything else, you get out of training what you put into it. Spend the time to do research and planning, and you'll spend less money for better-quality training. \*

Janet Dight is the owner of Venture Marketing, Colorado Springs, Colo., a marketing and advertising consulting firm specializing in new products and new businesses. She is a former author of those slick, glossy sales brochures.

### DP TRAINING ORGANIZATIONS

The following is not a complete list, but it is extensive enough to help you get started on your training search. Those companies with an asterisk only offer courses on microcomputers or CAI (computer aided instruction).

#### Advanced Systems Inc.

2340 South Arlington Heights Road  
Arlington Heights, IL 60005  
(800) 323-0377, (312) 981-4260  
Dp courses: 112  
In-house only: Ree Rost

#### Amdahl National Education Center

1250 East Arques Avenue, M/S 302  
Sunnyvale, CA 94086  
(800) 538-8460  
(408) 746-6393  
Dp courses: 40

Public & in-house:  
Education Products Department

#### American Institute for Professional Education

Carnegie Building

100 Kings Road  
Madison, NJ 07940  
Dp courses: 21  
Public: (201) 377-7400  
In-house: Anne Hartman,  
Carnegie Press, (201) 822-0262

#### American Management Associations

135 West 50th Street  
New York, NY 10020  
Dp courses: 34  
Public: (518) 891-0065  
In-house: Gladys Spivack,  
(212) 903-8258

#### Architecture Technology Corp.

P.O. Box 24344  
Minneapolis, MN 55424  
(612) 935-2035  
Dp courses: 5  
Public & in-house

#### \* Association for Educational Data Systems

1201 16th Street, NW  
Washington, DC 20036  
(202) 822-7845  
Dp courses: 10

Public & in-houses:  
Shirley Easterwood

#### Association for Systems Management

24587 Bagley Road  
Cleveland, OH 44138  
(216) 243-6900  
Dp courses: 8  
Public: Education Department  
In-house: Thomas Bisacchino

#### ATP Advanced Training Professionals Ltd. Inc.

111 East Avenue  
Norwalk, CT 06851  
(203) 866-6060 or (203) 866-3520  
Dp courses: 60  
Public & in-house:  
Gary Rothstein

#### Battelle Memorial Institute

Seminars and Studies Program  
4000 Northeast 41st Street  
P.O. Box C-5395  
Seattle, WA 98105  
(800) 426-6762  
(206) 527-0542  
Public & in-house

What vital human  
resource can the Republic  
of Ireland offer you? The  
service companies

The right people

Dynamic young people. Educated within a system of universities and technical colleges which inculcate the skills so vital to computer software development.

Young people capable of incisive, innovative thought and pioneering concepts. They are a natural resource that the Republic of Ireland has in abundance.

Ireland has managed to avoid the attendant disadvantages of industrialisation. It still offers a very special environment: clean air, open spaces, magnificent scenery and the possibility of a lifestyle which is calm and unhurried – yet stimulating.

Meanwhile, you benefit from 100% training grants to new companies, generous employment grants, and the lowest corporate tax structure in Europe.

If people are a key factor in your business the people to talk to are IDA Ireland. Call us or contact us at any of the offices listed.

**REPUBLIC OF IRELAND**  
**The new high-tech centre of Europe.**

**IDA Ireland** 

INDUSTRIAL DEVELOPMENT AUTHORITY

**New York** Tel. (212) 972 1000

**Chicago** Tel. (312) 644 7474

**Cleveland** Tel. (216) 861 0305/6

**Los Angeles** Tel. (213) 829 0081

**Menlo Park, Calif.** Tel. (415) 854 1800

**Houston** Tel. (713) 965 0292

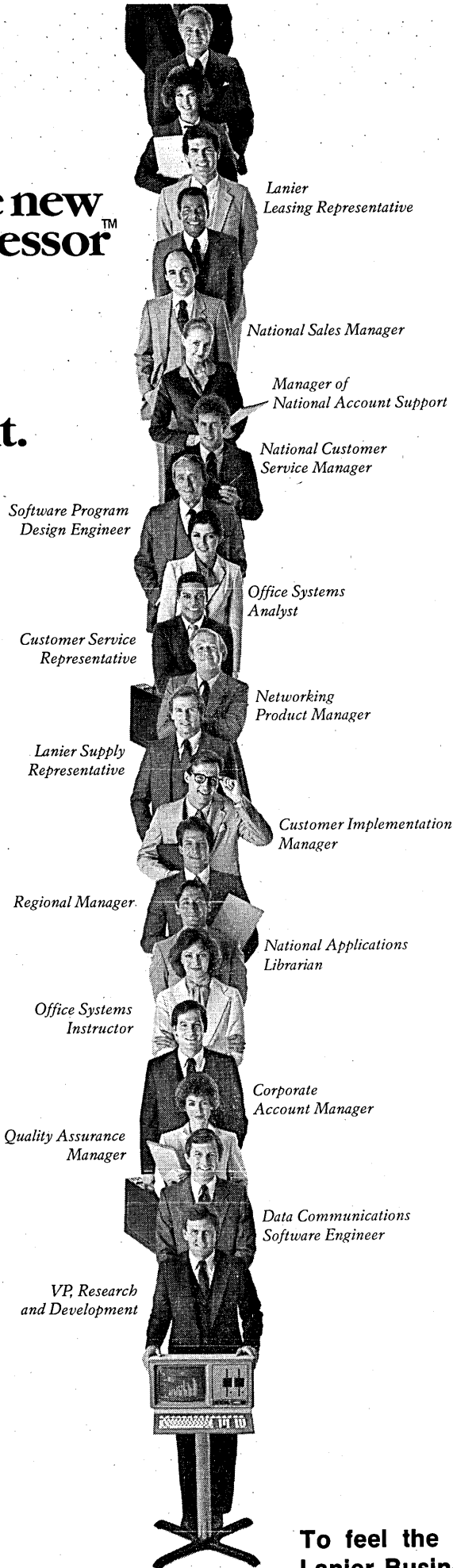
**Fort Lauderdale** Tel. (305) 785 9430

**Boston** Tel. (617) 367 8225

**Atlanta** Tel. (404) 351 8474

**You can choose the new  
Lanier Business Processor™  
because of what we  
put inside it.**

**Or because of  
what we put behind it.**



**To feel the full force of the  
Lanier Business Processor in  
a personal demo. Circle 101.**



It's the newest brainchild of the company that's been a driving force in office automation for over forty years. Built into it are decades of experience at helping businesses be more efficient, be more productive, and streamline, streamline, streamline.

So it's not too surprising that the Lanier Business Processor does virtually everything. It's a word processor that excels as a personal computer. A personal computer that outword processes even machines designed to do nothing else. A workstation that can be networked to other Lanier systems, or communicate via SNA through your host network. It's a modular business tool that you can add to, as your company's needs expand. You cannot outgrow it. It will never become obsolete.

You don't need an engineering degree to learn how to operate it, either. Thanks to Lanier's exclusive One Step™ system, it's incredibly easy to use. Within minutes you can take control. Your users waste less time becoming proficient. Non-typist executives, particularly, can use powerful spreadsheet tools or advanced word processing features in no time.

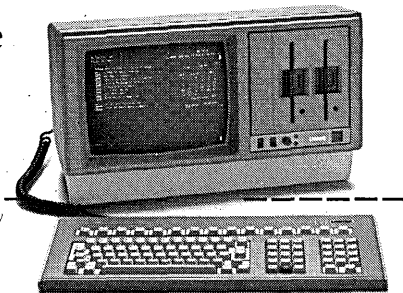
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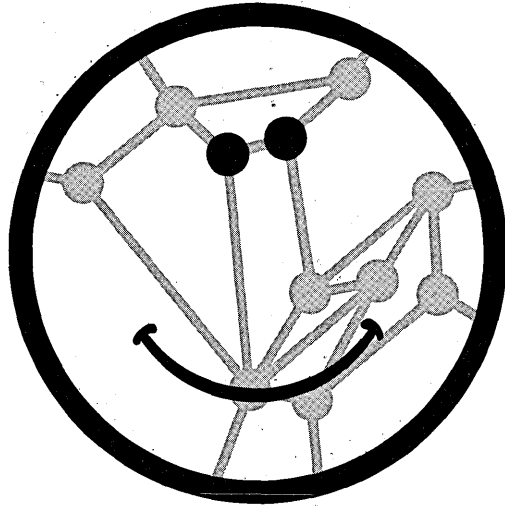
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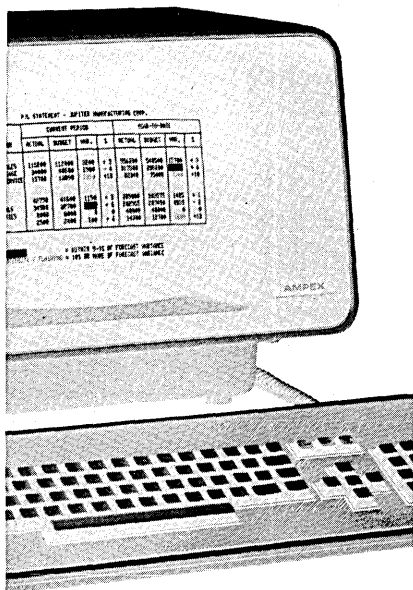
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CIRCLE 104 ON READERCARD

**Buick, IBM, and DEC are but a few of the many companies that have internal videotex systems.**

# TUNING IN TO VIDEOTEX

**by John Wolfe**

Department store managers in London, IBM clerks in Chicago, and Buick salesmen in Philadelphia are all part of the latest application of end-user computing. They are all using videotex systems for interactive communications between corporate headquarters and field offices, a more sophisticated networking scheme than the traditional approach of tying dumb terminals to a mainframe. After many years of consumer testing in the U.S. and full scale operation in Europe, videotex is finally becoming more popular as a way for firms to improve the productivity of sales and marketing personnel.

Videotex in its simplest form includes three components: a host computer housing a database; an interactive communications network for data transmission; and a user terminal, which can be a dedicated terminal or a personal computer equipped with a modem. Information is displayed via crt or home television set. A public videotex system designed for consumer use would include information retrieval, transactional services such as home shopping, banking, interactive games, electronic mail, even wagering. Private videotex services are not nearly as complex, since many of the entertainment aspects necessary for popular acceptance—such as games and news features—are not needed for business services.

In-house videotex systems are ideal for a number of management and corporate communications functions, including employee training, access to financial documents, electronic bulletin boards, and inter-office electronic mail. Also, videotex is a user-friendly medium. Several companies are experimenting with on-line retrieval services for direct communication between customers and corporate databases, providing instant data and order processing and also reducing possible misunderstandings due to inaccurate or untimely information.

Private videotex may also figure in the much-ballyhooed trend towards the "office at home." In this scenario, the busy executive does all business and office communication in his home via computer, with the

in-house videotex network providing access to corporate computer files, electronic mail, and perhaps an on-line link to clients. A home banking package would also offer financial transactions such as bill paying, as well as updating corporate accounts. Online teleconferencing could be used for staff meetings and strategy sessions. Futurists envision such services will save companies and employees time and money. Conclaves at the office coffeepot may become a thing of the past.

And yet, with all the advantages of videotex, only a few companies are experimenting with in-house systems in the United States. The same is not true in Europe, however, especially in the United Kingdom, where private and public videotex has been going full speed ahead for several years. The British public videotex service, Prestel, has more than 28,000 paying subscribers. In addition, several private videotex systems have emerged as "closed-user groups," linked via Prestel to databases controlled by an information provider.

Such systems, of course, have additional safeguards to prohibit outsiders from peeking into—or worse, manipulating—the data. Debenhams Group, a department store chain, has established a system that lets its store managers check inventory and seek other management messages from their home Prestel terminal at night or before they go to work. Viewdata Recall Systems Ltd. developed Visi-ValuCar, a private service that provides information about used car prices via Prestel. Dealers can access car information and also enter data into the system. And Prestel Datafreight, a joint venture between Prestel and British Road Services trucking company, provides information on semi-full loads delivered and on trucks returning with empty loads following delivery. Truckers contact each other to combine half-full loads or to arrange for return loads.

Private videotex in England is also faring well. Barclays Bank, London, has installed a videotex training system, which instructs employees on teller operating procedures, insurance sales, and security. The Barclays system, which includes three Rediffu-

sion Telecentre computers and 110 user terminals, cost the bank £250,000, or about \$375,000. Thomson Holidays, a large travel agency, uses a videotex system to schedule hotel reservations and travel packages. To underscore the potential for private videotex systems, Link Resources Corp. estimates that the market for private videotex in the United Kingdom may reach 1,860 systems by 1985.

Most of the early private videotex momentum in the U.S. will likely come from industries particularly well suited for in-house applications. These industries include banks, travel agencies, securities dealers, automobile manufacturers, and retailers. Obviously, private services need not be confined to terminals at corporate headquarters, but can be placed with dealers, agents, and clients as well.

## **FIRST PRIVATE SYSTEMS**

Not surprisingly, major computer companies such as IBM, Digital Equipment Corp., and Hewlett-Packard are also among the first to actually implement private videotex systems. DEC uses two systems, one private network including high-resolution graphics for colorful displays, the other encompassing primarily textual information for in-house communications. Both systems run on a VAX-11/780, but since each uses a different graphic protocol, separate terminals are required.

Digital's graphics system uses the Infomart Telidon System Software, a package developed by Infomart, Toronto, Canada. ITSS is based on North American Presentation Level Protocol Syntax, the high-resolution graphics standard endorsed by most developers of public videotex systems. That system is particularly useful for Digital's marketing group, which has been using the private videotex system for marketing communications, sales meetings, and trade shows. At a recent Boston meeting, the marketing group used its service to display a calendar of events, a colorful map of Boston-area restaurants and information on Digital products. End users entered the system through Digital's Professional 350 personal computer.

The other in-house network, using the

## IBM has 450 videotex users in 32 states, supporting sales of software, consumables, and other products.

IVS-3 software from the U.K.-based Aregon, found a home in the past year at Digital's Publications and Circulation Services group. DEC's VT-100 terminals are installed at more than 200 remote locations and are used mostly for employees to order supplies and retrieve information. Previously, a company employee who needed equipment or supplies faced the laborious and often time-consuming task of searching through printed catalogs for necessary products, completing an order form, and submitting it to order processing personnel who then reprocessed the order into Digital computers. With the videotex system, the same employee can call the system, access a menu of catalogs, browse for merchandise, and order through the system.

"We've saved over 500 hours of programming time since we started using the system," says Bill Carlisle, manager of publishing services. As a result, Digital plans to reduce its order processing staff for that group to four full-time employees from 14. As Carlisle points out, the in-house system also liberates personnel from basic programming chores, allowing them to chart a path upward in the organization.

Digital has ambitious plans to expand the Aregon system over the next few months. Various databases are to be geared to different segments of the corporation. A database for secretaries would include an electronic phone book of employees, a calendar, style manuals, and planning information such as shuttle van schedules. The in-house network might also evolve into what Carlisle terms a "semiprivate" system, which would give Digital customers access to company infor-

mation, publications, and perhaps facilitate customer orders as well.

IBM has developed its own videotex system, which it has been using in-house for nearly two years. The Series/1 Videotex System, which runs on a Series/1, is accessed via the IBM Personal Computer. It extends to 32 states and has nearly 450 users, most of them involved in product sales. The SVS/1 network incorporates both NAPLPS graphics and the less complex Prestel images. With proper interface software, the system can display both formats on the same screen simultaneously.

IBM is selling its system as it would any other data processing product; therefore, the in-house network serves as a testing ground. But the company also hopes to use SVS/1 to generate increased productivity from its sales staff. Many of the terminals are located in IBM Product Centers. It is unlikely that IBM will offer the service to other computer retailers who sell IBM equipment, since these computer stores often offer merchandise for considerably less than the IBM Product Centers. The videotex network enables the IBM-owned outlets to provide a "value-added service," according to Peter Grimm, program manager, Videotex Market Development. Store managers can use the service to request technical information, order merchandise, or review inventory.

The SVS/1 database includes IBM's software catalog and supply information, internal data like facts on employee life insurance policies, division bulletin boards, corporate news, a worldwide personnel directory, and electronic mail. The network also features access to Dow Jones News/Retrieval

and the Official Airline Guides Electronic Edition, two on-line services that offer specialized information. Grimm refers to these databases as "portals" rather than gateways, since the IBM system can redistribute the ASCII-based text into videotex format for display on the personal computers. Thus far, the financial information from Dow Jones and the electronic messaging have been the two most popular features, according to Grimm.

SVS/1 also has a videotex teleconferencing capability that allows multiple terminals to display the same frame (page) simultaneously at the direction of the conference controller. Voice communication is handled over separate telephone conference call hookup. The system has a maximum capacity of 350,000 frames of information, and will support concurrent usage of up to 32 terminals. IBM claims that nearly 30 companies are slated to begin SVS/1 in-house service within the coming year.

### VIDEOTEX FOR CAR DEALERS

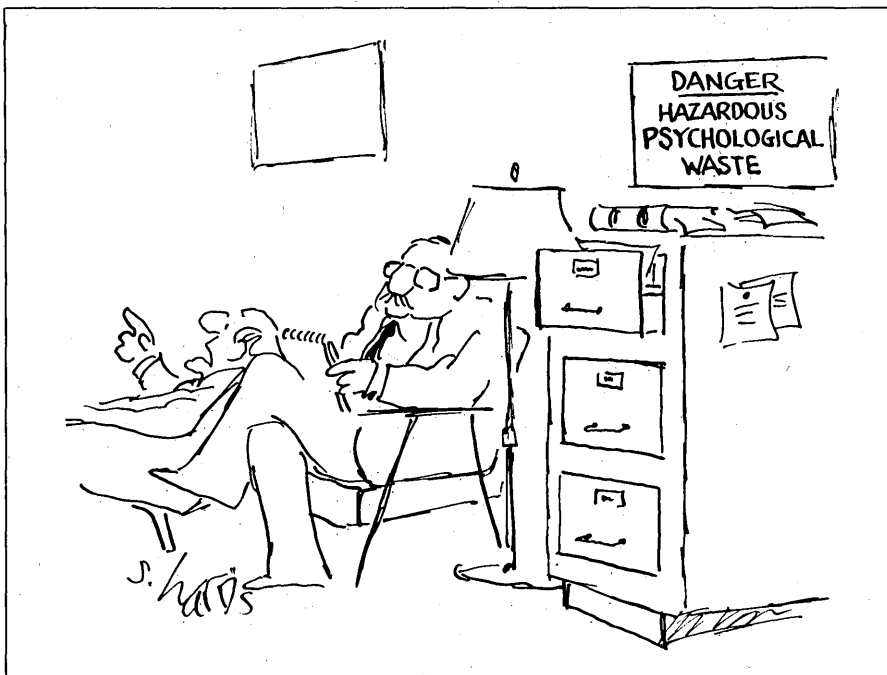
A novel combination of private and semiprivate videotex systems is the Buick Motor Division of General Motors pilot project in six dealerships nationwide. Each dealership has one terminal, which serves as a market station for Buick products. Customers and dealers both use the system to obtain information about Buick cars, including price comparison with other models, product specifications, and service data. A separate mode allows Buick dealers to obtain confidential information and communicate with Buick headquarters in Flint, Mich.

The Buick system is roughly analogous to the system used by Digital, since they both use the ITSS package and run on a DEC VAX-11/780. Buick dealers in Philadelphia, Chicago, Southfield (Mich.), Madison (Wis.), Houston, and Santa Clara used Norpak terminals, which transmit information and graphics at 1200 baud. Buick also had six Microtel terminals, which run at 4800 baud, at its Flint headquarters. The company used the system at the New York, Detroit, and Chicago automobile shows this year, again using the Microtel terminals.

The system was a "major success," averaging 1,800 accesses per terminal per day, according to Rich Little, Buick's administrator of systems development. "Anybody could come up to a terminal, push a button, and receive the information he needed."

Buick has ambitious plans to expand the service's capabilities. "We learned two things from the dealer pilot," says Little. "First, the graphics at 1200 baud were not fast enough for everyday use. Second, the dealers became interested in other applications, such as computing, which were not a

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## The ultimate do-it-yourselfer: Jim Clyde built a real estate listings videotex system from scratch.

part of the initial service." Therefore, Buick's new service will include a faster graphics transmission rate and a wider variety of videotex applications, still using the Informart system. "We plan for videotex to be an electronic encyclopedia of Buick products and competition," says Little, who termed videotex a "useful sales tool."

Finally, consider the case of James Clyde, a real-estate broker working the affluent counties around New York City. Clyde was spending several hours per week updating real estate filings cards; moreover, the cost of distributing the cards to other brokers for multiple listings was nearly \$50 a card. The situation reached the point where Clyde was unable to devote the necessary time to his files and was paying \$100 a week for someone to update the listings. Fed up with the costly, time-consuming process, he developed the Real Estate Information Network (REIN), which now has several dozen users in Rockland, Bergen, Orange, and Putnam counties, as well as on Long Island. "People don't realize that real estate has one of the highest expense-to-income ratios," says Clyde, who developed the service to reduce the ratio.

REIN includes property information such as multiple listings; floor plans; square footage of buildings or property lots; assessment evaluations; and deed transcripts, including the buyer, seller, costs, mortgage lending institution, and applicable taxes. The service also includes financial information such as current lending rates for various financial institutions.

Clyde's network has been well received among the real estate community—so much so that he plans to begin a nationwide service before the end of this year. Clyde has also established National Telecomputing, a company that will run other databases linked to REIN. Although it is essentially a private service, realtors will pay to use the system: costs include a \$100 one-time fee and a usage rate of \$75 per month.

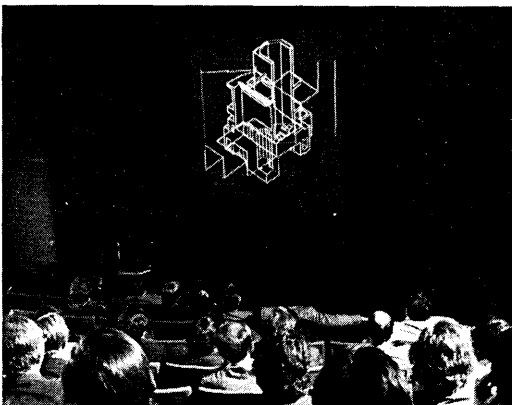
The national system will use Radio Shack's videotex and office information system, which runs on TRS-80 model 16B microcomputers; a communications multiplexor for simultaneous access to the system via several incoming telephone lines; two modems; and VIS software. End users access the database via any TRS-80 computer equipped with a 300-baud modem. All told, the basic vis

internal system costs \$13,500, not including user terminals.

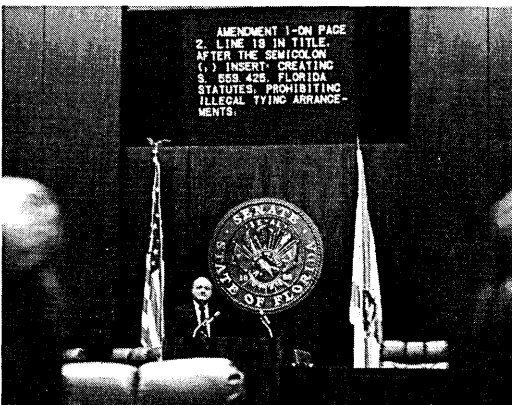
To help build his user base, Clyde plans to sell or lease the TRS-80 package. Also, participating realtors will provide data for multiple-listing files, using a 1200-baud modem to input information to REIN's host computer—creating a network of shared information, rather than one where users access data supplied via one information provider.

REIN is a good example of a private videotex system that can develop into a national information utility, albeit targeted to special interest segments of the public. For realtors, the money saved by using the network will more than pay for the cost of the equipment and service. And for Clyde, the potential for a profitable network is real. "There are more than one million real estate brokers in the United States," says Clyde. "With 20% to 30% of that market, we could make a heck of a lot of money." \*

John Wolfe is assistant editor of *International Videotex Teletext News* and *Teleservices Report*, Washington publications that chronicle the interactive telecommunications industries.



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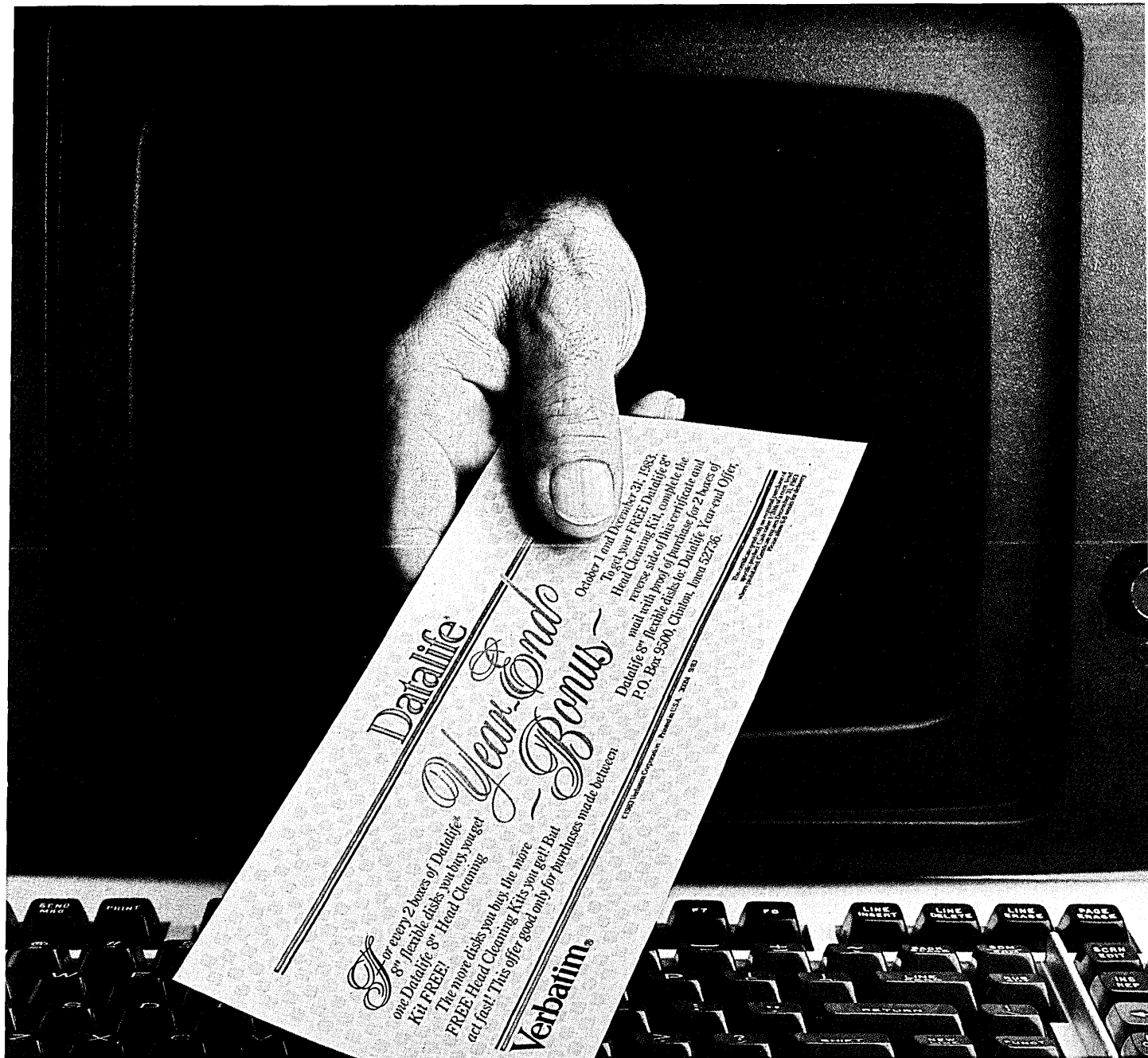
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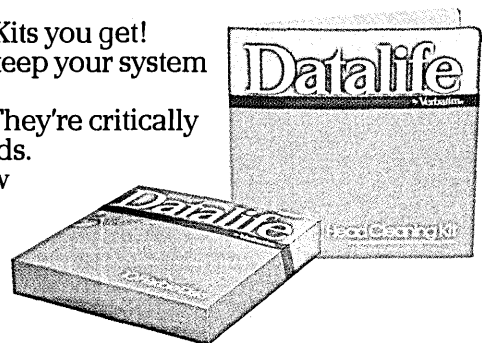
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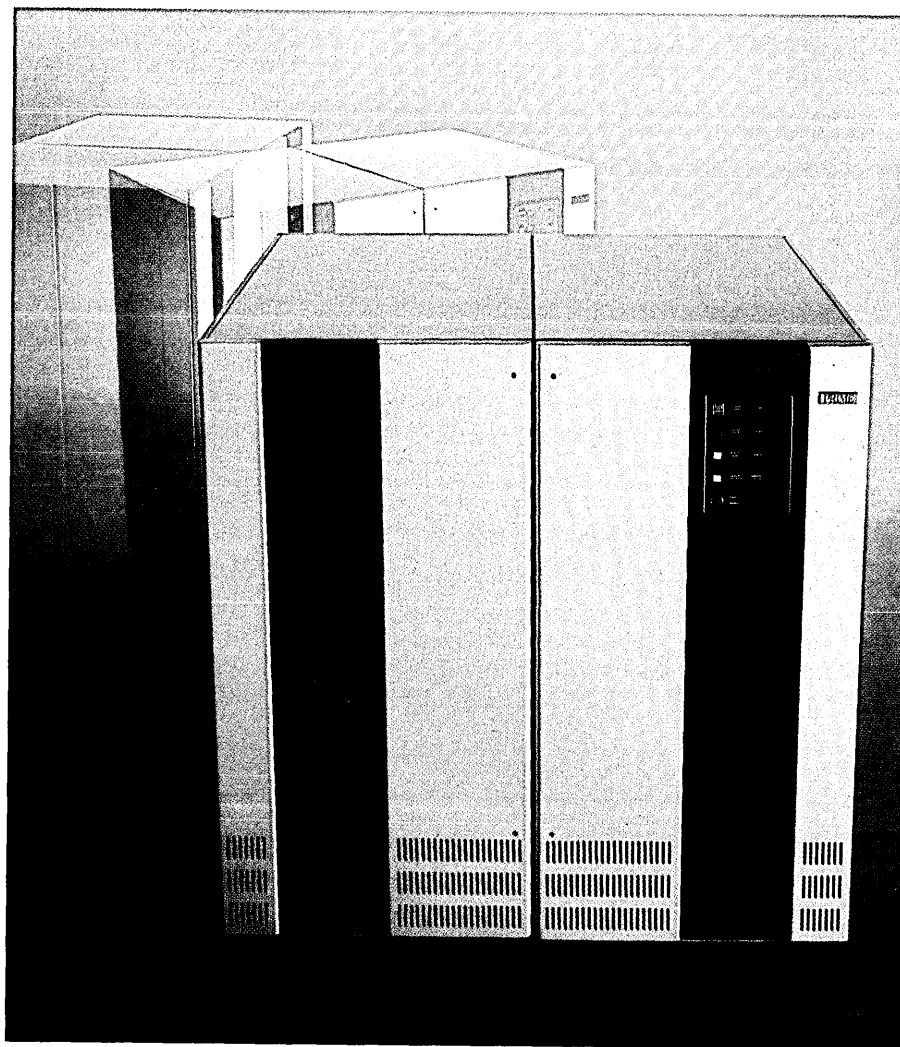
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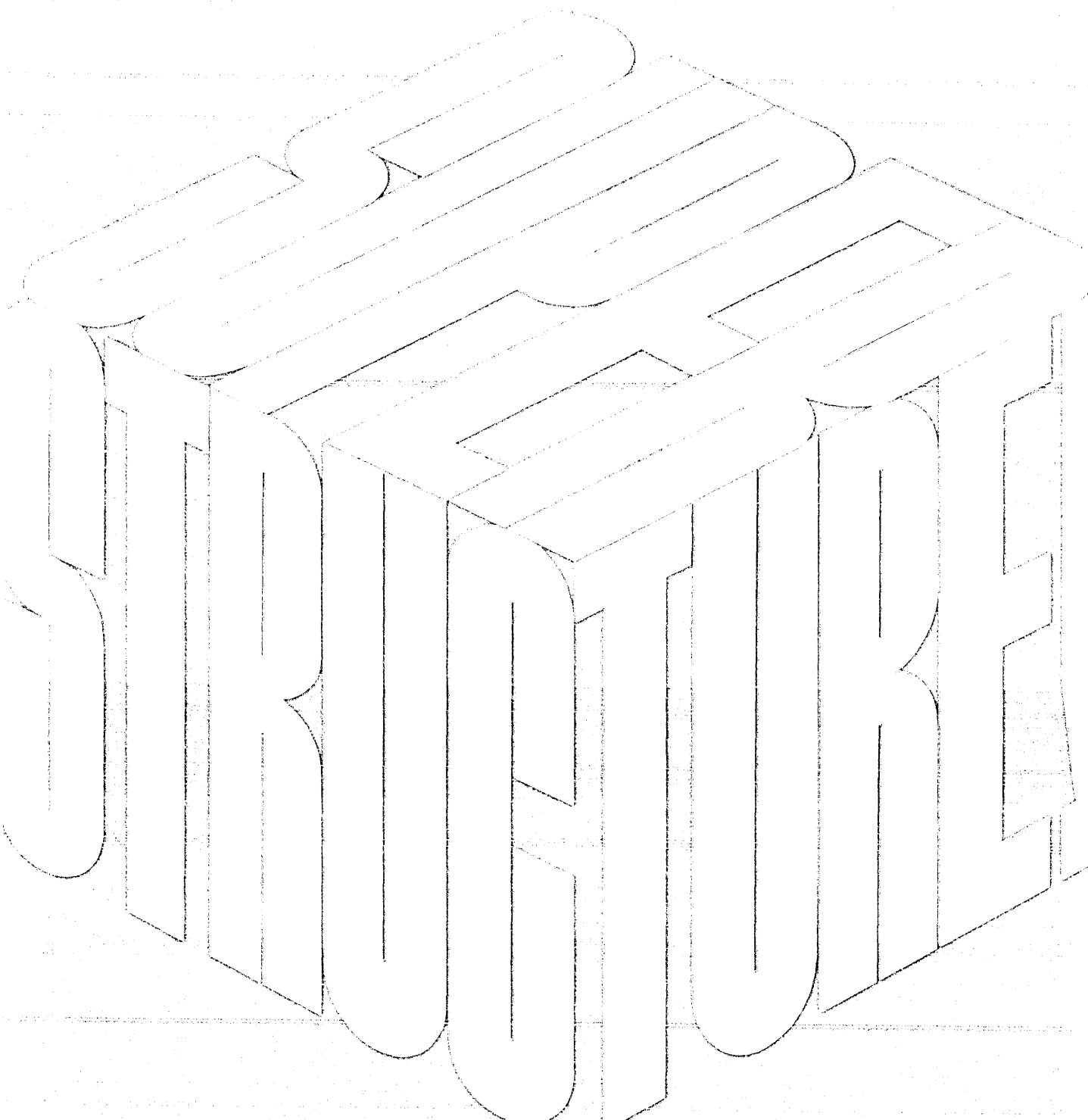
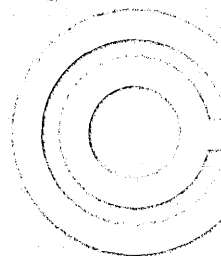
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Managers have lots of good reasons to keep doing things the way they've always done them.

# OFFICE AUTOMATION ALIBIS

by Louis Naugès

When people search long and hard for reasons not to do something, it's a fairly good indication that they ought to be doing it. This is certainly the case with office automation (or *bureautique*, as it's called in France). The tools are there, and their usefulness has been demonstrated, but thousands of otherwise efficient, progressive managers are avoiding them.

Over the past 10 years, in hundreds of seminars and consulting jobs on both sides of the Atlantic, I've heard managers explain why OA is inappropriate for their organizations. The reasons range from cultural to financial to technical. Specious or not, some have become quite popular. To wit:

*Automation is for blue collars, not white.*

Automation is associated with factories and blue collar work. Most people think that what was done in factories simply cannot be achieved in offices where the jobs are so different.

Since more than half the work force of industrialized countries now works in offices, handling information, it is obvious that the largest segment of the working population should get some help from technology.

*Offices are a world of no-measures.*

In the vast majority of offices—excluding entry level workers—what people really do is unknown. This is especially true of managers and professionals, although in the last five years some limited efforts have been made to get a better understanding of how managers spend their time. As long as examining what managers do in offices is considered improper, it will be difficult to explain that new ways of working can improve the situation.

*It's not for me, it's for the others.*

After a seminar on OA, many managers tell me, "You are right, OA is a very important problem, and it is essential for my secretary." A banker will add, "OA is mandatory in the insurance business, but really not crucial in my own job." The insurer will say, "OA is much more important for the survival of banks than for insurance firms." As long as this "it's for the others" syndrome

persists, managers and decision makers will be happy to stand still, waiting for their turns to come.

*Nobody else is doing it.*

There was also a time when nobody used telephones.

*We don't know who to put in charge of OA.*

OA = information = power. This

equation is often found in the minds of decision makers who don't know who should be trusted to introduce their OA tools. One of the easiest answers is to define management of OA. By cutting the problem into separate pieces, solutions are more likely to be found. For example, OA training can be managed by the training department, and OA budgets can be left in the hands of department heads. OA





tools are, by definition, under the full control of users; this is not always well received by management-heavy organizations, which, afraid of losing control, oppose OA. But they cannot prevent users from buying their own OA tools.

*Our managers will bicker over control.*

Most large organizations already have different managers in charge of information systems, computer centers, telephones, telecommunications, reprographics, word processing, record management, and internal or external mail. To whom should OA be given? How does one draw the lines between these technologies? Should an IRM (Information Resources Management) manager be selected? Which of the current managers is the best candidate for the IRM job? In many organizations, these power struggles will have a serious impact on the way OA is or is not implemented.

*Let's first define our OA plan.*

This seems reasonable: to avoid chaos, a very detailed OA plan should be prepared before starting any application. But too often, it takes such a long time to prepare the plan for presentation to management that it is obsolete when it is completed. This process can be summarized in a few words: "to stop OA, plan for it."

*We should first digest our dp systems.*

Computer systems and applications are very complex undertakings, often late or poorly received by end users. The development team may have a two- to three-year backlog of required modifications. In such a situation, OA demands may be forced to wait for better days, when the folks in dp have time to tackle such mundane applications as electronic mail.

*To succeed in OA, we ought to use our successful dp methodologies.*

Of course! Everyone knows that the methodology that helped design a payroll system for 12,563 employees, after only 26 months of delay, is ideally suited to install half a dozen PCs in the personnel department.

*It's not the right time.*

We're growing so fast we don't have the time to implement OA tools. We're in a recession; we have no money for office automation. We would really like to start, but we don't have the human resources or the technical expertise. Whatever the circumstances are, they will always be the wrong ones for organizations that don't want to start.

*Our people are not ready for OA.*

It's obvious that office workers can't use OA tools unless some preparation is provided by the organization. Acting otherwise would be equivalent to providing cars to peo-



ple who don't have a driver's license, telling them "move on," and not being upset by the chaos that follows.

*We have always worked this way.*

"The company has been very successful to date; why should we change our methods and oblige people to work differently?" Because in a business world that has already embraced high tech, those firms who are unwilling to use a minimum set of OA tools will become obsolete and disappear.

*Our managers will do the work of secretaries.*

If a manager is sitting at a terminal, drafting and editing her own report, some people will say the company is paying manager's fees for secretarial work. They forget that most of the time, typing is a job that consists of preparing, for the second time, a document which has already been created by a manager. Getting a manager on a terminal is simply a way to avoid doing the same job twice.

*Our people may use these tools for personal tasks.*

This is true. Any information tool provided by an organization will sometimes

be used for personal applications. Between 20% and 30% of the cost of telephones, copying machines, and office stationery goes to personal use. Microcomputers, word processors, and electronic mail will follow the same route. I would even say that a reasonable use of these new OA tools for personal applications is a good sign; it shows they are well accepted.

*Managers will waste their time with OA tools.*

"With the spreadsheet programs, managers will do too many simulations; with wp equipment, they will ask for too many revisions." Such an argument implies that the organization doubts the intelligence and maturity of its managers.

*Tools create needs.*

This is true, and the argument has been used for centuries about any new technology. It's clear that without cars, people would not commute as much, and that without telephones they would communicate less. But does it follow that these devices should have been avoided?

*What will our managers do with the time saved by using OA tools?*

This is a popular argument, with a

## Some people are afraid to look at the consequences of OA and prefer to play the ostrich.

stinging rebuttal: "If you feel this is a potential problem, the level of confidence you have in your managers is so poor that I suggest you fire them all. Start with yourself, because you are unable to build a decent management team." Do you have any confidence in the intelligence of the people working in your offices? If yes, then OA will be looked upon as a set of powerful tools to enhance your organization's most expensive resource—people. If the answer is no, then forget about OA, and good luck.

*The present economic situation is holding us back.*

If the economy is in a recession, investments will slow down, and OA investments are among the first to be axed. If the economy is rebounding, other urgencies will prevent organizations from focusing on OA opportunities.

The way you look at the economic situation is often biased by what you want to prove. For example, a recession could be viewed as an excellent opportunity to trim down the information costs in the organization. On the other hand, good economic forecasts will be a tremendous help for OA investments.

*OA will increase unemployment.*

Alfred Sauvy, a well-known economist, studied the impact of technology on employment during the last 100 years, and came up with gray answers. He found that the balance of jobs created and jobs lost was almost equal.

OA will have a serious impact on office jobs and their content; but to what extent? When? In which direction? I honestly have no answer to these questions.

*Let's wait for the educational system to prepare everybody.*

One of the top priorities of these educational institutions should be to provide all students with a "driver's license for modern information tools." Countries that do not quickly pursue these efforts will impose a severe burden on the shoulders of organizations that have to do the job themselves.

*The next generation of OA tools will be better.*

True! But the following year's OA tools will be even better and the ones available in three years better still. Sometimes, knowing too much can be a handicap. Given the fact that information technologies will improve their price/performance ratio every year for the next 10 years, should we wait forever?

All people who are responsible for buying OA equipment should have large signs on the wall of their offices, saying "Every piece of equipment I buy is obsolete." Luckily, today's OA technology is more than ade-

quate to equip everybody with a decent set of OA tools.

*We're waiting for the ideal tool.*

I need a terminal that displays text and images, has a 40-inch screen, color graphics, weighs two pounds, can access any network, and costs \$1,000. There is no such thing as an ideal product, and too many OA managers keep looking for one. The probability that one workstation will fit the needs of the general manager, his secretary, the financial manager, the researcher, and the traveling salesperson is easy to measure: zero.

*But what about compatibility?*

The information industry has seldom been very efficient in offering compatible products, networks, and media. The compatibility issue is one of the most complex ones in OA. Often, organizations or OA managers set the target too high, expecting all workstations to access all information servers on any network. Between 100% compatibility and 90% compatibility lies a world of difficulties; setting reasonable targets allows OA tools to be implemented easily while unreasonable ones make it impossible to start.

Nobody expects the tires of a Porsche to fit the wheels of a Jeep.

