

## THE DATAMATION 100



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lose

Pondy Gumbel 84

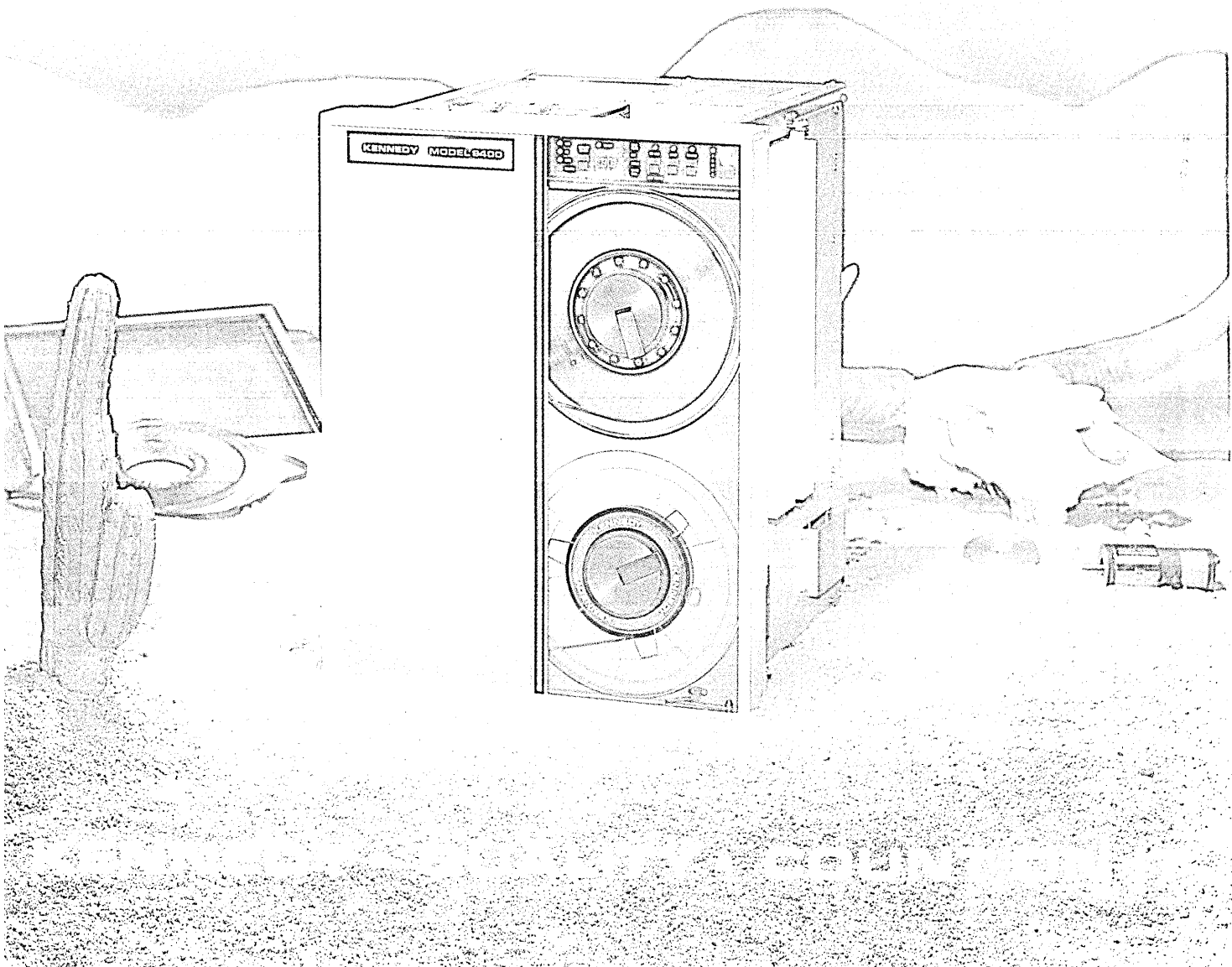
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