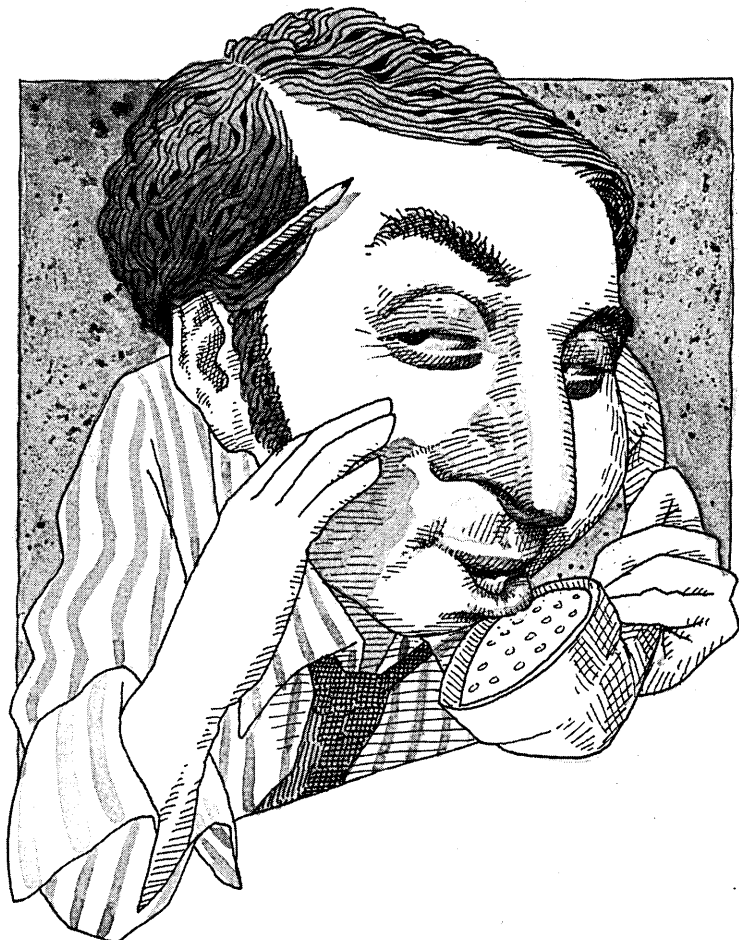
*Does OA really mean anything to us?*

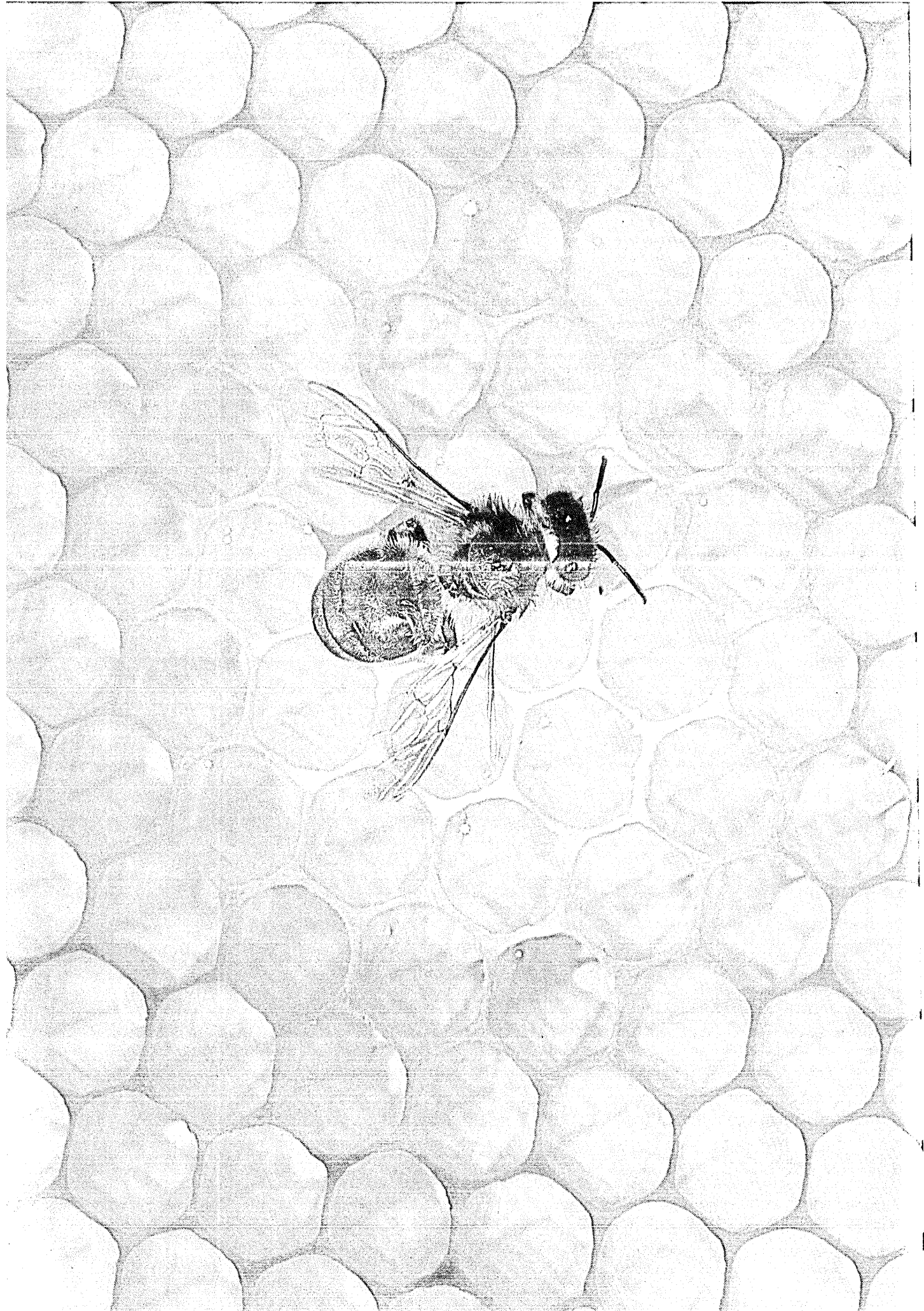
What is office automation? What are the real needs of managers? What are the important applications to offer? Very intelligent specialists, consultants, and professors try to define what a serious OA system should be. They may even complain that real life managers don't appreciate all the niceties of the proposed system. A good example is the electronic calendar. No serious OA specialist should ignore the potential benefits of this tool; the trouble is it's almost impossible to find one group of senior executives willing to use it!

On the other hand, one may wonder why none of the thousands of bright dp specialists were able, in 20 years, to come up with a tool like VisiCalc.

*OA is too expensive.*

This argument is by far the most widely used in management circles. I must confess it's hard to answer such a complaint; Too expensive compared to what? Is your car too expensive? If this is true, why didn't you





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CIRCLE 110 ON READER CARD

# Saying no to a user seeking OA tools is a crime against the organization's success.

buy a cheaper one?

What this objection usually implies is that the perceived value of an unclear phenomenon named office automation is less than the unknown benefits it could bring to an unmeasured problem called information costs.

*Tomorrow, OA will be less expensive.*

Yes, this is true, and will remain true for a minimum of 10 years. It's another facet of the technical argument that says tomorrow technology will be better. Managers will be watching new technology pass by while waiting for the next month's announcement of, say, a new diskette with the same capacity and a 25% price reduction. Playing this game will give managers the great satisfaction of saying "I never made a bad investment in information technology," for they have never made one at all!

*I don't know how to justify my OA investments.*

The magic word has just been written: cost justification. Investments in OA will have two main objectives: increasing the produc-

tivity of current information tasks, which is a cost reduction objective, and increasing the information processing potential of all information workers in the organization, which is an objective linked to effectiveness, not costs. Equipped with some information cost references, cost justification for OA tools becomes one of the easiest games in town. We designed a very simple technique called break-even point or BEP. To compute the full cost of new OA technology, we compare it to some unit of measure, usually the hourly wage of the manager who'll be using the technology. Classic examples would be:

A professional microcomputer: BEP = three to six hours/month

An electronic mail system: BEP = two hours/month

Looking at the tasks of a manager, it's easy to ask, "How would you justify a PC? Could you find and demonstrate a minimum saving of six hours per month?" The burden of cost justification now lies with the person most likely to find good use for the tools—the user. Organizations can have simple rules for OA investments: choose a parameter that is

the minimum multiple of the BEP needed to get an approval. Most users will choose a multiple of one. Some will go for two or even three, and still others will accept 0.7 as sufficient proof of the investment's validity.

To illustrate the previous financial alibis, let's use the BEP method to compare costs and investments for a manager and secretary. Assuming a manager costs four times as much as a secretary, the BEP of an electronic typewriter, an easily accepted investment today, is the same as the BEP of a powerful PC for the manager. If you can justify the investment of a word processor for a secretary, you should be able to justify a \$40,000 investment for the manager; that's a lot of technology for one person!

Today, OA tools are quickly invading a small number of organizations that see this technology as one of the best ways to increase their competitive edge. In most organizations, however, OA is not making inroads as fast as it should. If this article has helped even one organization recognize that arguments used to slow the introduction of OA tools are seldom valid, it will have served its purpose.

Taking for granted that you are now reaching for your telephone to order all the OA technology you need, I would like to conclude with the first three commandments of the "How to succeed in OA" Bible.

1. Saying no to a user seeking OA tools is a crime against the organization's success.

2. Action with risk of incoherence is better than coherence without action.

3. Your primary OA objective should be to install one workstation for each telephone, as quickly as possible. Five years is the maximum length of time in which to do it.

Your office automation investments for the next five years are very easy to evaluate. Offering a first, decent, level of OA technology for everyone in your organization can be computed using the following formula:

$NTOA = \text{Number of OA workstations (terminals) to install}$

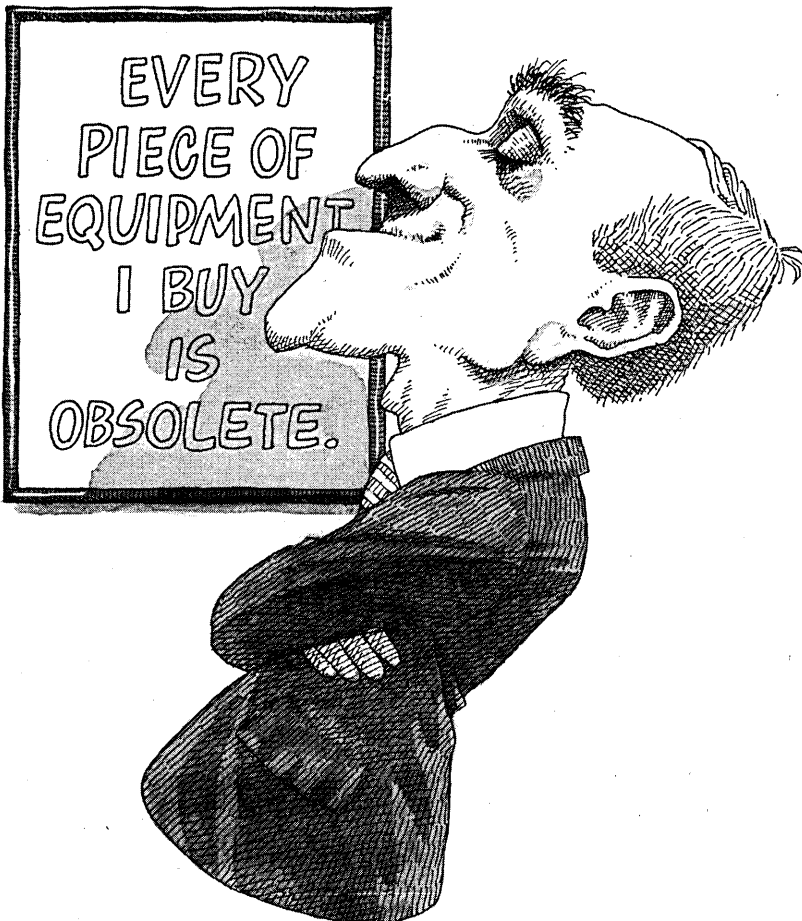
$NTEL = \text{Number of telephones already in use}$

$NTER = \text{Number of terminals (workstations) already installed}$

$INOA = \text{Investments needed in OA for the next five years}$

$NTOA = NTEL - NTER$

$INOA = NTOA \times \$10,000$  \*



Louis M. Naugès is the founder, president, and ceo of BUREAUTIQUE SA, the largest European consulting company specializing in office automation. He is also professor of information systems at Paris University. This article is based on a chapter of a forthcoming book on OA.



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CIRCLE 111 ON READER CARD

**Recent developments in expert systems point toward success for this technology in business environments.**

# EXPERT SYSTEMS IN BUSINESS

by **Robert Michaelsen and Donald Michie**

Experts make decisions in extremely complicated domains of knowledge, such as tax advice, by acquiring information about particular problems and then applying rules of thumb. Sometimes, more sophisticated analysis is also necessary. An example of a rule of thumb taken from investment planning might be "If the client is in a high tax bracket and is willing to dispose of some of his current investments, then he should consider tax-sheltered investments." Expert systems contain these same rules of thumb. In order to apply their stored rules, expert systems ask questions like "Is the client in a high tax bracket?" and display them on the users' computer terminal screens. Results, in the form of recommendations concerning problem solutions, such as "Consider tax-sheltered investments," are also displayed. TAXADVISOR is an expert system designed to make tax planning recommendations that will enhance client wealth. It asks questions concerning a client's current wealth and concerning eventual disposition of this wealth, and then applies rules of thumb to this information and produces a list of recommendations to help him maximize his wealth within these constraints.

A method for verifying an expert system's effectiveness is to have a panel of expert judges evaluate its recommendations. According to various panels of judges, several expert systems have performed as well as human experts. They have been able to perform this well because the system builders have captured and programmed the rules of thumb that experts use to make decisions. To capture these rules, a system builder must closely study the process that several human experts follow. Another way to determine if an expert system is performing at an expert level is through everyday use. Several systems have been proved in this manner.

Readers who are familiar with decision support systems (DSS) are probably won-

dering what makes expert systems different in any substantive way. It is hoped that this article will prove illuminating.

In the fall 1977 *Sloan Management Review*, Alter defined DSS as systems "designed to aid in decision making and decision implementation." Expert systems would also fit this broad definition. Closer examination, however, reveals some sizable differences.

While Alter's survey reveals a wide variety of DSSs, they are bound together by some common characteristics. The steps of DSS's model routine decisions are understood well enough that they can be specified in mathematical formulas and procedurally programmed using COBOL or FORTRAN. They are incapable of modeling expert decisions, because such decisions are not fully understood.

Expert systems employ unique programming techniques to model expert decisions. The production system has thus far proved to be the best programming method for expert knowledge. This knowledge is usually contained in a set of if-then rules. These are processed in a strict order of deductive inference and are invoked by a pattern-match with specified features of the task environment.

For example, the pattern in a rule's premises is matched with client data to see if the rule applies to this particular client. Because uncertainty is often present in expert judgments, expert systems allow conclusions to be reached with less than complete certainty.

This type of programming has two major advantages over that used for DSSs. In the first place, since the rules are independent of each other, program revision is much easier than procedural programming in FORTRAN or COBOL. And secondly, the system is capable of explaining its line of reasoning by displaying the rules used to reach a conclusion. Procedural programs are unable to do this.

Fig. 1 lists expert systems that have been verified as performing at an expert level, either scientifically or through field use.

Most of these systems were developed in the physical sciences, especially medicine, with the business systems still unproved in the field. Why? In the authors' opinion, this phenomenon occurred not only because of areas of initial interest and funding but also because business applications involve more behavioral variables, which can slow down acceptance of such systems. The following are some examples of behavioral variables found in a business environment:

1. The way that employees, customers, suppliers, and other affected parties react to changes may cause great difficulty for top management.

2. For the controller, employee reactions to budgets, standards, and various reductions in costs and resources are usually the most critical part of the equation.

3. Marketing managers must consider the reactions of customers to various price, product, and advertising strategies.

4. Production management must consider how employee behavior will be affected by various production techniques.

Expert systems in business must incorporate these variables, because experts consider them when making decisions. Despite problems with behavioral variables, expert systems should prove successful in business environments because they involve a type of decision making (using rules of thumb to make decisions in extremely complex domains) that is common in business.

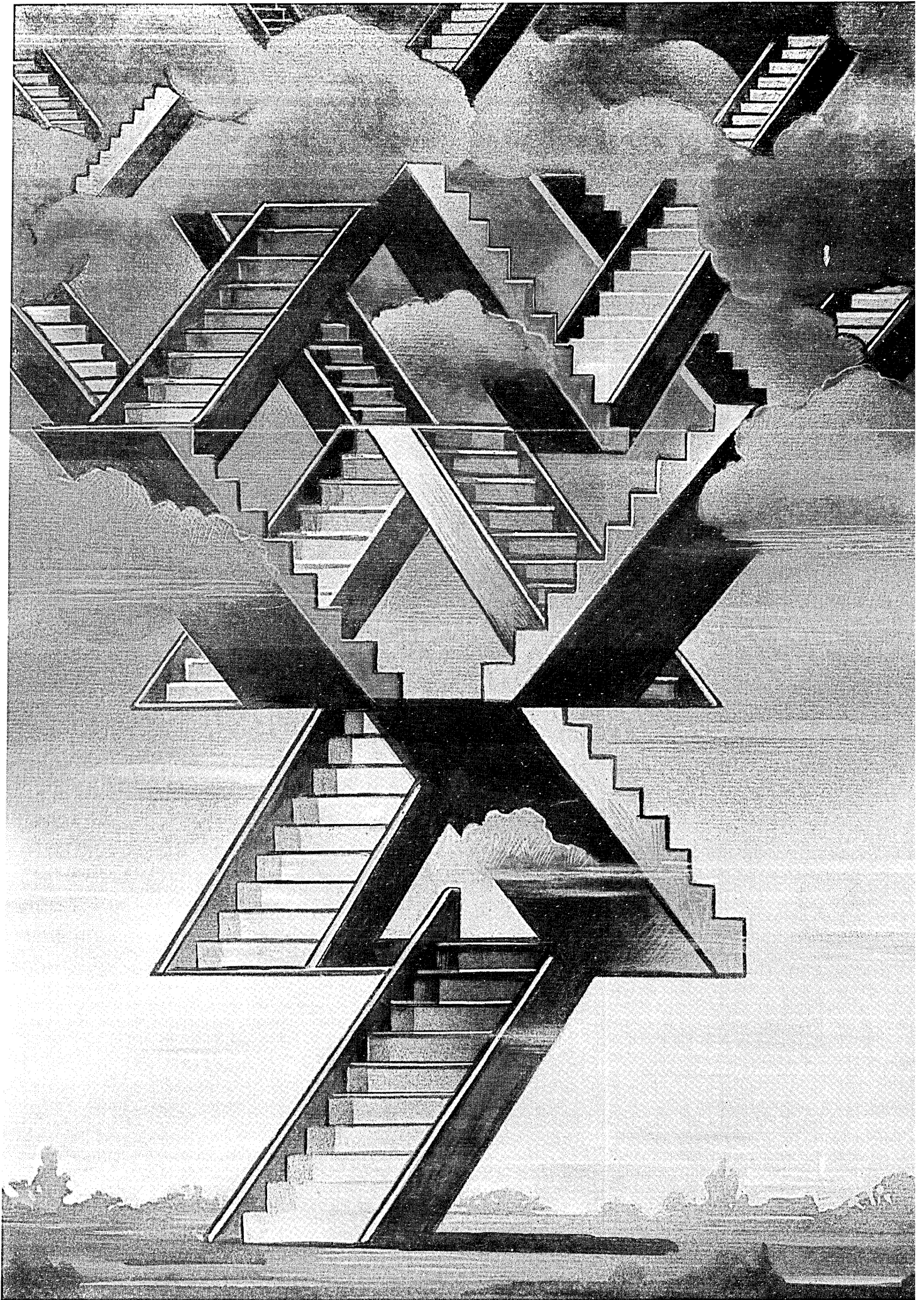
Fig. 1 also lists the best-known expert systems in the public domain. During the past year, expert-systems research in the United States has shifted to private companies, where the latest developments are difficult to ascertain.

## CURRENT BUSINESS SYSTEMS

If private firms have ideas for marketable systems in business, these ideas should currently be under development. To the authors' knowledge, the following systems exist in this area:

AUDITOR, developed by Christopher

ILLUSTRATION BY STAN ZAGORSKI



## If private firms have ideas for marketable systems in business, these ideas should currently be under development.

Dungan at the University of Illinois, is an expert system that assists auditors in assessing a company's allowance for bad debts. The knowledge base was constructed by eliciting from expert auditors a list of factors or cues that are important in examining the allowance for bad debts; polling auditors on the relative weight of each factor's effect; and querying the auditors about the existence and nature of any interrelationship among the factors. The auditors generally agreed in their relative weighting of the factors.

This information was assembled in rule form for use on the ALX system developed at the University of Edinburgh. The system was refined through interaction with the expert auditors. They tested the system's performance by using real and hypothetical cases.

The system was validated in two ways. First, the auditors who participated in building the system operated the model against 10 cases taken from audit working papers. Agreement with the human expert was about 90%. Second, two other expert auditors, one serving as a user of the system and the other as a "blind" validator, evaluated 11 real-world cases. Again, agreement was very high: 91%. Dungan concluded that "the validations were supportive of a belief that the system contained the cases and weights utilized by auditors in their evaluation of trade accounts receivable."

Andrew Bailey at the University of Minnesota and some former colleagues at Purdue University are developing TICOM, a computer-assisted method of modeling and evaluating internal control systems. While their approach doesn't fit into the category of a pure expert system, its construction is based in AI techniques, and its goals are similar to those of expert systems.

With TICOM, the auditor reviews the internal control system using traditional procedures such as observation and interview. TICOM, however, allows the auditor to document the review using a rigorous computer language rather than a flowcharting and narrative description. It maps the internal control system algorithmically and checks for consistency with programmed rules. The final component of TICOM is a query-processing system, which allows the auditor to pose questions about the internal control model.

TICOM is still in the developmental stage; it has not been tested yet.

James Hansen of Brigham Young University and William Messier of the University of Florida are developing EDP AUDITOR, which will assist auditors in auditing advanced edp systems. EDP AUDITOR uses the same ALX system as Dungan's AUDITOR, but it is still in the early developmental stages with only some 40 rules programmed to date.

The knowledge-base decision rules are being identified by a protocol study involving three senior computer audit specialists from a major public accounting firm and by detailed reviews of edp audit questionnaires from public accounting firms. At this point, it is obvious that this problem domain contains hundreds of decision rules.

### USE IN LEGAL ANALYSIS

Computers have been used for some time to augment legal analysis. Applications are found under such terms as automated legal reasoning and computer-aided legal analysis.

Early steps toward artificial intelligence applications in taxation would probably fail a definition of expert systems, because they didn't attempt to model expert knowledge. The earliest attempt was made by L. Thorne McCarty of S.U.N.Y., Buffalo, who developed TAXMAN for evaluating the tax consequences of certain types of proposed corporate reorganizations. Because McCarty had only limited success in modeling the type of reorganizations described in sections "B" and "C" of the Internal Revenue Code, his experiences are not particularly encouraging. However, current researchers may not be as limited as in the early '70s when McCarty did his work. First, systems for modeling human decision processes are more developed now. In addition, McCarty concentrated on modeling the law rather than an expert's thought processes. He aimed for a deterministic model of the law and not the decision rules of an expert in corporate reorganizations. McCarty's current research is concerned with more sophisticated models of the law.

Another attempt is the CORPTAX program by Robert Hellawell of Columbia University, which aims to assist the professional with Section 302(b) redemptions. It cannot be considered an expert system, because it ignores expert knowledge (it models the law) and contains none of the programming advantages associated with such systems (it was written in BASIC).

TAXADVISOR will be explored in more detail than the other business-related expert systems. It was developed in 1982 by author Michaelsen, under the supervision of coauthor Michie, as part of a PhD thesis at the University of Illinois, Champaign-Urbana. It has not yet been used in commercial practice. Written educational materials from the system's rules can be used to supplement a university tax course.

This system is quite different from current tax-related computer systems, which compute the financial consequences of planning alternatives that the human consultant decides are possible for a particular client. TAXADVISOR actually performs the consul-

tant's role. It uses rules of thumb to determine which planning alternatives, such as purchase of an exploratory oil and gas shelter, are feasible for a client.

The system's purpose is to provide estate-planning tax advice for a client. It attempts to help the client arrange his financial affairs so that income and death taxes will be minimized but not at the expense of sound investment decisions and adequate insurance coverage. Actions such as life insurance, retirement planning, gifts, tax shelters, and will provisions are considered.

The system is designed to interact with a human tax consultant but not with his clients, who do not have the background to understand it. It interacts with a consultant in the following ways.

A heading is presented to inform the user of the questions' contexts.

Questions are asked concerning a particular client who is in need of tax advice. The user, a human tax expert, types his responses—usually yes or no.

When the system has gained enough information to make a recommendation concerning a tax-saving action, this recommendation is also displayed on the terminal screen. When a consultation is completed, a summary list of the recommendations is produced.

If the user does not understand a question or recommendation, he can type "why" and the rule that generated that item, together with the chain of inference leading to invocation of the rule, will be displayed on the terminal screen.

The questions and recommendations are generated by if-then rules. An example of an if-then rule from TAXADVISOR is reproduced in the response to the "why" inquiry contained in the box on page 244. All of the questions in this example were generated by the premises in that rule. Since the questions were answered in the desired manner, the conclusion of the rule produced the recommendation found in this example.

TAXADVISOR contains 275 rules. How does the system decide the order of rule processing so a consultation will be logical? It proceeds in a deductive manner, as do many successful human decision makers, starting with the system's general goal and working toward a series of specific recommendations. This procedure can be illustrated with the partial rule tree in Fig. 2, showing a rule at each node. The system starts at the top and proceeds down all branches of the tree in search of recommendations for the client. For example, the rules marked (1) through (4) represent the following logic:

1. First decide if system can serve this client.
2. If so, decide if he should do life-



FIG. 1

**SUCCESSFUL EXPERT SYSTEMS**

| <b>NAME OF SYSTEM OR PROJECT</b>  | <b>APPLI-CATION AREA</b> | <b>BRIEF SYSTEM DESCRIPTION</b>  | <b>METHOD OF VERIFICATION</b>                            | <b>NUMBER OF RULES</b>   | <b>PROGRAMMING LANGUAGE</b>       | <b>HARDWARE</b>  |
|---|--------------------------|--|--|--|-----------------------------------|------------------|
| <b>Auditor by Christopher Dungan at the Univ. of Illinois</b>                                     | Business                 | Selects procedures to be used by an independent author                     | Scientific (blind verification by panel of experts) (BV) | Less than 50 (experimental system)                             | AL/X                              | Numerous         |
| <b>Crib by T.R. Addis at International Computers Ltd., U.K.</b>                                   | Fault Diagnosis          | Diagnosis of faults in computer hardware and software                      | Field use  | 1,500  | Coral and Plan                    | ICL 1903         |
| <b>Heuristic Dendral by E.A. Feignbaum et al. at Stanford Heuristic Programming Project (HPP)</b> | Science                  | Identification of organic compounds by analysis of mass spectrograms       | Field use  | 400  | Interlisp                         | DEC 10           |
| <b>MYCIN by E. Shortliffe at Stanford HPP</b>   | Medicine                 | Diagnoses certain infectious diseases and recommends appropriate drugs     | Scientific (BV)  | 400  | Interlisp                         | DEC 10/20        |
| <b>Prospector by P. Hart &amp; R. Duda at SRI International</b>                                   | Geology                  | Aids geologists in evaluating mineral sites for potential deposits         | Field Use  | Largest Knowledge base: 212 assertions and 133 inference rules | Interlisp                         | DEC 10           |
| <b>Puff by J.C. Kunz at Stanford HPP</b>  | Medicine                 | Analyzes results of pulmonary function tests for evidence of disorder      | Field use  | 250  | Emycin (implemented in Interlisp) | DEC 10/20        |
| <b>RI by J. McDermott at Carnegie-Mellon University</b>   | Computing                | Configuring the VAX-11/780 computer system                                 | Field use  | 772  | OPS4 (implemented in MACLISP)     | PDP-10 (model K) |
| <b>Raffles by T.R. Addis at International Computers Ltd., U.K.</b>                                | Fault Diagnosis          | Diagnosis of faults in computer hardware and software                      | Field use  | Precompiles the database for CRIB                              | Coral and Lisp                    | ICL 1903         |
| <b>Sacon by J.S. Bennett &amp; R.S. Englemore at Stanford HPP</b>                                 | Engineering              | Advises structural engineers in using the structural analysis program MARC | Field use  | 170  | Emycin (implemented in Interlisp) | DEC 10/20        |
| <b>Taxadvisor by R. Michaelsen at University of Illinois</b>                                      | Business                 | Provides estate planning recommendations for clients                       | Scientific (BV)  | 275  | Emycin (implemented in Interlisp) | DEC 10/20        |
| <b>VM by L.M. Fagan at Stanford HPP</b>   | Medicine                 | Provides care suggestions for patients needing breathing assistance        | Field use  | 120  | Interlisp                         | DEC 10           |

\*-These systems may also run on other hardware. Contact the authors if you wish an up-to-date listing of compatible hardware.



time planning.

3. If so, decide if he should make tax-sheltered investments.

4. If so, decide if he should buy an oil and gas shelter. (Specific types of oil and gas shelters will then be evaluated.)

If the system should decide against "tax shelters," then "oil and gas" will not even be considered. All four of the above decisions, each of which is made by a rule, must be in the affirmative before the system will explore specific oil and gas shelters.

If the system decides in favor of a general type of action—for example, tax shelters—it is programmed to pursue all specific possibilities in that category, such as oil and gas or real estate. In cases deemed more appropriate, these possibilities may be joined by "and" or "or."

## MYTHS ABOUT THE SYSTEM

Reading the preceding description of TAXADVISOR's operation can lead to some misconceptions concerning operation of expert systems. Following are the most common misconceptions.

TAXADVISOR is essentially a practitioner's checklist compiled into a computer program. Actually, it goes beyond the deterministic nature of checklists to model the "fuzzy" logic of expert decisions. It is capable of making decisions with less than certainty, pursuing more than one line of reasoning in a given situation, and explaining this line of reasoning. None of these capabilities comes within the concept of a checklist.

TAXADVISOR asks too many questions. The system has been presented as if every premise in every rule processed in the system generates a question that the user must answer. The number of questions is reduced, because the system can use rules to infer the answers to potential questions based on other information.

TAXADVISOR leaves too much of the decision-making process to the user. Since TAXADVISOR is an experimental system, this may be true. But this is obviously not the case with expert systems in daily use in other fields. An expert system designer has great flexibility in determining what the system decides and what the user must decide. For example, in premise (1) of the gift rule that was illustrated, the designer has the option of letting either the system or the user determine whether the client has a large enough estate to grant gifts comfortably. Either a rule or a user is needed to make this determination. Just who should do what for a system used in practice is a difficult question that requires cost-benefit considerations.

The author of TAXADVISOR, also a domain specialist, developed a reasonably intelligent system before other experts provided

## TAXADVISOR DIALOG ON MAKING PERMANENT GIFTS

1) Does the client have an estate that is substantial enough, given his present age and health, that he can afford to forego the income from gifted assets and to pay the expenses associated with making gifts?

\* \* Y

2) Is the client willing to relinquish possession and enjoyment of assets and power to alter, amend, revoke, or terminate any trust in which the assets are placed?

\* \* WHY

This will aid in determining whether the client should make permanent gifts. It has already been established that

Client has an estate that is substantial enough, given his present age and health, that he can afford to forego the income from gifted assets and pay the expenses associated with making gifts.

Therefore, if

1. A: Client is willing to relinquish possession and enjoyment of assets and power to alter, amend, revoke, or terminate any trust in which the assets are placed, or

B: is willing to transfer term life insurance or whole life that is borrowed up to an irrevocable trust,

2. A: Gift will produce a net increase in

family wealth by saving income and/or transfer taxes

B: particular beneficiaries need the help,

C: client desires to shield assets from future business risk,

D: desires to be relieved of asset management responsibilities,

E: desires to avoid probate on particular assets, or

F: desires to personally experience the gratitude of beneficiaries, and

3. Gifts are unlikely to cause family disharmony or the client is unconcerned, then

client should explore permanent inter vivos gifts

(back to question 2 . . .)

\* \* Y

3) Will gifts produce a net increase in family wealth by saving income and/or transfer taxes?

\* \* Y

4) Are gifts likely to cause family disharmony, and does client wish to avoid this?

\* \* N

I recommend that the client explore permanent inter vivos gifts.

(The system now investigates gifts in detail.)

inputs. To do this, he obtained books recommended to him by a leading authority as the top "how to" books in the estate-planning field. By searching these books for expert rules of thumb, he was able to assemble a fairly intelligent system.

The next step in system development involved having estate-planning experts from large public accounting firms and a law school professor experiment with the system and make comments concerning weaknesses. Working with an existing system triggered ideas and made the limited time with these experts highly productive.

Before system verification began, a large public accounting firm took part in a pilot study in which a case from the firm's files was run on TAXADVISOR. A critique of the system's performance resulted in several useful revisions.

A "blind" procedure was employed in system verification. Cases were run on TAXADVISOR, and both the recommendations of the system and a human expert concerning the same case were judged for acceptability, without the judge knowing the recommendations' sources. The intent was to determine if a significant difference existed between the system's performance and that of the human experts. No such difference was discerned.

Several generalizations can be made about expert systems for business. Concerning system structure, the basic function of expert systems is pattern matching. Not only do the systems discussed in this article pattern match, but the essential structure of all expert systems to date involves this phenom-

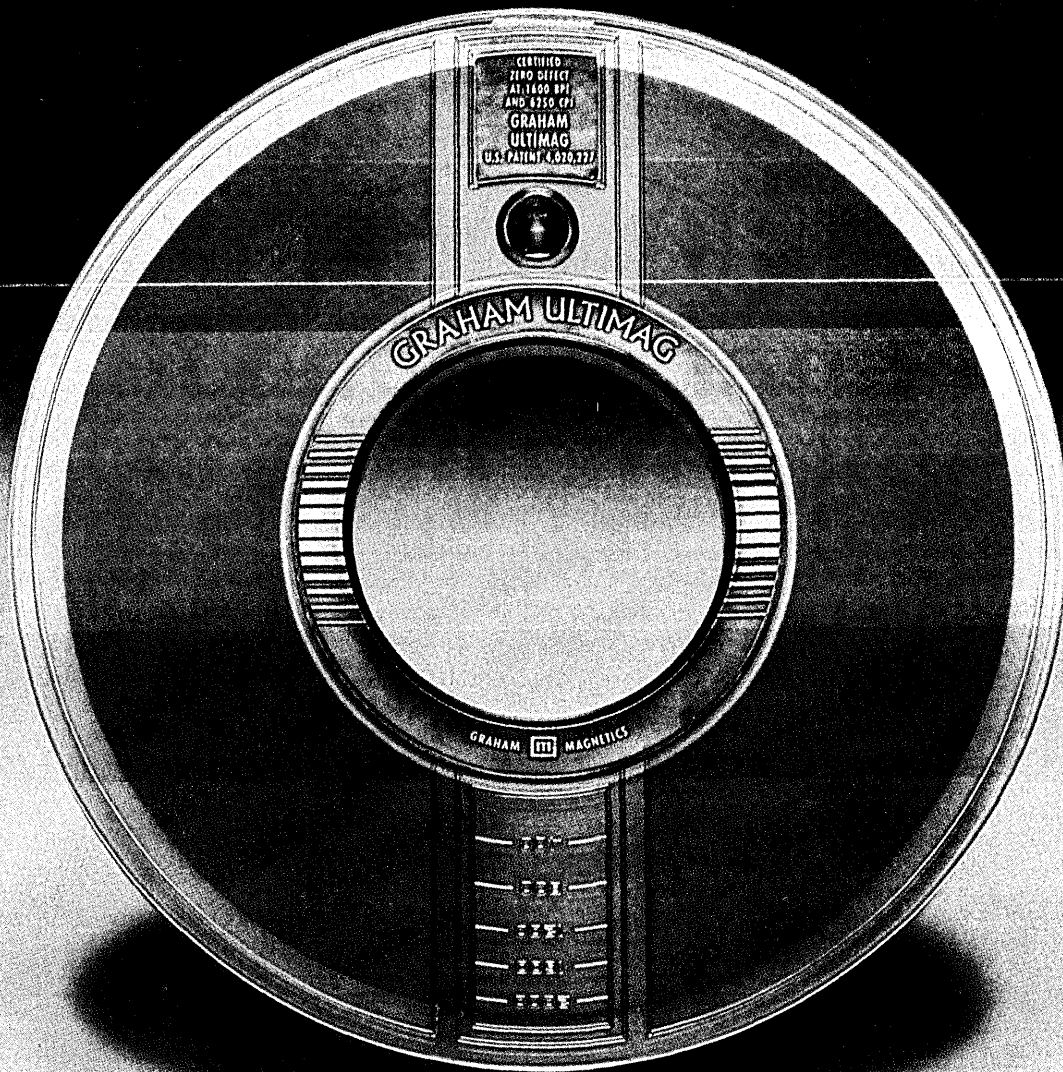
enon. This consists of matching the pattern of data on a particular problem, case, client, etc., with the data pattern required by the system to generate a particular conclusion.

Expert systems usually tend to be deductive. They start by looking at the entire situation and immediately attempt to narrow the inquiry into more specific areas.

Except for the broad generalizations noted above, there appears to be great flexibility in how an expert system can be built. For example, TAXADVISOR has a rigid structure best represented by a rule tree, while other systems tend to combine a similar structure with a general pattern-matching search. Ultimately, the innate structure of the domain in question dictates the most efficient system structure.

Concerning system development, there is considerable latitude in deciding how to develop an expert system. The latitude arises because so much of system building, such as writing rules and structuring the domain, can be performed by a knowledge engineer, a computer scientist trained in expert systems, or an expert in the domain to be modeled. The choice will depend on which course of action is more economical and will probably be determined by the relative availability of personnel. If availability is approximately equivalent, then individual motivations and capabilities must be considered. For example, a domain specialist may be exceptionally fast at learning how to write rules and structure a domain, or a knowledge engineer may have a background closely related to the domain.

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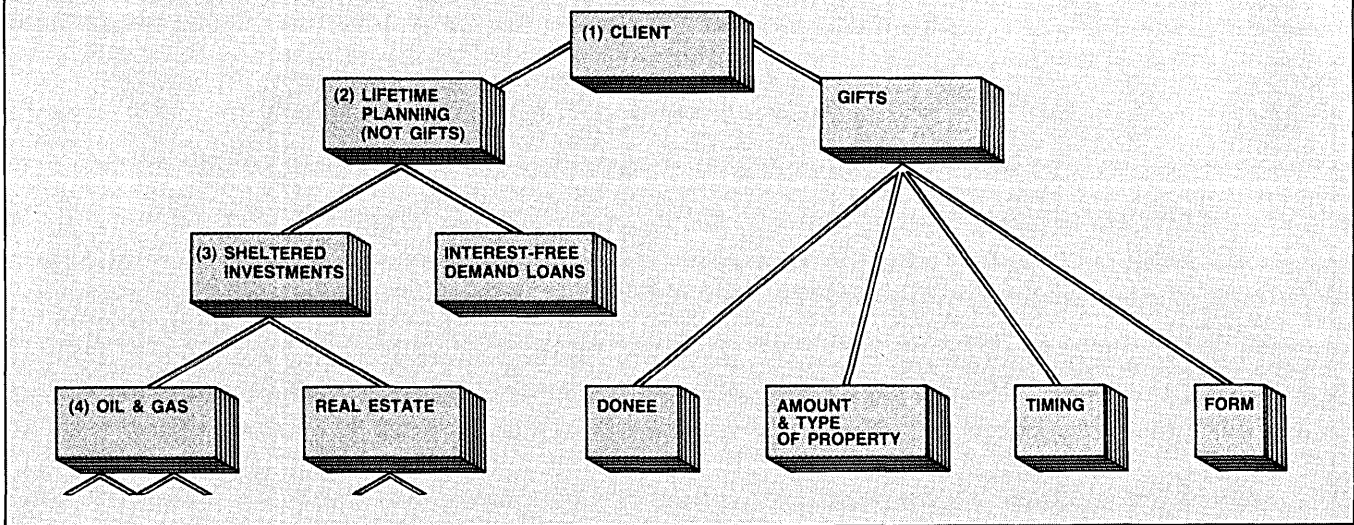
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FIG. 2

**SAMPLE TAXADVISOR RULE TREE**



**USING EXPERT SYSTEMS**

Determining which aspects of business decision making should be modeled with this type of system is essential. Once the problem decision areas have been discovered, all that is required is to identify which part of the decision must be performed by an expert. Examples such as the following abound in the business world:

The management consultant uses rules of thumb to identify client problems (for example, excessive inventories or poor credit policies) and their potential solutions. He usually confirms these observations with studies before reaching a decision.

The corporate treasurer uses rules of thumb to determine the type, amount, timing, and term of both borrowing and investing—for example, whether to borrow on a short-term or long-term basis. He then projects the consequences of these proposed actions before proceeding.

Examples also abound in other management areas, such as strategic planning, marketing, production, and personnel. One area where gains are found is in the domain of the company's data processing manager, himself an expert of high value. Opportunities exist for building micro-based "expert interfaces" to interact intelligently with existing dp systems. Facilities thus obtainable include rendering the dp programs and their master files more intelligible and accessible to an end user; assisting the end user to make more effective inquiries of the central system; and local processing of the data to be sent to, or obtained from, the central system in the manner of a "job assistant facility."

Before an expert system is developed, its ultimate use must be considered. To help decide what it will be used for, you can look at expert systems in other fields.

Unfortunately, no clear picture exists. In the case of MYCIN, a system that diagnoses infections and prescribes medications, practicing physicians have been reluctant to

use the system because of its narrow perspective. On the other hand, SACON, which assists civil engineers in structural analysis, is routinely used.

What is the outcome for expert systems developed in business? In the authors' opinions, most such systems will eventually find real-world uses. All that is needed is the development of uses for these systems that save the firm valuable time and money. For example, an expert system for tax advice could be used by practitioners in the following ways:

1. Some "experts" are not experts. For example, some lawyers do tax planning for their clients only occasionally. An expert system in tax planning would be very helpful to such lawyers, because they could compare the system's recommendations with their own and explore any disagreements.

2. If data for all of a practitioner's clients were computerized, the system could save the expert considerable time by reviewing client files and identifying those that need further attention whenever major changes in tax laws or economic conditions warrant a reevaluation of all clients.

3. After the system has become sufficiently intelligent through continued refinement, experts might find it useful to consult the system when confronted with an unfamiliar issue.

4. Data on client wealth and preferences concerning this wealth may be entered into the system before the expert turns his attention to the client. In this way, the system saves the expert time by immediately focusing his attention on the client's problems and on potential solutions to those problems.

5. The system could serve as a temporary substitute for a resident expert who quit, died, was sick, on vacation, or otherwise unavailable.

Other ideas for marketable applications will undoubtedly arise as creative individuals discover new ways to use this tech-

nology. Despite acceptance problems that are apparently unique to computer applications, most expert systems in business will eventually find real-world uses.

A more immediate use of expert systems is in education and training. Their development forces a complete specification of the rules that experts use to make decisions. In most cases, this specification is being accomplished for the first time. Educational materials derived from these systems are quite often superior to conventional materials. Medical students at Stanford University have found MYCIN a useful tool for studying infectious diseases, especially because it can explain its line of reasoning. Text derived from expert systems for playing chess end games is demonstrably superior to leading textbooks.

In business, expert systems should improve training through trainee use of the systems, through written materials derived from them as a supplement to formal classroom instruction, and as a training device for business personnel.

The authors' optimism concerning the future of expert systems in business is based upon substantial success in other areas and the limited success experienced with initial experiments in business. Executives who choose to ignore expert systems may find themselves at a competitive disadvantage within the next decade. \*

Robert Michaelsen has been assistant professor of accounting at the University of Nebraska, Lincoln, since 1981, specializing in taxation. Before receiving his PhD in accounting from the University of Illinois in 1982, he was a public accountant for several years.

Donald Michie is professor of machine intelligence at the University of Edinburgh, Scotland, and has been a consultant for IBM and the Rand Corp.

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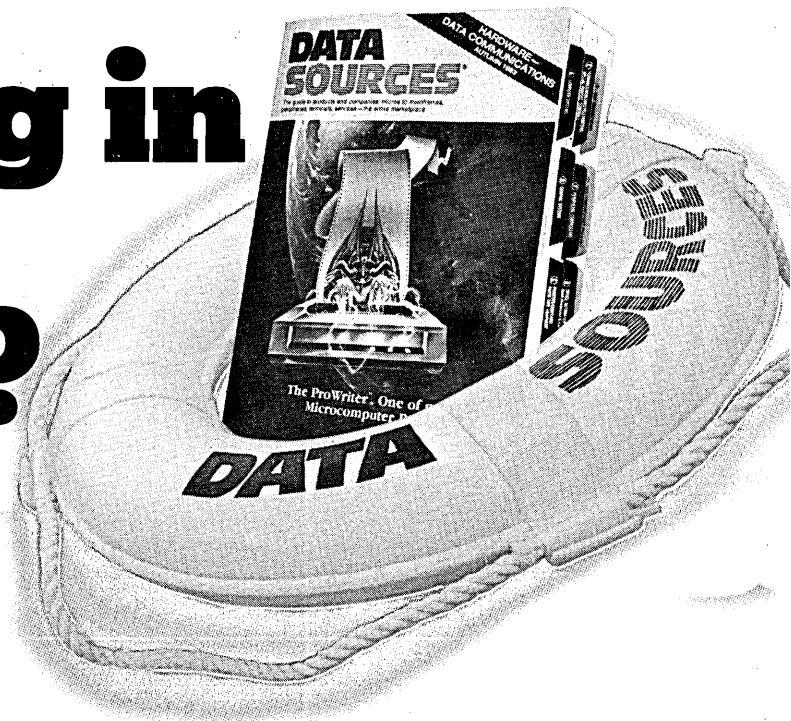
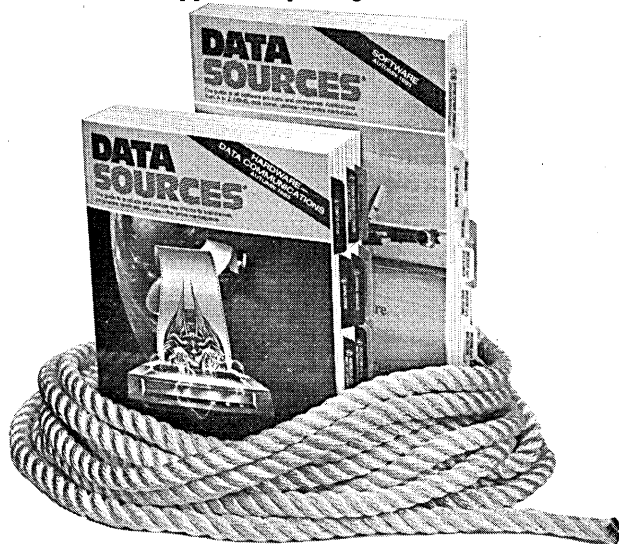
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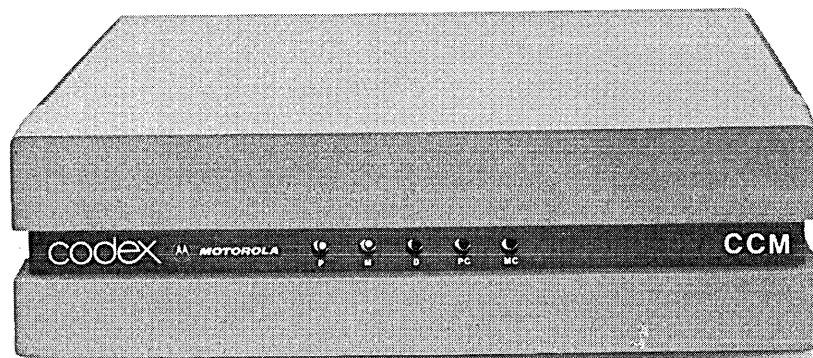
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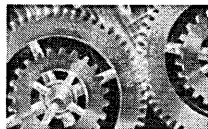
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## THE SOFTWARE ENGINEERS

# How the four kinds of prototyping can shorten— or eliminate—the traditional system development cycle.

## A PROTOTYPICAL SUCCESS STORY

by James R. Johnson

What is a prototype? Such a commonly used term should be easy to define. Test your knowledge by deciding which of the following a prototype may be.

1. A fourth generation language working model that will be rewritten in a procedural language (COBOL, PL1, etc.) for implementation.
2. A quick-and-dirty system intended to be enhanced over time until it is user acceptable.
3. Mock-up of reports (printed) and screens (on-line).
4. All systems implemented with a fourth generation language.
5. A unique approach that replaces the traditional life cycle for system development.
6. End-user computing.
7. An experiment, similar to research and development, to decide if a system is feasible.
8. A working model with real (live) data.
9. A simulation of complex logic in order to determine practicality of the logic.
10. A subset of transactions written in a procedural language.

If you answered yes to all but numbers 4 and 6, you have a fairly clear idea of how prototypes are currently used. Unfortunately, that still leaves room for some confusion. The fact is that some writers have defined prototyping as a complete replacement of the traditional life cycle (TLC), while others view it as a technique to be applied within the TLC. We can resolve this contradiction with a definition that distinguishes among four different levels of prototyping:

*Level 1—mock-ups.* Output mock-ups of printed reports and/or on-line screens.

*Level 2—simulation.* Simulated interaction of on-line activity and/or batch re-

ports, with no intent to implement the program or files. Level 2 is used within the TLC during the design phase only. The simulation involves a limited relationship among transactions.

*Level 3—working model.* A partial system with interaction among files and/or transactions. It has less than complete capabilities in one or all of the functions, transactions, or programs. If completed, part or all of this model could be implemented.

*Level 4—research and development.* Takes the place of the traditional life cycle approach. Level 4 prototyping is similar to a research project where the result may or may not be pursued. It eliminates the feasibility study and other project phase distinctions.

The first three kinds of prototyping are used in the design phase of the traditional life cycle; the fourth replaces the TLC (see Fig. 1). For simplicity, assume that the TLC has three phases: feasibility study (general design), detail design, and implementation (where programming is performed). Most organizations have been using level 1 prototyping for a number of years as part of the TLC. It consists of generating mock-up reports and/or screens through print programs or on-line editing tools such as TSO (IBM's Timesharing option). Once created, the output is part of the design documentation. Level 1 prototyping saves preparation effort and is definitely an improvement over typed design documentation.

Level 2 prototyping introduces the concept of simulated interaction of transactions, but with limited relationship among transactions. The programs developed to support the simulation are throwaway—there is no intent to implement the code. A better design results when a user becomes involved with simulated activity; the design process allows for, and is enhanced through, iterations.

In level 3 prototyping, the simulation

is replaced with a working model and there is interaction among transactions and files. During this process, the user debugs the design with the working model. Obviously, the model is incomplete when compared to a final implemented system; it is a subset of the final product. However, as distinguished from level 2, part or all of a working model could be implemented. If the prototype code is eventually put into production, the implementation phase is shortened, because some of the programming has been completed in the design phase.

The general consensus seems to be that levels 2 and 3 are more useful than level 1, and many companies are modifying internal standards to encourage the use of these kinds of prototyping within the traditional system-development life cycle. They minimize design documentation because the simulation or working model serves as the design. One might ask: why not always use level 3—isn't it the natural progression? Not necessarily; consider a system rewrite that changes 25% or less of the existing user interface. In this case, level 2 may be the preferred alternative since the user design does not present a major problem. Another factor that dictates a level 2 approach is a high processing volume need where the prototyping language is not suitable for implementation.

### BENEFITS HARD TO VISUALIZE

The benefits of some systems are inherently difficult to visualize. Assume, for example, that a manufacturing plant has a batch scheduling system and that a project team is asked to determine the feasibility of a real-time system. In a feasibility study it is almost impossible to define how a totally different method of operation will affect an entire plant. In this situation, the best way to understand the consequences is to observe a system in operation by implementing a working model. In level 4 proto-

# The benefits of some systems are inherently difficult to visualize.

typing, the model encompasses the feasibility study, the design, and potentially the implementation phase; the project phases are merged so that there is no phase distinction. The technique is one of trial and error, and is analogous to a research and development process where a significant percent of the efforts may fail, or lead to a different approach. Conversely, the TLC process sets out to produce a feasible system every time.

As a system development technique that replaces the TLC, level 4 prototyping has the following steps:

- Identify user's basic information requirements.
- Develop working model.
- Use working model to refine needs and justify system.
- Enhance model and possibly implement.

As companies complete the implementation of basic operational systems and proceed to less structured management information systems (MIS), the technique of level 4 prototyping becomes more useful. Over the next two years, our organization expects to apply level 4 prototyping in 10% to 20% of all projects exceeding one man-year. For larger projects, the percentage qualifying for level 4 will be even higher.

No one is happy with the traditional system development life cycle (TLC). Because control was emphasized in the late 1970s, the standards governing the TLC were designed to cover every detail and situation, and ended up becoming overburdening and bureaucratic. Projects that didn't meet users' needs were implemented, and the solution was seen as the addition of design documentation steps that defined those needs more carefully. The specific design tool—whether SDM 70, a problem statement language/analyzer, PSL/PSA, or structured analysis and design technique—is not relevant. Each technique requires more training and adds more time to the TLC. Thus, it now takes so long to implement a large system that the problem changes during the process, and the design becomes unacceptable.

This is why the TLC has come under attack. But there is hope because the first three levels of prototyping shorten the process, reduce misunderstandings between dp and users, and save time on documentation. In general, prototyping enhances communication because the simulation sessions are more personal and flexible, and are held frequently throughout detail design. The format of such walk-throughs allows for a great deal of discussion. By using prototyping, the users can see versions of the systems early in development to verify their ideas and expectations. When level 2 or 3 prototyping is used, the design document can be more brief

FIG. 1

## CHARACTERISTICS OF THE FOUR LEVELS OF PROTOTYPING

| TECHNIQUE/CHARACTERISTIC                      | LEVEL OF PROTOTYPING |     |     |     |
|---|----------------------|-----|-----|-----|
|   | 1                    | 2   | 3   | 4   |
| 1. Print programs or TSO                      | Yes                  | Yes | Yes | Yes |
| 2. Simulate subset of system functions        | No                   | Yes | Yes | Yes |
| 3. Model system integration and relationships | No                   | No  | Yes | Yes |
| 4. Intend to implement code                   | No                   | No  | Yes | Yes |
| 5. Use within TLC                             | Yes                  | Yes | Yes | No  |

FIG. 2

## PROCEDURAL CODE LIMITS FOR 4GL USE

| FUNCTION OF PROCEDURAL CODE  | PROCEDURAL CODE RANGE    |
|------------------------------|--------------------------|
| Initialization               | 0 to 50                  |
| Processing/Data Manipulation | 0 to 50                  |
| Simple Field Validation      | 0 to 200                 |
| Total combined lines of code | 0 to 300 (Plus comments) |

Simple validation means field characteristic validation only. Relationship testing and file matching are not regarded as simple in this context. Relationship testing and file matching would be considered processing/data manipulation.

FIG. 3

## SELECTING AN APPROPRIATE LEVEL OF PROTOTYPING

| PROJECT CHARACTERISTICS           | LEVEL 2                            | LEVEL 3 |
|-----------------------------------|------------------------------------|---------|
|                                   | Limited innovation and uncertainty | Yes     |
| Not able to implement prototype   | Yes                                |         |
| Medium innovation and uncertainty |                                    | Yes     |
| Able to implement prototype       |                                    | Yes     |

since the prototype is part of the design.

Three other criteria not included in the definition are also worth discussing: type of data/files, segmentation, and type of language. Having live data or real files in the simulation is not a requirement, although levels 3 and 4 would generally use live data because it adds realism and facilitates the process.

Segmenting a project—that is, breaking it into smaller, easier-to-manage pieces—is not a definitional criterion for prototyping, but in many cases segmenting is done in conjunction with it.

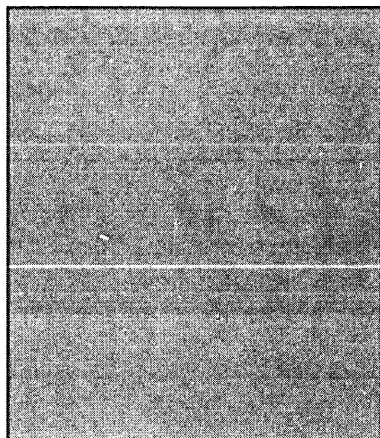
The type of language is a more controversial criteria to exclude since most illustrations do involve fourth generation languages (4GL). Over the past two years, our organization has worked on numerous level 1 prototypes of all sizes, three level 2 prototypes ranging from two to 20 man-years, five level 3 prototypes ranging from one to 50

man-years, and two level 4 prototypes ranging from five to 10 man-years. Thus, there have been 10 significant projects employing prototyping levels 2 through 4. Six of these projects used 4GL. However, the other four used the standard production language (CICS command level COBOL). One is a level 3 prototype system for a materials warehouse. It is a simplified version of a much more elaborate and costly proposal. If the remaining effort is justified, independent of the initial project, it would be completed as enhancement work. In other words, this project was segmented with the most critical piece first. Since most of the transactions were of medium complexity and since the intent was to implement the prototype, the language of CICS command level COBOL (department standard) was chosen over a 4GL.

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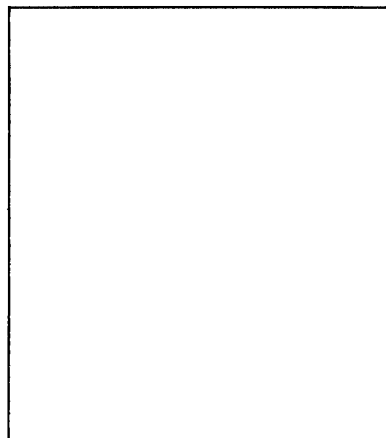


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## Segmenting a project is not a definitional criterion for prototyping, but segmenting is often done in conjunction with it.

The code generated will operate with live data in a test mode for an evaluation period. Final implementations would require additional coding to interface to existing systems. All the programs were written in the standard production language (CICS command level COBOL). On both projects, significant manpower time savings resulted from prototyping without a 4GL. But 4GLs do offer a more responsive tool for most prototype situations because of their interpretive nature and non-procedural code. Because the code is interpretive and does not require a compile, analysts and programmers can perform iterations at a terminal with the user; and the key productivity factor of 4GLs is the automatic features of the high-level coding, the nonprocedural code. However, 4GLs have a significant limitation that is not publicized by the software vendors. This limitation may dictate 4GL production guidelines and may require using the standard language for some level 3 and 4 prototypes.

When a system requires fourth generation language procedural code because of complexity or special processing, the benefits of the 4GL decrease dramatically. This is because the procedural code of 4GLs, when compared to CICS command level COBOL, is difficult to read, of limited function, symbolic rather than descriptive, and nonstructured. If the programming doesn't require procedural code, a 10 to 1 productivity gain is possi-

ble, but as the percent of procedural code increases, the productivity gain is reduced. For example, if a medium-complex 4GL program requires 1,200 statements, a CICS command level COBOL program that performs the same function may need 1,400 statements. If the dp standard is CICS command level COBOL, the minor development gain from writing 200 fewer statements may be lost in the maintenance area.

The solution to this problem is to establish a rule that limits the use of 4GL procedural code in production; our rule is described in Fig. 2. Only 300 total statements (excluding comments) are allowed. Fifty is the limit for both initialization and processing/data manipulation; simple field validation may be up to 200 statements. These rules are based on the fact that 4GL procedural code is as difficult to write and more difficult to maintain than CICS command level COBOL. Although the rules apply to production, they also influence the selection of prototyping level 2 or 3.

### WHICH LEVEL IS RIGHT?

When should prototyping be used, and how do you decide which level is appropriate to the job at hand? One organization begins by deciding whether the traditional life cycle should be bypassed in favor of level 4 prototyping.

Providing structure is the inherent

reason for the TLC. This structure has a price in documentation, design reviews, approvals, and control. Yet, level 4 does not provide typical control techniques; a project team is free to pursue design in a free-lance mode. Thus, there are disadvantages. Project characteristics favoring a level 4 approach are new technology, innovative software design, and a high degree of uncertainty in the operational impact or benefits, as shown in the real-time manufacturing example.

If the TLC, rather than level 4 prototyping, is chosen as the methodology, we proceed to consider which of the other three levels of prototyping might be appropriate. Some level is recommended for every project and, as stated earlier, many corporations have practiced level 1 prototyping for years.

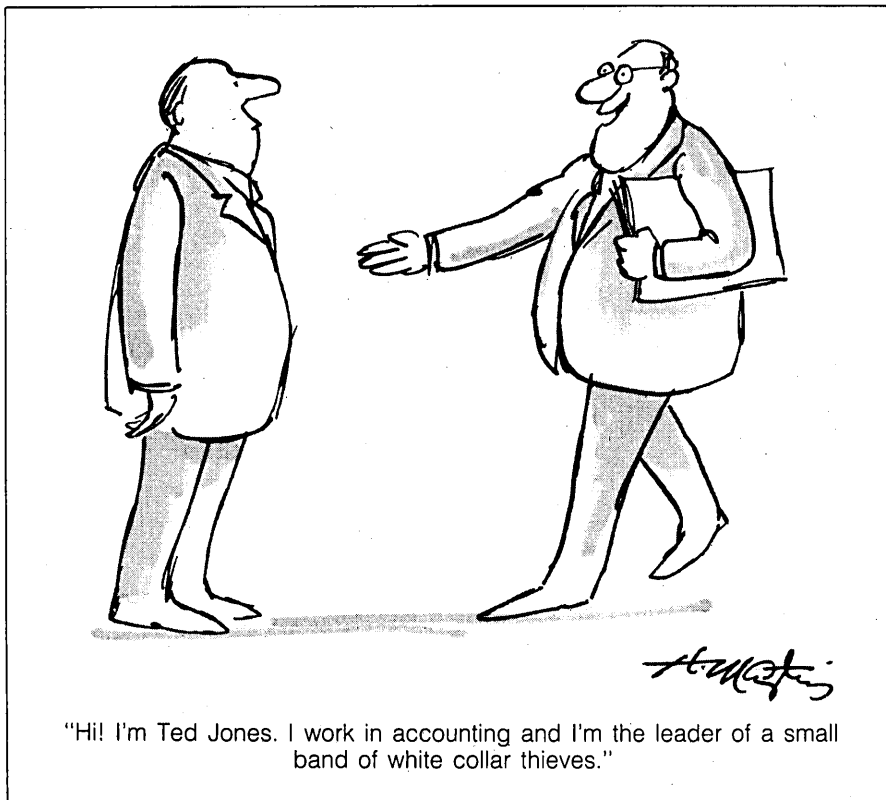
Indeed, the TLC can become bureaucratic, with excessive forms, procedures, and controls. By using either level 2 or 3 prototyping, the TLC can be dramatically accelerated. The factors influencing the selection decision are shown in Fig. 3.

Both levels 2 and 3 resolve uncertainty during system design. When the project uncertainty is low, a less sophisticated prototype is warranted. Limited innovation may occur on rewrites, existing system enhancements, or smaller projects. As design uncertainty increases, the advantage of a more sophisticated prototype also increases.

Directly related to this decision is the ability to implement the code. When it is known that the resulting code will not be implemented because of processing constraints or other operating standards (as may be the case with a 4GL), the level 2 approach is obviously recommended. It would be counterproductive to write a detailed code and then completely rewrite the code. Conversely, by eventually implementing the code as with level 3, productivity is enhanced because less programming is required in the implementation phase.

It is management's responsibility to decide which type of prototyping applies to an individual project so that the project team will understand the technique and objectives. Prototyping is a philosophy, a new mode of operation. Some resistance may be expected within an organization, but there is no excuse for ignoring this proven concept. \*

James R. Johnson is director of systems development at Hallmark Cards Inc., Kansas City, Mo., where he is responsible for the design, programming, and implementation of all corporate systems. He is the author of *Managing for Productivity in DP* (Q.E.D. Information Sciences, Wellesley, Mass., 1980). This is his third article for DATA-MATION.



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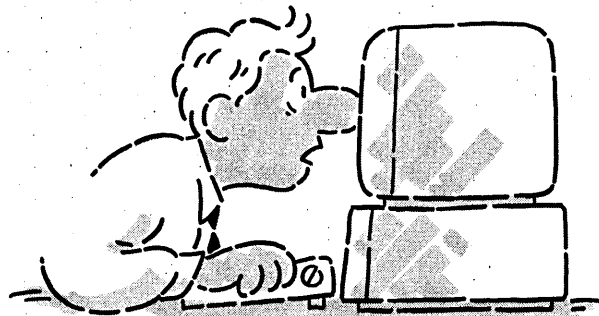
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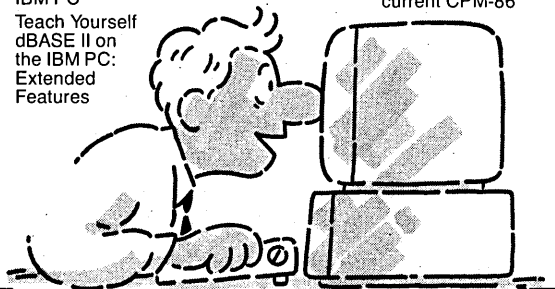
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CIRCLE 118 ON READER CARD



**Functional decomposition has proved inadequate as a systems development strategy because requirements really do change.**

# DATA-DRIVEN PROTOTYPING

by Daniel S. Appleton

There is a quiet revolution taking place in systems development. It is being driven by the same forces that produced end-user computing, relational data management, fourth generation languages, and personalized business computing. It is called prototyping.

During the next five years, prototyping will replace functional decomposition as the dominant mode for developing and maintaining end-user application systems and shared databases. It has already made tremendous inroads in timesharing environments and information centers. The in-house data processing department is the last bastion of traditional systems development concepts, but even this fortress is beginning to crumble.

This is in spite of the fact that prototyping is not generally understood as a formalized approach to systems development. Even though there are many different ideas about what prototyping is, there does seem to be general agreement on two points: 1. properly implemented, prototyping could be the most significant concept since COBOL for improving overall dp productivity, and 2. if not properly integrated into the existing environment, prototyping can produce anarchy. In either case, it is clear that prototyping cannot be ignored. Its potential benefits are too great, and potential penalties too severe.

Prototyping is not a new approach to building systems. Actually, it was probably the first approach ever used. Functional decomposition (FD), on the other hand, is a relatively recent development, the result of much detailed analysis of the systems development process. FD differs from prototyping in one key respect: it assumes that "requirements" can be precisely determined *before* system construction is attempted. By contrast, prototyping incorporates a learning process into system design; it assumes precise requirements are not always definable before system construction. It develops requirements in parallel with coding rather than serially.

End-user application software systems are usually developed by means of the decomposition strategy. Requirements are

expressed in terms of system outputs and are predetermined. Then an application system is constructed that will best satisfy those requirements. Few information systems projects however, come in on schedule or within budget, and those that do are often characterized by extremely high maintenance costs.

Recognition of these realities has led to a heightened emphasis on improving productivity in the systems development process. To date, two main strategies have been employed: 1. a modification of the decomposition approach, and 2. use of a prototyping approach. Both are used today.

Systems developers who have chosen the first strategy have tried to automate the decomposition approach and to make it more rigorous, especially in the area of requirements definition.

## MANY NEW TOOLS DEVELOPED

Automation of functional decomposition has resulted in many new tools, including application generators (for example, DMW Group's Application Builder) and automated requirements definition languages (such as PSL/PSA, produced by project ISDOS in Ann Arbor, Mich.). Undoubtedly they have had some effect on productivity, but how much is anyone's guess. (Some estimates are that application generators can increase productivity from 10 lines of code a day to 30 lines of code a day.) What is clear is that their successes pale when compared to the problems caused by increasing applications backlogs.

The focus on increasing the rigor of functional decomposition has led to much more bureaucracy in system design, which, in turn, has increased project costs and lead times. This is evidenced by the massive tomes needed to provide guidance methodologies such as AGS Management Systems' SDM-70, McAuto's STRADIS, and Yourdon's Structured System Design. Emphasizing the requirements aspects of systems development has led to two fads: planning (e.g., IBM's BSP and Database Design Inc.'s Data Planner, among many others) and "data requirements definition," using methodologies

and tools such as Clive Finklestein's Information Engineering and Robert Holland's Subject Databases.

But functional decomposition will inevitably exact a penalty in unpredictable lead times (because of the difficulty of incorporating changes during design), unpredictable development costs (for the same reason), high maintenance costs (because of changes after implementation), and short system life cycles. The problem cannot be solved simply by spending more time on requirements phases and making the user sign in blood; requirements do change, and should be encouraged to change, because an unchanging environment is dying.

Decomposition strategies seem especially futile in the face of the changes coming to the whole concept of information management. Those changes are foretold by the wide acceptance of database management systems, communications, and end-user computing. These technologies are countercurrents to the notion that massive systems can be efficiently constructed based on a philosophy of predefining information requirements. All three are indicative of environments where information requirements are increasingly dynamic. They presage an era when millions of people will be telling computers what to do—as opposed to today's situation where only 500,000 programmers are able to control the machines. In an environment of dynamic requirements, where functional decomposition has become counterproductive, prototyping has begun to move to center stage.

Prototyping-based system development methods—and their accompanying software tools—have begun to assume an important role in the information management arena. Indeed, many of the industry gurus have stopped chanting about structured system design and are now singing the praises of something they refer to as prototyping. It is not clear that there is a consensus about what the word means. In fact, they seem to be talking about at least two different notions.

Which school of prototyping thought you are in is determined by what you believe

# To the data prototyper, the challenge is to discover and manage the shared data in the most efficient, least expensive way.

is being prototyped: an application system or a database.<sup>1</sup>

## SCHOOL OF CONVERTS

The school of application prototyping consists of converts from the decomposition religion. This camp still believes that the primary information resource is an application system and that these systems are essentially closed or state-determined—that is, they are designed to consistently produce specified outputs given predefined inputs. Techniques such as rapid prototyping have been retrofitted into such functional decomposition approaches as TRW's SREM (Software Requirements Engineering Methodology) and the USAF's SEM (System Engineering Methodology). These techniques focus on transaction modeling and simulation technology. Adherents of the application prototyping school believe that prototypes should be thrown away in favor of production systems.

The school of data-driven prototyping

ing, on the other hand, believes that prototypes should not be thrown away. Instead, they should evolve, extending the data architecture of the business in a process somewhat akin to learning. Data prototypers fundamentally believe that a database is a system or, more to the point, that the shared database is *the* system. But, it is an open system. The main difference between a closed system and an open system is that an open system learns from its experiences. It has adaptive mechanisms, and it responds to changing requirements in a positive, assertive way, both to protect and improve itself. It is, in a sense, organic.

Data-driven prototyping was created around an abstraction approach to development, rather than a decomposition approach. Further, it abstracts from an entity base, rather than decomposing from a functional base. If requirements are both known and static, the functional decomposition approach will work best. But if they are primarily unknown and dynamic, then the only practical way to approach system building is with an entity-based abstraction approach.

One of the most significant factors distinguishing adherents of the application prototyping school—or even promoters of the decomposition approach—from those in

the data-driven prototyping school is the perception of the role and value of data. Application prototypers believe that data are defined by systems, that they are constrained, even held hostage, by them. Data prototypers, on the other hand, believe that entities are the essential elements of learning and that they transcend individual system boundaries, becoming the common denominator of all systems and, therefore, the quintessential information resource. Data prototypers also believe that, contrary to popular opinion, data are not static either in meaning or structure. Changes in meaning and structure of data reflect the learning, growing, and maturing that every business experiences. The problem is to manage these changes, not to stop them, and the first step is to recognize that there is a data life cycle distinct from the traditional system life cycle.

Data, it turns out, do not die when their host system dies. In fact, they grow, becoming integrated with data from other systems.

The idea of system integration, a concept much touted as a key to information resource productivity, is actually not a system problem at all; it is a data problem. As Robert Curtice asserted in Arthur D. Little's *Data Management Newsletter*: "All users and nearly all computer specialists agree that any meaningful concept of integration must revolve around the *data* that [are] used by the systems. Thus, we would say that systems are integrated to the degree they use the same data."

## HOW TO HANDLE DATA

To the data prototyper, the problem at hand is to discover and manage the integrating data (sometimes called shared data) in the most efficient, least expensive way. Building, implementing, and maintaining complete standalone systems through their traditional life cycles does not accomplish this. The only clear alternative is to build and exercise prototypes.

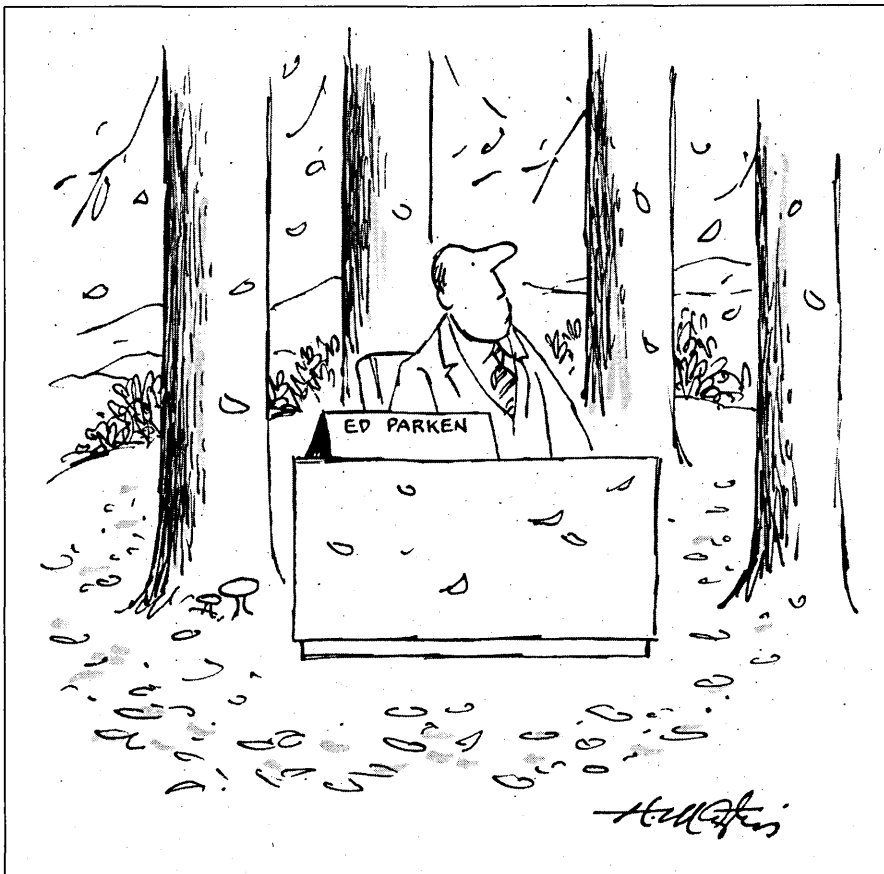
To the data prototyper, prototyping is done for nine important reasons:

1. To validate information requirements. From a user's perspective, information requirements define the need for data; however, the types of data that are available tend to influence information requirements. Through prototyping, users can verify their information requirements.

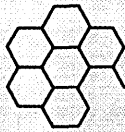
2. To discover an optimum structure for the data *about* data, meaning the *meta*-data. These metadata are critical for effective management of the data resource and for defining the best structures for logical and physical databases (see box, p. 262).

3. To provide for bottom-up integration. Through prototyping, shared data can

<sup>1</sup> There are some other popular notions of prototyping, such as "screen prototyping" and "subroutine prototyping," but these concepts are valuable in only a limited sense. Screen prototyping, which became popular with the IBM System/38, has only minimal implications for fundamental architectural issues involving either systems or databases. The same is true of subroutine prototyping. Both are limited in scope.



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## A DATA-DRIVEN APPROACH TO CAPITAL PROJECT MANAGEMENT

Capital projects are highly complex. They generally involve huge amounts of money, have high visibility, take a long time to complete, and involve a lot of people. A system to manage capital projects is not just an operational control system; it is also a business strategy, with requirements that are highly volatile. It involves hundreds of mostly unpredictable activities that require consistent, timely, and accurate data from all aspects of the business—finance, engineering, production, etc.

To provide an automated capability for capital project management, a project team using DACOM's PDM-80 prototyping methodology would proceed as follows:

**Operational review.** Examine the current information usage in the business and determine the operative business rules (by means of DACOM's company business rules analysis methodology). These business rules define the business entities and relationships between them which are relevant to capital project management. Examples of such rules might be: 1) a return-on-investment projection must be developed for each capital project; 2) no capital project can exist without an implementation plan; 3) a work package must be assigned to each stage of the implementation plan for a capital project; 4) each capital project must be assigned a capital account; 5) each work package in a capital project implementation plan must be assigned to an expense account.

By examining the business rules, the team identifies business entities that have the maximum data leverage for capital projects. In this example, business entities such as capital project, implementation plan, work package, capital account, expense account, and implementation plan stage are defined.

Each of these business entities is examined to determine its *metadata*. For example, the metadata associated with a capital project could be capital project number, return on investment, scheduled start date, scheduled complete date, and approval date. Metadata associated with capital account might include account number, maximum approved expenditure level, subordinate expense accounts, responsible account manager, and actual expense accumulation to date.

**Conceptual design.** Using critical success factors (see "Chief Executives De-

fine Their Own Data Needs" by John F. Rockart, *Harvard Business Review*, March/April 1979), forecasts are developed to anticipate the changes which will occur to a company's business rules. Such changes will not only affect the business entities, they will also affect the relationships among business entities as well as the metadata associated with them. A critical success factor such as "minimize capital project expenses" might require a change to an existing set of business entities, which might only include the entity "account." The new critical success factor, however, will have identified the need for an additional business entity called an "expense account," which is now related to another business entity called "capital account." The relationship between capital accounts and expense accounts would probably then be defined as "one capital account controls many expense accounts."

The team works with users to structure new business entities and their relationships, based upon scenarios which evolve consistently with critical success factors. These scenarios are used to structure the metadata associated with each business entity, and are developed separately to determine the uses to which the metadata will be put, as well as to determine how data will be collected and inputted.

Once the business entities, relationships, scenarios, and basic metadata have been developed, the total conceptual structure is evaluated to determine which entities are to be implemented first. The prototypes are structured from the conceptual design phase based on a notion of first prototyping entity sets with the highest data leverage. Subsequent prototypes, adding entity/relationship structures, are planned, in series or in parallel with one another.

**Data design.** The data design is established from the entities, metadata, and relation structures. Metadata and entities are first normalized to the fifth normal form. Subsequent to normalization, the data definition language of a DBMS is employed to develop physical database structures. At the same time, the three-schema data dictionary is updated to include both the normalized entity/relationship clusters (in the conceptual schema) and the physical database file designs (as internal schemata).

This step is completed for each prototype until the conceptual design is com-

pletely implemented. Each of the prototypes contributes to the overall conceptual schema and may or may not add to existing internal schemata.

**Heuristic analysis.** For each prototype, live data are loaded into the internal schemata. These data are then exercised by users employing the DBMS data manipulation language to identify changes to the metadata structure. In addition, depending on the types of scenarios employed, performance characteristics of different internal schemata are determined for tuning in the environmental test stage.

Heuristic analysis continues until the ratio of new users' scenarios to metadata changes reaches an acceptable level, e.g., 100 to 1. This can usually be determined from a forecast of the cost that will be incurred in making a metadata change in the quality control stage of PDM-80.

**Environmental test.** After the heuristic analysis stage, individual prototypes are at maximum effectiveness and are logically integrated through the conceptual schema. During the environmental test phases, individual prototypes are improved from an efficiency perspective and can also be physically integrated. For example, a "work package" prototype and a "financial" prototype are in fact logically integrated because they share entities in the conceptual schema. They may not be physically integrated because they employ different internal schemata. For efficiency purposes, they may be consolidated physically into a different DBMS, such as IMS.

**Quality control.** During the quality control stage, new requirements are constantly scrutinized to determine whether they require metadata changes or even changes in relationships among existing entities in the conceptual schema. Such changes may be occasioned by new business rules or new critical success factors.

Each proposed requirements change is evaluated to determine its effect on efficiency or effectiveness of the information resource. Requirements which change the efficiency can be dealt with by reinvoking the environmental test stage. Requirements which improve effectiveness are dealt with by reestablishing an heuristic analysis stage, or, indeed, even returning to the operational review stage to start a whole new project.

—D.A.

be validated and integrated by synthesizing metadata from different areas into one integrated neutral structure or conceptual schema, which can be mapped, in turn, into many different physical structures (called internal schema) as well as many different user views (called external schema). It is the notion of managing development with a conceptual schema that makes this form of prototyping "data driven."

4. To define macros that compute or derive new data from stored data. When these macros are incorporated into the database, they become available for everyone's use. The process of deriving macros is called abstraction. Incorporating them into the database is called database extension. The economics of abstraction and extension are most easily determined through prototyping.

5. To validate domains. Domains de-

fine what values data elements can take. Some of them are extremely complex and hard to guess. However, next to adding new data elements to a database, domain redefinition is the most expensive, time-consuming, and disruptive activity a data processing department performs. Prototyping is the best way to validate domains.

6. To evaluate update and retrieval efficiency. By exercising prototypes, data-

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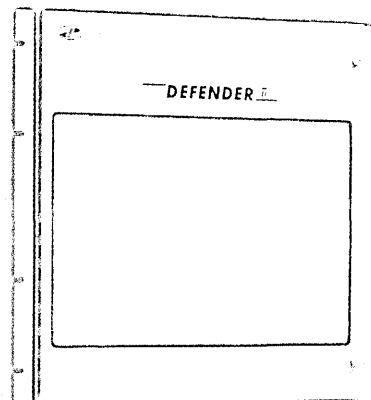
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## Implementing a data-driven prototyping methodology is not a trivial exercise.

base designers can use empirical evidence to determine how certain combinations of transactions and database structures will perform given different update and access patterns. This helps to optimize transaction and database efficiency.

7. To improve physical database design. Prototypes lead to more informed development of physical structures for files and databases.

8. To anticipate changes. Given an unrestrained effort to define new information requirements, prototypes should be exercised until those requirements can be accommodated with an absolute minimum of metadata changes.

9. To facilitate implementation and acceptance. Users involved in building and exercising prototypes are more likely to accept the final product, and they better understand its data capabilities and limitations.

Application prototypers tend to focus on the last point—that is, selling the user. Some attention is paid to the first point (validate information requirements), but it is done with an eye to discovering which requirements to freeze. They're also concerned with points six and seven. But rapid prototyping,

screen prototyping, subroutine prototyping, and quick and dirty prototyping all lack the procedures necessary to perform the nine prototyping tasks well.

### MANAGING THE DATA RESOURCE

There is little argument that in order to achieve productivity gains and become more responsive to information users, dp shops must manage the data resource, instead of just the machine or application resource. The problem is that of the three, data is the least understood. The inability of data processing departments to achieve data management goals is one more instance of a familiar phenomenon: the methods employed affect the actual outcome more than the objectives do.

To achieve a data-driven environment, you must not only plan to do it, you must also modify your systems development methods so that it comes naturally. This is true even if you build supposedly data-driven plans using one of the avant-garde planning methodologies like Data Planner or Subject Databases. The key to achieving a data-driven environment is in the methods and tools you employ to implement end-user applica-

tions and shared databases.

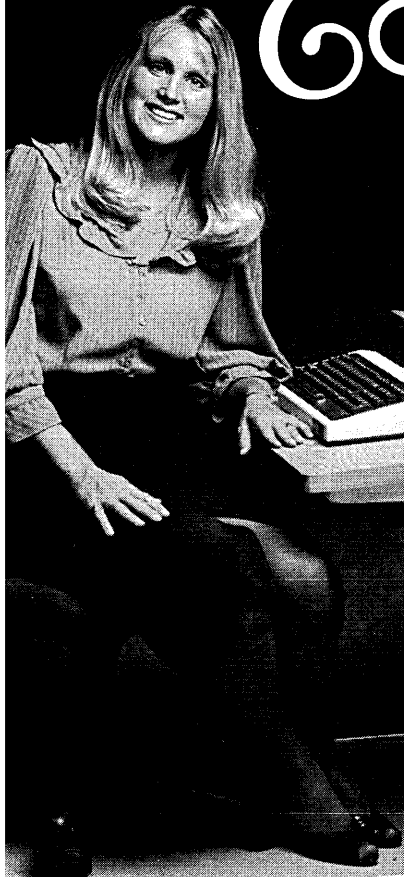
Data-driven prototyping provides the orientation necessary to redefine a systems development methodology so that it automatically provides a manageable data resource. The purposes of data-driven prototyping are to develop and maintain open systems (shared databases) that are constantly being extended to accommodate new information requirements. This is the essential management problem of a data-driven data processing environment, which Richard Nolan called Stage 5 (*Harvard Business Review*, March-April 1979).

Data-driven prototyping is focused on data and metadata discovery, validation, and integration. It provides the service of managing the migration of data from private to shared status (which happens over short periods of time) and the means of monitoring—even anticipating—and improving efficiency as the logical data management problem is continually transformed into the physical environment of heterogeneous, distributed files and databases.

Implementing a data-driven prototyping methodology is not a trivial exercise. It is not simply a matter of inserting a prototyping

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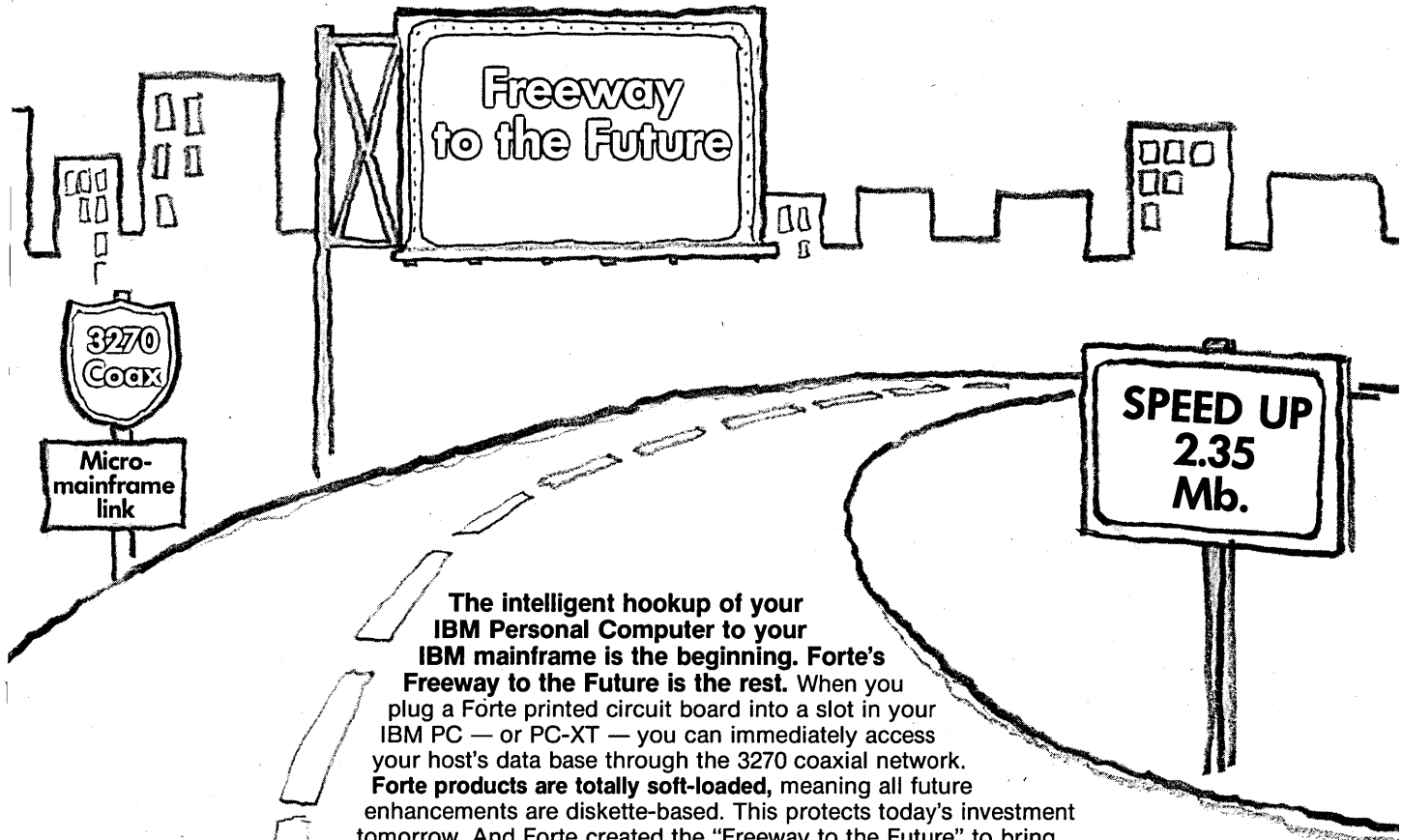
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# Companies that do not move into the data-driven direction will either drown in their own information pollution or lose millions of dollars on outmoded systems.

step or steps into a traditional functional decomposition strategy. The greatest danger is the lure of the fast food approach: buy a software tool (a 4GL, a relational DBMS, a screen generator, or a data modeling tool) and do what feels good. This leads to trouble, because it's critical that the software tools be held hostage to an overall prototyping methodology that defines when to use them and what to do with their results. In fact, the controlling role of the methodology is so important to achieving a data-driven environment that I prefer to call it *Methodware*.

Prototyping Methodware consists of three essential parts (Fig. 1). The first is the capability to describe neutral metadata—metadata that is independent of any physical computer or DBMS constraint, and independent of any specific report format or information requirement. The Methodware for defining neutral metadata is sometimes called information modeling. It is used to discover the structure of metadata, and it must provide for easy extension to the metadata structure to accommodate newly integrated data. This Methodware must also provide for easy transformation of neutral metadata into all DBMS data models (for example, hierarchic, network, or relational).

The second essential part of prototyping Methodware provides the capability to describe information requirements. This type of Methodware is sometimes called activity modeling. It must be integrated with the Methodware used to describe metadata so that information requirements can be used to validate the metadata.

## THE SIX BASIC STEPS

The third essential part of the prototyping Methodware controls and sequences project activities.

This part controls what happens and when; it tells you what to prototype and when to stop. As shown in Fig. 2, it consists of six basic steps:

1. Operational review—define project scope; evaluate "as is" environment; evaluate current metadata structures within the scope.

2. Conceptual design—define proposed metadata structures; build scenarios to describe service functions for changing data states and retrieving data.

3. Data design—normalize metadata; transform logical structure into physical structure for appropriate DBMS data models; extend the conceptual schema, integrating new metadata into the existing structure.