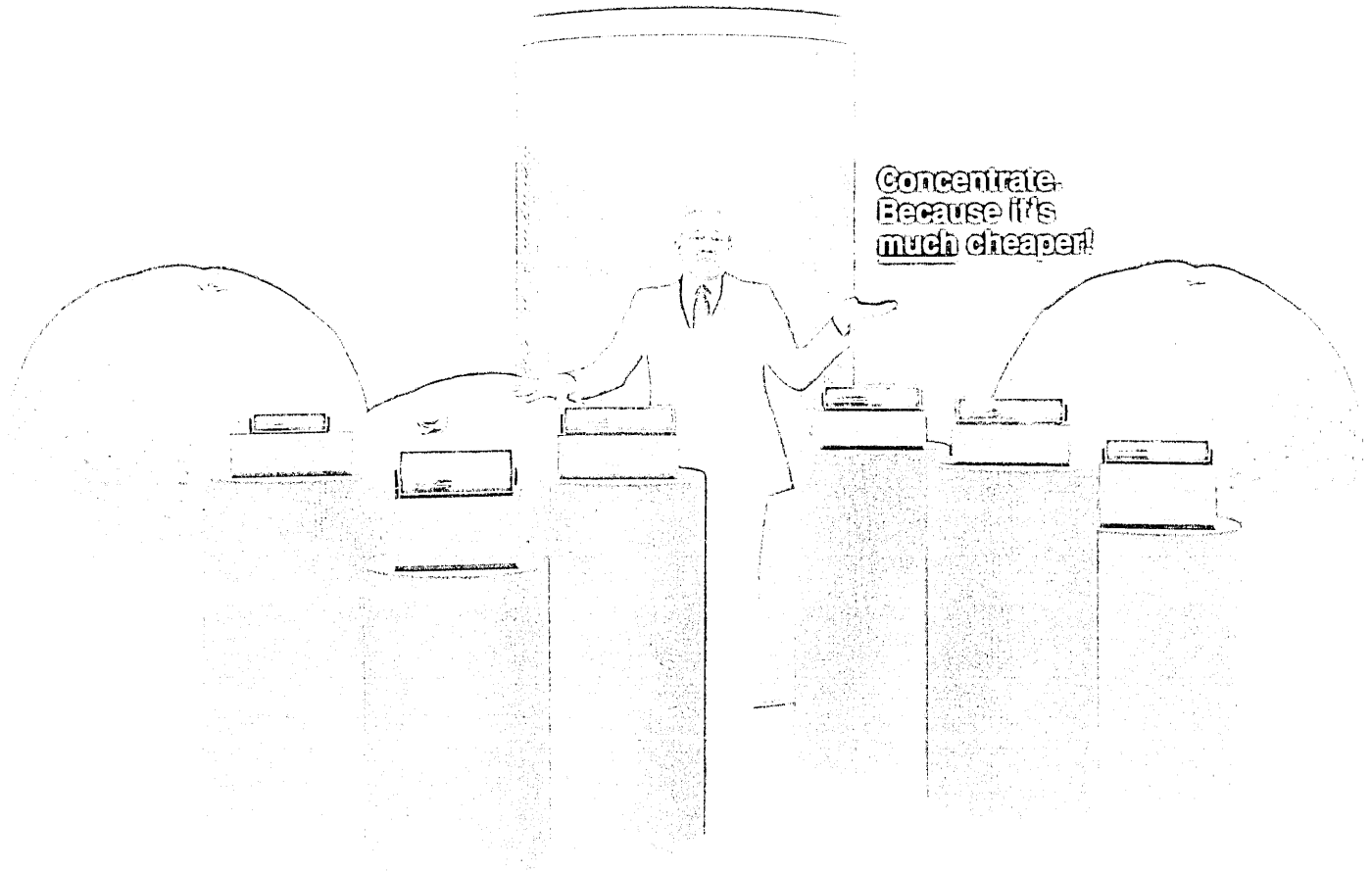
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For more details or to arrange a trial of any of these products, contact your Candle account manager.