4. Heuristic analysis—exercise requirements scenarios against metadata structures using real data values, changing metadata until the ratio of changes to new scenarios reaches an acceptable level usually based

FIG. 1

## DATA-DRIVEN PROTOTYPING METHODWARE

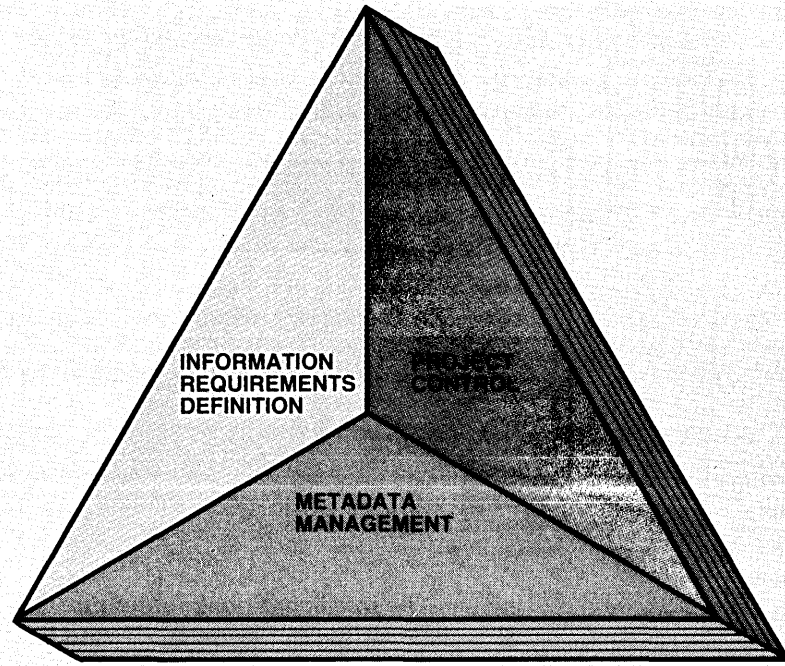
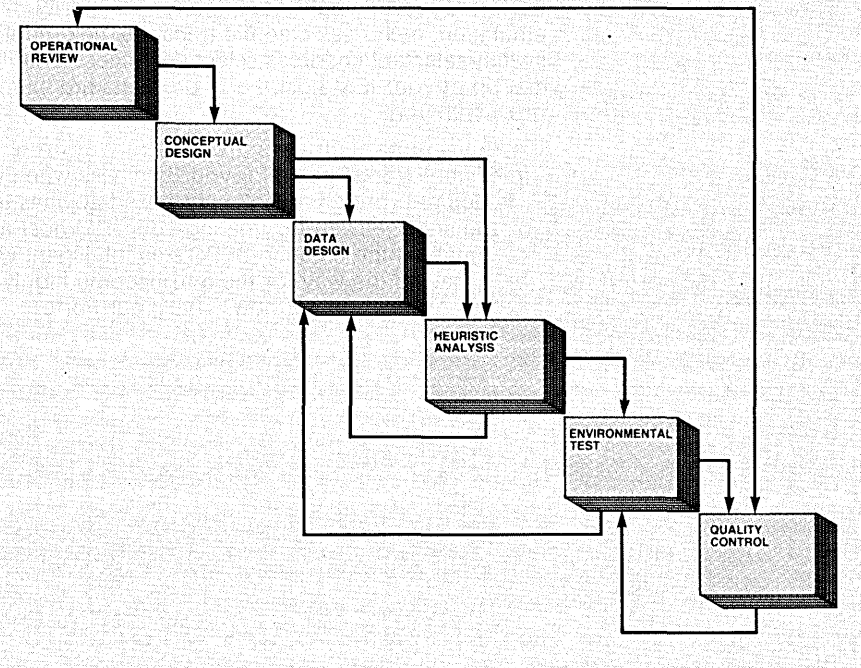
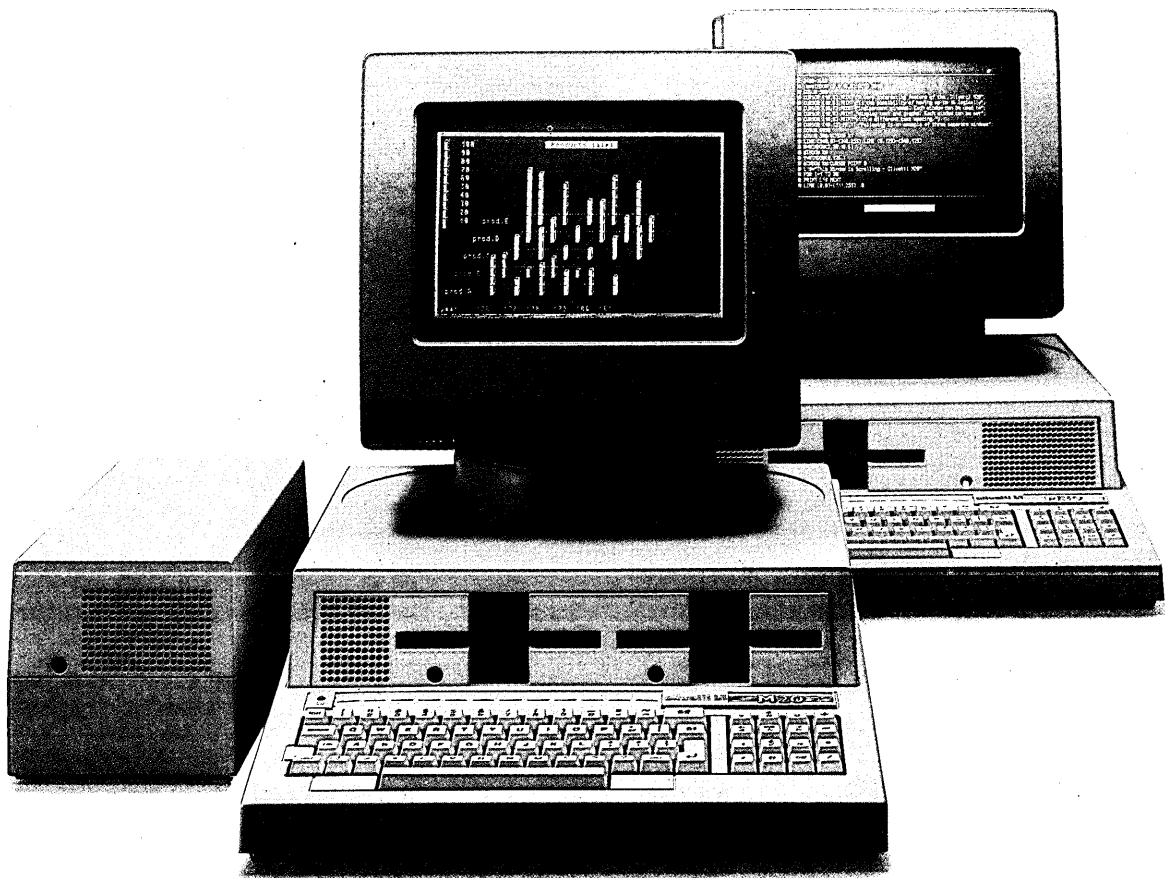


FIG. 2

## SIX ITERATIVE STEPS IN DATA-DRIVEN PROTOTYPING





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# The nature of end-user software development and maintenance will change radically over the next five years.

FIG. 3

## SOFTWARE TOOLS FOR DATA-DRIVEN PROTOTYPING

### TOOLS EMPLOYED IN PROTOTYPING STEPS

| Prototyping Steps     | Software Tools    |                |                               |                              |                        |               |                        |                              |
|-----------------------|-------------------|----------------|-------------------------------|------------------------------|------------------------|---------------|------------------------|------------------------------|
|                       | Information Model | Activity Model | Project Control/Documentation | Three-Schema Data Dictionary | Relational DBMS or AGL | Standard DBMS | Structured Programming | Performance Monitoring Tools |
| 1. Operational Review | X                 | X              | X                             | X                            |                        |               |                        |                              |
| 2. Conceptual Design  | X                 | X              | X                             | X                            |                        |               |                        |                              |
| 3. Data Design        | X                 | X              | X                             | X                            | X                      | X             |                        |                              |
| 4. Heuristic Analysis | X                 | X              | X                             | X                            | X                      |               |                        | X                            |
| 5. Environmental Test |                   |                | X                             | X                            | X                      | X             | X                      | X                            |
| 6. Quality Control    |                   |                | X                             | X                            |                        | X             | X                      | X                            |

### TOOLS EMPLOYED IN PROTOTYPING ENVIRONMENTS

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| Info Center Configuration                   | X | X | X | X | X |   |   |   |
| Integrated Info Center/<br>Dp Configuration | X | X | X | X | X | X | X | X |

on cost; iterate with step three.

5. Environment test—build programs to support data acquisition (update) service functions, based on performance, data integrity, backup, recovery, and security constraints; build software structures for supporting data retrieval service functions based on efficiency and effectiveness criteria.

6. Quality control—provide performance monitoring tools and targets; filter new requirements (or service functions) based on their potential effect on the conceptual schema.

Each of these steps must be supported by a complement of software tools, namely: an information modeling tool, an activity modeling tool, a project control/documentation tool, a "three-schema" data dictionary, and a relational DBMS or fourth generation language.

In addition, some organizations may want to include the following software tools to support their data-driven prototyping Methodware: a standard DBMS, including its two-schema data dictionary; a set of structured programming aids; and a set of performance-monitoring software tools.

Fig. 3 describes two different configurations of tools and steps. The first configuration is typical of an information center environment. Here the user is building proto-

types and will probably not want to perform steps five and six, since after step four he has his database. The second configuration is typical of an environment wherein prototypes are being constructed on information centers (by users) or application development centers (by the data processing department) and subsequently integrated into a production environment, using, say IMS or IDMS as the production DBMS. In this environment, the databases can be thought of as migrating from private to shared status. As they do so, the notion of who can change the prototype begins to change, and issues of data integrity, security, shareability, accessibility, recoverability, performance, and so on become much more important and difficult.

Both configurations exist today, but because of the popularity of prototyping in end-user computer environments, the most popular scenarios implement variations on the first configuration. The second configuration will, over the next five years, become the dominant methodology for developing end-user applications and shared databases, because it provides a natural conduit from prototype to production. The first configuration tends to leave prototypes stranded on information centers, never providing for their incorporation into the production environment.

The nature of end-user software de-

velopment and maintenance will change radically over the next five years simply because 500,000 programmers will not be able to rewrite \$400 billion of existing software (which is hostage to a seven- to 10-year life cycle). They'll be further burdened by those new applications in the known backlog, as well as by those applications in the hidden backlog. To solve the problem, dp shops must improve productivity in generating end-user software and provide end-users with the means of generating their own software without creating anarchy. The trick is to establish a cooperative systems development environment. The key to this cooperative environment is prototyping but not application prototyping. That approach fosters neither cooperation nor integration. The answer is a data-driven prototyping approach, and companies that do not move smoothly in this direction will either drown in their own information pollution or lose millions of dollars on systems that are late, cost too much, and atrophy too quickly.

Dan Appleton, president of D. Appleton Co. (DACOM), Manhattan Beach, Calif., is recognized internationally as an expert in data management technology and prototyping. In 1973, he published a landmark article on prototyping.



# **SCIENCE/SCOPE**

Landsat 4 is being used to study toxic waste disposal sites in the northern part of San Francisco Bay. NASA scientists are using data from the Earth resources satellite to study water quality, stress on vegetation, land use, soils, surface geology, and topography around more than 20 existing and abandoned disposal sites. One objective is to determine criteria for buffer zones around the sites. Providing data is Landsat's multispectral scanner, an imaging instrument built by Hughes Aircraft Company and its Santa Barbara Research Center subsidiary.

Military commanders who previously relied on second-hand information now can get vital data instantly through a new communications terminal. The ground-based terminal is connected to a display console to show surveillance information provided by E3A early-warning radar aircraft and the Joint Tactical Information Distribution System (JTIDS). Unlike previous terminals, which are operated as part of a full command and control network, the new terminal can give second- and third-echelon commanders the situation in their immediate vicinity. The new Hughes terminal, called a Stand-Alone, can be transported easily and set up in an existing facility, or installed in a small shelter or command vehicle.

A network of small "smart" radios will let U.S. troops and their commanders know where they and friendly forces are located at all times. With the Position Location Reporting System (PLRS), combat troops will no longer have to seek landmarks to pinpoint their location. PLRS automatically supplies position and navigation data in digital form through a computerized communications network that displays data on a small hand-held box. PLRS units can be mounted on vehicles, aircraft, and helicopters. All units serve as automatic relay stations, so that units far away from a master station can stay in touch regardless of terrain or weather. Hughes is producing PLRS for the U.S. Army and Marine Corps.

Much as a TV picture is made, the newest U.S. weather satellite can create a full portrait of Earth in about 18 minutes. GOES-6 (Geostationary Operational Environmental Satellite) views the western U.S. and the Pacific from its orbital slot 22,300 miles above the equator. While the satellite's antennas remain fixed and pointed toward Earth, its body spins at 100 rpm for gyroscopic stability. Housed in the spinning portion is the picture-taking instrument, which makes a west-east scan of Earth one line at a time. On each scan, the instrument's mirror steps down 1/100th of a degree. Some 1,800 scans are needed for a full-disc image of Earth. Hughes built GOES-6 for the National Oceanic and Atmospheric Administration as part of the World Weather Watch project.

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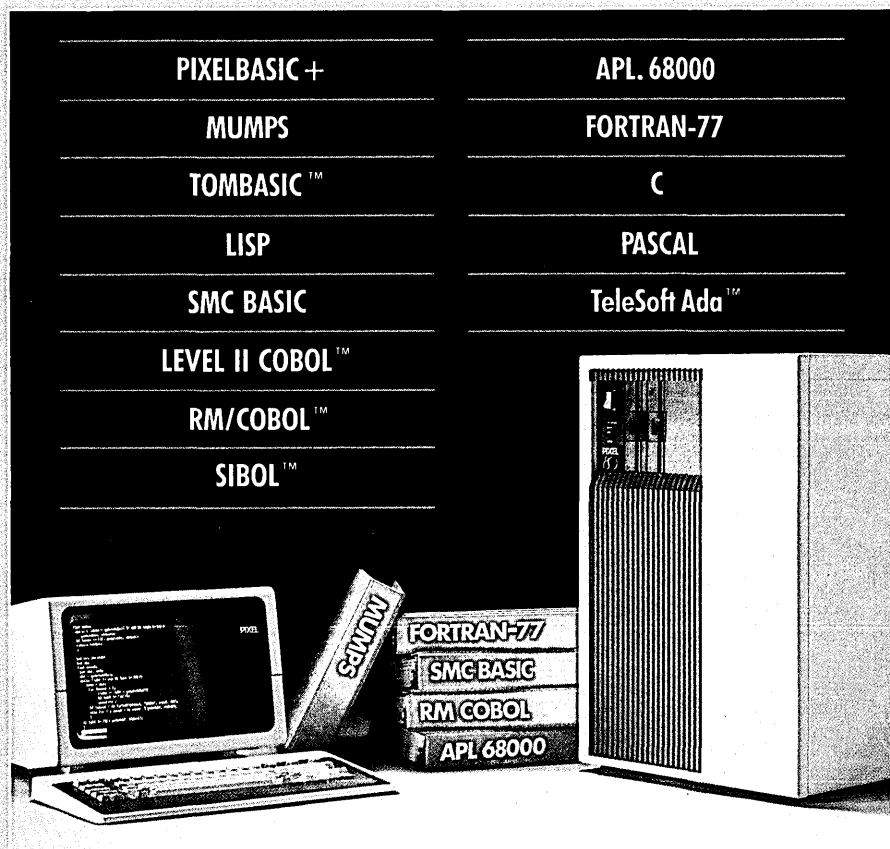
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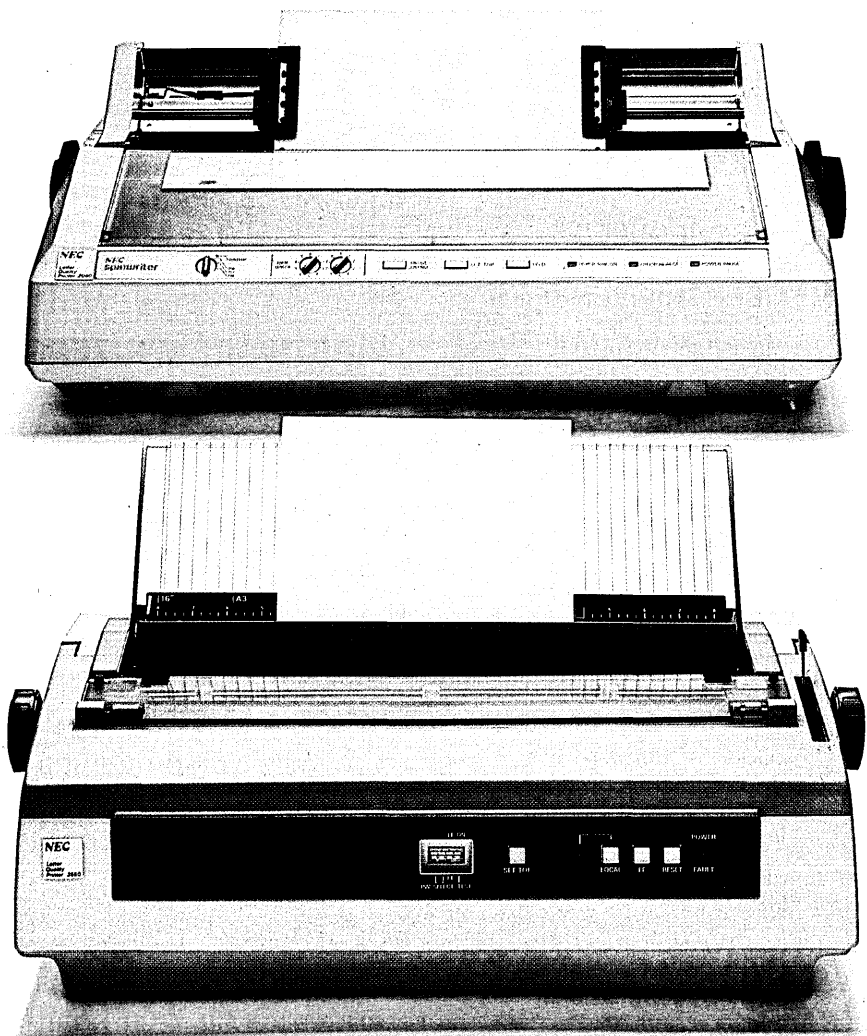
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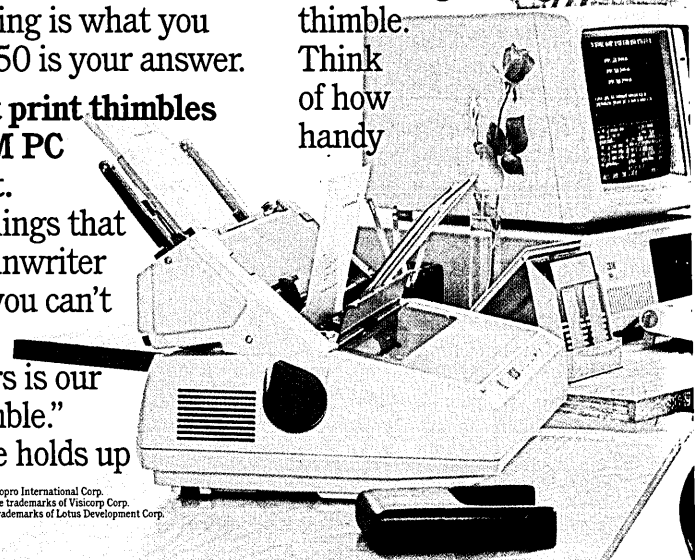
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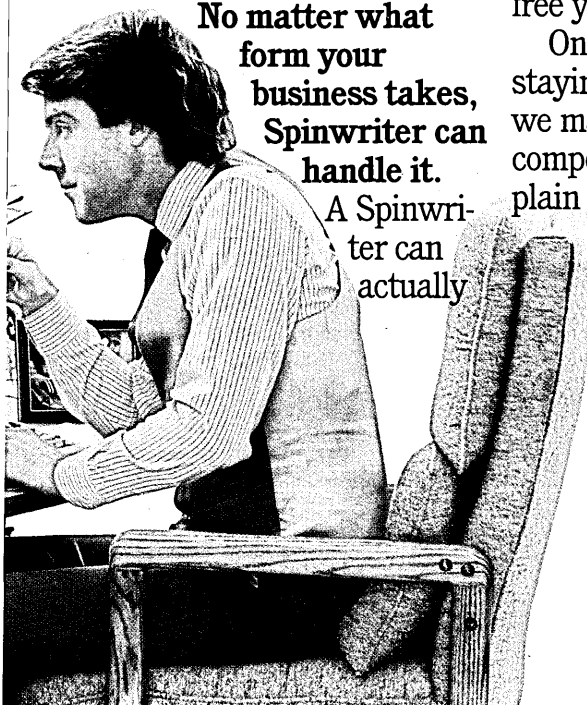
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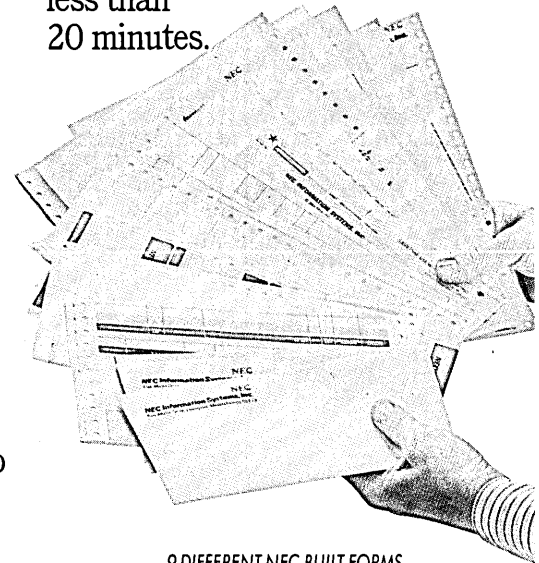
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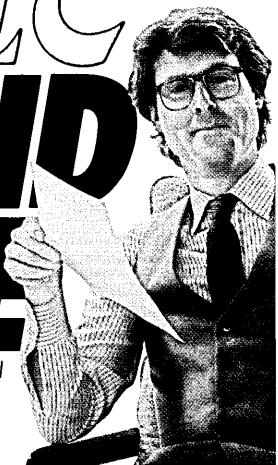


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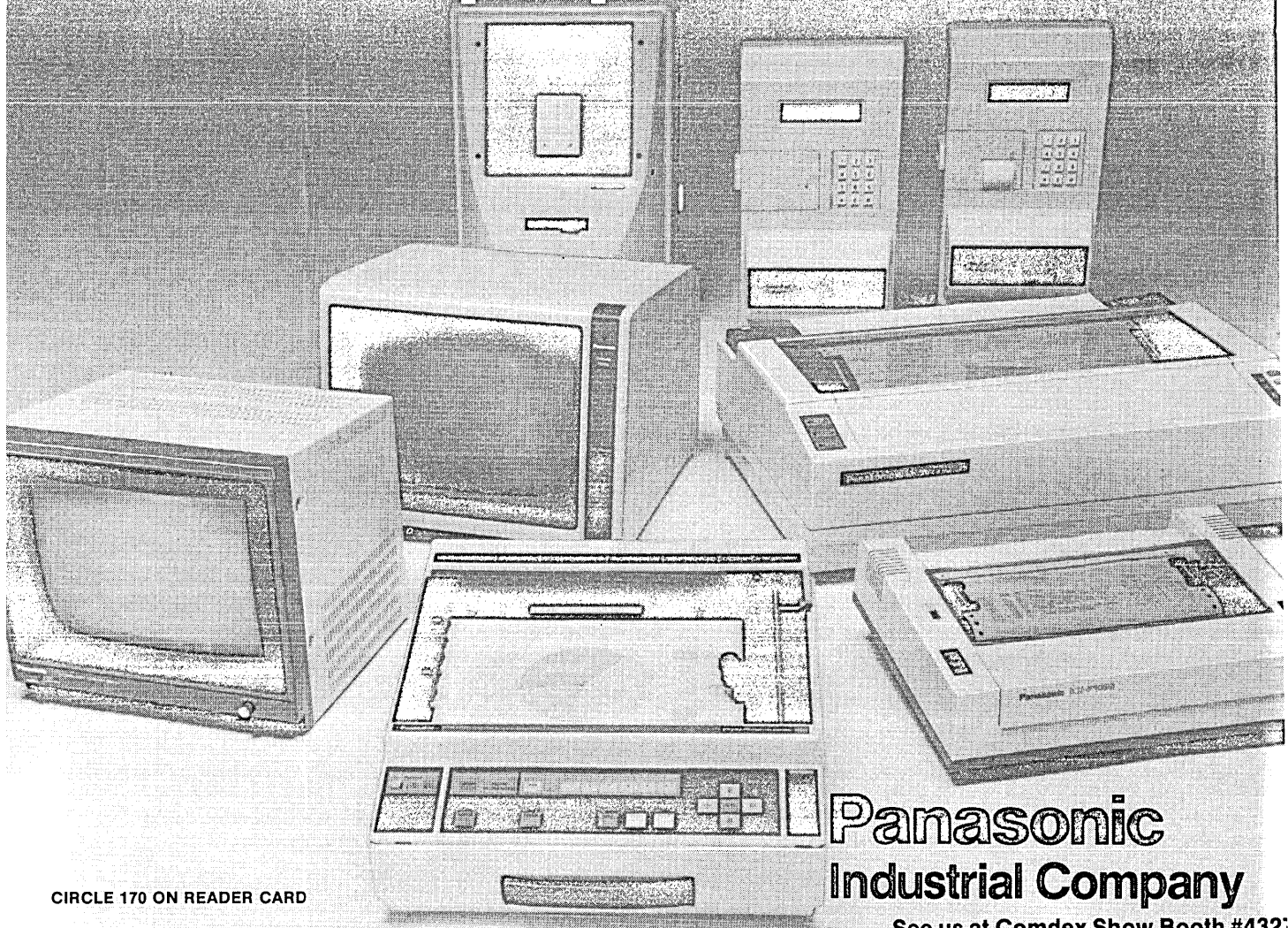
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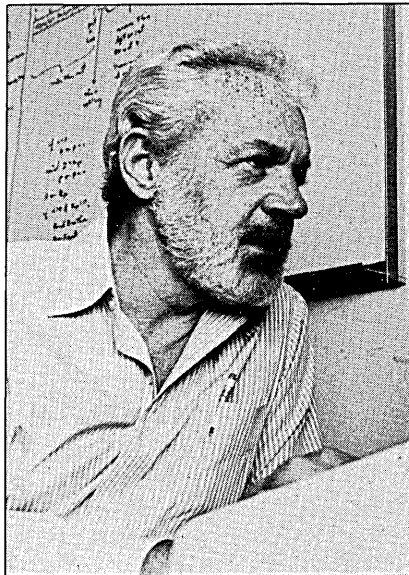
Personnel: Four people and a 10-month-old Siberian husky.

Explanation: David E. Ferguson, chairman of the one-year-old company he prefers to call ASNA.

At 51, Ferguson is doing what he's liked best for the last 27 years—improving on IBM's systems software. For ASNA, he's developed a data management system for the IBM System/34 that he calls Acceler8 and which, he contends, makes the machine run five times faster and eliminates key sorts. He calls IBM's data management for the 34 "a dinosaur from the '60s."

The holder of three software patents (he was the first person to receive a software patent, in 1967, for a method of encoding information), Ferguson has applied for a fourth on an aspect of Acceler8. "It's the way we write an index sector that's unique, what gives us faster access time. The rest is advanced but known art."

Ferguson hasn't spent all of the last 27 years writing systems software. He's taken time out to do battle in court twice, once with Fletcher Jones and Computer Sciences Corp. (he won) and once with IBM (he lost). And he's found time to take an active



FERGUSON: Improving on IBM's small systems software for 27 years.

part in a wine and food society and to enjoy fast cars.

Ferguson first became interested in math at the age of 7 when he picked up algebra. It made sense to him. The son of Albert Ford Ferguson and Craig Rice, a sensational mystery writer of the late '30s and early '40s, he spent the years from 3 to 10 in a boarding school.

He quit high school after one year because there wasn't anything there to excite him. He bummed around the country on a motorcycle for a year, then joined the Navy when he was 16 with a phony birth certificate and his mother's blessing. He "blew the top off" a math test in the Navy and was sent to electronics school for a year. "I loved it."

After four years with the Navy, he enrolled at UCLA as a math major. While still a student in 1956, he went to work for IBM's Service Bureau Corp. as a programmer working on the 704. "While there [SBC], I got advance information on the 709 and found out UCLA was getting a 709 and would be needing a 709 programmer. It was an exceptional opportunity for me. I was very lucky. There wasn't much money, but they sent me all over the world to conferences."

While working for UCLA, Ferguson took a look at IBM's assembler program for the 709 and decided, "Gee, that's no good at all," and wrote a better one, FAP (FORTRAN Assembly Program). SHARE, the big IBM user group, forced IBM to adopt and support FAP, and it became an industry standard. "IBM took over. We gave them the code and the documentation. In one FAP manual IBM actually gave me credit."

Ferguson left UCLA in 1959 for Computer Sciences Corp., lured there by founder Fletcher Jones, whom he had met through SHARE. "I liked CSC. We did a lot of original things. Everything we did was original. We were the only people doing systems programming."

"Fletcher fired me in '63," he recalls. "He thought I was starting my own company and I was. He thought I was taking his people. I did take his personal secretary."

Earlier, Ferguson had been tempted to leave CSC to accept an attractive offer from the University of California, Berkeley. "Fletcher offered to buy me a yacht if I'd agree to stay three years. I learned that he would actually own the yacht for the three years, so we agreed on a three-step, \$10,000 bonus instead." He had received \$6,000 of the \$10,000 when he was fired,

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## PEOPLE

and CSC and Jones sued to recover that. Ferguson countersued for unpaid vacation pay and profit sharing in the sum of \$3,000. Ferguson won and CSC lost in the litigation, which went up to the California Supreme Court.

It was at Programmatic Inc., the firm he formed after leaving CSC, that Ferguson took on IBM in court. He had developed PISORT, a DOS sort replacement for the 360 that ran twice as fast as IBM's DOS sort program. IBM countered with SORT 483, and Ferguson sued for damages and an injunction preventing IBM from selling its program. He lost this suit in a New York federal court.

Programmatic was sold in 1969 to Applied Data Research. Ferguson stayed on with ADR until 1972. "I thought they should focus on the smaller business market and they wanted [RCA's] Spectra 70."

He pursued the smaller business market with Group 3, a for-profit user group for System/3 users. Among other things it developed System/3 software. This organization was sold to Informatics in 1974 and Ferguson stayed with it for two more years.

"I just did free-lance consulting after that. I'd found out I wasn't a very good employer or employee." A year and a half later, Informatics decided to get out of the small systems software business and asked him if he'd like to buy back all of his software. "The price was right. They just gave it to me. I was to pay them a 10% royalty on anything I sold." He put together a catalog and started selling, doing business as Ferguson Tool Co.

"Then I decided the System/34 was where it's at, that the System/3 was evaporating." Hence, ASNA, his current company. Acceler8 went into beta test sites at the end of May and shipments started in midsummer.

Ferguson is looking ahead. He'd like to do for the System/36 what he's done for the 34 and he probably will if he can get the IBM source code. He has a System/36 on order.

Another probable future product is a database management system for the System/34. "The data management system had to come first. DBMS will be a tougher marketplace. Here [with data management] the system is transparent. With DBMS we'll get into publications and training. It will be a much stiffer sale."

Will he do it? "Yeah." But the data management system for the 36 will come first. He won't tackle the System/38. "No one man could handle the 38 and I don't want to be a big programming shop." He plans to expand beyond his current four-person (including his wife Ann), one-dog staff, but not a lot. "We'll need more clerical and marketing help and I would like to have another programmer."

—Edith Myers



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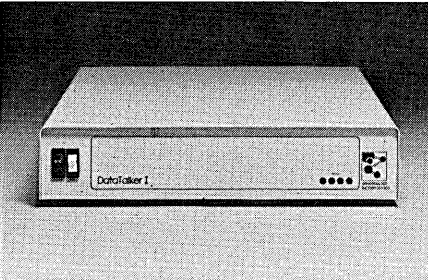
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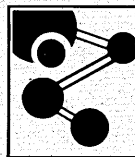
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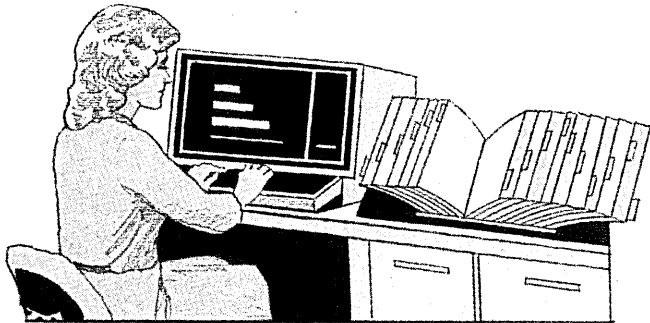
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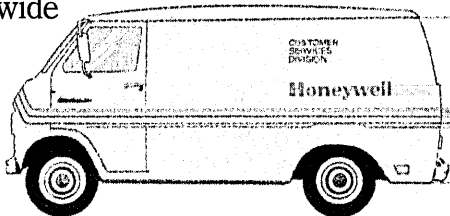
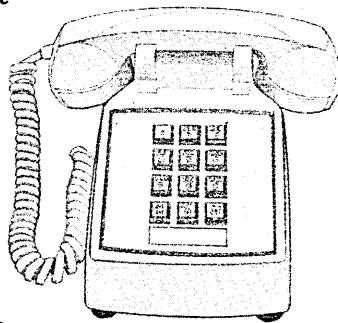
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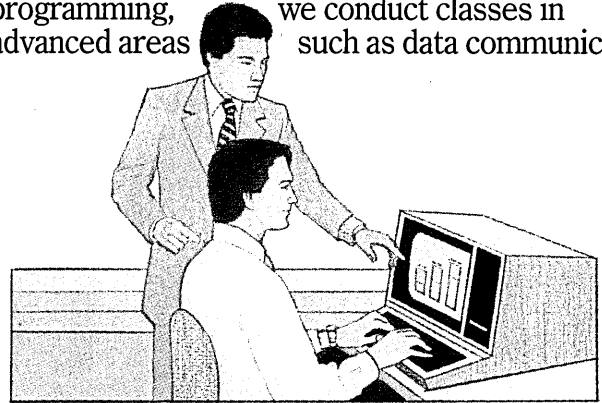


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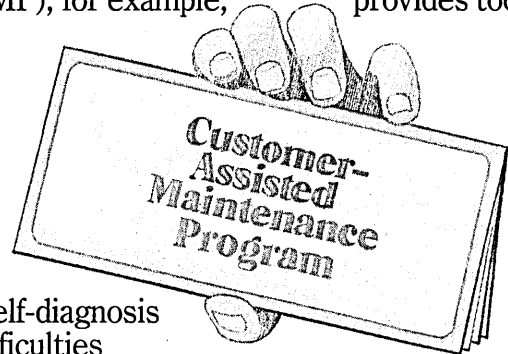


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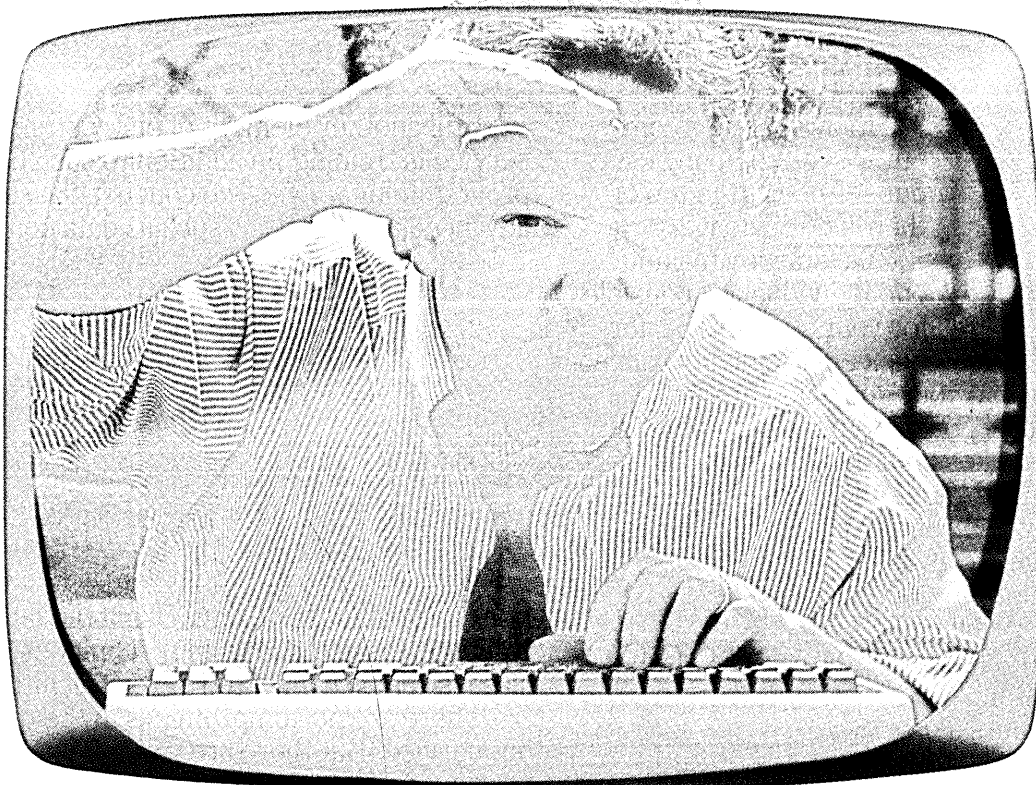
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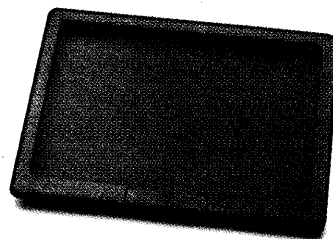
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CIRCLE 131 ON READER CARD

# HARDWARE

## OFFLINE

Kitchen appliances often provide excellent comparisons when discussing the size and shape of computers. For example, everyone knows that minis look like refrigerators. So what do you call superminis like the Zilog System 8000 or the NCR Tower 1632, which are tall and deep and thin? A marketing exec at one maker recently dubbed them "trashmashers." We hope that reflects on their shapes and not on the data they process.

'Tis the month for optical disk drive introductions. A few weeks ago Storage Technology came out with its 7600 series, which includes an optical drive with 3Mbps transfer rate and a single-sided nonerasable capacity of 4GB per 14-inch platter. Then Shurgart Associates jumped into the fray with its Optimem 1000, a 1GB per 12-inch platter nonerasable drive. STC's costs over \$100,000, while Shugart's costs about \$6,000 in oem quantities. Shugart's can almost fit on a desk, while STC's is about as big as, well, a refrigerator. Creative Strategies International, a San Jose research firm, says the optical disk market will soar from nothing now to \$5.5 billion in 1988.

One solution to the two-terminal desk is offered by Boulder-based Systems Concepts of Colorado. The firm's SMS-1 is a passive switching box small enough to stick on the side of a 3278 unobtrusively. The \$28 box allows users to switch manually between two networks.

Mitsubishi recently announced a television that can print hard-copy. Their marketing intent may veer more toward homemade pinups of Tom Selleck or Joan Collins, but personal computer users may find it a useful monitor/printer combination. U.S. cost is about \$320.

## SUPERMINI

This vendor's model 1000 ECL-based supermini-computer offers almost 4MIPS performance for users in engineering, scientific, technical, and industrial applications. The computer uses 100K ECL, which uses less power than 10K ECL and is temperature compensated. The unit is fully compatible with all of the vendor's smaller computer systems, and supports the same memory, I/O, peripherals, and current software.

The computer uses pipeline processing so that seven instructions can be processed simultaneously with a cpu cycle time of 75 nsec. Hardware implementations of virtual memory and transcendental functions are designed to enhance overall computational performance. The unit supports 32-bit single precision, 48-bit double precision, 64-bit triple precision, and 96-bit quadruple precision, all of which are implemented in hardware.

The 1000 uses cpu microcode for instructional enhancements in RAM, so field upgrades can be performed more easily. The processor boards, however, are larger than previous models', meaning that the entire card cage needs to be replaced, including peripheral boards.

The basic configuration of the 1000 includes a cpu with 6KB of cache, 16 external interrupts, a line frequency clock, and an interval timer; 1.5MB integrated memory subsystem (the vendor's term for main memory); a communications network processor with operator's console and maintenance aid processor terminal; the VOS operating system; and dual cabinets with space for four rack-mountable peripherals. This configuration costs \$250,000. HARRIS CORP., Computer Systems Division, Fort Lauderdale, Fla.

**FOR DATA CIRCLE 301 ON READER CARD**

## LASER PRINTER

The model 8211 nonimpact laser page printer prints 4,000 lines per minute with a resolution of 240 x 240 dots per inch. Designed to emulate the IBM 3800, the unit is

compatible with all IBM mainframes and operating systems, and is optimized for Calcomp and SAS plotting software.

The printer has an electronic forms overlay capability that lets users design and print forms in real time, rather than sending them out for film creation. Logotypes and other forms can be stored digitally, so that blank pages can be printed with both the form and the actual printed matter merged in proper alignment. The unit's low temperature fusing technique does not affect heat-sensitive materials, such as gummed labels, the vendor says.

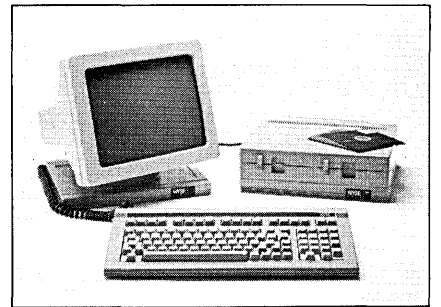
The model 5211 is a related, 20 page per minute nonimpact printer. It, too, has the electronic forms overlay feature, as well as an optical image overlay that merges copy, graphics, and forms (from the host) on a preprinted document. A charge-coupled scanning feature uses a charge-coupled device to scan the merged material and send bit data to the host for later generation by the host computer.

The 8211 costs \$95,000, while the 5211 costs \$25,000. Each comes with a standard parallel or serial interface, although IBM 328X and 3770 interfaces are also available. The vendor is a subsidiary of Kanematsu-Gosho in Tokyo. KEL INC., New York, N.Y.

**FOR DATA CIRCLE 302 ON READER CARD**

## MICRO MODULE

This vendor's microcomputer is essentially its WY-50 terminal with an 80186-based processor module added on. The intent is to



## HARDWARE

provide a micro that is designed from the ground up to act as part of a large corporate network rather than to provide a desktop computer with primary concern for the standalone applications.

The micro module is designed to sit underneath the pedestal of the terminal, so that the total footprint will be identical to the terminal's. The module comes with two 5¼-in. floppy disk drives, 12KB of RAM, and three I/O ports. Initial memory capacity can be expanded to 256KB, and an optional card provides another 512KB.

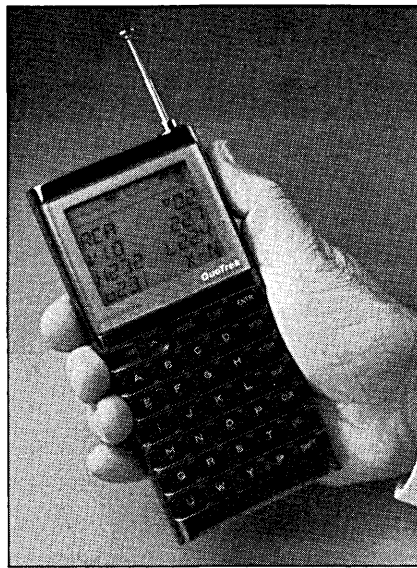
The WY-1000, as the micro is called, is offered with either CP/M-86 or MS/DOS, but no claim is made for IBM P.C. compatibility. The 80186 operates at 8MHz, significantly faster than most 8086- or 8088-based micros, but it can be used by only one person. Options include high resolution graphics that operate in conjunction with the WY-50 monochrome terminal or the WY-300 color terminal. Monochrome resolution is 800 x 338 and color display resolution is 800 x 286 pixels. Up to 16 colors can be displayed simultaneously.

The micro costs \$2,500 for a complete system, including the WY-50 terminal. The WY-300 can be added for an additional fee, but the vendor's WY-100 and WY-200 terminals cannot be attached to the module. WYSE TECHNOLOGY, San Jose, Calif.

**FOR DATA CIRCLE 303 ON READER CARD**

## STOCK QUOTES

QuoTrek is a cordless, pocket-sized receiver that tracks current trading information from the New York and American stock exchanges, the National Association of Securities Dealers over-the-counter market, the Chicago Mercantile Exchange, the Chi-



cago Board of Trade, and the Commodity Exchange Corp. The vendor says that the receiver gives investors transaction prices immediately, without the delays encountered with some other services.

The vendor receives stock and commodity price information from computers at each exchange and transmits it via satellite to an FM radio station. The station broadcasts the trading data over the subcarrier portion of the FM broadcast signal to the QuoTrek device; the portable receiver can then display the data on its screen. (Currently, only KQED in San Francisco has agreed to provide the service.)

An investor can enter as many as 40 stocks and commodities in QuoTrek's memory bank for easy access, or can call up trading information on any publicly traded

stock. The battery-powered device is switched on when the market opens, and data are transmitted to the unit's memory as the trades occur. The investor calls up the stock or commodity by its trading symbol, and the 40-character liquid crystal display shows last sale, up/down tick, high, low, open, and total volume. The device can be used up to 40 miles from the FM broadcast antenna. It costs \$400, with a \$60 monthly charge and exchange fees added on. It can also be leased for \$125 per month plus exchange fees. A SportsTicker option, which costs \$5, provides late scores for several sports. DATASPEED INC., Burlingame, Calif.

**FOR DATA CIRCLE 306 ON READER CARD**

## DATA TRANSPORT

The INA/BTS (Integrated Network Architecture/Binary Synchronous Communications Transport System) transports synchronous data formatted under the IBM 3270 BSC protocol through this vendor's INA network. The unit can transmit both synchronous and asynchronous data through the same telephone lines, and eliminate the overhead of poll/response through the network. It is designed to completely support the operation of remotely attached 3270 control units and their associated displays, keyboards, printers, and ancillary devices.

Each INA/BTS unit manages one or two sync communications links operating under BSC. Each of the links may operate at up to 9.6Kbps with a maximum aggregate speed of 19.2Kbps. Each link connects the INA network either to an IBM host control unit or to a 3270 display system. On the host end, the INA/BTS unit acts as a BSC tributary device, emulating the operation of 3270 devices. The unit may be multi-dropped with other devices that act as BSC tributaries. Starting price for the unit is \$1,000.

The INA/ATS (INA/Asynchronous Terminal Controller) allows async ASCII terminals, either connected directly or attached via dial-up to the INA network, to communicate with an IBM or compatible computer using the 3270 BSC or SNA protocols. Up to 24 terminals can be interfaced to the host over a single 9,600bps line. The INA/ATS appears to the SNA host as an IBM 3274 model 21C, 31C, or 51C, or as a 3276-12 control unit. To the BSC host, the device appears to be a BSC-oriented 3271, 3274, or 3276. The device supports over 100 different async terminals. The unit costs \$8,950. DIGITAL COMMUNICATIONS ASSOCIATES INC., Norcross, Ga.

**FOR DATA CIRCLE 304 ON READER CARD**

## GRAPHICS CARDS

This vendor will be introducing three graphics cards later this month at COMDEX. The IDEagraph series, as they are called, provide high, medium, and low resolutions for CADD, business, and other applications, in combination with monochrome or color

## HARDWARE SPOTLIGHT

### PORTABLE SPREADSHEET

The WorkSlate portable computer is specifically designed to perform spreadsheet and related applications in a mobile environment. The lap-sized unit uses an 8-bit CMOS microprocessor, has a typewriter keyboard and numeric keypad, and offers what is said to be the industry's first 16 line by 46 character liquid crystal display. The unit combines 80KB of RAM and ROM for system software and user worksheets. The user can store up to five active worksheets in memory or save 10 worksheets with concurrent voice annotation on a microcassette.