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# DATAMATION®

JUNE 1, 1984/\$3.00 U.S.A.  
VOLUME 30 NUMBER 8  
This issue, 183,866 copies

## FEATURES

### 22 IN FOCUS

Money will not buy a local election, but it is the cost of admission, and microcomputers supply the tickets. "The New Political Machine," says Rodney N. Smith, is managing the money, setting up the schedules, and mailing the propaganda in current campaigns.

### 52 THE DATAMATION 100: FATHOMING THE INDUSTRY

**Pamela Archbold**

Revenues for the Top 100 companies grew 18% to \$91.8 billion in 1983, as all but two dozen of the firms reported earnings gains. Increased sales, combined with belt-tightening in personnel and R&D, seemed to be important in shaking off the effects of the recession.

### 60 RANKING OF THE TOP 100

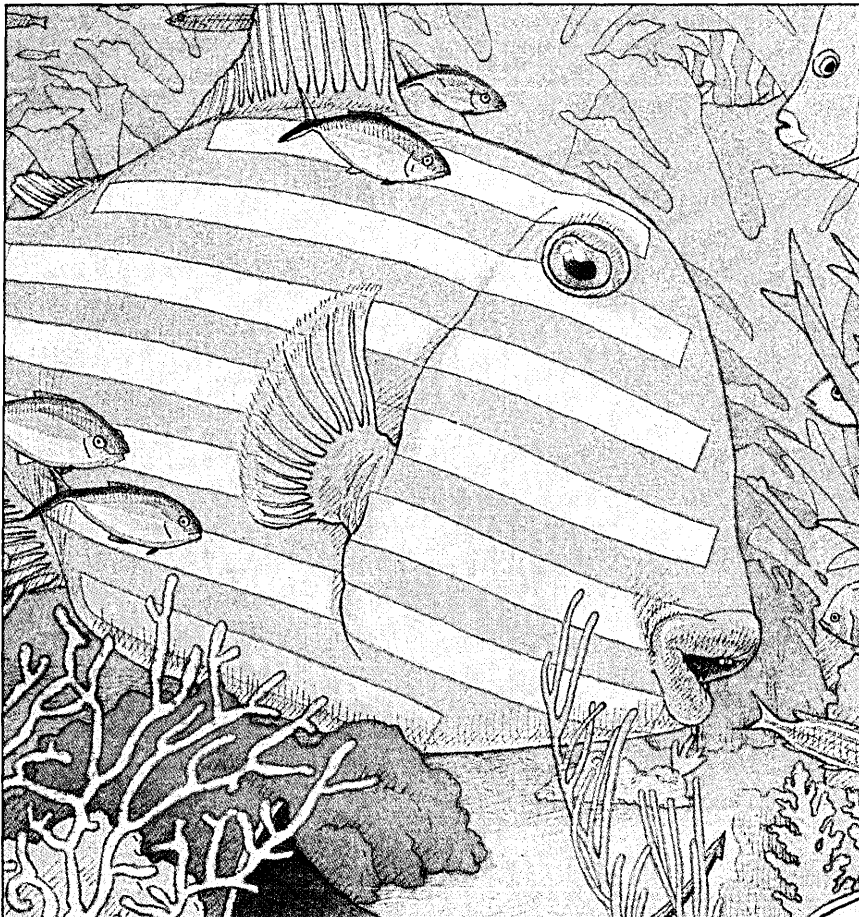
The 10 companies that topped the list last year did it again, and in exactly the same order, except for Wang and Honeywell, which switched positions.

### 66 COMPANY PROFILES

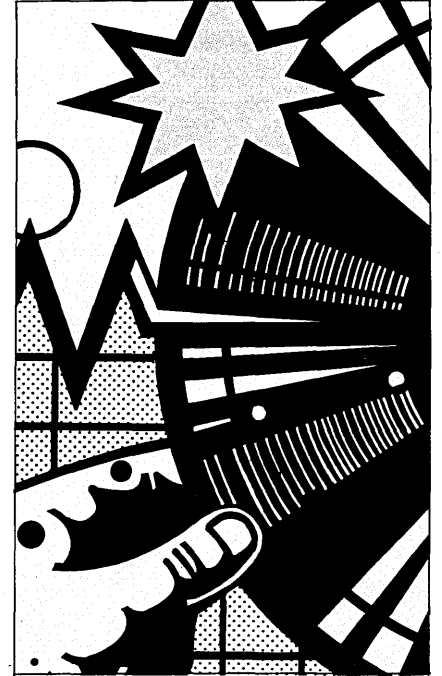
Incisive sketches of each of the Top 100 companies, with analyses of their pasts, their potentials, their products, and their problems.

### 189 READERS' FORUM

Bruce C. Kula, donning (and losing) his detective's hat, admits that when it comes to sleuthing out a software scam, "My Skull is Thick." Roy Mengot provides another window into the computer with *Digits*.



## NEWS IN PERSPECTIVE



### 30 NEW TECHNOLOGY

Optical disks foreseen

### 34 MICROCOMPUTERS

HP's TP: It's for the lap.  
A chip in your wallet.

### 42 IMPORTS/EXPORTS

U.S. shuns IBI.  
Cracking down on software.

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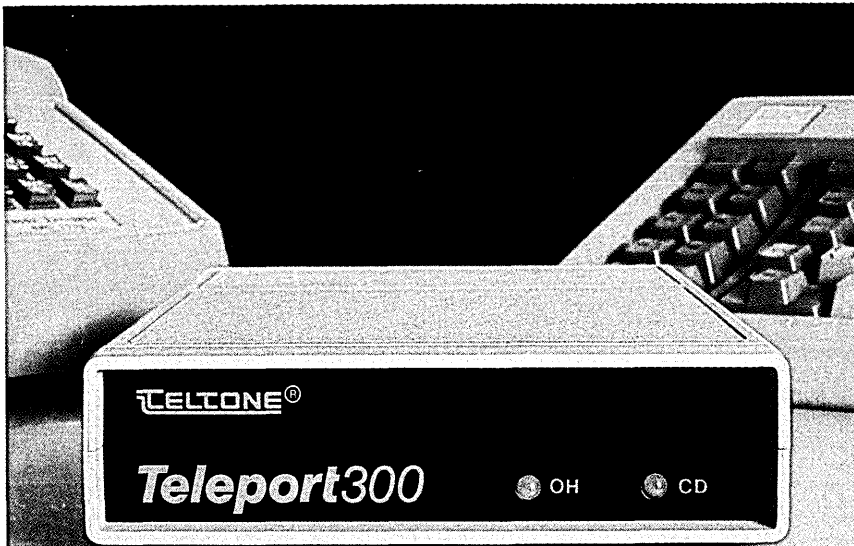
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COVER SCULPTURE BY KATHY JEFFERS/  
PHOTOGRAPH BY WALTER WICK



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# SAS/FSP Gives You FSCALC...

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Command ==> █ Define Mode

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		YEAR_1	YEAR_2	YEAR_3	YEAR_4
TAXRATE	Tax Rate	22	22	22	22
INFLATE	Inflation Rate	0	7	8	6
D_UNITS	Delta Units	0			
D_PRICE	Delta Price	0			
UNITSOLD	Units Sold	50,000	57,500	66,125	76,044
PRICE	Selling Price	8.50	9.00	9.50	10.00
REVENUE	Revenue	425,000	517,500	628,187	760,437
RAW_MAT	Raw Material	150,000	184,575	229,242	279,446
DIR_LAB	Direct Labor	100,000	123,050	152,828	186,297
PACKAGE	Packaging	25,000	30,762	38,207	46,574
DISTRIB	Distribution	37,500	46,144	57,311	69,862
GROSS_P	Gross Profit	112,500	132,969	150,600	178,258
FIXED_C	Fixed Costs	40,000	40,000	40,000	40,000
NET_BTAX	Net Before Taxes	72,500	92,969	110,600	138,258
TAXES	Taxes Payable	15,950	20,453	24,332	30,417
NET_INC	Net Income	56,550	72,516	86,268	107,841