The product allows the user to build integrated electronic worksheets for formatting information and data to prepare a variety of business and financial reports. Information is organized in a format of rows and columns, which supports the entry of numbers, words, formulas, and special commands. The user can enter information at any time. The worksheets also have "what-if" capabilities.

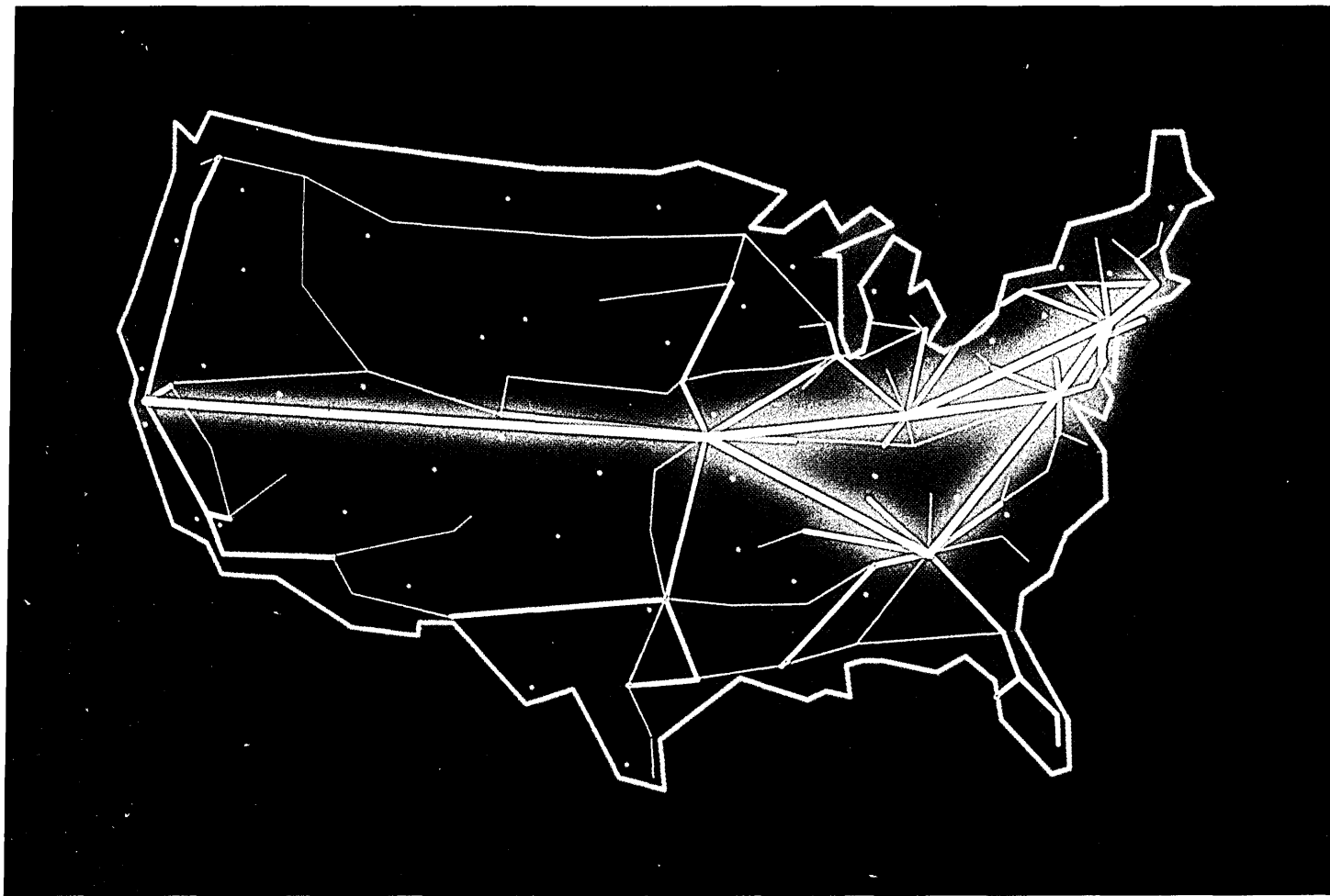
The WorkSlate also serves as a tape recorder, calculator, speakerphone, automatic dialing telephone, and terminal for other computers and databases. The user can also use WorkSlate as an electronic notebook for appointments, telephone numbers, and reminders. The voice functions are provided by the same on-board microcassette recorder that acts as a small tape drive.

In addition to all these inherent functions, WorkSlate can be enhanced by what the vendor calls "taskware," which is essentially a set of preformatted worksheets recorded on microcassettes. Ten taskware packages are currently available, including portfolio analysis, estate planning, and personal tax. The vendor says that 10 new titles will be announced each quarter.

The unit costs \$900. Taskware cassettes cost between \$20 and \$50, depending on the applications. A microprinter is available for \$250. CONVERGENT TECHNOLOGIES INC., Santa Clara, Calif.

**FOR DATA CIRCLE 300 ON READER CARD**





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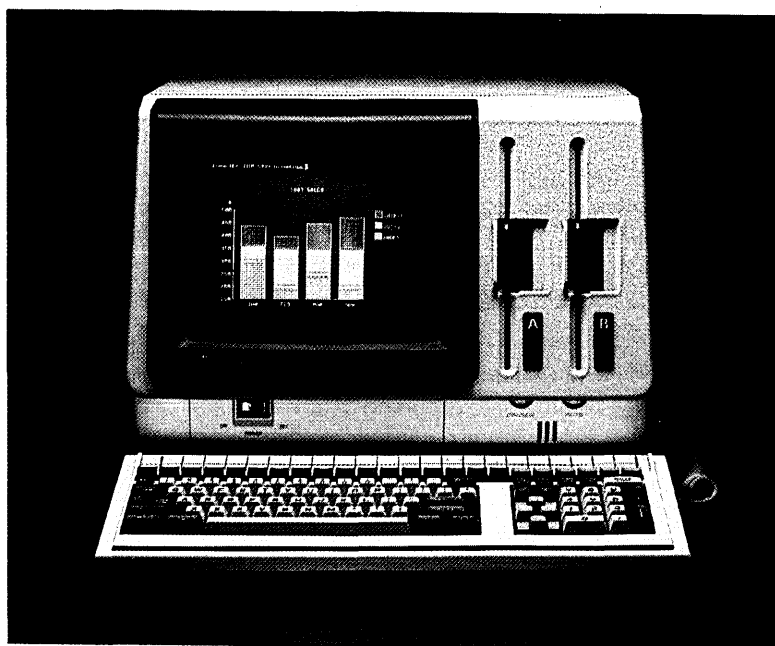
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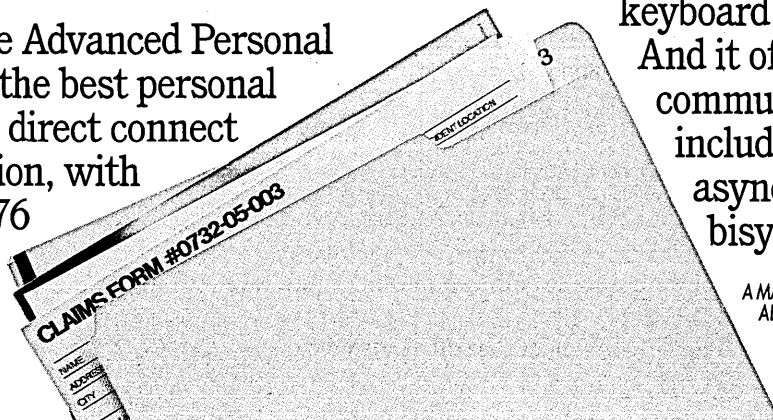
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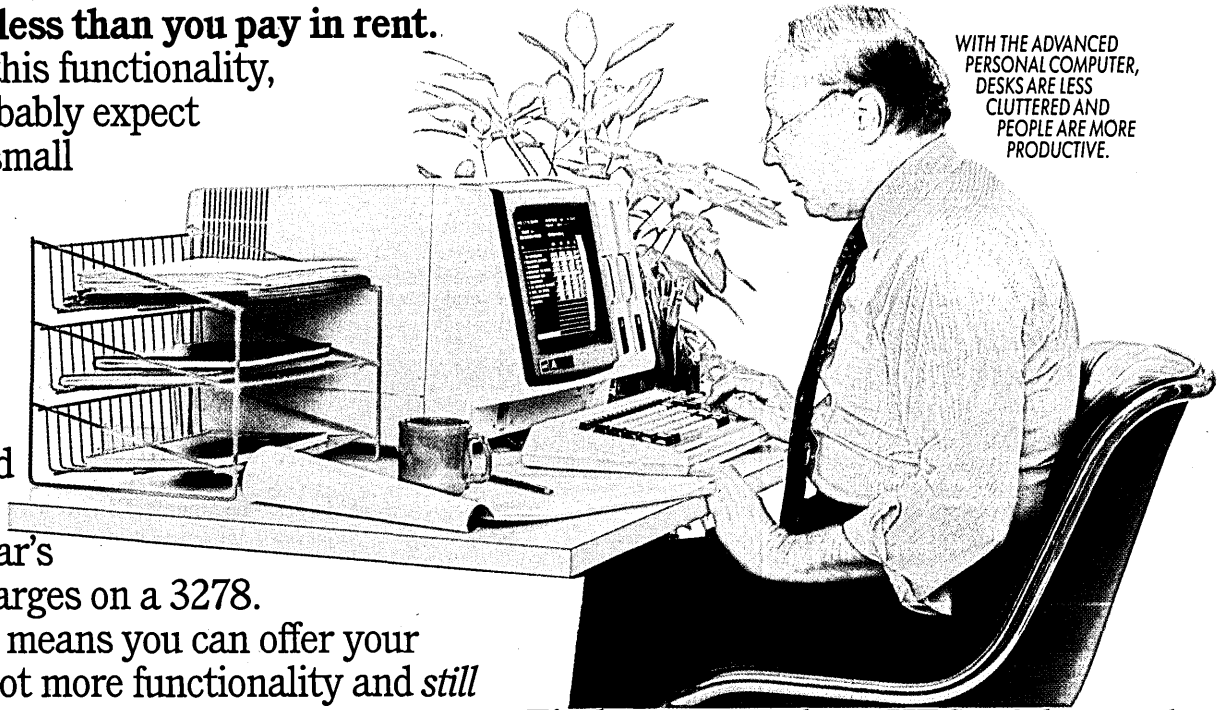
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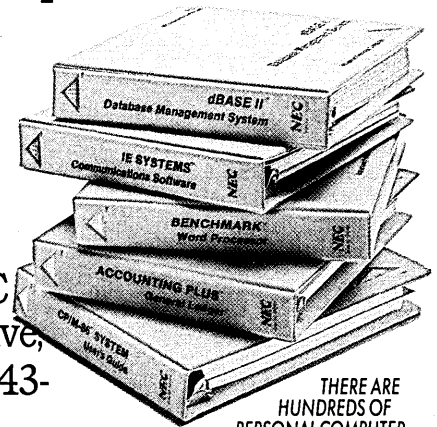
CIRCLE 133 ON READER CARD

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## HARDWARE

displays. Using the NEC 7220 chip, the cards will be programmable with high-powered macro functions that allow automatic line drawing and space filling functions. With a display memory of 128KB to 256KB that is programmable to eight planes, there will be a range of up to 256 colors that can be displayed simultaneously, from a palette of 4,096.

The cards will come with all of the memory needed to support the color, so that the user need not purchase additional memory. The high-end card, with 1,024 x 1,024 resolution, is designed specifically for CADD and engineering applications and costs \$1,600. The IDEagraph 640, for medium resolution CADD applications, costs \$1,000, and the IDEagraph 320, for business and professional applications, costs \$645.

The cards represent the vendor's second venture into the IBM Personal Computer marketplace. In August the company introduced the IDEAcomm 3278, a board that allows P.C.s to interface with the IBM 3274 and/or 3276 controllers in local or remote configurations using the BSC or SDLC protocol. That board costs \$1,200. IDE ASSOCIATES, Bedford, Mass.

**FOR DATA CIRCLE 305 ON READER CARD**

### CACHE

The Cache Disk Accelerator Subsystem (CDAS) is designed to boost the performance of this vendor's high end Concept 32/8780 superminicomputer in applications that require extensive disk I/O. The subsystem provides from 2MB to 16MB of cache in single megabyte increments in the disk controller.

During write operations to the disk, the cpu can transfer large blocks of data from main memory to the cache in the disk controller. As far as the cpu and the user program are concerned, the operation is completed as soon as the data are in the cache; there is no need to wait for the data to be written onto the disk. During read operations, large programs and data files are kept in the cache as soon as any part of them is accessed. That enables the average access time to be reduced from 30 msec to 1 msec, the vendor says.

The cache can improve reliability as well as performance, according to the vendor. Because the data are kept in the cache before being written onto the disk, it is more likely that the data will be transferred to the disk as a complete unit rather than as several fragments; thus, there would be less head movement in accessing data. Other reliability-oriented aspects of the product include dynamic save, error detection and correction, and multiport capabilities.

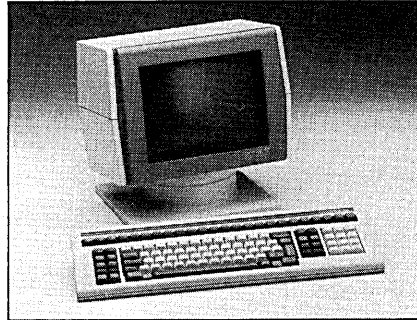
The CDAS can be used with any Concept/32 computer, and will support up to eight disk drives. It supports an optional second port for multiprocessor configurations, and costs \$77,000 for 2MB and

\$8,925 for each additional megabyte. GOULD SEL, Fort Lauderdale, Fla.

**FOR DATA CIRCLE 307 ON READER CARD**

### MULTIHOST TERMINAL

The 178 display station is designed for use with the vendor's BSC- and SNA-compatible remote cluster controllers. The unit is compatible with the IBM 3178 and DEC VT52 terminals, and provides several networking options. It includes all the features of the



standard 3278 keyboard, as well as some operator productivity features found on IBM's 3290 plasma display keyboard. For example, it has an unshifted clear key and 12 PF keys located above the main keyboard. A 10-key numeric pad can be dynamically reconfigured for either numeric or PF keys 13 through 24.

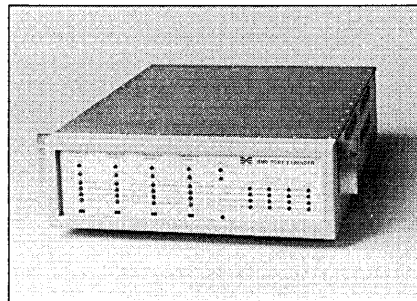
When the terminal is attached to the vendor's controller, it can be used to connect to two IBM hosts and to minicomputers and timesharing applications. Printers can be attached to either the controller or the terminal; when attached to the terminal, the printer can be used as a 3287-compatible system and/or as a local copy printer.

The 178 can be attached directly or through phone lines to the vendor's controllers. Within a building, terminals can be attached to the controller using a local network, a PBX, or a data switch, as well as through a conventional coax link. The terminal costs \$975. DATASTREAM COMMUNICATIONS INC., Santa Clara, Calif.

**FOR DATA CIRCLE 308 ON READER CARD**

### SMD PORT EXPANDER

The SPE 44 SMD port expander provides the capability of interfacing multiple DEC cpus to a single bank of up to four SMD-compatible disk drives while appearing transparent to system software. Four controllers, resident in up to four different DEC computers,



can timeshare control of the disk drives, allowing system sharing of a common database and peripheral resources. Applicable controllers include the vendor's SC03 disk controller in the DEC LSI-11, the SC21/SC31 in the PDP-11 and VAX-11, the SC750/SC758 in the VAX-11/750, and the V-Master in the VAX-11/780.

Each of the four controller ports of the SPE 44 uses a single "A" cable and up to four "B" cables in typical SMD fashion. An extra "A Cable Out" port allows for daisy-chaining to another SPE 44 or to additional unswitched disk drives, in order to expand the number of cpus and drives that can share common resources. The device offers backup capability: if a cpu fails, the user can continue to access the database by switching to one of the other cpus in the system.

In normal operating mode, the system's software handles all control between cpus and disk drives. In specific applications, however, front panel switches allow the operator to enable or disable any combination of channels for access to the drive bank. Front panel controls also provide selective write protection for each of the four drives on a channel basis, enabling read-only functions for specific drives on specific channels. Switches can also control the activity level on each channel so that no controller can monopolize the drive bus unless specific switch settings allow for it. The SPE 44 costs \$5,500 per unit. EMULEX CORP., Costa Mesa, Calif.

**FOR DATA CIRCLE 309 ON READER CARD**

### ARCHITECTURE

The ProDraft CAD system is designed specifically for architects in small firms who cannot afford very expensive design and drafting systems. The product includes a 1,024 x 800 raster display screen, single-sheet plotter, menu tablet, as well as the cpu and 6.7MB of Winchester storage. Software for the system includes an architectural drafting library, system software, an architectural application package (from a choice of five), and utilities.

Options include a digitizer, large or small plotters from the firm's Houston Instruments division, a workstation desk, a self-paced video training course, telecommunications software, bill of materials, and additional menu overlays for various architectural applications. The product's hardware and software are compatible with the vendor's Producer drafting system for larger firms.

The five software packages, each of which has its own menu overlay, are residential, commercial, HVAC, light commercial, and renovation applications. The architectural drafting library contains pre-drawn figures and symbols. The basic product costs \$30,000. BAUSCH & LOMB, Austin, Texas.

**FOR DATA CIRCLE 310 ON READER CARD**

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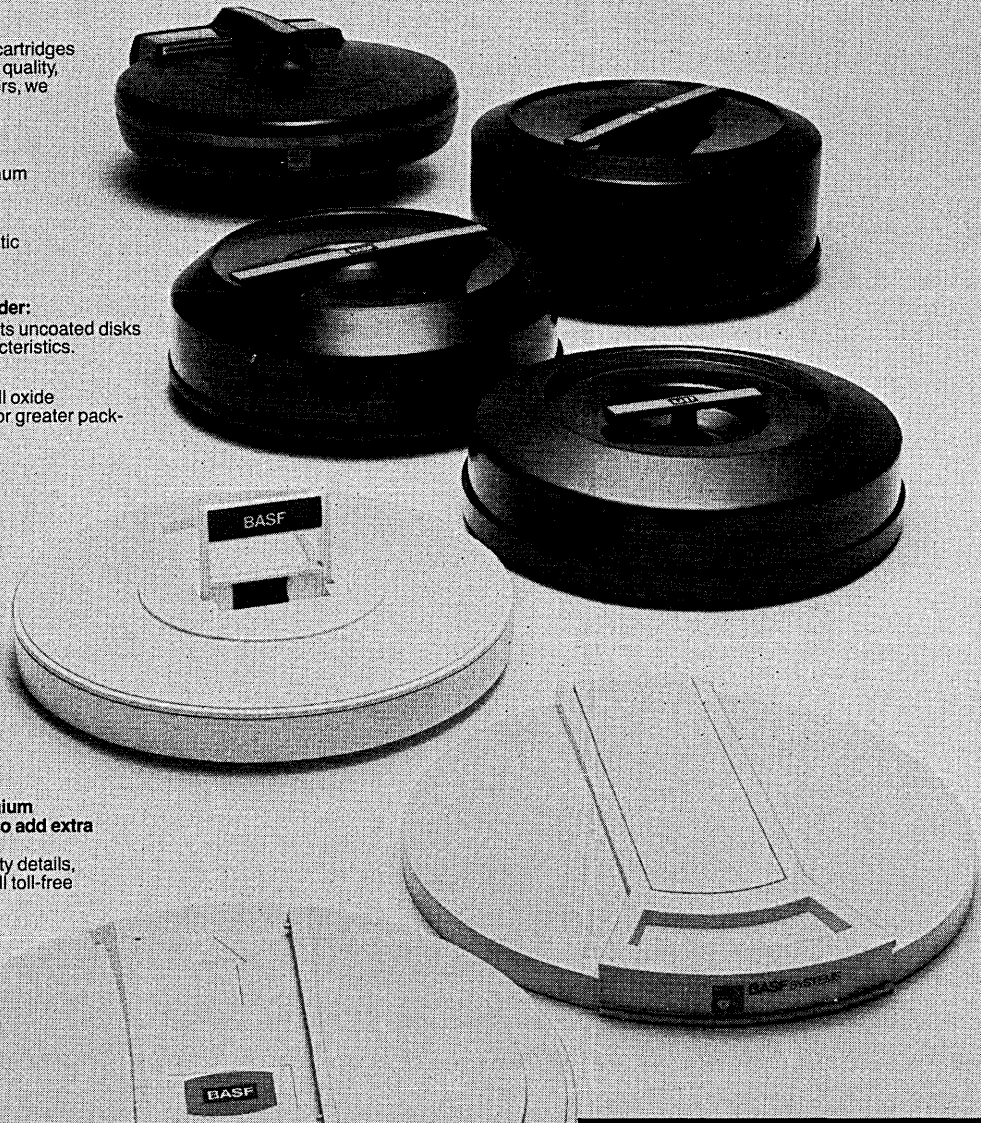
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For Honeywell: Phoenix single disk cartridges, 80 and 300 MB storage modules, 100 MB packs.  
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## HARDWARE

### MATRIX PRINTERS

The PLP-8 pair of 80- and 132-column printers is designed for professional dedicated use in applications such as listing, invoicing, labeling, and letter printing. They incorporate a heavy duty nine-needle head with a reported 300 million character life to print up to six-part forms at 270cps. Head travel is 27 inches per second, and tractor feed line advance requires 35msec for either six or eight lines per inch spacing. The tractors are adjustable from three to 16 inches wide. A stationary ribbon cassette contains 50 yards of half-inch ribbon, which the vendor says will last 10 million characters.

The printer comes with a standard interface, although a serial interface is available as an option. The serial interface accepts 110 through 9,600 baud, current loop, Xon-Xoff, and DTR (CTS) data restraint. Space is provided on the printer's main printed circuit board for an 8KB to 64KB character buffer, so that the attached terminal can be freed to operate on other tasks. Sixteen form lengths can be selected using front panel controls. The printer can provide 32 positions of vertical and horizontal tabs. The standard character is 9 x 7 with ascenders, descenders, and underscoring. The character generation is in a plug-in EPROM; a 96-character ASCII set and a 96-character European/mathematical set are provided. The 80-column version costs \$675, while the 132-column version costs \$900. PRACTICAL AUTOMATION, INC., Shelton, Conn.

**FOR DATA CIRCLE 311 ON READER CARD**

### NETWORK MONITOR

The series 50 Net/Alert network performance monitoring and management system is designed for 16 to 64 line data communications networks. The product is essentially a downsized version of the Net/Alert system for larger networks. All basic Net/Alert functions are provided in the series 50, including standard real-time performance and status color displays and about 25 reports and color analytical charts. Application or transaction monitoring, a standard feature of larger Net/Alert systems, is optional on the series 50, with monitoring for up to eight applications priced at \$25,000. An additional option is a host interface adapter to transfer the Net/Alert database to a mainframe for advanced statistical analysis using packages such as SAS.

Each series 50 system includes a system control unit with fixed and removable disk drives, one or more line monitoring units, a color crt, and a printer. Up to 64 lines and 1,600 devices can be handled by the system, using any of 30 currently supported Net/Alert protocols. The series 50 ranges in price from \$75,000 to \$142,900. Previous Net/Alert systems for 64 lines cost more than \$200,000. AVANT-GARDE COMPUTING INC., Cherry Hill, N.J.

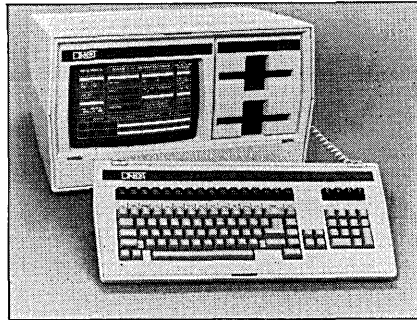
**FOR DATA CIRCLE 312 ON READER CARD**

### BUSINESS MICROS

The series 1600 line of personal business microcomputers is designed to combine computer characteristics with Hewlett-Packard or DEC terminal personalities. The units operate as both MS/DOS-based 16-bit micros and as full-function host-specific terminals, allowing users to transfer data back and forth between the host and the personal computer.

The model 1625 is host-compatible with the HP-3000 and has an application-specific keyboard that provides Hewlett-Packard terminal personality with full block-mode capabilities. The unit has dual 5-inch floppy disk drives and IBM P.C. compatibility. It also uses a pair of floppy drives. Both transportable systems offer an optional CPM-86 operating system, and cost \$4,000.

Both units are 8088-based and run at 7.7MHz. The units have 128KB of dynamic RAM, as well as 64KB of terminal display memory, a pair of RS232C ports that can be used for host or printer interconnection, and



a high resolution display screen. Options include an integral hard disk with a 20MB capacity, a 212A-compatible modem, Plot 10 graphics capabilities, and additional RAM and communications ports. SNA support is also offered as an option. DIRECT INC., Santa Clara, Calif.

**FOR DATA CIRCLE 313 ON READER CARD**

### 3 1/4-INCH DRIVE

The TC-1000 Drivette is a double-sided 3 1/4-inch floppy disk drive offering a megabyte of storage capacity. The unit is one fourth the size and one half the weight of standard 5 1/4-inch floppy drives, and consumes 40% less power, the vendor says.

The unit is plug-compatible with standard double-sided, double-density 96tpi 5 1/4-inch drives. Its 80 tracks per side media format makes it data-compatible with standard 5 1/4-inch drives as well. The vendor says that users can download programs and data from 5 1/4-inch diskettes to the TC-1000, so that the drive will accept many prepackaged software programs on the market.

Major components of the TC-1000 Drivette include a direct drive spindle motor, a lead screwhead-actuator mechanism that records at 140 tpi, and read/write and motion-control electronics boards. Media

for the drives will be provided by the same suppliers that provide the single-sided media for the vendor's TC-500 Drivette. The unit costs \$300 in evaluation quantities. TABOR CORP., Westford, Mass.

**FOR DATA CIRCLE 314 ON READER CARD**

### NETWORK MANAGEMENT

The Analysis 5500 advanced network management system allows software-generated strapping options to be downline-loaded and permits a user to review the strapping of any modem in the network from a central console. The soft strapping feature provides a user with the capability of changing speeds and configurations from a central site, eliminating the need for remote site changes.

The family of network controllers is modular in design, so that units can be upgraded in capacity and features. Standalone configurations are intended for small- to medium-sized network applications; a distributed system design is planned for larger networks. Various configurations support multiple operator terminals and printers.

The 5500 expands the range of phone line parameter reporting by analyzing data from every network location automatically on a continuous, noninterfering basis. The system is intended to facilitate training by using menu-driven function keys. Tests can be initiated by entries on the operator's console, with execution proceeding immediately. On completion, the results of the tests are displayed on the console or printer. At press time, no price had been set. Deliveries are slated to begin this month. PARADYNE CORP., Largo, Fla.

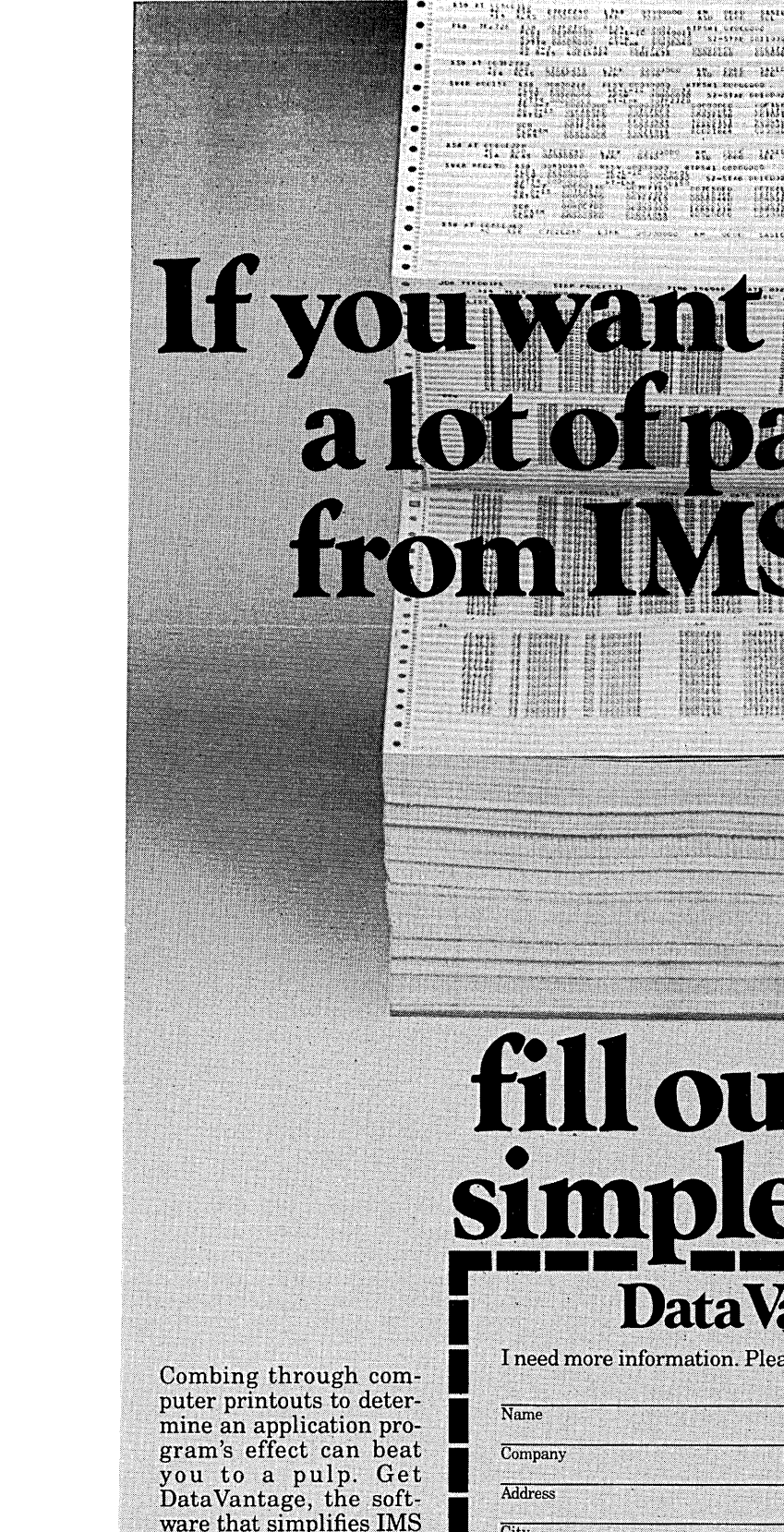
**FOR DATA CIRCLE 315 ON READER CARD**

### DEVELOPMENT SYSTEM

The Emunet-2 is a virtual disk multi-user microprocessor development system that gives the power of the VAX on which it is based to each member of a development project team, the vendor says. Using the VMS operating system, Emunet-2 supports a wide range of 8-bit and 16-bit microprocessors. The system can support as many as 60 widely dispersed hardware/software workstations, which are essentially modified ECL-3211 standalone systems. Workstations can be located up to 5,000 feet from the host and can transfer data at one megabit per second.

The virtual disk architecture gives each workstation transparent access to the mass storage of the VAX host, so that projects can be coordinated more smoothly. The system is host-independent to the extent that any VAX can be used. Upward migration and satellite arrangements can be reconfigured quickly because of the host independence and because each multidrop data link can accommodate up to 15 workstations. Four links may be used in one system.

Each workstation is based on an LSI-



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## HARDWARE

11 cpu, so that no individual workstation can place a significant load on the host during emulation or local operation. All of the vendor's microprocessor development software—cross assemblers, linkers, debuggers, cross compilers, and utilities—run on both the VAX host and the local workstations.

A typical Emunet-2 system consisting of six workstations and not including the customer-supplied VAX can cost \$110,000 to \$160,000. Additional workstations cost between \$18,000 and \$25,000. EMULOGIC INC., Norwood, Mass.

**FOR DATA CIRCLE 316 ON READER CARD**

### CONTROLLER

The 274C remote control unit provides up to 32-device support with several extended function capabilities. It allows attachment of both Telex and IBM terminal devices which support the "A"-type coax, using the BSC or SDLC communications protocols.

The unit provides users with 128KB of memory for controller configurations and setup. An optional 128KB of additional memory enables the controller to operate with the extended function capabilities. These functions include dual host communications, local print buffering, and format and storage retrieval.

Under SNA/SDLC, the 274C supports all SNA parameters exactly as defined for the IBM 3274 41C. The control unit is fully compatible with IBM's Network Problem Determination Application (NPDA) program for SNA/SDLC network problem detection and isolation. The controller's \$10,000 purchase price, excluding the additional memory and function options, includes diagnostic functions. TELEX COMPUTERS PRODUCTS INC., Tulsa, Okla.

**FOR DATA CIRCLE 317 ON READER CARD**

### LISP COMPUTER

Lambda is designed to optimize processing using the artificial intelligence language LISP. A virtual control memory feature can be programmed using LISP instead of assembly language, which allows the machine's instruction set to be conformed to specific applications rather than preset at the start.

The Lambda Machine provides a set of functions, utilities, and programming tools that have been developed by AI researchers to deal with the complex and powerful programs that can be written in LISP. Because of the modular nature of the LISP environment, these functions and utilities can be used both as program development tools and as design elements of the final application program; the intent of this design is to allow programmers to concentrate on the application-specific elements of the program.

The unit is built around the 32-bit NuBus, a communications-centered architecture in which the cpu(s) and various sub-

systems all share a wide bus with a 37.5Mbps peak transfer rate. A variety of processors, memory, I/O, and other devices can be plugged into the NuBus. The System Diagnostic Unit board senses what kinds of devices are installed and automatically conforms system operation accordingly.

Lambda is supplied with a four-board LISP processor with a 67MB virtual address space and a 4KB cache. The 64K x 64-bit virtual control store is paged 16 words at a time into 16K x 64-bit physical control memory, of which 8K is reserved for basic system control. A LISP Machine software license is supplied with the processor, which costs \$72,500. LISP MACHINE INC., Culver City, Calif.

**FOR DATA CIRCLE 318 ON READER CARD**

### 25MB WINCHESTER

This three-platter, 25.52MB, 5/4-inch Winchester disk drive incorporates a conventional stepper motor for read/write head positioning and a temperature-compensation servo for increased track density, the vendor says. The ST425 drive is designed as an upgrade of the vendor's ST412 (12MB) and ST419 (19MB) 5/4-inch Winchester drives, and is fully compatible with the ST506 controller. Average access time is set at 60msec, compared to 85msec for the vendor's other series ST400 drives; track-to-track access time is 16.5msec, including settling. Track density has been increased from 345 to 480 tracks per inch, yielding a total of 408 cylinders for a capacity of 4.25MB per surface.

The servo data that permit the drive's increase in storage capacity through higher track densities supply the actuator with the calibration information needed to compensate for track offset due to temperature change. These data also keep the read/write head positioned over the center of the track.

The unit uses oxide-coated media and operates at a flux density of 9,074 flux changes per inch (9074bpi). Transfer rate is 5Mbps. The unit costs \$1,090 in 500-lot quantities. SEAGATE TECHNOLOGY, Scotts Valley, Calif.

**FOR DATA CIRCLE 319 ON READER CARD**

### VAX MEMORY

The VX-2MB-780 is a high-density, two-megabyte, add-in memory card for Digital Equipment VAX-11/780 superminicomputers. The card was designed to comply with DEC's specification that all new VAXs be upgraded in 2MB increments.

Both the VX-2MB-780 and its predecessor, the depopulated 1MB version called the VX-1MB-780, use 64K RAMs. They are functionally identical to each other, including interleave, extended cycle, ECC, and diagnostic compatibility. They are also functionally identical to the DEC 1MB equivalent MS780-F(X) memory. The memory card inserts directly into the DEC MS780E memory

system, with no changes required to hardware or software. The two megabyte board costs \$6,300 in single quantities. EMC CORP., Newton, Mass.

**FOR DATA CIRCLE 320 ON READER CARD**

## PERSONAL COMPUTERS

The Abacus line of personal computer currently consists of a desktop model with a detachable keyboard and a portable model with an amber monitor. The vendor says the machines can be compatible with Apple, CP/M and IBM software and peripherals.

Both models come with aluminum cases and are available with single or twin floppy disk drives. A bundled software package includes the CompuWord text processor, the CompuCalc spreadsheet, the CompuBase database management system, and a set of games including backgammon and blackjack. The computers each have 64KB of dynamic RAM, 12KB of static RAM, five Apple-compatible I/O slots, a game paddle port, video and RF outputs, high and low resolution graphics, and upper and lower case keyboards with auto repeat.

The Abacus portable costs \$1,645 for a single 5/4-inch disk drive version, and \$2,000 for a dual drive version. Apple and CP/M compatibility are standard, and IBM compatibility can be added for \$400. The desktop model costs \$1,300 for a single-drive version and \$1,700 for a dual drive version. The desktop is Apple-compatible and may be made CP/M-compatible for \$200 and IBM-compatible for \$400. COMPU-SOURCE, INC., Minneapolis, Minn.

**FOR DATA CIRCLE 321 ON READER CARD**

## EXPANSION CHASSIS

The PC-XTRA bus expansion chassis can double the option adapter board capacity of the IBM Personal Computer. For P.C.s having exceeded capacity, the unit will increase the P.C. to a total of 10 option slots.

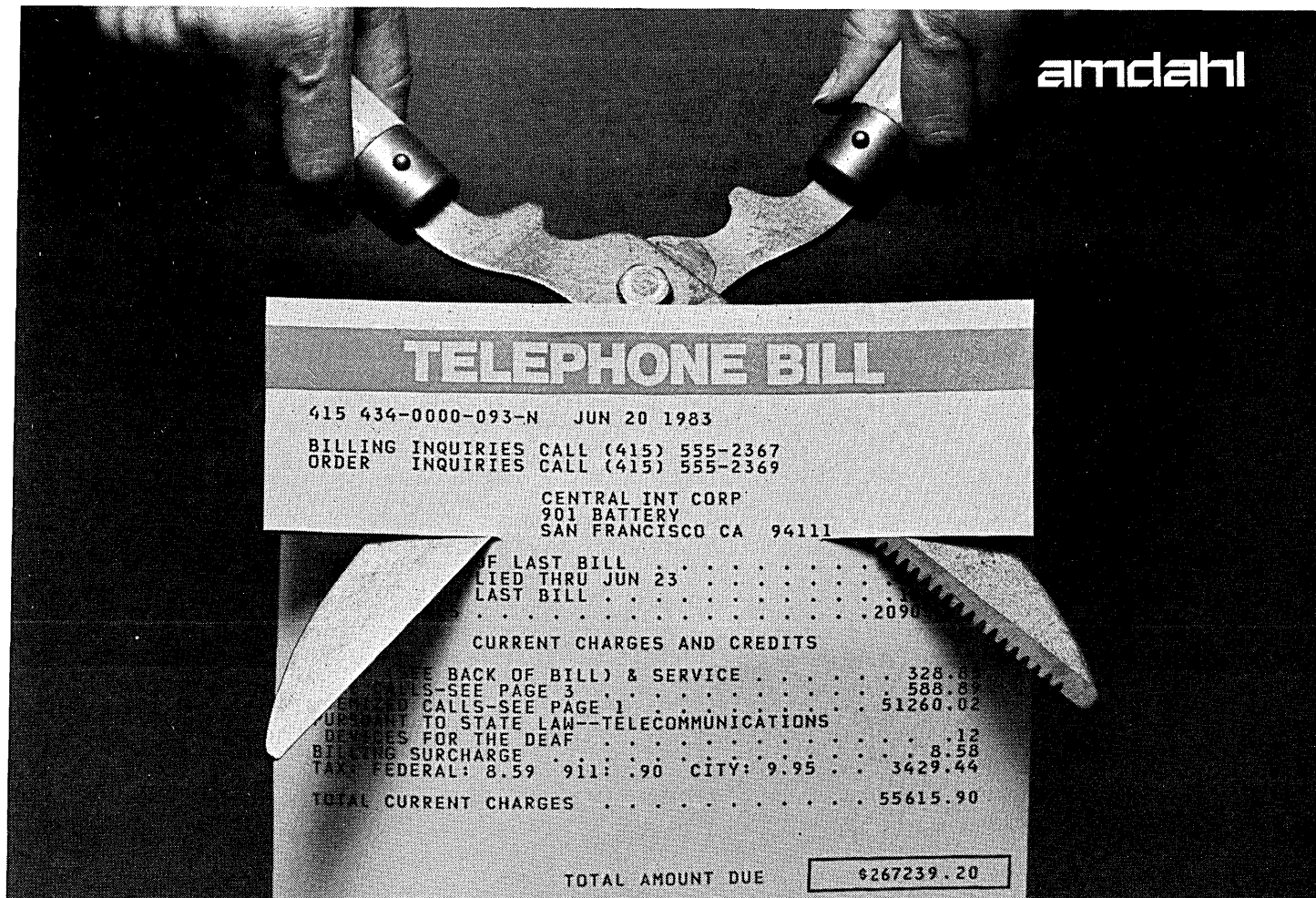
The unit has six expansion slots and an internal power supply, and is said to be totally IBM-compatible. The unit ties directly into the IBM P.C. bus in order to double the capacity; no software changes are required and no hardware modifications or additions are necessary. The PC-XTRA allows the addition of all special options available for the P.C.

The product consists of an expansion chassis, power cable, bus expansion chassis adapter board, P.C. bus adapter board, power supply, system mother board, and seven option slots; when fully configured, five slots are left open for expansion cards. The expansion chassis is housed in a cabinet with the same height and depth of the P.C. and has a matching facade, so that users can place it on the desk next to the computer. It is 9/4 inches wide. The unit costs \$680. P.C. HORIZONS INC., Santa Ana, Calif.

**FOR DATA CIRCLE 322 ON READER CARD**

—Michael Tyler





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**1.** Can you offer us a complete range of software systems designed to work together?

Or will we have to piece together a patchwork of systems?

**2.** Are your systems just record keepers, or can they really help us make decisions?

Can we pull together information from any of our integrated systems? In exactly the form we want it?

**3.** Can you provide business software for both mainframe and microcomputers?

Do you develop this software yourself or do you simply market it for another company?

**4.** Are your systems truly online—so all of our information is current?

How many of your systems are online? How secure are they?

**5.** Will my company have to be the one that discovers the bugs in your brand new system?

Just how long have your systems actually been used, and how have they been tested?

**6.** Will you update your systems as technology advances and regulations change?

What are some of your most recent updates? Will you keep us current on regulatory changes?

**7.** Do your systems really do everything you say they will?

Or will we have to change them or add to them to get the features we want?

**8.** How long have you been in business?

What are your revenues? What is your growth record? Where will your company be five years from now?

**9.** How many systems has your company installed?

How many of these were installed in the past six months? How many of your earlier customers are still using—and liking—your systems?

**10.** Do your financial systems handle unlimited foreign currencies?

Do your financial systems use a common set of currency exchange rates?

**11.** Can you link our executives' computers directly to the mainframe—so they can get their own information?

Is that software available right now?

**12.** How will you make sure my people thoroughly understand your system?

Do you have educational centers near us, or will we have to travel all the way across the country to find one? Will you be there to help during installation and after?

**13.** How many of your people specialize in software for my industry?

How many accountants work for you? Human resource specialists? Manufacturing experts?

**14.** Do your systems have built-in features that make them easier to use?

What happens if someone needs help figuring out a feature? Do you have online documentation that's easy to understand?

**15.** As my business changes will your system be flexible enough to change with it?

Or will I have to pay a lot to revamp it? Or even regenerate it?

These questions will help you when you sit down with individual software companies.

They're tough questions. Relevant ones. And any supplier who is worth his salt should be able to answer them without backpedaling.

## Ask MSA

We'll answer all these questions to your satisfaction—plus any others you may have.

In fact, we're probably the best equipped to answer them. Because MSA is the software company. We offer the most complete line of totally integrated systems in the software industry, including financial, human resource and manufacturing.

So you avoid the headache of trying to tie together individual systems. (And the even bigger headache of adding to them.)

We've planned our growth, and the

growth of our products. Instead of acquiring systems piecemeal, then trying to integrate them, MSA carefully develops each system to work with the others.

With MSA's integrated systems, there's no unnecessary duplication of data or effort. Reporting is faster. All your company's information is more timely and accurate—and in the right form.

In short, we do everything we can to help your executives make informed business decisions, without creating unnecessary headaches for your department.

## Our technical edge comes from experience

Staying ahead is easier for a company that's steeped in software technology. MSA has spent years developing, refining, testing and enhancing our systems.

This year alone, we'll invest \$25

million to make sure all our systems are technologically razor sharp. That gives us a decided advantage over flash-in-the-pan technology that may not have the bug-free logic of a more experienced system.

It also gives you a decided advantage over "custom" systems you have to update yourself.

MSA relieves you of that time-consuming burden. We update and enhance your software for a full year. Then we continue this service for a surprisingly low annual fee.

Maintenance includes keeping your system up to date technologically. Enhancing it with new features that make it work even harder for you. And making sure it reflects changes in accounting procedures and government regulations, including 401(k), TEFRA, and FAS52. (That eliminates a lot of tedious work you normally have to do.)