## Financial Spreadsheets on the IBM 3279.

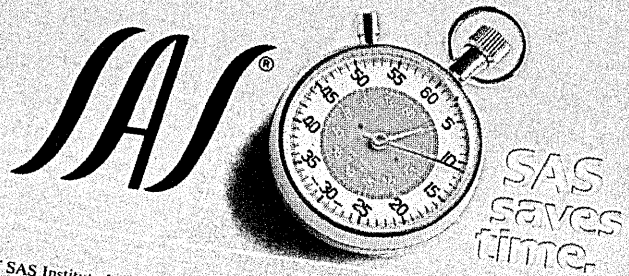
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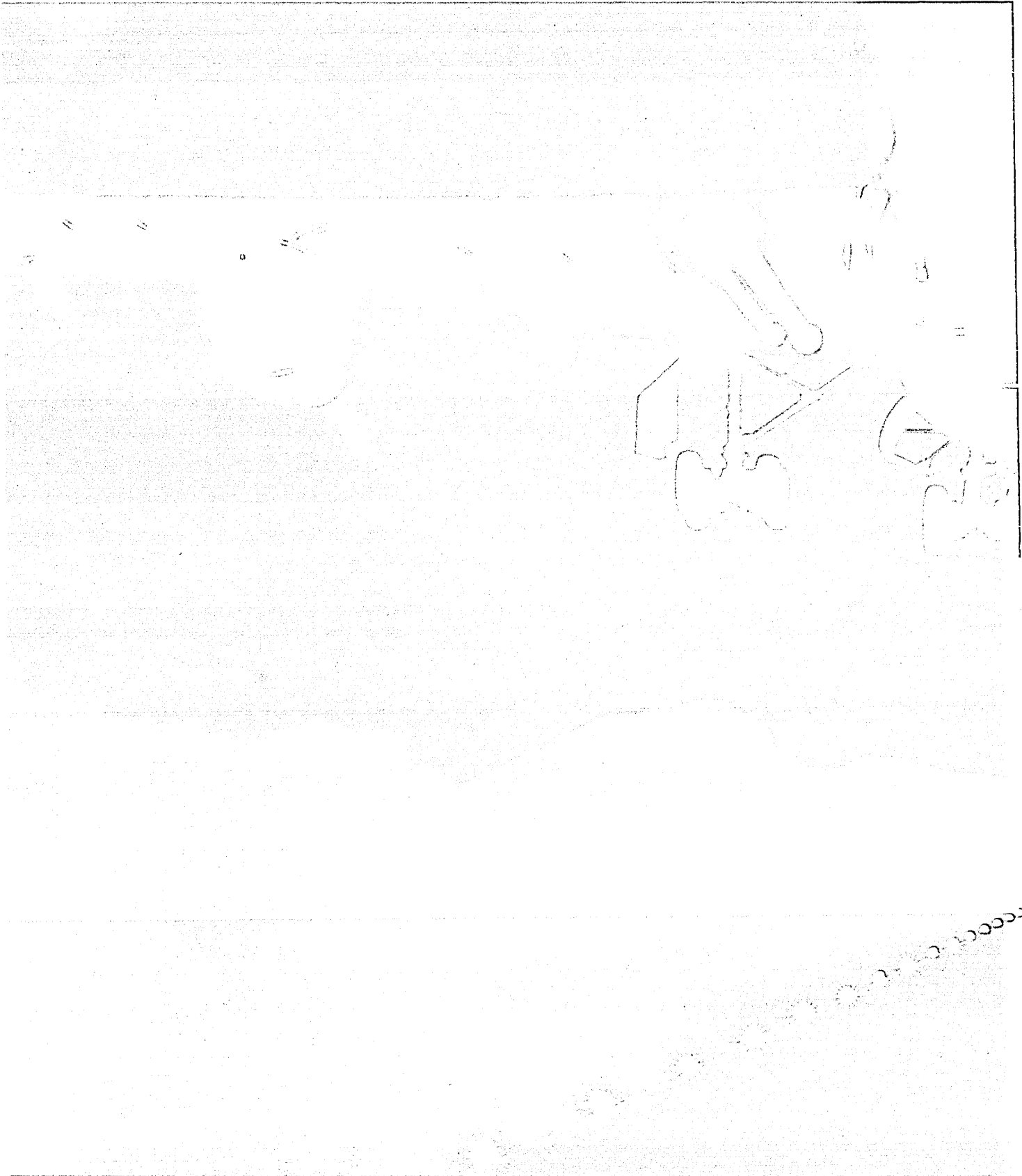
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*How many of the world's 15 largest airlines are*