If we can do all this, you can be sure



MSA's software is flexible enough to accommodate changes in your business. Your company won't have to unexpectedly invest in customizing or completely regenerating your systems when you expand or reorganize.

### 35,000 days of training

New software can't improve your business until your company's employees feel comfortable using it—and know it well enough to exploit all its capabilities.

We make sure your people have a firm grasp of our systems. Last year alone, MSA conducted more than 35,000 student days of customer training for over 1,800 companies. At education centers all over the world, as well as at our headquarters.

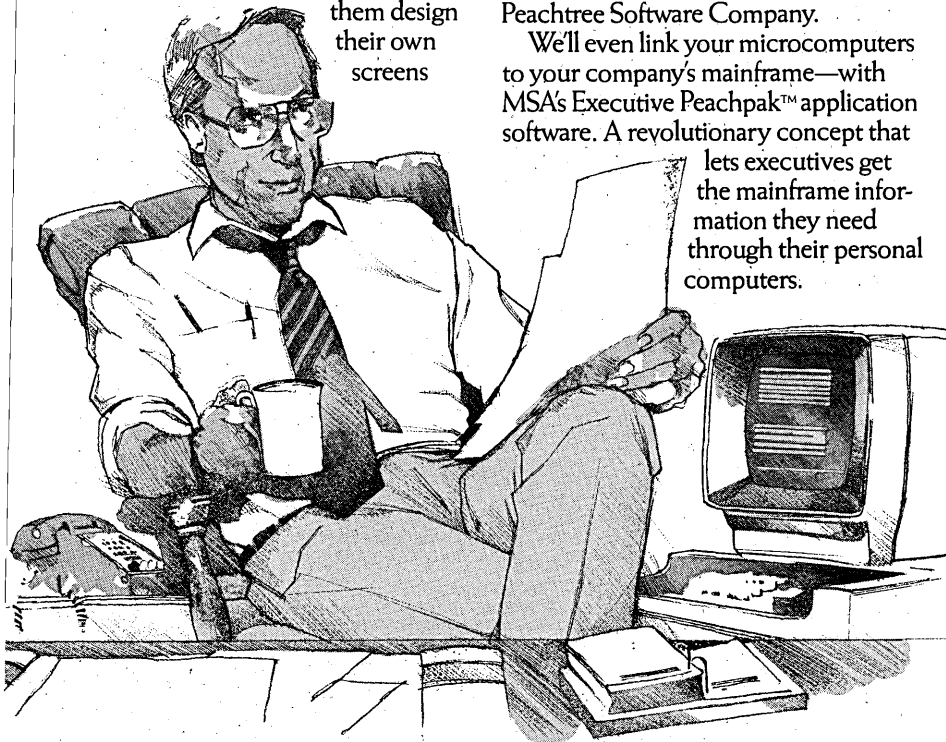
From training sessions to cassettes to complete, easy-to-understand documentation, MSA provides the most extensive Customer Education Programs in the industry. We even do a follow-up audit after installation to make sure you're getting the most from our system.

MSA not only enhances software, we enhance the people who use it. Regular user meetings give our customers a forum to express their likes, dislikes and suggestions. These often lead to new product developments.

### Our systems are always ready to HELP

MSA systems are just as friendly as our people. Our online HELP feature actually guides users through our systems. And EASY-SCREEN™ lets

them design their own screens



without creating data processing nightmares.

If there's ever a question or problem with our systems, MSA customers are always close to service. Our Account Managers are knowledgeable, responsive, and backed by a complete team of industry specialists.

This team is responsible for solving the specific software needs of your industry. So you'll never get a blank look or an answer that doesn't relate to your business.

### The heart of our integrated systems

It's MSA's General Ledger System. Combined with Accounts Payable/Purchase Order Control and our other systems, it gives your company complete control over your financial information.

Over 800 data processing specialists, accountants, and financial experts work together to make MSA's financial systems the most advanced and most highly integrated in the industry.

### MSA has the answers

Whatever your size—whatever your business—MSA has a total software solution.

We'll provide the highest quality integrated online software.

We'll tie your business and manufacturing software systems together, using our exclusive Extended Closed Loop™ manufacturing system.

We'll provide business software for your microcomputers, through our Peachtree Software Company.

We'll even link your microcomputers to your company's mainframe—with MSA's Executive Peachpak™ application software. A revolutionary concept that

lets executives get the mainframe information they need through their personal computers.

### MSA ready-to-install application software

|  |
|--|
| 1. General Ledger  |
| 2. Accounts Payable/Purchase Order Control                             |
| 3. Budgetary Control/Encumbrance                                       |
| 4. Fixed Assets Accounting   |
| 5. Capital Expenditure Tracking  |
| 6. Forecasting & Modeling  |
| 7. Accounts Receivable   |
| 8. Order Processing  |
| 9. Foreign Exchange  |
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| 13. ALLTAX™ Taxing System  |
| 14. ALLTAX Reporter™   |
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DM 17b(11/83)

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With large volumes of textual material now available in computer-readable form, the indexing, storage, and retrieval of full text has become both an opportunity and a problem for managers of corporate records, regulatory affairs, corporate libraries, research, and litigation support. IBM has recognized that text management is a critical part of overall information resource management.

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# SOFTWARE AND SERVICES

## UPDATES

A current maxim holds that personal computers need to be marketed just like consumer goods such as televisions or hamburgers. The latest example is North Star Computer's "Bundle It Your Way" program, in which purchasers of a \$6,000 Horizon or Advantage with a hard disk can choose \$2,000 of bundled software from a selection of 26 popular packages. If you buy the computer without the hard disk, you can still choose \$1,100 worth of software.

Users of the 3270s can now take advantage of a dedicated access facility that allows them to attach directly to the Telenet network. The service permits direct leased line connections between 3274 or 3276 cluster controllers and the public packet switching network, without requiring any hardware interface. No modifications to existing hardware or software are needed.

CAD, like other applications, seems to be moving inexorably to personal computers. One new system is the Draft-Aide package for the IBM P.C. The full-blown Pro-300 version is geared for sophisticated users, such as entrepreneurs operating their own drafting service centers; the Pro-200 and Pro-100 are for professional users with fewer requirements; the Academic 100 is geared for university use, including company-sponsored training schools; and the Starter 100 is designed for novices who want to learn about drafting. The product is sold by United Networking Systems of Houston.

Computer Sciences Corp. is moving into the value-added network services market with its tried-and-true 9600bps Infonet. Previously available only to customers of its remote computing service, Infonet is now being sold as a private net.

## DECISION SUPPORT

The Encore decision support system is targeted at computer timesharing financial modelers, personal computer spreadsheet users, in-house corporate financial modeling system users, and first-time financial modelers. The product assists these people in performing financial forecasting and reporting, investment analysis, cash flow forecasting, budgeting, corporate consolidations, strategic planning, and corporate modeling. It is composed of eight sections. A full screen editor is provided for text entry and editing. A menu-driven interactive spreadsheet has 512,000 cells, as well as data input screens, highlight analysis; formatting, multiple windows, regression, and other features. An English modeling language is designed to allow modeling statements and commands to be entered in English, without such devices as gotos, looping, or indirect addressing.

A function library provides U.S. tax tables, all types of depreciation, regression, statistics, loan amortization, net present value, and internal rate of return including compounding, continuous, and perpetual returns. The Exec programming language acts as a developer's tool kit for customized menus, prompts, and automation. It includes looping, branching, and special screens for turnkey decision support systems. A report writer allows custom formatting of reports, including cross-sectional reports across spreadsheets. A graphics system provides on-screen slide shows; a graphics editor; output to printer; horizontal, stacked, and clustered bar charts; and scatter, Gantt, and other graphs on a monochrome or color display. Finally, a computation facility allows for unlimited hierarchical consolidation, random number generation, simultaneous equations, sorting, ranking, forecasting, searching, and highlighting analysis.

The product runs on the IBM Personal Computer and costs \$1,850. FEROX MICROSYSTEMS INC., Arlington, Va.

**FOR DATA CIRCLE 326 ON READER CARD**

## FILE MANIPULATION

Data-Xpert is an interactive file manipulation tool designed to reduce the time and difficulty associated with creating and manipulating files for program testing, maintenance, and support in the COBOL application environment. The product automatically interprets the existing COBOL layouts, without modification, to define and manipulate files; this capability is intended to eliminate the need to redefine files in another language when creating, viewing, updating, extracting, reformatting, and printing files.

The product has menu-driven, full-screen, SPF-like displays; user-defined PF key support; and on-line help and tutorial facilities. Other features include support of sequential, PDS, ISAM, and VSAM files; the capability to edit or browse using a formatted screen consisting of the COBOL layout and data fields; automated interfaces to Panvalet and Librarian; and printing of file contents in COBOL formatted mode, three-line hexadecimal mode, or single-line character mode.

The Data-Xpert allows file contents to be reformatted by providing specification of fields to be mapped from one COBOL layout to the other. It also allows selection criteria to be specified by entering the condition next to the COBOL names to select records for browsing, editing, extracting, and printing. The product also supports transfer of data from one file organization to another, such as from sequential to ISAM.

Data-Xpert runs under the TSO/ISPF option and is available under a perpetual license agreement for \$30,000. XA SYSTEMS CORP., Santa Clara, Calif.

**FOR DATA CIRCLE 327 ON READER CARD**

## NESTING

Auto-Nesting is an interactive CAD/CAM package that automates nesting of two-dimensional parts for numerical control flame cutting and plasma cutting in plate fabrication. The package operates in conjunction with the vendor's series 7000 Advanced Graphics Software CAD system. Operators



## SOFTWARE & SERVICES

can produce nested layouts of manufactured parts and when these are applied to the manufacturing process, the vendor says, more of the area of a raw material will be used for finished parts, with less scrap material left behind.

Promising to reduce the cost of labor and materials, the vendor says auto-nesting automatically enters part orders, performs the nesting, selects the parameters for raw materials, defines remnant material parameters, defines the cost model parameters, and defines the numerical control machine parameters. It also shortens machine cutting time, provides automated inventory control for both raw materials and finished parts, and facilitates adherence to production schedules.

The product costs \$20,000 each for the first two licenses and \$4,000 each thereafter. AUTO-TROL TECHNOLOGY CORP., Denver, Colo.

**FOR DATA CIRCLE 328 ON READER CARD**

### DOW JONES INTERFACE

The NaturalLink database software package is billed as an artificial intelligence-based, natural language interface between the vendor's Professional Computer and the Dow Jones News/Retrieval service. The initial version is in English, although the vendor says that other languages can be supported. The product allows users to develop queries for the news service off-line, and then submit the queries in batch form



for more efficient use of the user's connect-time.

The NaturalLink screen is divided into windows, each of which contains a list of words or phrases for a portion of a command. Based on what the user has chosen, the next set of options is displayed. Each element selected builds a portion of a plain English sentence used to frame the query. As a command is constructed, it appears in a window across the top of the display screen. Individual function keys allow the user to backtrack a phrase at a time or to

erase the entire question and start over.

The product includes tutorial and help facilities that are available as ongoing aids while using the system. Other features include an automatic sign-on and dialing process, which cuts a connection after two minutes of inactivity and reconnects the user automatically when another question is entered. NaturalLink also allows users to tie into the regular News/Retrieval inquiry mode at any time. Connection to the news service is made through Tymnet or Telenet in the U.S. or through Datapac in Canada.

The package costs \$150, including a free subscription to the news service, a free non-prime-time hour of use of the News/Retrieval database, documentation, program diskettes, an on-line tutorial, and a help function. The end user's micro must have 256KB of memory and an internal modem or a serial board with an external modem. TEXAS INSTRUMENTS INC., Austin, Texas.

**FOR DATA CIRCLE 329 ON READER CARD**

### XA TRAINING

The video self-study MVS/SP/XA Training Package details the specifics of MVS/SP internals and provides product information on MVS/XA. Designed for technical, supervisory, and systems personnel who may or may not have experience with MVS, the package has 70 video modules and workbooks. Topics covered include multiprocessing functions, I/O management, communication between address and spaces, developing user services, error recovery, and a dozen other MVS functions, as well as the XA information.

The course material is a refined version of the MVS material contained in the IBM educational SP or XA courses. The lessons are designed so that new participants can begin with the first video and proceed at their own pace through the entire series, while experienced staff members can begin at a more advanced module and proceed from there.

The package is available on a purchase, rent, or lease basis—in full or by selected course modules. An outright purchase of the entire 70-module package costs \$36,000; a three year paid-up lease, including maintenance, costs \$15,000 per year; and a six-month lease including maintenance costs \$12,600. Prices for the individual modules vary but average about \$550 each. COMPUTER SYSTEMS RESEARCH, Avon, Conn.

**FOR DATA CIRCLE 330 ON READER CARD**

### PROJECT MANAGEMENT

Pertmaster is a project management package for several microcomputer systems that lets users manage multi-activity projects using either the project evaluation and review technique (PERT) or the critical path analysis (CPA) method. The product has a maximum project network size of 1,500 ac-

## SOFTWARE SPOTLIGHT

### MICRO TRAINING

This package combines an IBM Personal Computer with a laser disk player and a second color monitor to teach novice users how to make the most of VisiCalc and WordStar. Unlike some other training packages, this package uses the actual WordStar and VisiCalc software diskettes in its training, so that the user is able to see how the program works, how fast it works, what happens if wrong keys are typed, and so on, in real-life environment.

The training package is based on a pair of floppy diskettes for the P.C., which control the interaction between the P.C. and the videodisk player and monitor. The videodisk plays scenes of instructors speaking to the user, as well as the instructions displayed in large type. It acts as an adjunct to the P.C.'s monitor, which operates under the control of the software application package being learned.

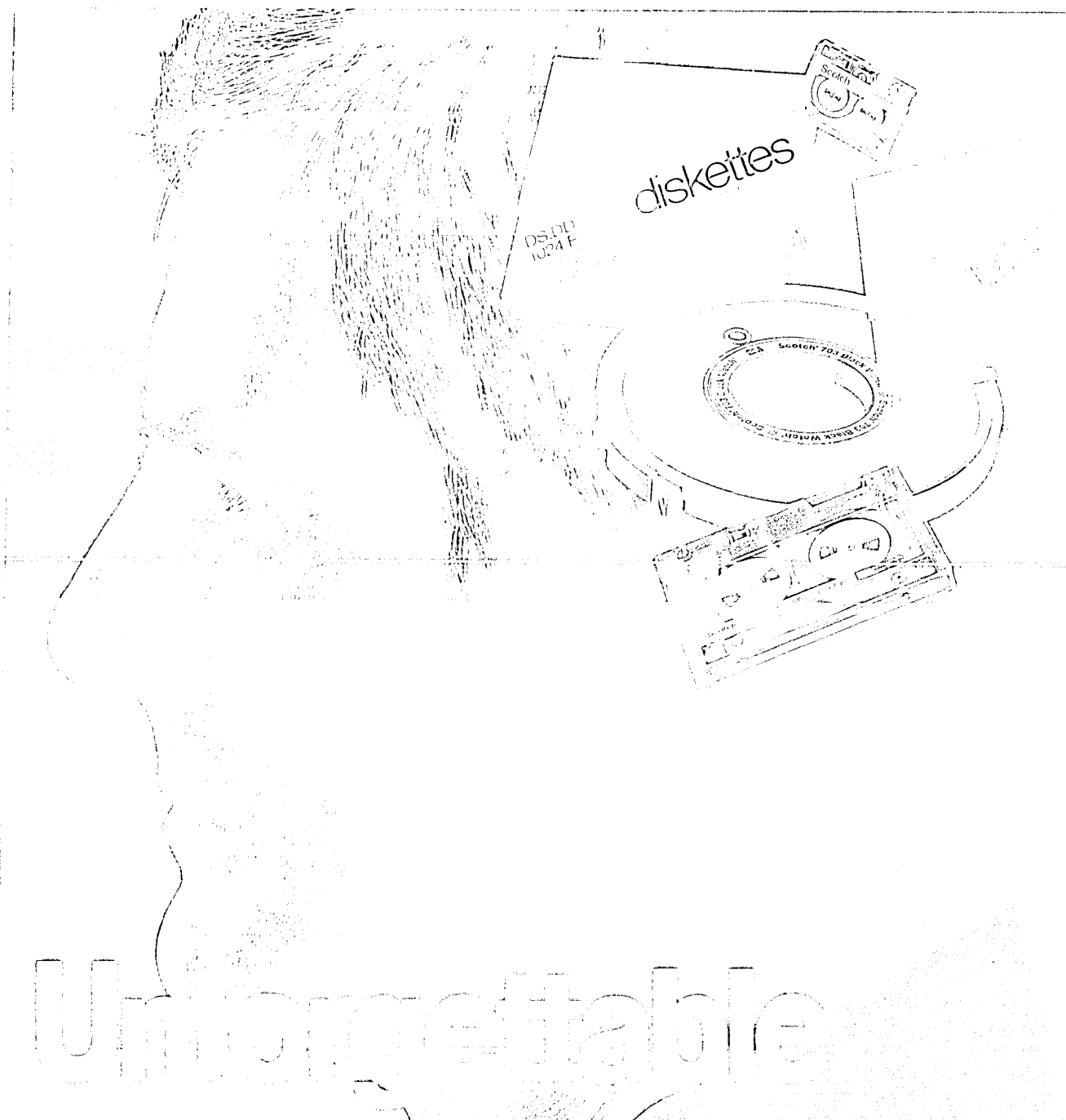
For example, the P.C. monitor might show a letter generated by WordStar, with the Wordstar main menu at the top of the screen. The videodisk monitor would show and tell the user which keys to hit in order to delete a word or insert a paragraph. The user must follow the instructions to continue the lesson. Synthesized "That's great" or "That's not quite right; try again"



comments are generated from RAM for immediate feedback.

The vendor estimates that the average novice will need about four hours, typically spread over two days, to learn all of the material in the package. It comes with extensive on-line help both on the P.C. and on the videodisk, and a manual and a keyboard overlay assist trainees in operating the training package itself. The package, which includes two program diskettes, the videodisk, the manual, and the keyboard overlay, costs \$1,850. It is geared to large corporations beginning to implement microcomputers, and discounts are provided for multiple-copy purchases. INTERACTIVE RESEARCH CORP., Santa Clara, Calif.

**FOR DATA CIRCLE 325 ON READER CARD**



# Unforgettable

If it's worth remembering, it's worth  
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Computer media products from 3M remember everything, every time. Their reputation for reliability is backed up by something very rare in the magnetic media industry: over thirty years of manufacturing experience. That experience, plus the fact that 3M controls the entire manufacturing process, assures that the same high quality is built into every computer media product we make. So you can have complete confidence in every 3M data cartridge, diskette, and roll of computer tape you buy.

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CIRCLE 138 ON READER CARD





# GONE BUT NO

Message Center - 6311

Message for JIMMY, 0800

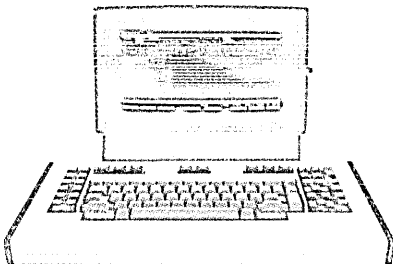
Information for calllogs

IN MIAMI FROM 5/9 THROUGH 5/12  
FOR BRIAN QUINN: NEED CONTRACTS  
FOR NANCY: YOUR TICKET IS AT TR

FROM: QUINN, BRIAN  
Msg:

CONTRACTS SIGNED, COPIES BEING  
HOPE YOU GET A SUNBURN.

Tue May 19 08:58 am - 6311



Message Center/Directory from AT&T Information Systems displays visible proof that you can be out of town, out of the office, but never out of touch.

It will *never* forget you. It's a personalized call coverage and information system. With it, one trained attendant can act as a backup personal secretary to you and 149 other busy managers.

Calls to unanswered or busy phones are automatically routed to the Message Center attendant. The display lets the attendant know where you are, why you're there, for how long, how you can be reached—or anything else you want to leave as a message.

You can retrieve your messages three ways: from a display unit, on elec-

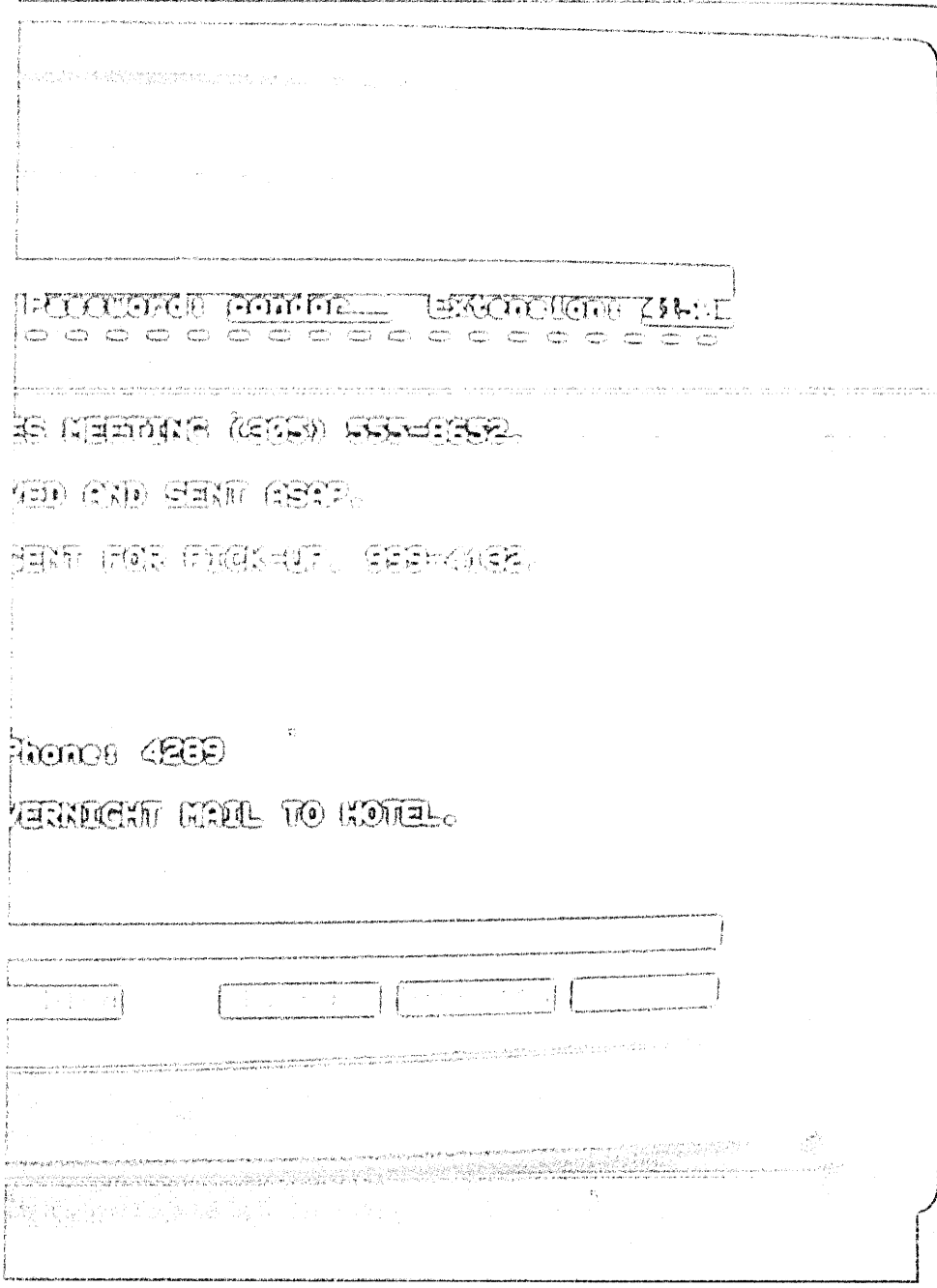
tronically-printed hard copy, or with a call to the attendant.

The Directory function adds to Message Center. It's an on-line database that gives you continuously updated information about fellow employees. Information such as name, extension number, location, title, department, and up to ten other fields of information.

The result? Vastly improved call coverage, better information flow, no unanswered phone calls, no missed messages, *no more park strips.*

Message Center/Directory is just one of several office management appli-

# IT FORGOTTEN



options available on DIMENSION 600 and 2000 systems and the new System 85. You can hook up a few individuals or your entire company. It's your choice.

System components and features are customized to fit your needs. The information is available with a terminal or a printer, or both. You can use the system for a single user or for a group of users. You can use the system for a single user or for a group of users. You can use the system for a single user or for a group of users. You can use the system for a single user or for a group of users.

peripheral devices: voice-only terminals, voice terminals with 40-character displays, data terminals with full CRT screens like the 500 BCT pictured above, or new intelligent terminals that combine voice and data functions in an integrated workstation. And there's a full line of printer.

Message Center Directory was developed by Bell Labs Systems Research, who now work for ADWF Information Systems Laboratories. Built by ADWF Northern Electric and maintained by the largest service organization in the industry, it's part of a fully integrated product

line designed to help your business do business better.

That's our message loud and clear. To find out more, call toll-free 1-800-247-1212, Ext. 879M.



**ADWF**  
Information Systems

CIRCLE 139 ON READER CARD

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## SOFTWARE & SERVICES

tivities, and accepts up to 29 different resources per activity. A typical network can be analyzed and updated in 10 seconds, the vendor says. The product produces bar charts and histograms on 132-column printers or on the terminal display.

The product is an American version of the British Micronet package. It uses CPA, in combination with project planning formats, to facilitate coordination of activities on complex projects and to identify critical implementation and completion points. Pertmaster is designed to be applicable to any project management task, since it employs only starts, finishes, stages, and user-defined codes for resources and time periods. The menu-driven product can list milestone events and flag important completion dates. A help facility is provided.

Pertmaster accomplishes its speed relative to other project management packages by keeping the entire project network in memory and accessing the disk for programs, rather than vice versa. It is designed to catch errors such as logical dangles, looping, and duplications. The product costs \$700, and runs on most CP/M, MP/M, and MS/DOS operating systems. It requires 64KB of main memory with two disk drives and a 132-column printer. WESTMINSTER SOFTWARE, Menlo Park, Calif.

**FOR DATA CIRCLE 331 ON READER CARD**

### CROSS DEVELOPMENT

The Multi-Target Executive (MTX) is designed to provide cross-development capabilities between a host Concept/32 computer in a Unix development environment and a target Concept/32 computer in a real-time MPX-32 environment. The MTX includes UTX, the vendor's implementation of Unix; the vendor's proprietary MPX-32 real-time operating system; and ACX-32, an X.25-based local area network. At the heart of the MTX system is a FORTRAN 77+ cross-compiler that allows FORTRAN programs to be compiled on a host processor and executed on a target processor. Downloading of the object program from the host to the target is accomplished over a high-speed data link under the X.25 protocol.

A programmer working at a host processor terminal can monitor and debug a program executing in a target processor; the capability was designed to give the programmer access to UTX development tools while retaining the real-time environment where the program must run. Among the UTX tools are SCCS source code control, and subroutines for documenting programs.

The initial version of MTX supports only MPX-32 targets, the vendor says, but future releases will support other target environments. MTX costs \$5,500 for a system with one to eight terminals, and \$7,500 for a system with nine to 16 terminals. The FORTRAN 77+ cross-compiler costs \$5,000. GOULD SEL, Fort Lauderdale, Fla.

**FOR DATA CIRCLE 332 ON READER CARD**

### DBMS

The Aura series of integrated software packages is based on the database management system rather than on the spreadsheet component, in contrast to some other packages currently on the market. The package runs on microcomputers running the MS/DOS or Xenix operating systems.

Aura 3 incorporates a DBMS, spreadsheet, and word processing, and costs \$400. Aura 4 includes those three functions plus a graphics module, and costs \$500. Aura 5 integrates the DBMS, spreadsheet, word processing, graphics, a report generator, and a three-mode communications package, and costs \$1,000.

The series is intended primarily for menu-driven operation, although command-driven applications can also be used. Help screens are available, and function keys can be user-defined in specific applications. The dataflow between the DBMS element and the other modules is structured for facilitated access and updating in either direction. A spreadsheet can therefore be built from data on file, and updates to the spreadsheet can be sent back to the original file if the user desires.

The communications element of Aura 5, which is designed for both personal and mainframe computer communications, supports SNA/SDLC, bisynchronous, and asynchronous communications, with host file transfer and 3270 emulation. The package is written in C. SOFTREND INC., Windham, N.H.

**FOR DATA CIRCLE 333 ON READER CARD**

### TERMINAL SUPPORT

The Extended Terminal Support (ETS) package for Wang vs users is a library of utilities and subroutines that can be incorporated into existing Wang applications to expand the functionality and versatility of the system. A message sending and receiving utility may be employed, independent of any application, to allow an operator to send a message to another VS workstation. The originator can interrupt an application, compose and send a message, and then resume the application immediately where it was interrupted. Likewise, the receiver can read the message and return his terminal to the exact point where it was interrupted.

An error positioning subroutine, when incorporated into an application, automatically positions the cursor to the first modifiable blinking field on rewrites to the screen. A time-out utility provides a programmable time-out facility on screen applications, and the programmer can set a time limit for automatic inactivity shutdown to avoid system resources being tied up.

A virtual terminal subroutine can be incorporated into applications to allow several application programs to run simultaneously on the same terminal. If a program requires a user response, the current screen

operation is suspended and the program needing input is displayed. Once the user responds, the program drops into the background again and the suspended screen operation is resumed at the point where it was interrupted. ETS costs \$500 for a single license. GLENN A. BARBER & ASSOCIATES, Sherman Oaks, Calif.

**FOR DATA CIRCLE 334 ON READER CARD**

### CASH MANAGEMENT

This funds transfer package is intended to reduce the cost and improve the security of retail banks by combining the off-line preparation of funds transfers with high-speed data transmission. The package is offered as part of the micro/Ca\$h-Register cash management system for the IBM Personal Computer.

The product can also be used to obtain on-line, real-time account information during the business day. In addition, it can be used to receive opening balance information, including the previous day's account activity, and end-of-day reports on electronically processed debits and credits, including funds transfers, automated letter of credit, foreign exchange, and loan transactions.

The package allows customers to enter and verify on the P.C. both repetitive and nonrepetitive funds transfers off-line, using passwords. Processing is speeded and simplified through the use of formatted screens and by the computer's response time. Data transmission to the host includes text authentication of customers' messages as an extra security procedure, the vendor says. The micro/Ca\$h-Register package, including the funds transfer capability, is provided free of charge, but each transaction is billed at about half the cost of a typical manual funds transfer transaction. IRVING TRUST COMPANY, New York, N.Y.

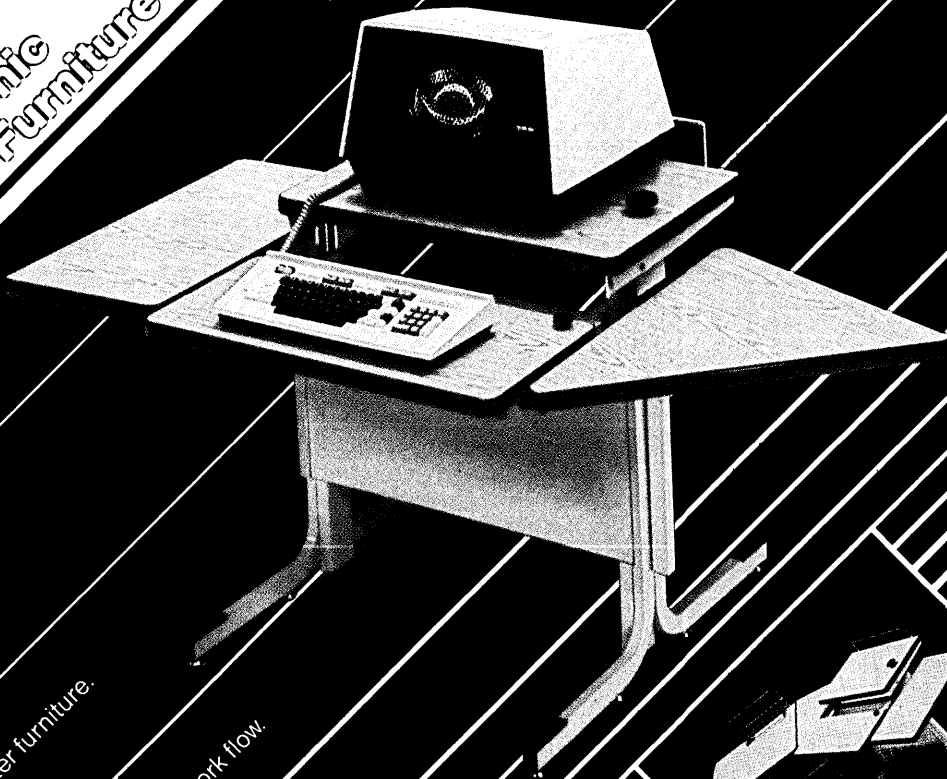
**FOR DATA CIRCLE 335 ON READER CARD**

### PRINTER MANAGER

The ACX-PM Printer Manager for VM/SP controls and manages small printers attached to IBM mainframes. The product, which supports the IBM 328X and compatible printers, and the Diablo 630 ASCII printer, provides interactive prompting, full screen help, extensive query capabilities, and automatic acknowledgment messages. It allows users to tailor authorization profiles for each user and printer, and an unmonitored, time-stamped audit trail logs all activity. Authority to manage a printer can be assigned on a printer by printer basis, allowing remote users to control their own printers without affecting others.

The product is intended to provide workload balancing, increased data integrity, automatic printer error and idle notification, and form and class control. A failing printer can be removed from the network and its entire workload shifted to one or more other printers. A first-year license

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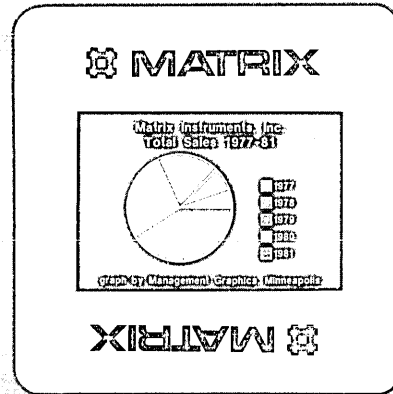
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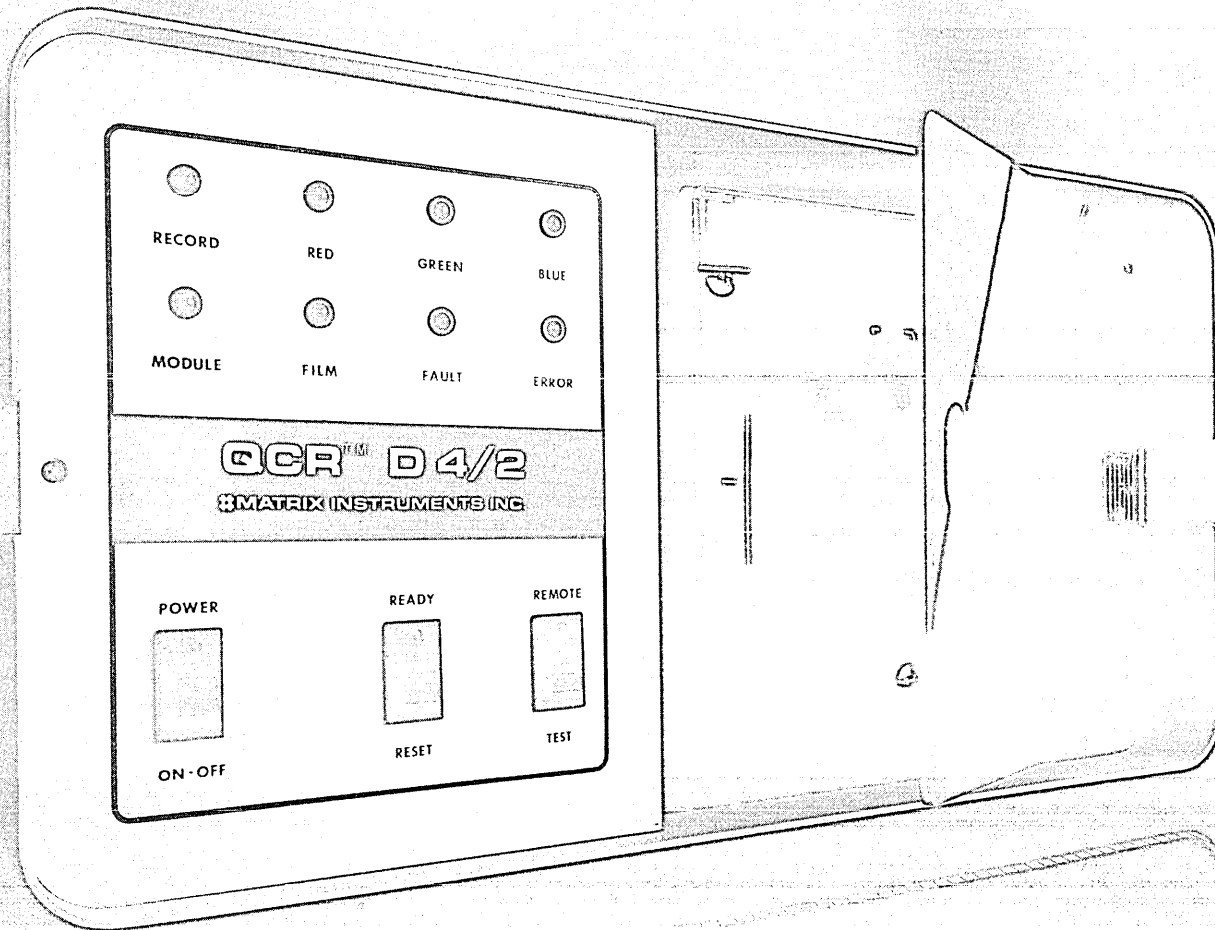


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### DRG MODULE

This vendor's DRG module is designed to handle the prospective payment regulations for hospitals that were enacted earlier this year by Congress. The module can accept data from hospital medical record abstracts and patient bills, and assign appropriate diagnostic-related groups (DRGs) to each case. It can also merge abstract and billing information to build a patient level database, and performs detailed case demographic and profitability analyses.

The DRG module is fully integrated into the vendor's MediFlex hospital financial data management system, enabling user hospitals to bring case mix information into the existing functions of planning, simulation, forecasting, and control processes. The reimbursement and budgeting systems interface with the vendor's MediPac patient accounting systems for a unified patient accounting and financial planning package.

The product can be used either on an in-house basis or on the vendor's time-shared network. Systems will be updated as local, state, or federal regulations change, the vendor says. The module, as with other aspects of the hospital management system, runs only on IBM mainframes. Prices have not yet been established for the in-house version; the network service can be implemented for \$2,000 to current customers or \$3,000 to new customers. Each report is priced separately, but typically runs from 20 cents to \$1.10 per patient discharge. MEDIFLEX SYSTEMS CORP., Evanston, Ill.

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### DEBUGGER

The Debug/32 symbolic debugger provides full source level debugging of FORTRAN VII programs using the same variables, labels, and other constructs of the original FORTRAN source. The product interpretively executes FORTRAN VII assignment, IF, and CALL statements. Among the applications that can be created using this capability are dynamic source level patching, breakpointing targeted only on cases of interest, and subroutine testing without having to write driver programs.

Construction of these commands uses the same FORTRAN language used in creation of the source program; no debugger-unique command set need be learned. Other capabilities of the debugger include trace and single step execution, display and modification of values of variables, call procedures, and alteration of program flow of control.

The Debug/32 is a part of the vendor's FORTRAN Language System, an integrated set of components designed to

develop programs quickly and efficiently. Other products in the family include an optimizing compiler, development compilers, and performance utilities. The products run on the full range of the vendor's series 3200 superminicomputers. The Debug/32 purchased separately costs \$2,000 for the first cpu and \$1,000 for each subsequent license. PERKIN-ELMER CORP., Data Systems Group, Oceanport, N.J.

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### ADVISORY SUPPORT

The Application Advisory Support service is designed to support application software written by third-party vendors for this vendor's personal computers. It provides users with telephone assistance for both installation and operation of applications sold under the Digital Classified Software (DCS) program.

The service is provided free for application software during the 90-day warranty period for a newly purchased personal computer, and is available for Business Aids software at \$25 per month thereafter. Software requiring specialized support, (i.e., for unique applications) are priced individually as Advisory Service Options.

Software sold through the DCS program has been tested and approved by this vendor for operation on its personal computers. The software can be purchased through and supported by this vendor as well as through the third-party vendors directly. DIGITAL EQUIPMENT CORP., Maynard, Mass.

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### APPLICATION MAKER

The Creator is a package for IBM or Apple personal computers that is designed to allow any user to tailor a variety of applications to a set of particular requirements, without requiring much programming knowledge. Users can design programs in one of two ways. After selecting one of 10 ready-to-customize work areas, the user can answer English questions that appear in a step-by-step process on the screen. The Creator then does the programming, and the custom application is completed within about 10 minutes.

Alternatively, for users who want to design unique individualized applications outside of the 10 provided work areas, the Creator offers additional English language routines that provide the capability to program in other areas. The 10 work areas include word processing, database management, bar graphs, mailing list, and invoicing. Any or all of the work areas can be combined into integrated programs.

The Creator costs \$300 for the IBM P.C. and the Compaq portable computer, and \$250 for the Apple II and Apple IIe computers. The IBM version requires 64KB of main memory for the P.C. and 128KB for the XT; the Compaq version requires

128KB, and the Apple version requires 48KB. Two disk drives are required. SOFTWARE TECHNOLOGY FOR COMPUTERS INC., Newton, Mass.

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### SCREEN GENERATOR

Screen.COB is a utility program that writes COBOL code for screens set up in a text editor. Once the literals have been positioned and the variables have been defined, the program generates COBOL code for an input screen (entry), an output screen (display), an edit module, and a record declaration. Rows and columns are calculated by the program, and the code always conforms to COBOL specifications, the vendor says.

The product is intended for users who program screens in COBOL on a micro-computer, using IBM or Microsoft COBOL. The program generates the bulk of COBOL code required for screens, with variables being defined as "required" or "auto."

Screen.COB can automatically create several multiple screens at once. No additional libraries, languages, or compilers are required, according to the vendor. The product costs \$50. REMROL COMPUTER SERVICES INC., Boston, Mass.

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### SHIPPING

This Ship Movement Library provides current data on worldwide movements of tankers, gas carriers, and dry cargo vessels. All told, the on-line library covers some 19,000 commercial vessels. It contains data currently found in *Lloyd's Shipping Index* and *Lloyd's Voyage Record*, the preeminent sources for commercial shipping data.

The Ship Movement Library covers more than 4,000 daily movements and includes ship names, types, flag, deadweight, and arrival and departure ports and dates. The database can be searched selectively, for example, to analyze vessel activity along selected trade routes or to determine movements of the world tanker fleet.

The library can be used in conjunction with the Ships Casualty Library, Ship Characteristics Library, Charter Fixtures Library, and Ships on Order Library, all of which are available on the General Electric Mark III timesharing network. An annual subscription costs \$3,000. MARITIME DATA NETWORK LTD. (MARDATA), Stamford, Conn.

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### ASSET MANAGEMENT

The Asset Management Package (AMP-PC) for the IBM Personal Computer has the same features as the vendor's implementations for Burroughs and Wang mainframes. The product is a full portfolio system, with the capability of inputting all transactions in real time with immediate database updates. The package uses standardized screens and menus, and allows securities transactions

## SOFTWARE & SERVICES

under tax-lot (FIFO, LIFO, high cost, low cost) and average cost accounting methods. It has provisions for cancellations and for sector analysis, performance measurement, modeling, and forecasting.

AMP-PC can produce 20 reports that can be output to the screen or to an attached printer. Among them are operational and client-oriented trade blotters; holdings and forecast evaluations; realized and potential gain and loss reports; and performance measurement on absolute, comparative, and strategic bases. The mainframe and micro versions can be linked for uploading and downloading of data.

AMP-PC requires a minimum of 256KB of main memory and a 10MB hard disk. Rental prices, which include the hardware, start at \$1,000 per month and include maintenance, insurance on the hardware, and service and updates on the software. SECURITIES INFORMATION SERVICES LTD., New York, N.Y.

**FOR DATA CIRCLE 343 ON READER CARD**

### PETROLEUM PACKAGES

The SIGMA1 petroleum fluid and rock properties package covers gas supercompressibility factor (Z-factor), gas properties from correlations and composition, oil and water properties, multi-phase flow, and rock properties analyses. The package is intended for use by chemical and process engineers, petroleum engineers and scientists, and general industrial management.

SIGMA1 was developed in consultation with Sigma Energy Consultants Inc., and runs on the IBM Personal Computer. It costs \$100.

A second package from the same vendor is the CLIPI general purpose project management package. Consisting of five programs designed as comprehensive tools for project managers, the product handles scheduling, resource allocation, and costing applications that are frequently performed in the daily management of multitask projects. Specifically, programs include critical path method management, project evaluation and review technique (PERT) charts, cost distribution, linear programming, and inventory control.

CLIP1 is also written for the IBM P.C. and requires a double-sided, double-density disk drive and 128KB of main memory. The package costs \$250, and can be run in conjunction with the \$100 Straightfit multiple linear regression program. COADE, Houston, Texas.

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### FORMS GENERATOR

Autopilot automatically creates VPLUS forms for any IMAGE database. VPLUS is Hewlett-Packard's standard terminal handler, and IMAGE is its database management system for its HP-3000 computers.

Autopilot operates by analyzing an IMAGE database and passing form and field

specifications to Formspec, the VPLUS forms maintenance utility. Formspec then actually builds the forms file. By replacing the manual entry of forms, the product is intended to cut application development time and eliminate typographical errors.

The product allows users to perform high-overhead Formspec operations in batch mode, so that forms file compiles and listings do not monopolize terminals or degrade system throughput. An optional feature allows users to automatically create add, change, delete, and inquire transactions for the generated forms. The product costs \$1,200. COMPUTING CAPABILITIES CORP., Mountain View, Calif.

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### CICS SPOOLER

The CICS/Spooler terminal printer spooling system is designed for use with IBM mainframes running CICS. The product allows either batch or on-line programs to spool reports into the CICS/Spooler queue. The reports may be sent to CICS printers or to a batch system printer, and may be viewed from a crt before printing.

The product, which runs on the DOS/VSE operating system, includes a utility to extract reports from the Power queue and load them into the CICS/Spooler queue. Another feature allows Power console commands to be submitted through JCL or from batch programs, so that users can release a series of jobs automatically upon the successful completion of another job in a different partition.

Print lines are built with standard ASA control characters similar to the way they are built in batch programs, and passed to CICS/Spooler using the CICS Link command. The product supports multiple copies, header and trailer pages, and reports accumulated by a series of CICS tasks. The product costs \$1,300, and is distributed in command level COBOL. MACKINNEY SYSTEMS, Fair Grove, Mo.

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### HOSPITAL MANAGEMENT

The Hospital Information System (HIS) is a MUMPS-based system centered on financial programs, including medical records and utilization review. These financial systems establish the foundation on which other modules will eventually be built, the vendor says. The system operates in a real-time environment on PDP and VAX computers.

The product, which has been installed as a prototype at a large teaching hospital since 1978, includes a database component that enables the system to store large amounts of data with little impact on response time. Data can be used for on-demand DRG reporting and case-mix analysis as well as other functions.

Future releases of the product are slated to include an order communications system and other ancillary systems. The

service currently costs about \$2 to \$2.50 per inpatient day. (Three outpatient visits equal to an inpatient day.) INTERPRETIVE DATA SYSTEMS, Burlington, Vt.

**FOR DATA CIRCLE 347 ON READER CARD**

### HP-85 BOOSTER

The BIN85 binary enhancement package adds numerous statements and functions to the Hewlett-Packard HP-83 and HP-85 microcomputers' BASIC languages. The extended capabilities include date and time conversions, keyboard masking, bit manipulations, special string functions, crt and cursor control, and others.

The capabilities are designed to be used by BASIC programmers in order to improve the speed, power, and flexibility of BASIC programs. The package comes with a user's guide that describes the new BASIC statements that are supported. No knowledge of assembly language is required in order to be able to use them. A demonstration program is included to illustrate the new statements.

Some specific functions provided by the package include the capability of entering commas and quotes with an INPUT statement; disabling of selected portions of the keyboard; scrolling the display under program control; displaying text at any position on the monitor; reading text directly from the display; entering and displaying dates in mm/dd/yy format and times in hh:mm:ss and a.m./p.m. formats. The package costs \$145 and is available on disk or tape. APPLIED MICROCOMPUTER SYSTEMS, Silver Lake, N.H.

**FOR DATA CIRCLE 348 ON READER CARD**

### MANAGEMENT SERVICE

The APECS/8000 integrated project management system was designed to work with multiple delivery systems to accommodate large, small, and multisite project needs. At the heart of the service is a relational database management system that provides a collection of data related to any given project. APECS/8000 (which stands for the ADP Project Evaluation and Control System) can perform earned value analysis, critical path analysis, application building techniques, work breakdown and organization structure consolidation, and report writing and graphics functions.

The service can summarize project information to different levels of detail as defined by organizational structures. The results can be reported for analysis or graphed to show status at a glance. The product is available for Unix-based 16-bit microcomputers as well as for DEC VAX and IBM mainframe computer systems. The hardware/software combination costs from \$2,000 to \$9,000 per month for the micro versions. ADP NETWORK SERVICES, Ann Arbor, Mich.

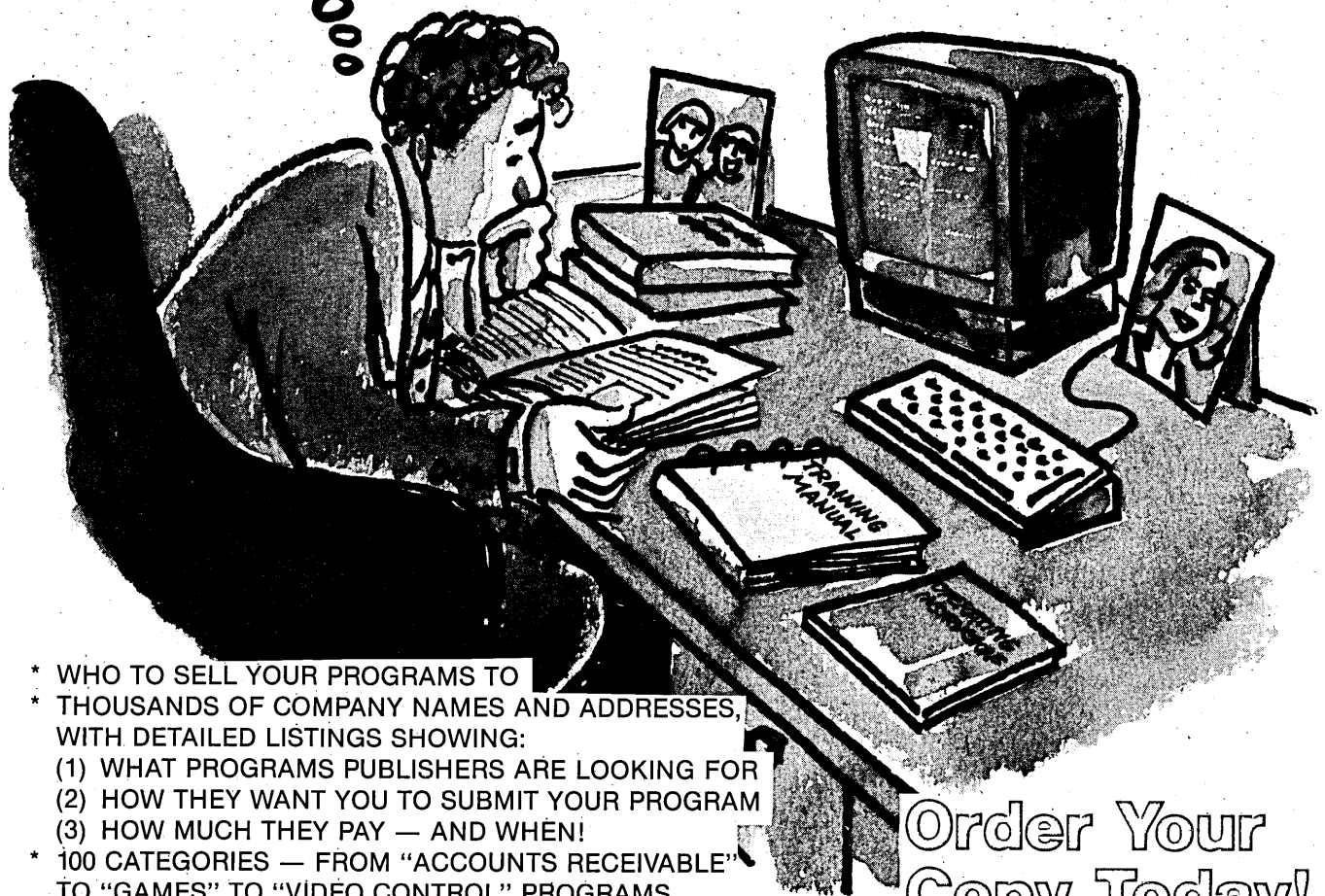
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—Michael Tyler

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## BOOKS

### THE RISE OF THE COMPUTER STATE

by David Burnham

It takes a lot of nerve for a newspaper reporter, who is almost certainly a technodud, to write a book about computers. With a subtitle like "The Threat to Our Freedoms, Our Ethics, and Our Democratic Process," this has got to be a Naderesque attack on technology written to scare Granny and delight the Luddites. Reviewing this book will be a simple matter of picking the silliest technical mistakes and being as droll as possible in pointing them out.

Well, that's what I thought before I read the book.

I started to suspect that this book wasn't exactly what I had expected when the blurb on the dustjacket reminded me that David Burnham has good credentials with UPI, *Newsweek*, CBS, and *The New York Times*. He's the guy Karen Silkwood didn't live to talk to about Kerr-McGee and the guy Frank Serpico did talk to about police corruption in New York City. On top of that, he's in the habit of winning awards and prizes for outstanding achievement in investigative journalism.

My suspicions grew when I read the foreword by Walter Cronkite (Cronkite really likes technology—remember all those space shots?). He said: "If—or is it when?—these computers are permitted to talk to each other . . . they can spew out a roomful of data on each of us that will leave us naked before whoever gains access to the information."

If the man who was America's "Most Trusted Man" for so long says this is a problem, then I'd better pay attention and read on.

Burnham is not attacking technol-

ogy, computers, or databases per se. In fact, he believes the computer and its accompanying information technology may be the most important and influential of all human inventions. He does not deny the immense power for good that these tools offer. Instead, he reminds us of something that most of us in the information business already know but tend to forget—the tools that we build and use have the potential to hurt as well as help, injure as well as heal, and strengthen oppression as well as promote freedom. Burnham forces us to look at the dark side of our art.

My defensive first response to this theme echoed NRA's famous slogan "Guns don't kill people, people kill people." I thought, information systems don't invade privacy and inhibit freedom—people do. Almost immediately Burnham read my mind and told me that my defense was irrelevant and misleading. By the time I was halfway through his book, I had to agree. The moral problem is akin to the concern that Alfred Nobel expressed about his invention of dynamite and that nearly all of the pioneering physicists felt about their contributions to atomic power. Those of us who design and build information systems must feel this responsibility as well. Computer systems won't maim, kill, or irradiate our bodies, but there is a danger that they could cripple, destroy, or poison our human spirit. This is an unusual line of thought for most computer professionals to hold, but Burnham makes a strong case that the path from databases to dictatorship is shorter than we would like to admit. The Burnham argument goes like this.

Historically, the ability of large bureaucracies to control and interface with our lives was partly limited by their lack of knowledge about who we were and what we did.

Now there are very large informa-

tion systems that keep track of all sorts of personal information. Doctors and hospitals have medical records. The trains, airlines, and car rental companies have records on our travels. The local and state police and a variety of other law enforcement agencies have access to arrest records and criminal history records. The credit agencies have files on how we pay our bills. Banks, brokers, and credit card companies have enormously detailed records of how we spend, save, and invest our money. And every licensing agency, service company, school, or social service organization has records that describe us and what has happened to us.

Professional dp people know that assembling all of these diverse records into a coherent summary of each individual is a complex and expensive task. We also know that if it's wanted badly enough, it'll be done.

Burnham quotes Lord Acton: "Power tends to corrupt; absolute power corrupts absolutely." He reminds us that the most compelling concern of any bureaucracy is for the bureaucracy to protect and perpetuate itself. Computer systems and databases give power to these organizations, and there is evidence that this power is used in ways that extend beyond inadvertent abuse into real and intentional corruption. Burnham recounts events and abuses in every chapter to support this thesis that only constant vigilance will prevent bureaucracies from exploiting the power of the computer to change our democratic society. He is very convincing.

Anyone in our profession who is inclined to doubt the seriousness of this threat should read Burnham and then turn to one of our own, Stafford Beer. In Stafford Beer's terminology (which Burnham doesn't use), our free society has a great deal more variety than the bureaucracies



## SOURCE DATA

that have sought to control it. Beer illustrates this assertion by pointing out that the main problem in law enforcement is that, even though there may be as many policemen in a society as there are criminals, crimes will still be committed because the cops don't know who to watch. There will be more control as the number of policemen increases until there is one policeman per citizen. Then, theoretically, there would be no crime because the variety of the police force has grown to equal that of the entire society. Clearly this approach to increasing the variety of a bureaucracy has its limits, but the practical way for any control system to increase its variety, according to Beer, is to implement information systems!

If there is a flaw in Burnham's argument, it probably lies in economics. He clearly shows that sufficient data and technology exist to create a nightmare of bureaucratic control over our lives. What is not so clear is where the money will come from to build the mega-information systems that he tacitly foresees. He would probably reply that the National Security Agency (the only organization considered enough of a threat to rate its own chapter) has all the money it can use. Okay, that's a start, but "national security" will only stretch so far. Can the forces of bureaucracy really get billions for less compelling reasons? It may be the purse-strings are the only reins we can put on this process. Random House, New York (1983, 273 pp., \$17.95).

—Bruce W. Hasenyager

## MAJOR EQUIPMENT PROCUREMENT by Joseph Auer and Charles Edison Harris

In the Neanderthal era of computing, neither user installations nor vendors gave much thought to the idea of negotiating a contract. Typical was the one-page letter saying: "Dear IBM: Please send me a 7090 with eight tape drives just as soon as possible." While this may seem a tad casual for an investment of \$3 million, little more was really required. The majority of systems operated on a month-to-month rental basis. If the user didn't like it, the movers were called in and the system returned.

Since those happy days, many things have changed. IBM began to sell computers. Leasing companies arose. Plug compatibles appeared. And, above all, lawyers got involved in the data-processing business; thereafter, life was never the same.

These days, the equipment procurement business is somewhat more complicated, time-consuming, and expensive. Users prepare Requests for Proposals (RFPs) to which vendors must respond with definitive statements. The relaxed handshakes of earlier times have given way to dogged negotiating sessions often marked by acrimony, ploys and counterploys, and painful discussion of each and every word, clause, paragraph, and section. The fine art of negotiation is now part of the required skills reper-

toire for senior MIS executives in large installations.

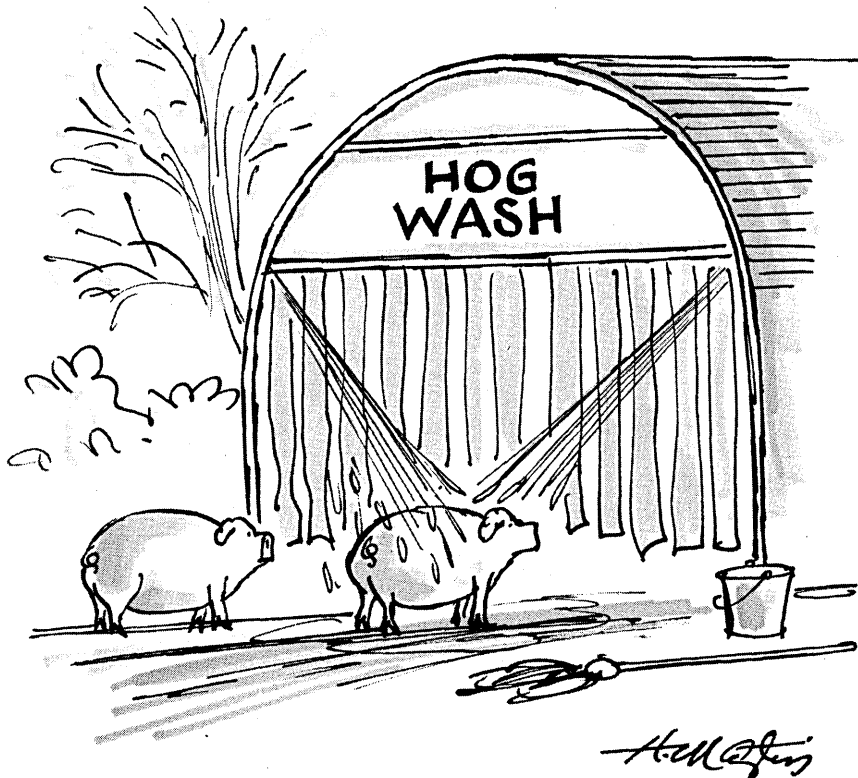
Where does a dp executive turn to acquire an understanding of the negotiating process? The in-house lawyers and purchasing experts have some feel for the process. But, as we all know, buying a computer system isn't quite the same as purchasing an electric motor or even a whole power generation system. Even major companies often do not have the necessary expertise on hand to thoroughly brief MIS management in the negotiation process.

Whenever a vacuum appears, somebody will inevitably come to the fore with the talents to plug the gap. In computer contract negotiation, Joe Auer has long been justifiably known as the expert to whom others turn. In his lectures, seminars, and articles, all widely circulated during the past decade, Joe Auer has stressed the key point that you don't have to accept what is offered by the vendor. In his new book, Auer sets out the rules of the game in great detail. His coauthor, Charles Edison Harris, an attorney, adds the technical descriptions required to explain such quaint legal notions as force majeure and warranties of merchantability to nonlawyers.

The net result is a single volume that ought to be required reading for any senior MIS executive beginning a major equipment acquisition effort. The procedures outlined in this book do not generally apply to the purchase of very small systems because of the price tag involved. It would be rather poor management to expend \$25,000 haggling over a contract worth no more than \$10,000. But a big contract is another matter. It is worth noting that the contract clauses used in major equipment purchases apply equally to small systems. The big differences are the amount of effort that can be justified, the risks and exposures, and the flexibility of the vendors.

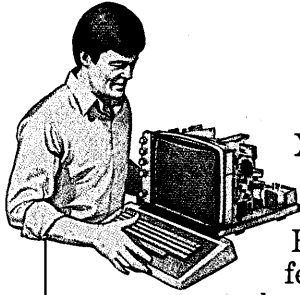
Those who have heard Joe Auer lecture know how deeply he understands vendor psychology, the tactics and tricks used in negotiating, the games played, and the concessions made only when the potential buyer exerts the pressure. If this book tells you nothing else, you should remember Joe Auer stressing over and over again that you are the buyer and the vendor is the seller. Because you are the buyer, you have the power if you exercise it wisely. Auer repeatedly reminds readers that a negotiation has two sides. When the vendor starts saying "we are all in this together," remember the expression often used by Shirley Prutch, vice president of Martin-Marietta Data Systems: "There is thee and me; there's no such thing as we."

*Major Equipment Procurement* provides a distillation of Auer's wisdom. Rather than plunge right into the RFP and contract-form discussions, the authors first discuss vendor ploys. In each instance, they describe the ploy and then show the reader



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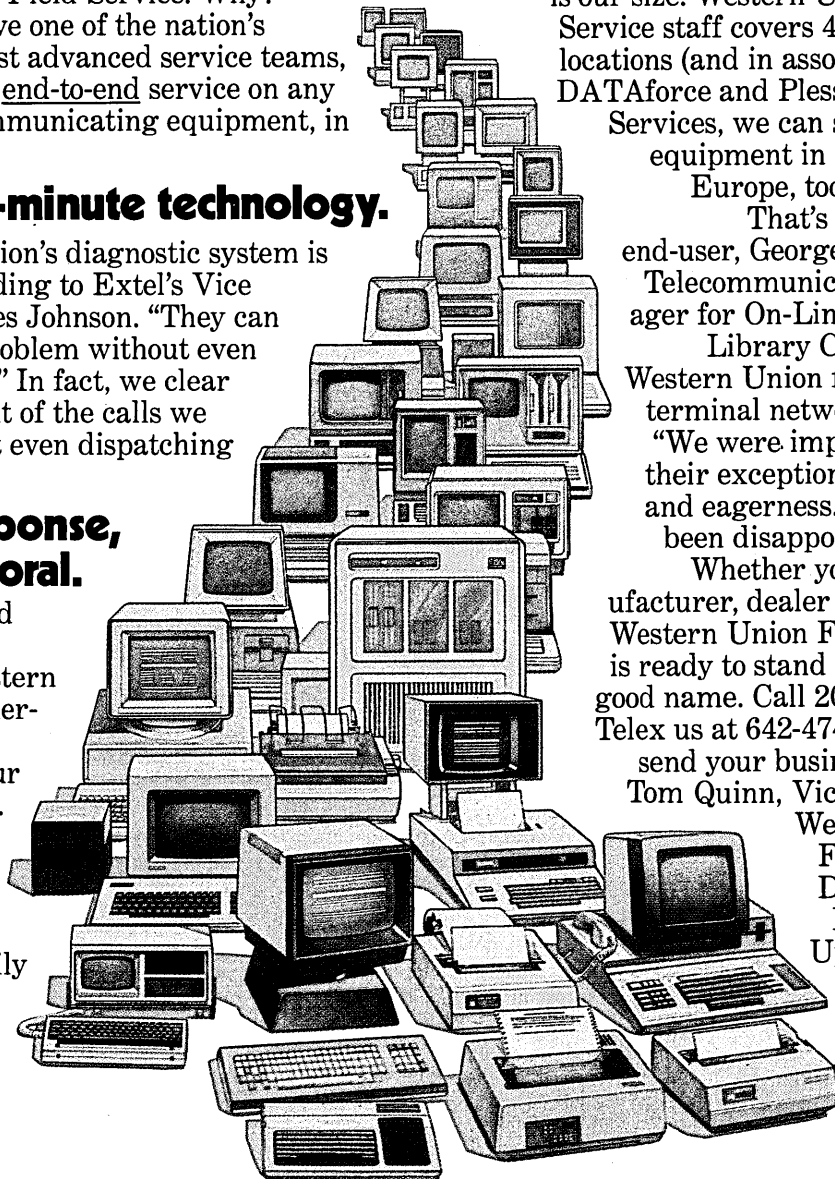
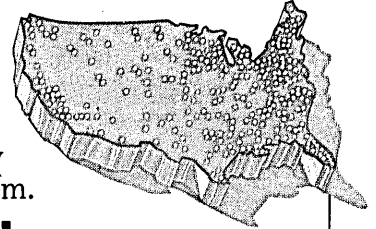
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how best to respond, react, and turn the ploy to the user's advantage. All the standard ploys are covered, including "Our Best Price," "Have to Get the Changes Approved by Corporate," "Can't Do It Because GSA Won't Let Us," and "We Would Be Setting a Precedent." The author's offer an established, well-proven defense for each one.

Another major section discusses the art of negotiation. While numerous books are available on how to negotiate, these authors save reading time by summarizing most of the major texts. They cover such topics as body language, tactics, and what has been dubbed "Personal Negotiating Power."

The book includes a thorough description of the purpose and use of an RFP, a model version, and a complete analysis of what points should be covered in such a document. As anybody who has been on the receiving end of vendor proposals knows, the advantage of stating a standard response structure cannot be overemphasized. Otherwise the analysis of half a dozen responses to RFP, tender offers, is chaos. If the installation, or buyer, doesn't specify the precise form, it will find itself dealing with an array of approaches, each favored by a single vendor and none covering all the desired points. Apples + oranges + strawberries = fruit salad.

As much as MIS executives may wish to confine their thinking to technical matters, the mysteries of contract law will still intervene. A large part of any contract is a set of clauses describing the duties and responsibilities of the parties. These include warranties, indemnification, copyright and patent implications, and a great many other points. The MIS executive cannot ignore these or accept the usual vendor explanation of "just our lawyer's boilerplate." The authors review the conventional boilerplate and explain the implications, what should be avoided and what is acceptable.

One clause that always attracts a great deal of user attention is the vendor disclaimer of any implied warranty. Auer and Harris suggest that few users will have success striking out the implied warranty of merchantability. Computer vendors seemingly do not like the provisions of the Uniform Commercial Code as far as warranties are concerned. Speaking from the vantage point of participating in many similar negotiations, this reader agrees with the authors. An installation would do better to get more specific expressed warranties than to waste its time fighting the lack of implied warranties.

Another cute vendor clause is force majeure. This language essentially takes the vendor off the hook for on-time delivery if an Act of God, liberally defined by the vendor, occurs. Smart users have learned how to turn this clause. Simply redefine it

to permit the installation, the buyer, to walk away at no cost should an Act of God occur. This is sure to rile the vendor's lawyers.

Additional sections in the book deal with used equipment, third party leasing, master contracts, and the usually forgotten notion of contract administration. All of this information is highly useful, but perhaps the most important point, since installations tend to ignore it, is contract administration.

After haggling for several months and finally getting a contract with mutual responsibilities, the installation all too often takes a deep breath and then promptly forgets what it has just signed. Very few shops specify detailed procedures for logging and tracking the errors—building a record, if you will. One wishes installation management would heed the authors' warning and pay more attention to the after-contract phase: technical people want to get on with the job.

Auer and Harris have written an important volume for those involved with major procurement. It is a textbook on how to do the negotiating job, what weapons are needed, and what objectives are sought. Unfortunately, it is merely a book and not a substitute for action at the table, care in drawing up the documentation, and managerial skill in establishing the rules for the negotiations.

In an ideal world, each copy of this book purchased would include a videodisk of a Joe Auer seminar. It is a lot easier to remember the key arguments when one is subject to a thunderous Auer blast on the point. Because Auer has been involved in many negotiations, he can usually think up a specific example or two to illustrate any point convincingly.

With apologies to Attorney Harris whom I have not heard speak, I think that Auer, in the flesh or in this book, is a persuasive customer. He makes it seem possible to bring the vendors around to your way of thinking.

In the classic English common law, a contract was described as containing "a meeting of the minds." Far too many contracts for data-processing equipment or services are merely one-way streets with every possible protection for the vendor and none at all for the using installation whose money is being spent. Many executives will spend weeks and even months researching and discussing a personal purchase of a \$9,000 automobile while casually purchasing a \$2 million computer on faith. There is a strange difference between spending one's own money and one's employer's. Hopefully, this book will open some eyes and show the senior MIS executive that there is indeed room to maneuver, gains to be made, and advantages to be won. Van Nostrand Reinhold Co., New York (1983, 436 pp., \$42.50).

—Philip H. Dorn

## BOOK BRIEF

### WHACKS ELOQUENT

Roger von Oech, PhD, founder of Creative Think, Menlo Park, Calif., is "a man who puts creative thinking into action for himself and others." His company provides consulting, seminars, conferences, and publications. It also serves as an idea agency for entrepreneurs and companies such as Apple, ARCO, Colgate-Palmolive, Du Pont, GE, GTE, Hughes Aircraft, Hewlett-Packard, IBM, ITT, and others. Hence, he now offers his book, *A Whack on the Side of the Head*, which promises to tell you how to unlock your mind for innovation. According to von Oech, most people are plagued by 10 "mental locks" that prevent them from being creative. The 139-page book is sprinkled with jokes, case histories, and terrific illustrations by George Willett. In addition to being humorous, the book is thought provoking and makes for very easy reading. The paperback costs \$8.95. For more information, contact Warner books, 666 Fifth Ave., New York, NY 10103, (212) 484-2900.

## REPORTS & REFERENCES

### WP OR PC?

If you're having trouble deciding whether to buy a word processor or a personal computer, you may want to look at a new study offered by Input, Mountain View, Calif. Entitled "Word Processors Versus Personal Computers: Resolving the Selection Dilemma," the study analyzes the future roles of personal computers and word processors in the office. It provides a step-by-step method for selecting a proper combination of the two technologies that would be most appropriate for different business applications. The report also examines how vendor support, company organization, data communication, function, and cost affect the decision-making process. To order the \$600 report, contact Input, 1943 Landings Dr., Mountain View, CA 94043, (415) 960-3990.

### CHIPS OFF THE OLD BLOCK

*Advanced Microprocessors: A Book of Selected Reprints* is now offered by the IEEE Computer Society. The publishers claim this book fills a void in literature on the subject by presenting a history of the microprocessor field as well as a comprehensive picture of current trends. The 41 reprinted papers included in the book are organized into six parts: Overview, 16-Bit Microprocessors, 32-Bit Microprocessors, Performance Evaluation, Related Technologies, and System Issues. The 368-page clothbound volume costs \$24.90 for members and \$41.50 for nonmembers. For more information, contact IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854, (201) 981-0060.

Due to popular demand, we've created a new display that fits both tight spaces and tight budgets.

Our new ITT Courier 1700.

The 1700 is compatible with the 3278 model 2. Yet its footprint is only 13 x 12 inches (24% smaller than IBM's 3178). And its keyboard is only 16 inches wide (17.9% smaller than the 3178).

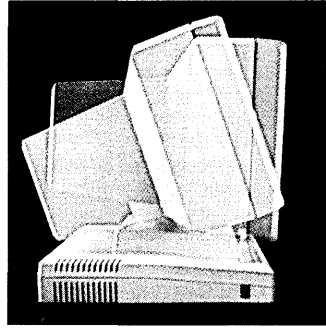
Still, the 1700 is big on

ergonomics and the kind of performance features you expect from ITT.

Its screen tilts and swivels, and its keyboard adjusts for optimum operator comfort.

It has Reveal to aid program development. Capture to aid troubleshooting. And Variable Field Underline to increase productivity.

Things you don't get with the IBM 3178.



ITT 1700 tilts, swivels and has a smaller price than IBM 3178.

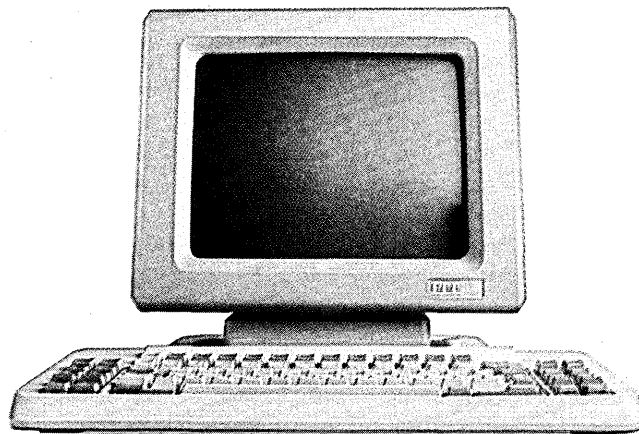
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The ITT Courier 1700. The economy-sized 3270 display that really is economical.

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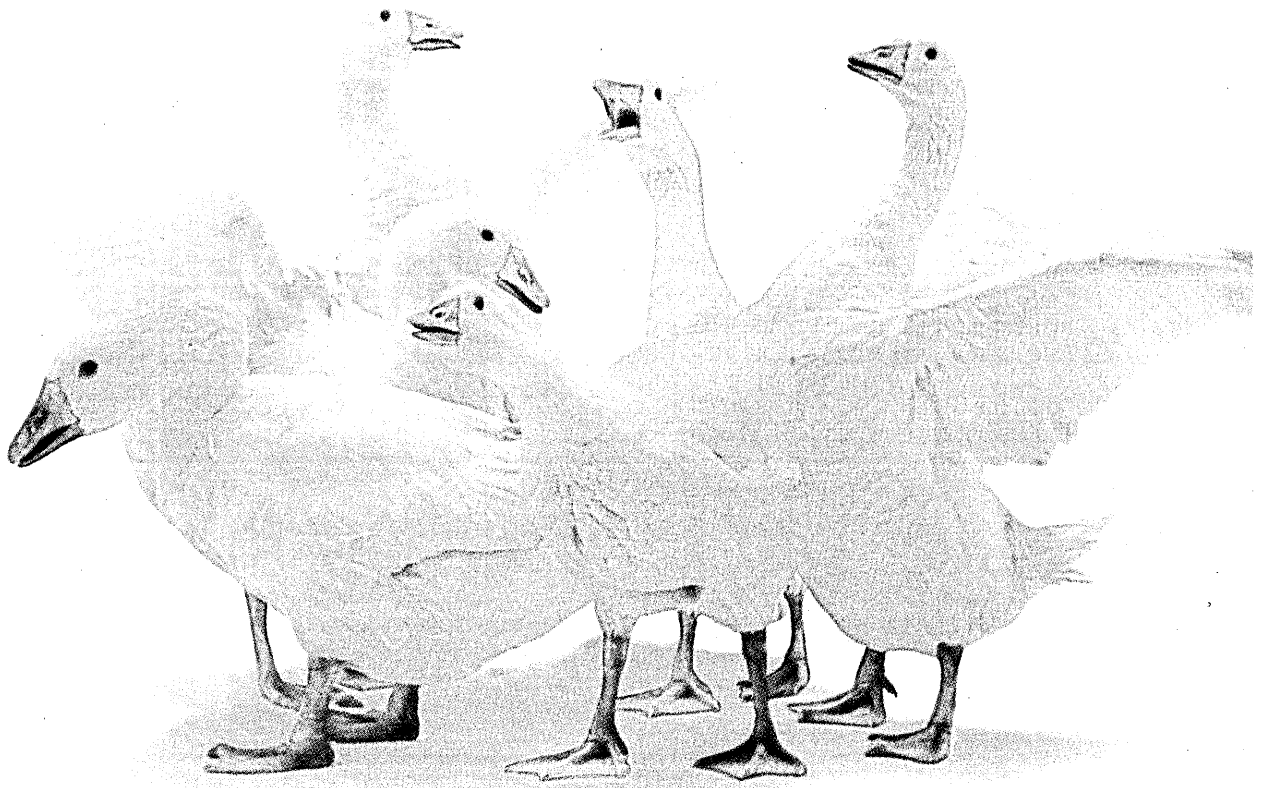
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COURIER

# WE HAVE 3270 COMPATIBILITY IN THE NEW ECONOMY SIZE.



ITT Courier 1700.

CIRCLE 146 ON READER CARD





## While everyone else has been squawking about private networks, one company has been quietly building them.

Today, with dozens of new companies and hundreds of unproven products all promising to perform networking miracles, the noise level has become exceedingly loud.

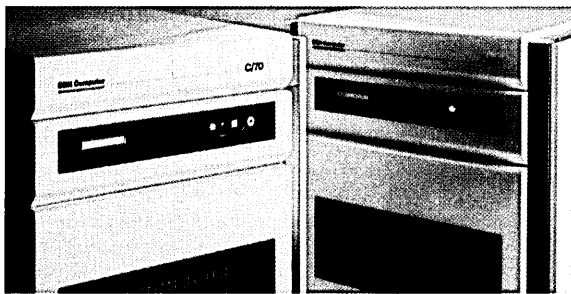
And the job of finding the right company to build your network has become more confusing than ever.

Meet BBN Communications. In the midst of the noise and confusion, we've been quietly building networks for government agencies and major corporations around the world. In fact, we built the world's first packet-switched computer network back in 1969.

But what sets us apart even more than our experience is the way we work. Instead of the usual short-term "fixes," we're committed to providing long-term solutions. So before we design your network, our communications consultants will analyze your specific needs—present and future. And based on them, establish your optimum network configuration. Then we'll build your network. Of course, even after everything is working to your satisfaction, we'll still be around to help with your future needs.

### **It takes more than computers to make a computer network.**

Another thing that makes us different is that we manufacture a full line of our own proven networking hardware and software, not just a few isolated products. Including packet switches, terminal access

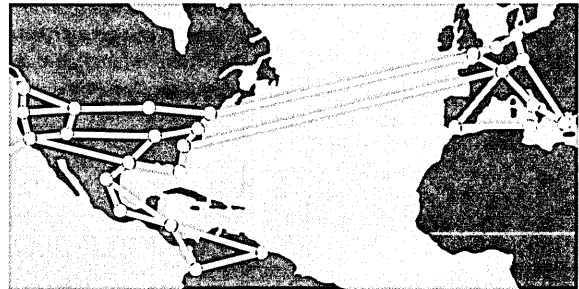


*Our communications processors are the most advanced available today.*

devices, and electronic mail systems. All of which simply means we can supply everything you need.

What's more, our entire product line is fully X.25 compatible and easily interfaces with public data networks.

But state-of-the-art technology is just the beginning. We also provide a network operations center so



*Packet-switched networks built by BBN Communications link companies with offices around the world.*

you can monitor your entire network at a glance and control it almost as easily. We'll even run the center for you if you like. And to ensure maximum network reliability—and uptime—we offer round-the-clock field service by the most experienced communications engineers in the business.

Just because we're the networking leader, don't think for a minute that we're resting on our accomplishments. Our R and D effort is one of the largest in the industry, with major programs in protocol development, network control, and future network applications. And, of course, our customers receive the full benefits of every breakthrough we make.

### **We're the networking leader.**

Fifteen years ago, we pioneered packet-switching technology to build the Arpanet, the world's first packet-switched computer network. Today, Arpanet supports 10,000 users and over 300 different computers in the United States and Europe, and the technology we invented for it has become a cornerstone of the data communications industry.

As the networking leader, our customers include major financial, manufacturing, and industrial corporations from all over the world. Recently we've even been selected to build and run the U.S. Defense Department's major new computer network, the Defense Data Network.

So if you're tired of all the squawking, consider BBN Communications. We think it's about time you got your network, and some peace and quiet, too.

For a brochure on our complete networking capabilities, contact BBN Communications Corporation, 33 Moulton Street, Cambridge, MA 02238, (617) 497-2800.



**BBN Communications Corporation**

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## SOURCE DATA

### HISTORY REPEATS

In 1952, Van Nostrand published *Automation*, a book written by John Diebold on the future role of computers and communication in business methods. Recently reissued, the book is unchanged but for a new introduction by the author and an editor's note pinpointing the accuracy of Diebold's original predictions. The 181-page hardcover book can be purchased for \$14.95 from AMACOM Book Division, American Management Association, 135 W. 50th St., New York, NY 10020, (212) 586-8100.

### SOVIET SCIENCE

Information Resources Press has announced publication of "the first English-translation of the basic account of information collection, processing, and distribution in the Soviet Union." *Scientific Communication and Informatics*, written by A. I. Mikhailov and two associate directors of the All Union Institute of Scientific and Technical Information (VINITI), promises to review, analyze, and update 25 years of Soviet developments in information processing. The publishers claim the book details and analyzes worldwide developments in information science and computer and related sciences, and shows how they have been adapted and refined for Soviet needs. The book will be available in December 1983 for \$55.50 plus \$2.45 for postage and handling, and has a prepublication price of \$50. You can order the book from Information Resources Press, 1700 North Moore St., Arlington, VA 22209, (703) 558-8270.

### CENTER OF ATTENTION

Yourdon Press has published *The Data Factory: Data Center Operations & Systems Development* by Edward G. Roeske, which seeks to "elevate the reputation of the data center and to professionalize this critical dp group by expanding its role in systems development." The book costs \$17 plus \$1.25 for shipping and handling and can be ordered from Yourdon Inc., 1133 Avenue of the Americas, New York, NY 10036, (212) 391-2828.

### EX-IBM

The latest issue of the IBM Alumni Directory is out. Bob McGrath, president of Ex-IBM Corp., says it lists more than 2,700 alumni with more than 1,000 chairmen of the board, presidents, and vps. Two U.S. senators, Donald W. Riegle (D-Mich.) and Frank R. Lautenberg (D-N.J.), are included. McGrath, who has been publishing the directory since 1971, says he is always looking for additions. The directory costs \$14 and can be ordered from Ex-IBM Corp., 6733 Lake Shore Dr., Garland, TX 75042.

### MICRO WHO'S WHO

Datapro Research Corp. publishes a reference guide to 2,500 companies marketing microcomputer hardware, software, pe-

ripheral equipment, and services. Entitled "Datapro Who's Who in Microcomputing 1983," the 575-page, color-coded guide is cross-indexed by application, product, hardware system supported (for software companies), and company. Each company profile includes name, mailing address and telephone number, areas of principal business specialization, applications focus, product line summary, primary customers served and sales concentrations, the date the company was founded, number of employees, and the names of the company president and marketing director. The directory is available for \$39.95. To order, contact Datapro Research Corp., 1805 Underwood Blvd., Delran, NJ 08075, (800) 257-9406 or (609) 764-0100.

## PERIODICALS

### COMPUTER-BASED TRAINING NEWS

A free newspaper for end users and trainers has been announced by CRWTH Computer Coursewares, a vendor of interactive computer-based training for the information center. Called *CRWTH CBT News*, the newsletter is "designed to share information with the field about new developments in the information center, end-user training, and CBT course anchoring." The quarterly publication covers such topics as a comparison of IBM mainframe CBT presentation system interfaces and a look at corporate skills training. For a free subscription, send your business card to *CRWTH CBT News*, c/o CRWTH Computer Coursewares, 613 Wilshire Blvd., Suite 200, Santa Monica, CA 90401, (800) 282-2372.

### MACROSCOPE

Scope Publications is publishing a monthly newsletter designed for IBM System/36 users. Features include such topics as tips and techniques for OCL, RPG II and utilities, a program-of-the-month highlight, as well as technical discussions of all facets of the computer. The newsletter, entitled *Scopel 36*, will also have a contact column where readers can get in touch with one another, and will include operating hints for the non-professional. Subscription details and a sample issue are available from Scope Publications Inc., P.O. Box 1252, Maitland, FL 32751, (305) 645-2351.

### FLOPPY COPY

The first issue of *Software Digest* will be available in December for a target audience of personal computer users. The publication will include one floppy disk with each month's issue, containing both usable and demonstration programs. The publishers claim the magazine will be written in "plain English" for the user who is not interested in reading a lot of technical information. A separate edition will be published for each of the major types of person-

al computers so that "subscribers will not have to wade through a lot of information or programs they cannot use." Charter subscriptions are offered at the rate of \$10 a month for the first year. For more information, contact *Software Digest*, P.O. Box 10, Merion, PA 19066, (215) 923-5400.

### HONEY DO

A new publication for Honeywell computer users is available from Publications and Communications Inc. Called *Honeyworld*, the publication will feature news and information on Honeywell systems and users. *Honeyworld* also plans sections such as a technical exchange/"help wanted service," a software exchange, user installation profiles, review of Honeywell products, reviews of Honeywell-compatible products, a used-equipment exchange, and other features. For more information, contact *Honeyworld*, Publications and Communications Inc., 12416 Hymeadow Dr., Austin, TX 78750, (512) 250-9023.

## SEMINARS

### TEL US MORE

ICA Telemanagement is sponsoring a three-day conference to bring together leading authorities on office technology for an intensive examination of today's electronic office. Called "Implementing the Electronic Office: The Second Annual Conference on Office Technology," the conference promises to explore such topics as the new role of corporate telecommunications, designing integrated office systems, networking personal computers, and teleconferencing at preconference seminars and regular sessions. For more information, contact ICA Telemanagement, 2175 Sheppard Ave. East, Suite 210, Willowdale, Ontario, Canada M2J 1W7, (416) 494-4440.

### 34, 36, 38, HIKE

DGC Incorporated is presenting two seminars on the IBM System/36. The first, entitled "The IBM System/36: What's In It for You?" covers the actual performance capabilities of the System/36, particularly from the vantage point of a System/34 user. The course also promises to provide a recommended migration strategy to the System/36 and to help you determine if the System/36 can satisfy your needs and at what cost. The second seminar, "Everything You Always Wanted to Know about the IBM System/38. . . but Didn't Know Whom to Ask," offers technical education on the 38, as well as performance tips for System/38 owners. If you're considering moving to the System/38, this course should provide a clear appraisal of the system's features, says DGC. The seminars will be presented in various cities throughout November and December. For more information, contact DGC Inc., 1450 Preston Forest Sq., Dallas, TX 75230, (214) 991-4044.

# Getting your system in front of management is finally made simple.

Now your system can be accessed quickly and easily with Northern Telecoms Displayphone terminal. It's as simple to use as a telephone. And compact enough to fit on everyone's desk.

Perhaps the most difficult part of your job is getting your system in front of the people who would benefit from it most. Management often finds computer terminals too bulky or too complicated to operate. As a result they shut themselves off from information that can be vital to your company's productivity.

MIS professionals in a variety of industries have discovered the Displayphone\* terminal, an ideal solution to the problem of user acceptance. Voice and data are integrated into one compact unit whose sophisticated capabilities are so easy to use, everyone will welcome it on their desks.

Menus of features and functions, visual prompts and terminal-resident soft keys guide even novice data users through correct operation easily. And soft keys can also be downloaded from your host computer for single key activation of program commands. As an advanced business telephone, the Displayphone unit brings the convenience of voice features such as directory dialing to data calls, and allows simultaneous voice and data communications.

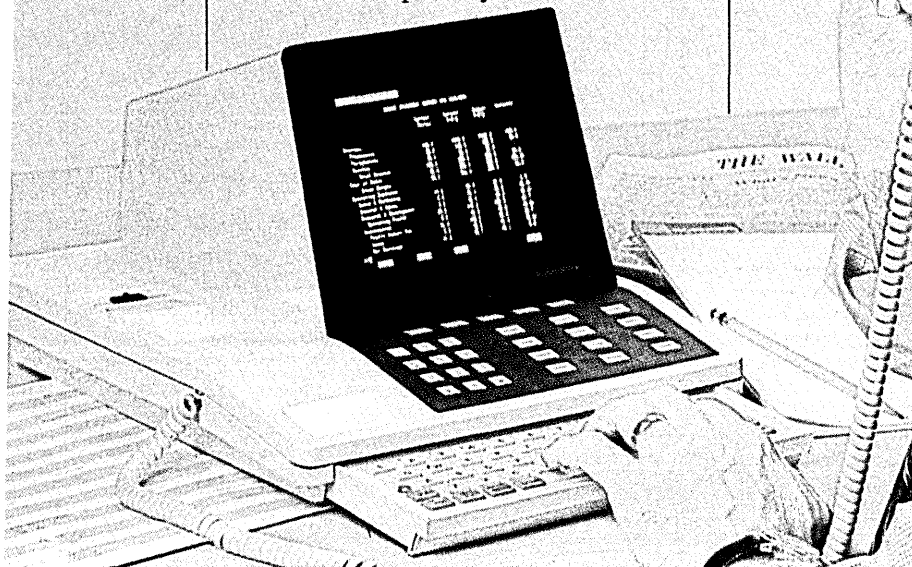
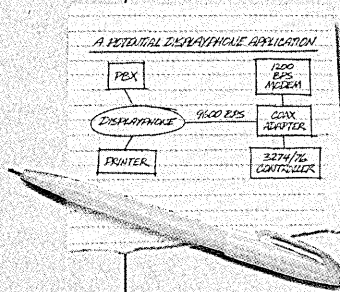
In addition to its ease of use, the Displayphone terminal offers powerful data access capability.

It is an asynchronous terminal that can also be configured to operate in IBM 3270 and other sophisticated computer environments. This flexibility gives users high speed access to a full range of corporate and public data bases.

The Displayphone terminal is an exciting example of Northern Telecom's commitment to the OPEN World—our approach to information management that combines telecommunications and computer technology in innovative ways to increase productivity, save time ... and money.

To find out how productive the Displayphone terminal can be for your company, call 800/621-6476. (In Illinois: 800/572-6724; in Canada: 800/268-9079), or send in the coupon.

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the rational approach to information management. It's the best of all possible worlds.



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P.O. Box 10934, Chicago, IL 60610

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Company \_\_\_\_\_


Address \_\_\_\_\_

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City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

D-3



CIRCLE 148 ON READER CARD

## SOURCE DATA

### CLASS ACT

Computer education takes on a new twist with CLASS Associates Inc., an outfit that is organizing a series of week-long Mississippi riverboat cruises combined with courses for micro users. The courses are designed as easy-to-understand, comprehensive lessons on computer fundamentals and personal use. Classes are tax-deductible and will meet on the *Mississippi Queen*; the first two are scheduled for Nov. 25 through Dec. 2 and Feb. 24 through March 2. The daily hour and a half seminars will be held in the boat's auditorium. More than 30 computers will be set up in locations throughout the boat with instructors available for personal

consultation and assistance at any time. The cruise begins in New Orleans and includes visits to the historical ports of St. Francisville and Baton Rouge, La., and Natchez and Vicksburg, Miss. Prices range from \$1,495 to \$1,895 per person, with discounts for a second person sharing a room. Contact Jerry Mekler, CLASS Associates Inc., P.O. Box 492, 644 Danbury Rd., Wilton, CT 06897, (203) 762-2595.

### VLSI DESIGN TECHNIQUES

MOS analog/digital interface circuit design for VLSI digital systems will be the subject of a two-day course, sponsored by Continuing Education in Engineering and the Col-

lege of Engineering, University of California at Berkeley. The course will be held Jan. 16-17 and will emphasize applicable design techniques. Other topics include passive and active devices in MOS VLSI technology, MOS operational amplifier design, interface requirements for a signal-processing applications, switched capacitor filters, monolithic digital filters, data converters, and the role of digital and analog processing in scaled technologies. The \$450 session will be held at the San Francisco Airport Hilton Hotel. For more information, contact Continuing Education in Engineering, University of California Extension, 2223 Fulton St., Berkeley, CA 94720, (415) 642-4151.

### NET WORTH

The DMW Group Inc. will present a seminar on "Data Communication Networks: Planning, Analysis and Design" on Dec. 6 and 7. The course is designed to provide quantitative experience with germane models and design trade-offs for data networks; emphasis is on engineering approximation, which the sponsor claims is understandable without the use of detailed mathematics. The course costs \$595 and will be held in Ann Arbor, Mich. For more information, contact Marilyn Chasteen, the DMW Group Inc., 2020 Hogback Rd., Ann Arbor, MI 48104, (800) 521-7802 or (313) 971-5234.

### ROBOT AWARENESS

Continuing Engineering Education at George Washington University will present a three-day seminar entitled "Intelligent Robots: The Integration of Microcomputer and Robotic Technology." The course is intended to help participants develop awareness of the principles and capabilities of modern robot technology and the important position microprocessors play in development of that technology. The course costs \$795 and is recommended for those with degrees in engineering, mathematics, or the physical sciences or with equivalent work experience in a technical area. For more information, contact Chip Blouin, Continuing Engineering Education, George Washington University, Washington, DC 20052, (800) 424-9773 or (202) 676-8527.

### PROTECT YOURSELF

Digital Equipment Corp. will present a two-day seminar on "Protecting Data Information: A Workshop in Computer & Data Security." The seminar will be held in Dallas Nov. 10 and 11; Boston, Dec. 15 and 16; and Los Angeles Feb. 9 and 10. DEC says the seminar will give you the information you need to design, develop, and implement the appropriate security program for your organization. For more information, contact Digital Equipment Corp., Educational Services, Seminar Programs BUO/E58, 12 Crosby Dr., Bedford, MA 01730, (617) 276-4949.



CARTOON BY SID HARRIS

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# THERE ARE TWO SIDES TO BAR CODE SHOP FLOOR DATA COLLECTION.



## THE **SHOP** NEEDS A TOUGH, ACCURATE DATA COLLECTION TOOL.

INTERMEC 9341 industrial data collection terminals are improving productivity in work-in-process tracking, inventory and production control, shipping and receiving, labor reporting, quality control and more.

The compact 9341 not only virtually eliminates data errors, but also eliminates the need for on-line CRT terminals. Its 32 character display provides prompt, computer response and status, time and wandling feed back and is readable from 10 feet. An adjustable volume beeper also provides operator feedback. You won't get faster, more accurate first-read rates than from INTERMEC.

You won't find a tougher, industrial data collection terminal than the 9341. Encased in a heavy aluminum casting with a mar-resistant, polycarbonate face panel and sealed keyboard, the 9341 keeps functioning in spite of the abuse industry hands out.

## THE **MIS** GROUP NEEDS A SIMPLE HANDSHAKE WITH THE HOST COMPUTER.

MIS managers need no longer dread the thought of designing, programming and implementing bar code data collection.

The INTERMEC 9160A Port Concentrator minimizes both the costs and headaches of interfacing. The 9160A handles bidirectional data traffic between your host computer and up to 16 INTERMEC bar code readers and/or printers. All polling and error checking for each channel is automatically controlled, and data storage expandable to 64K of RAM is available.

The 9160A provides superior system diagnostic and debug capabilities with the equivalent of a data line monitor built in. The 9160A is compatible with most minicomputers including the IBM Series/1, HP 3000, DEC PDP-11 and IBM Systems 34 or 38.

Whether you're an OEM designer or end-user, for more information on shop floor data collection tools that integrate easily and work well, contact INTERMEC, 4405 Russell Road, PO Box C-N, Lynnwood, WA 98036-0694. Call 206/743-7036. TELEX: U.S. 152447. INT'L 4740080.

## FRIENDLY, ACCURATE, INDUSTRIAL STRENGTH BAR CODE TOOLS.



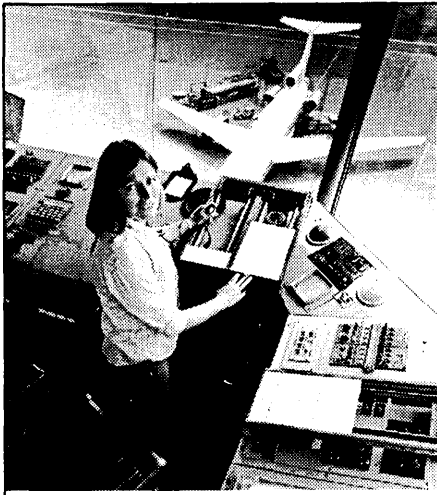
 **INTERMEC®**

*The industrial bar code experts.*

FOR LITERATURE CIRCLE NUMBER 150

FOR DEMONSTRATION CIRCLE NUMBER 151





## Does business stress cause high blood pressure?

Stress on the job is a real problem for most of us. Many people think high-pressure jobs cause high blood pressure.

Scientists and doctors aren't sure if stress causes high blood pressure. But, one thing is for sure: *anybody*, no matter how they react to stress, can have high blood pressure.

If you have high blood pressure, you can control it—with medication, weight control, less salt, and whatever else your doctor tells you to do, every day.

No matter what you do for a living, keep on living.

**High blood pressure.  
Treat it and live.**

National High Blood Pressure Education Program.  
National Heart, Lung, and Blood Institute,  
U.S. Department of Health and Human Services

## Employment Scene

# ON THE JOB

### THE ELUSIVE DP PROFESSIONAL

So you want to hire a seasoned dp professional. It seems like an impossible task because most of them are not looking for jobs. They are successfully employed, making good money, and usually content with their careers. Want ads and headhunting agencies can't always uncover the person you're looking for. So where do you turn?

One possibility is the Technical Career Job Fair, presented by Business People Inc. (BPI), Minneapolis, Minn. This consulting company came up with the job fair idea in 1978, when, as president Bill Aberman says, his son David graduated from college and began job hunting. While watching David run from one end of town to the other looking for a job, Aberman concluded that prospective employers should get together under one roof, thereby making life easier for everyone. The job fair was born.

This year alone, BPI ran approximately 30 fairs in U.S. cities; including Washington, D.C.; Denver, Col.; Los Angeles, Calif.; and Boston, Mass. The average number of booths per fair is 35, with a low of 25 and a high of 70. Each show averages between 2,500 and 3,000 attendees, but there are always exceptions. A recent fair in San Jose, Calif., brought in a record high of 5,000 job seekers.

The companies exhibiting at the job fairs are usually looking for a wide range of senior level employees, such as engineers, scientific computer programmers, and technicians. A year-long study by BPI found that exhibiting companies generally hired between three and seven job hunters per fair. (These numbers sometimes go as high as 40 and as low as zero.)

According to the elder Aberman, there are two major reasons these fairs appeal to people: they draw the inactive job seeker, and they are relatively cheap to attend, per hire, compared with traditional

recruiting methods. Additionally, job seekers who want to remain anonymous may do so; there is no registration or fee for attendees. They can wander around incognito and find out their worth in the open job market. Attendees generally have major companies to choose from, including IBM, Control Data, 3M, Honeywell, and Texas Instruments.

Aberman doesn't just run job fairs, though. The company also keeps up an advisory board, consisting of such heavyweights as Citicorp, McDonnell Douglas, Sperry, Wang, Cray, Amdahl, and Hughes Aircraft. The 30 companies that make up the board meet twice a year with BPI to talk about their personnel problems. BPI then comes up with programs to solve these problems. The advisory board also helps Aberman and company get a grasp on the national job situation. To help them do the same on a regional level, they've begun a California Regional Council to deal with that region's specific problems. With the combined input of both advisory boards, Aberman feels BPI gets enough information to keep ahead of the competition, and to supply better solutions for the problems facing this industry. His formula seems to be working; this year's revenues will be over \$2 million, and, since BPI's expanding to do more services for its client companies, Aberman is hopeful revenues will reach \$3 million in 1984.

Although the advertising preceding each fair specifically states the fairs are for experienced dpers, there are always young folks looking for a first job. These fairs don't really ease the plight of the college grad who can't get a job without experience, or the experience without a job. But Aberman has noticed that since the economy is improving, more companies are again putting money into on-the-job training programs.

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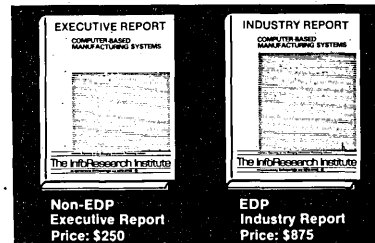
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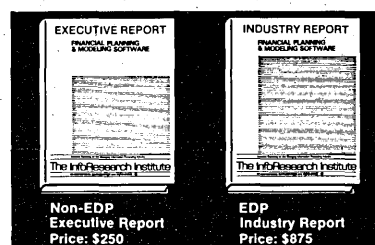


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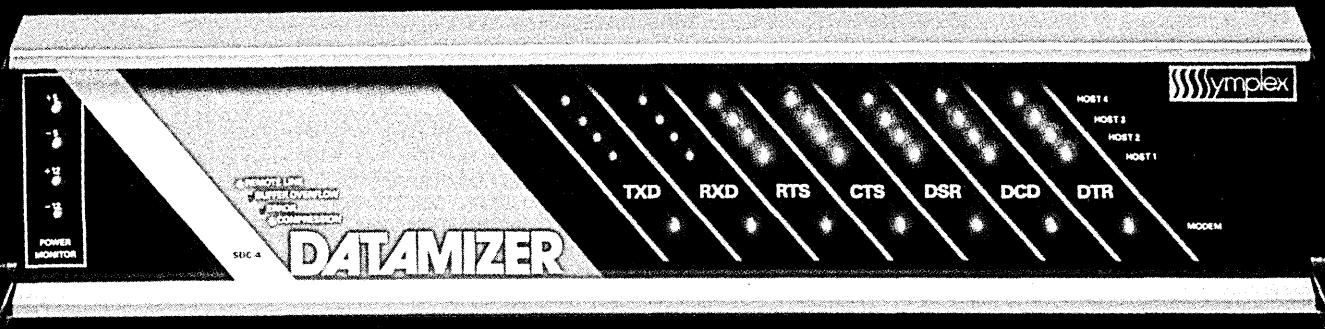
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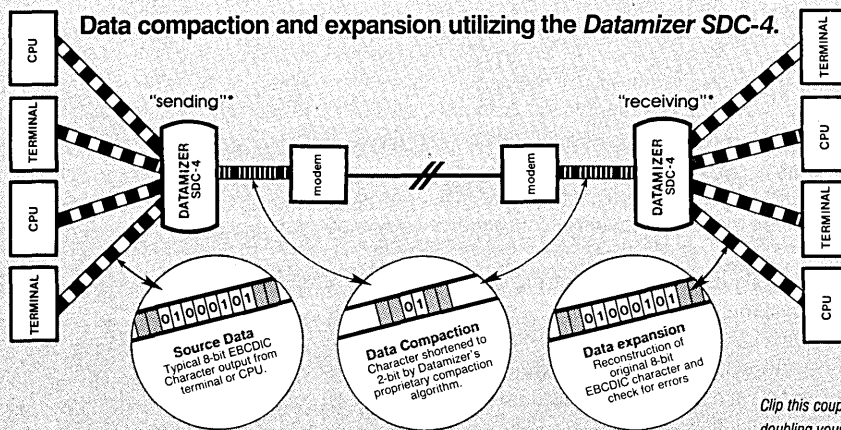
The Datamizer SDC-4 is also an advanced 4 channel statistical multiplexer, capable of simultaneously muxing a different half or full-duplex communications protocol at an independent rate on each channel. Utilizing dynamic band width allocation, aggregate input of up to 38,400 bps is possible in certain configurations.

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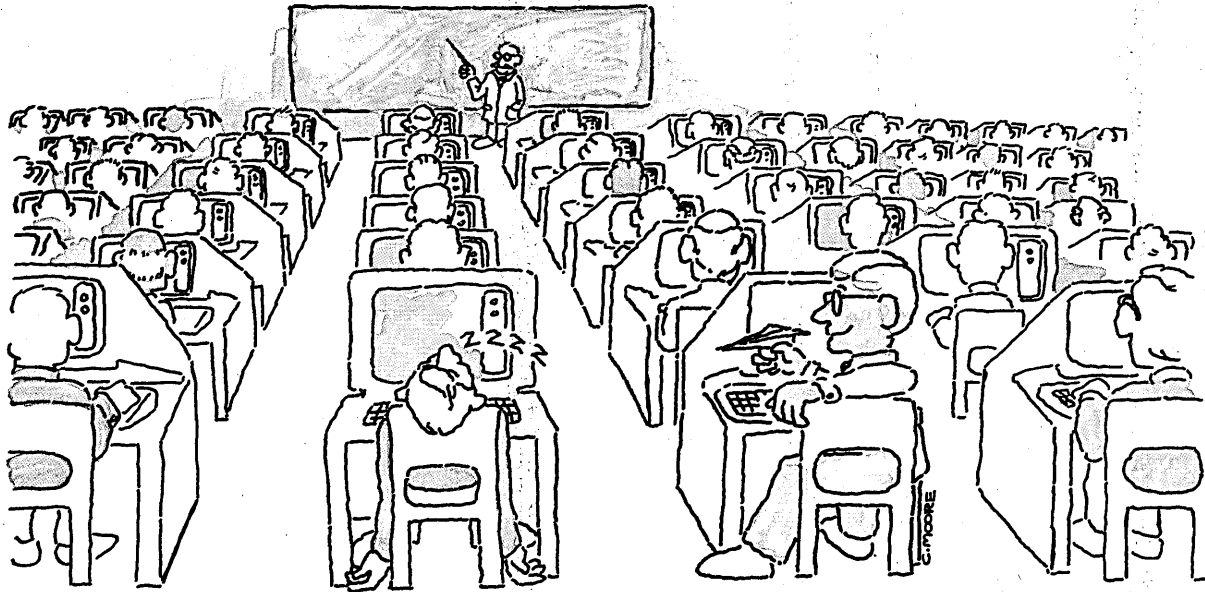
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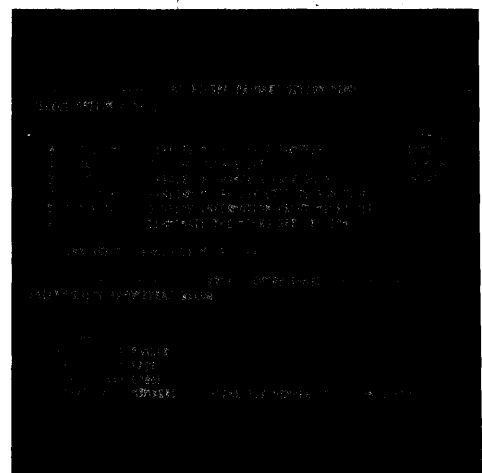
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CIRCLE 155 ON READER CARD

# READERS' FORUM

## DATABASE POLITICS

The database approach to managing automated business data has a ghastly track record. In the past 10 years it seems to have failed more often than not. I suspect that only one in five companies trying it actually pulls it off.

Now let me explain that I've been working with databases since 1970 and speak from personal, often hectic, experience. That four out of five failure rate is not inability to use the software. Sure, in the early '70s there were times we simply couldn't get the vendor's DBMS (database management system) package to work, but those days are gone. It's failure of goals—not of means—that I'm talking about, a more insidious and subtle kind of failure.

Firms adopt the database approach because it promises a central pool of shared business information for all applications. The alternative—each application maintaining its own standalone, often duplicated files—leads to inconsistencies and timing problems. Why database? So that users can share the same data.

The goal then, is pooled data-sharing among applications. The means of reaching it is a DBMS software package. I suspect that most shops that have implemented the means run out of steam before reaching the goal.

It's insidious because the failure is not dramatic, so it often goes unnoticed. It's subtle because its underlying cause is never identified. Sort of reminds you of *Invasion of the Body Snatchers*: the worst obstacle they faced in dealing with alien replacement was failure even to realize that it was happening.

It isn't dramatic because heads never roll. The DBA isn't fired. He keeps his title but actually becomes a kind of tech support for the DBMS software. Having failed at standardizing or consolidating data names and formats for interapplication sharing, he redefines his goals so that these functions aren't really included after all. Having succeeded in bringing up the software, he puts on a system programmer's hat and persuades himself that software support is all that's needed.

This scenario has occurred so often during the past 10 years that many DBA job descriptions today fail to include any data standards role at all. Instead, a new title, "data administrator," covers the very same functions that formed the guts of the 1973 DBA job description. The phrase is familiar to all of us (may the fates forgive us): "Of course you don't have an integrated database. You only have a DBA and what you need is a DA."

Similarly, few companies throw out their DBMS package, especially after they've paid for it. Instead, it becomes one of the shop's available access methods (link-list VSAM with rollback) and each application maintains its own files, duplications and all.

That reminds me of a true story. A few months ago, in the

question-and-answer period following my presentation, a client solemnly asked, "We have three 'customer' databases: one for Credit, one for Shipping, and one for A/R. All three use IDMS. How many DBAs do we need?" I honestly thought the client was joking and answered in kind. Nobody laughed.

I'm convinced that the single most serious obstacle to reaching the database goal is our inability to cushion the political impact of the changes it wreaks. Software and hardware problems are irritating, but people problems are lethal.

In a nutshell, the database approach means that computerized master files are shared among different users with different applications. Now anybody who actually tries sharing a master file with someone else soon learns that the risks and benefits are quite different from what he's used to. The benefits are impressive, but the risks can be terrifying.

The benefits are:

*Consistency.* That vendor's address may be wrong but if it is, by George, it's wrong for everybody. Somebody will surely spot it before the check is mailed.

*Security.* The knowledge that every user is on the same customer master tends to make dp operations serious about running the backups. The certainty that you will be hanged in the morning is wonderful for clearing your mind.

*Timeliness.* Users seem to do a more effective job of hassling each other to get the data in on time than dp does.

But, again, the risks are terrifying. Look at it this way: every year your first-line user manager has a performance review with his boss. His rating (salary) ultimately depends on the success of his department. When you tell him that he can share a file with someone else, you're telling him that his group's productivity (and his career) might now hinge on data put into the computer by someone else's organization.

You say, "Integrated database."

He hears, "Your kids will see Disney World next summer only if Harry's screwball trainees down in Shipping don't clobber your data."

Another sad-but-true story: it was the first time I presented the database approach to a government agency. I had only been DBAing for a couple of years and was a bit nervous. I'd finished the talk when one of the executives exploded with, "You mean those maniacs in Purchasing can update my vendor file?"

Rattled, I gave my best smile and stammered, "Of course, sir, with database, you'll all share the same files."

They fired me.

Today, a little more cynical and a lot lazier, I believe the most effective solution is to warn upper management ahead of time that this problem will arise. Let them solve it. They know how to persuade their subordinates better than we ever will. They should publicly reaffirm their commitment to the database approach. They must be ready to reassure their subordinates that the overall benefits to the company outweigh the risk to any one group and that no one will be penalized for someone else's mistake.

*“But knowledge  
is easy to him who has  
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Proverbs 14:6

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## READERS' FORUM

The attitude, of course, cannot be one of forcing file sharing down people's throats. The database approach is too easy to sabotage and too vulnerably exposed. The key word was "reassure."

Finally, what do you do if you're a DBA and your upper management doesn't actively support data integration? It would appear that you face two choices: 1) abandon the goal and become the tech-support type of DBA described above, or, 2) convince them. After all, that's how you got to be DBA, isn't it?

—Frank Sweet  
Jacksonville, Florida

# FAIR-WEATHER FRIENDLINESS

User-friendliness is one of those unassailable concepts: it is the mom and apple pie of the data processing industry. The trouble with such concepts, however, is they tend to become catch-phrases instead of ideas. We use them to hype the product or fire up the sales force.

To hear people talk, one would think that user-friendliness is an obvious and demonstrable property of systems. Given two systems that do about the same thing (i.e., generate a payroll or diagnose problems in a network), it should be easy to recognize the friendlier alternative. Or, given a Version I that we want to modify into a friendlier Version II, it should be clear what kinds of improvements need to be made.

But it isn't.

Think a while about designing for friendliness, and you'll discover that sometimes opposite approaches compete for the friendliness criterion. Typically, an improvement in one phase of the system creates problems or unfriendliness in another.

In designing systems, then, the road to friendliness is not one, clear, unmistakable path. It is a set of trade-offs and compromises that, in the best cases, reflects a particular view of the user and the particular kind of friend you want the system to be.

The most common stereotype of the friendly on-line system is of one that the user doesn't have to learn. Except for being told to press one key (ENTER, or one of the F-keys), the user learns everything from the system itself: step-by-step prompts appear; blinking arrows point to the appropriate fields and keys; error messages—worded without unfriendly criticism—appear on-line with readable recovery instructions.

For more clerical operations, such as office tasks, cash registers, and hotel reservations, this is the truest friend. But a system that is extremely easy to learn is not always the friendliest to use. For example, what happens when the operator leaves the menu or performs any task involving more than one key?

Whenever the operation calls for typing words and numbers, there is a conflict between easy to learn and easy to use. Is it friendlier to type PRINT (which is plain English and requires almost no learning) or to type a ? or P? Isn't it true that a greater number of keystrokes equals a greater opportunity for errors? And doesn't plain English always need more keystrokes than a set of one-, two-, or three-character abbreviations, which might be learned in a few minutes or hours of instruction?

In many systems, the longer and more difficult the instructional phase, the more efficient the operational phase. Procedures that eliminate unnecessary keystrokes, remove overlap, and shorten transactions are skills to be studied in formal training. And which approach is friendlier to the user and the user's employer?

Training is an important part of system setup. A more general problem in friendliness trade-offs is setup versus operation. In many ways, systems that take longer to install or implement (expensive and unfriendly) are smoother and more efficient in actual use. Consider how slow and difficult it can be to create a carefully

structured file that allows both easy query and report generation. Think how much time and money you'll save by customizing a vendor's product to your needs, which, initially at least, is less friendly than the more easily installed standard or "default" version.

This trade-off is almost a paradox. What the sales people call flexibility and adaptability may be perceived by some users as unfriendly implementation. Systems that carry out a procedure any of a thousand ways may be inimical to a user who wants it done only one way. (Writing the manuals for systems that do everything makes us especially aware of the paradox. When a system does everything, it's awfully hard to define the content and sequence of the User Guide.)

Customizing your own version of a software product is something like building a piece of furniture from a kit. But if users must spend days or weeks "defaulting" the product, they may complain the product should have been cheaper. Ordinarily, do-it-yourself projects compensate the hard work of the purchaser with a lower price. But flexible, versatile software products in general are more expensive than single-purpose programs! The users are paying for all the features they might use, whether or not they use them.

Flexible products—most products with longer implementation—are friendly and cost-effective down the road. At first, though, they may seem too expensive and require an intimidating startup effort.

The historical precursor of the term user-friendly is idiot-proof. And the old saw is that an idiot-proof system will also be genius-proof, for the procedure simple enough for the dullest operator will be too simple for the brightest.

The stereotyped friendly system is especially simple. To enter or change data in a record, the operator moves through a branch of two-four menus, making one selection each time, until the target screen appears. The procedure is impossible to foul up; if the operator gets lost in the middle, one of the programmable keys works as a panic button, bringing the operator back to the first menu.

The problem with this approach is that, after only a few hours at the terminal, most operators find this multistep, idiot-proof procedure to be slow and unfriendly. Thus, another conflict: is it friendlier to force every user through a series of tiny steps or to allow the user shortcuts and bypasses that jump from branch to branch?

The answer is not always obvious. I know a system that allows you to fill in an entire record with information and, until the



"Apparently I was damned if I did and damned if I didn't!"



## READERS' FORUM

data are sent to the buffer, does not inform you of an invalid transaction code. The transaction code is the very first character typed, and all the later data will have to be reentered—just because the system was trying to save you a keystroke!

Notice that the usual way of making a system friendly to novices and beginners is to make it stubborn. The friendly system won't let an operator make a mistake. You must go through every step in the procedure and fit every character into a prescribed field or block. Stubborn systems simplify by restriction, making serious errors impossible; about the worst thing that can happen in such a system is that one screen's worth of information might have to be retyped. Stubborn systems are filled with checkpoints, which contain the consequences of the errors. But, again, it may be that a more tolerant system—which gives its users a bit more rope to hang themselves—is friendlier to experienced and ingenious users.

When dp professionals call something transparent, they mean it is invisible. Is a friendly system filled with transparent features? Does it edit and contain certain errors automatically? Does it recognize variant and inaccurate spellings? Does it do half a dozen things we are unaware of, like automatically billing our credit card for a service charge?

On the one hand, the friendliest systems are tolerant, forgiving, and gracious; not only do they interpret away your mistakes, but they do it without scolding you or reminding you how lenient they're being.

On the other hand, is that truly friendly? Wouldn't everyone ultimately be better off if systems were a bit more didactic, telling you what you did wrong and teaching a lesson or preaching a sermon on your mistake? Don't we often conclude after years of reflection that our best teachers were not the ones who were easy on us but the ones who gave hard tests and insisted on making us know our mistakes?

Some of the most successful software products I have seen solved the problems discussed above by working in both modes. Users can run either the off-the-shelf, default version (limited training and setup) or they can fully customize. Screens can be run either in the lock-step, stubborn fashion or in a more freewheeling, swooping style. Errors can be corrected invisibly or with full explanations and stern reminders.

The hard design choices come when there is neither time nor money to do everything. Then, the developer must think carefully about all aspects of friendliness and make tough decisions.

And similarly, the customer or user must try to see through the most obvious and immediate signs of friendliness. The real measure of system value comes long after implementation and startup. Often, it's only after months or years that we discover our systems were fair-weather friends.

—Edmond H. Weiss  
Cherry Hill, New Jersey

## INTELLIGENCE

The vagaries of my job (as principal scientist in data processing for a scientific consulting firm) require me to spend several days a month seeking enlightenment at various universities in the Boston area. One morning, while engaged in this activity at the Department of Statistics of Harvard University, I witnessed an incident that caused me to rethink several of my opinions on the possibilities of intelligence (artificial and otherwise).

As is my wont on such occasions, I parked my van in one of the university lots. There are several small markets in this area and a plethora of shopping carts infests the neighborhood. Having finished my business, I wandered back through the parking lot and witnessed a most interesting example of human interaction with an inanimate object. A woman had parked her car, a T-Bird of indeterminate vintage, in a space next to a shopping cart. As I approached, she attempted to open her door but found it was blocked (by the

cart). She pushed on the door for four or five seconds without much success and then tried to slam the door open. She repeated this two or three times and succeeded only in creating an interesting design on her car door. She sat in the car thinking and then got an idea. She laid down on the seat, braced herself and pushed against the car door with her feet. This succeeded in knocking the cart over, but it still blocked the door. At this point she saw me and, obviously startled, sat upright, scooted across the seat, opened the passenger-side door, and jumped out. She then ran around her car to see what was blocking the door and, seeing the cart, gave it a good kick.

Woody Allen used to complain about the perversity of inanimate objects, but as Brenda (that was her license plate) limped away, I was led to muse: 1) Brenda didn't solve her problem until she stopped thinking about it, and, 2) such objects as shopping carts, intelligent toaster ovens, elevators (Woody Allen's nemesis), computers, etc., are not really perverse but only reflect the attitudes and level of understanding of the people who use them. This may well be true, but the moral of the story is Brenda still had a hell of a kick.

—David J. Hartzband  
Bedford, New Hampshire

## SOFTWARE IDENTIFICATION

I first heard the story about 10 years ago while on a business trip in southern California. Over the years it's had varying characters and companies, but the first time it was about a senior manager at an aerospace firm who was reviewing the weight and volume data for his company's latest satellite.

In the midst of a long list of items to be boosted into orbit were two that caught the manager's attention: computer hardware and software. A cursory glance showed that the hardware weight and volume figures were within bounds. The software data, however, seemed to be in error, for clearly entered in the weight and volume columns were the digits zero and zero. Since the senior manager had recently completed a series of seminars on the importance of computer software to proper functioning of the satellite, obviously a serious mistake had been made. Something that vital could not be infinitesimally small and light, especially when it was so expensive.

The senior manager immediately summoned his satellite computer manager and demanded that the software data be corrected. The satellite's total weight and volume were carefully calculated to just fit the launch rocket's boost capabilities. "Proper" values for the software data might upset all of his company's plans. And the senior manager didn't want any fingers pointed at him. I'll leave the details of the ensuing explanations, meetings, and briefings to your imagination. Eventually, however, all the right people were convinced that the twin zero software values were correct and the satellite was launched and became very successful.

So much for the story. Its moral, however, can not be so easily dismissed. For, as a consequence of having neither weight nor volume, computer software is impossible to see. I admit that we see various secondary representations of software (e.g., source code listings, executable code dumps), but, like any other idea, the real item is invisible. Since it cannot be seen, the question is, how do we verify that what we've loaded into the satellite computer (or any other computer) is what we expect?

Quality assurance specialists repeatedly tell me not to worry about this. They say the name plate on the computer states what is inside and they always have a long list of documentation to prove that the name plate is correct. Unfortunately, I have looked at enough program listings and dumps over the years to know that what the paperwork says is inside a computer "ain't necessarily



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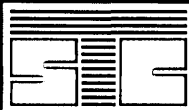
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## READERS' FORUM

so." In addition, determining that the wrong program is installed sometimes requires hours of sleuthing. Unlike the rest of the material world, computer software is not amenable to visual inspection by opening an access panel and noting component part numbers. In fact, most computer software rarely bears its part numbers (i.e., program name and version) in any form, virtually never in executable form.

It is this latter deficiency that we must seriously consider remedying. At this stage of the software industry, very few of us will deny that all programs have bugs. Some of them are the result of errors induced during the software construction process and others are due to changing and/or overlooked operating conditions.

One of the primary difficulties in bug correction is determining the version of the executable program that needs modification. This is particularly the case in general purpose packages that were delivered to numerous customers in varying versions over an extended period. When a bug is reported, it is imperative to know the precise version of the program to be corrected.

Most of us currently use a manual research procedure to determine the program listings applicable to a particular release (if we can find the records of the release at all, that is). A far more effective technique for identifying program versions would be for the program itself to be able to identify its name, version, and release date as it is executing. I don't mean just the overall system's top level release number but each and every subroutine contained in the system.

In most cases this would not be onerous. Each subroutine

could contain its self-identification logic as a section of code that would be executed only if an appropriate system option were enabled. The logic itself would be simple: essentially IF INDENT OPTION ON THEN WRITE NAME, VERSION, RELEASE DATE TO LOG FILE. The additional time required to execute this logic would be negligible in the normal operating environments of today's high-speed computers. Any additional space requirements for this code would be equally lost in the vast virtual memory management facilities common on most current computers.

The result of such a self-identification technique would be the ability to positively verify the identity of the software loaded into a computer at any time. By enabling the appropriate option, software personnel could effectively open the access panel and inspect the component part numbers. This would make modifications of programs faster and more reliable because we would have some assurance that we got the right module the first time.

Considering the amount of time computer software maintenance occupies in the life cycle of a project (estimates of over 50% of total project cost are common), anything that improves the accuracy of this process will be significant. Faster, more precise identification of the software component requiring modification can become one step in the process of reducing the high costs of doing computer business.

—David Feinberg  
Seattle, Washington

## RESPICE FINEM

The status of software engineering as an honest and respectable profession is in real jeopardy.

This conclusion sprang fully formed into my brain one night while watching the late, late show. In retrospect, it is easy to see that I had been filing away the data in my subconscious for some time. All it took was a particularly repugnant commercial to package all the subconscious pieces into a coherent whole that my conscious recognized.

Some of the data were only mildly irritating. I had noticed that programmers on television often seemed to use their knowledge of computers to steal large sums of money. Of course, misrepresentation by tv is a sure sign of respectability these days.

Other data I had filed away seemed to suggest that software engineering was losing some of its panache. Universities complain that promising professors are lured away by industry to make more money. How crass!

My self-esteem as a software engineer, however, reached an all-time low that fateful night when an advertisement claimed: "You too can be a programmer in only six weeks!"

Suddenly, from the slightly bored, half-tuned stupor I usually reserve for commercials, I was instantly aroused and concentrating.

Six weeks! After sweating through college and graduate school, enduring a painful apprenticeship, and accumulating years of real experience, I could be replaced by someone who needed only six weeks of training. Clearly, my position as a respected engineer was in jeopardy.

It took some time for me to figure out what was wrong. Solutions, unlike problems, do not spring fully formed into one's brain during annoying commercials. I kept thinking about the six weeks. Finally, I realized there were two possibilities:

The first was that software engineering is so easy that anyone can learn it in six weeks—a very unappetizing thought considering the time it took me to learn to make a living. The second possibility was that software as a profession only seems simple enough to be learned in six weeks.

If the latter possibility is true (the only logical alternative), then the discipline of software engineering merely has an image problem. The course was at once clear. Software has to be recast in a new guise, one that suggests abstruse science.



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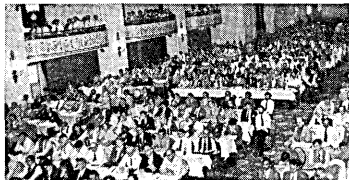
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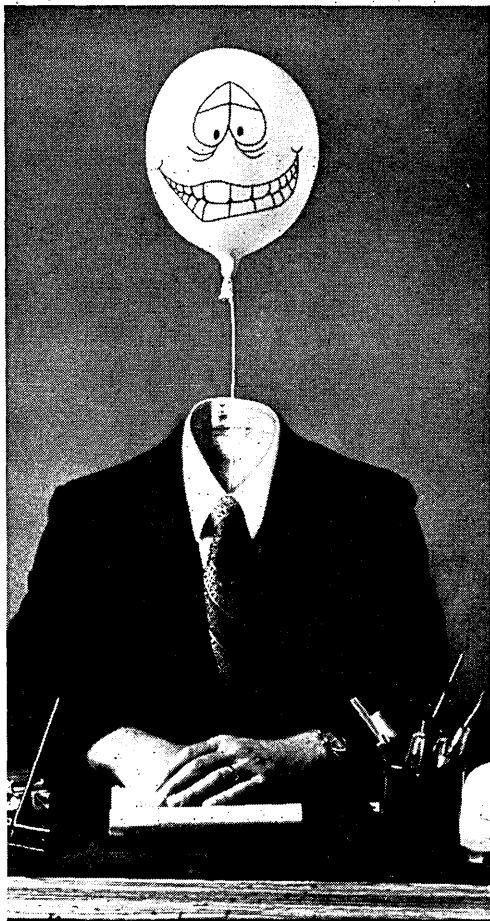
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## READERS' FORUM

Dusting off college textbooks that hadn't seen the light of day in years, I began to perceive a grand hierarchy of the sciences. What determines the status of a scientific field in this hierarchy is the degree to which its scholars have obscured the few simple truths that make up the discipline.

This obfuscation correlates directly with the language in which the truth is cast. The rule seems to be that if a truth is particularly simple, then some fancy language is required to make it more elaborate.

Mathematics is at the top of the grand hierarchy of science. Mathematicians have abstracted themselves to a plane so high that no one dare approach. Descending the hierarchy, we find physics, chemistry, and biology. These eminently respectable fields, if slightly inferior to pure mathematics, are loaded with Latin (very classy), Greek (strictly show-off), German (will do in a pinch), and French (if desperate).

The biologists make up for their lack of mathematical rigor with an overabundance of Latin. Clearly, they are working hard to maintain their status and obey the law of Conservation of Esteem, which goes as follows: the real world perceives "apparent esteem," which is truth combined with an obfuscation factor, otherwise known as a language barrier. Following this hypothesis, then, a larger obfuscation term leads to higher esteem.

Now we begin to see the desperate straits that software engineering is in. There are practically no foreign language phrases in the entire discipline! To save software as a scientific discipline and gain the respect due its practitioners, I propose a few modest changes to the vocabulary of the field.

I knew that four years of Latin would come in handy someday. But, try as I might, I couldn't apply the only Latin I remembered without recourse to my old textbook. *Omnia Gallia in tres partes divisa est* does not arise all that often in programming.

Resorting to the dictionary, I did find some choice idioms. The first concerns one of the few pieces of mathematically based subjects in computer science—structured programming. Obviously, the best latinizing was missed here. There are two ways we can translate "structured programming." The first and more straightforward is *programmensis structile*. The word *structile* carries the connotation of pieces, and so we have the composite of programming in pieces, an excellent rendering of the spirit of structured programming.

Personally, I prefer a slightly different construction. *Strutum programmiensis* means to construct, but it also has the connotation "to pile." It is the aspect of the pile that is so attractive. Just try to find a programmer's desk that isn't piled high with listings. That is not all for piling, though; the word also has the association of a funeral pile. Quaint.

One of the basic tenets of structured programming is that only a few idioms are required to write any program. One such idiom is the if-else-endif construct. Below are two code fragments. Now I ask you, which one looks more learned?

|          |            |
|----------|------------|
| if x = 2 | si x = 2   |
| call sub | fac sub    |
| else     | nisi       |
| punt     | calcitrate |
| endif    | fini       |

I submit that there is no contest. The "si-nisi" construct is clearly more erudite. By the way, the word "calcitrate" is pronounced calc-ee-traa-tay.

There are a few other areas that need cleaning up. Debug, although now universal, has to be the most inelegant technical term in any science. Turning to the dictionary again, we find the phrase *zonan perdidit*, which literally means "in distressed circumstances." Apart from the meaning reflecting a truer state of affairs than the term debugging, it has such a marvelous ring to it! Should an accounting executive try to determine the status of a job, imagine what would happen if you stood proudly and explained that you

# SEE

# IT

# ALL.

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## READERS' FORUM

were in the last phases of zonan perdidit.

There is no doubt in my mind that if computer science had sprung up as an offshoot of the legal profession, such phrases would be commonplace.

Before you become too despondent, I should point out that all is not lost. Somewhere out there are engineers who perceive that maintaining status is important. I refer to that long-forgotten person who named the little blinking thing a cursor (from the Latin *curcus*) meaning running or voyage). A person with that kind of talent probably saw the handwriting on the wall and went to law school.

A word of warning—no matter how respectable we become, we shall only be tolerated non deficiente crumena. Roughly translated, this means "no crummy deficits," or more formally, as long as the money lasts.

—Roger Warburton  
Newport, Rhode Island

## PECK LOSES ITS HUNT

Why can't computer terminal manufacturers simplify keyboards? More specifically, an alphabet-in-sequence keyboard will probably get far more use than the QWERTY keyboard ever has. I'd like to call this the PECKkeyboard (or Petersen's Easy Computer Keyboard).

This seems like an appropriate name since users can eliminate hunting and simply peck. Some manufacturers may decide to call it the ABC Keyboard if they offer it as an alternative to the QWERTY typewriter keyboard.

I'm convinced that at least half the people who have considered buying a computer for personal or business use (or may do so in the future) have been turned off by the keyboard because they never learned touch-typing. You and I may not have that problem but tens of millions of people in the U.S. alone do. The letters on a typewriter keyboard are scattered all over the place. The computer immediately becomes unfriendly when a non-touch-typist tries to use it. You know what they say about first impressions.

In letters to marketing vice presidents of 50 computer manufacturers, I asked that they consider producing such a simplified keyboard. Three have replied so far. One said they are concentrating on voice and touch as alternatives to the keyboard. Another, one of the leading firms in both the personal and business fields (as well as education), will consider it. The third replied that the keyboard is the most expensive part of a terminal and they cannot afford to offer another keyboard as an alternative.

I suspect they will change their minds if other computer firms adopt my proposal. It is possible I have not heard from the others because they are seriously considering it and do not want to tip their hand.

Considering the news about TI's personal computers, despite all their tv commercials, other manufacturers are probably in the same fix. They may not be able to manufacture another keyboard until they unload most of the terminals now sitting in warehouses. I think, however, you will find some manufacturers offering the PECKkeyboard in time for Christmas shopping.

If the travel industry is any example, there are loads of executives and employees who do not know how to touch-type. Many people do not have the time, money, aptitude, or desire to learn touch-typing. Why should they have to?

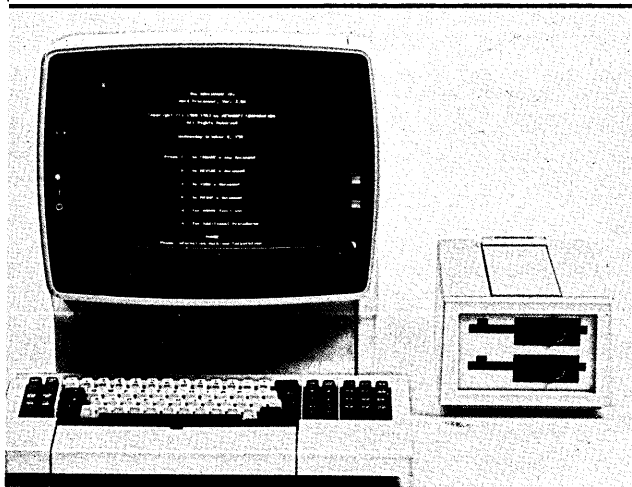
—Allen Petersen  
Rumson, New Jersey

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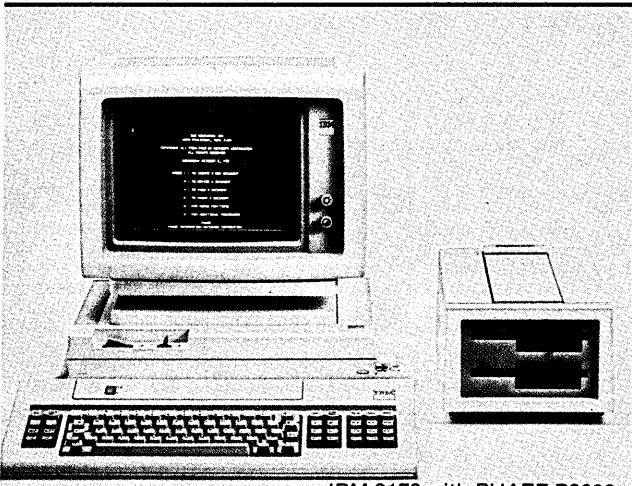
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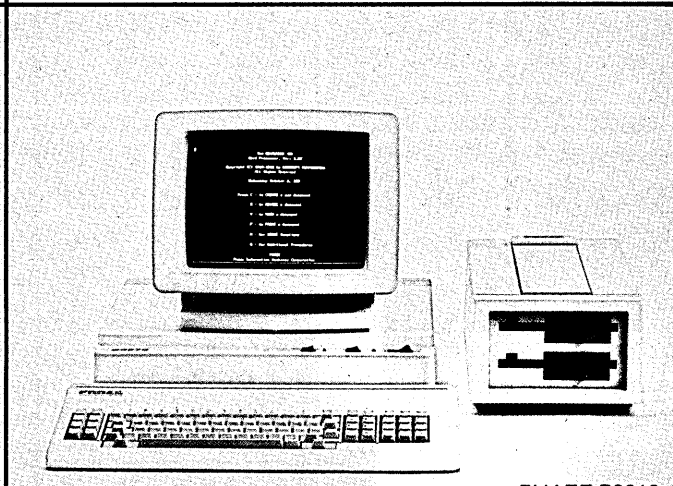
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We've also given the 5540 a more powerful microprocessor-based controller that will cluster up to 32 devices. Or you can choose a compact tabletop controller. You also get a choice of reduced size or standard displays, and 80 or 132 column data formats.

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