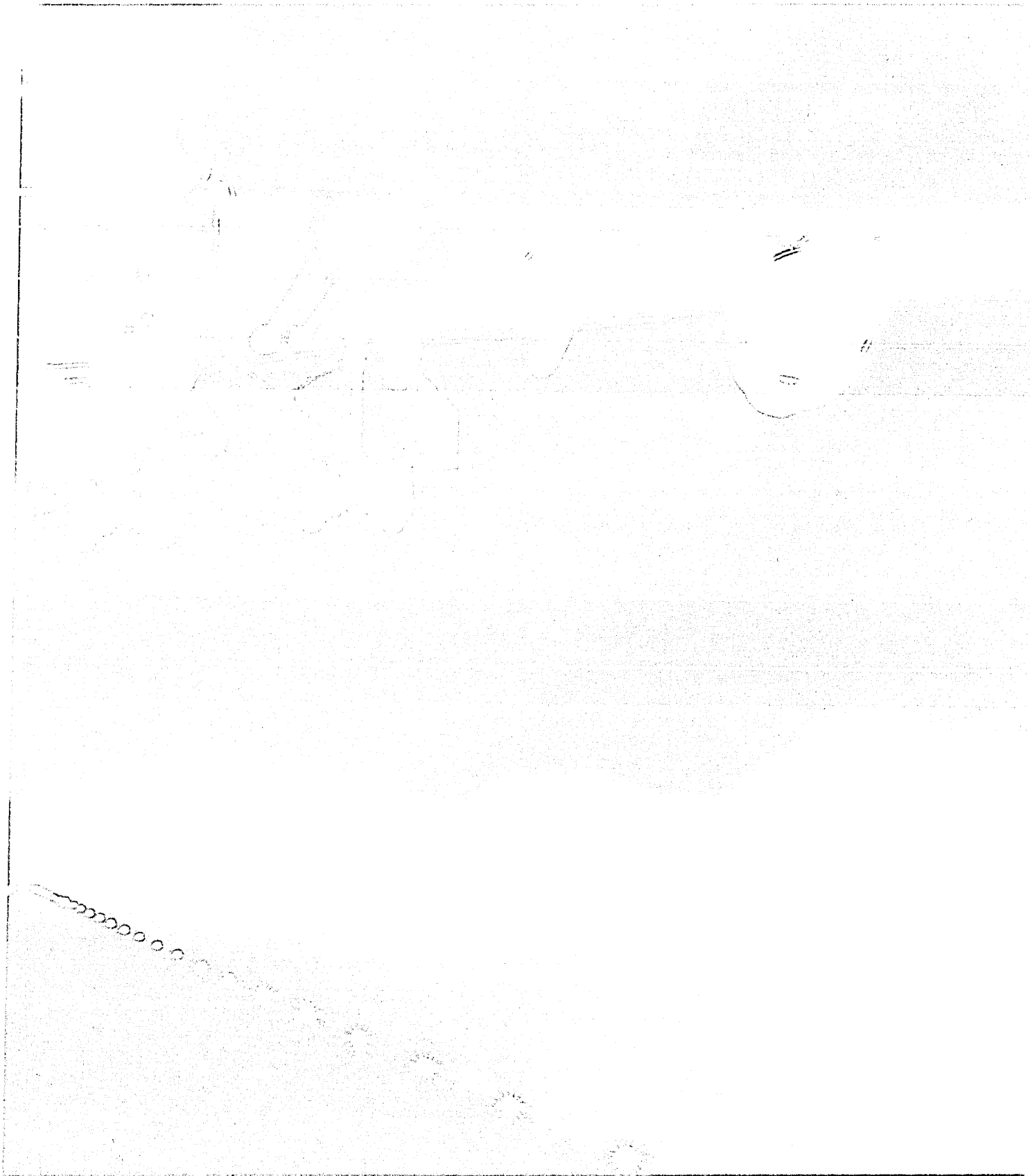
\* In Canada use of via connection to Societe Internationale de Telecommunications Aeronautiques

***All of them.***

*Motorola is a world leader in advanced electronics for memory, logic and voice and data communications.*



served by our data communications systems?



**MOTOROLA / codex**

CIRCLE 8 ON READER CARD

# "...and trust me, when your information needs grow, you can always connect all your PCs together."

There's a lot of optimistic talk going on about networking today. Not lies, but perhaps wishful thinking.

Talk, in fact, that's making those in the know very nervous.

An alarming lack of standards among manufacturers has stalled the development of software applications packages for networked personal computers.

As a result, offices that attempt to connect their existing personal computers together find an appalling absence of programs that really share data.

Personal computers were simply designed for individual use, not for sharing information among each other within an office.

So, meanwhile, countless department heads, data processing managers and small business owners are indefinitely stuck with various personal computers that won't talk to each other - a predicament only acceptable in offices where no one works together.

But that's rarely the case.

---

## Why should your employees work together on computers that don't?

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We have a solution. A cost-effective, high performance solution renowned for its straightforward simplicity: the Fortune 32:16™ multi-user computer system.

It has all the capabilities of personal computers, but without the complication.

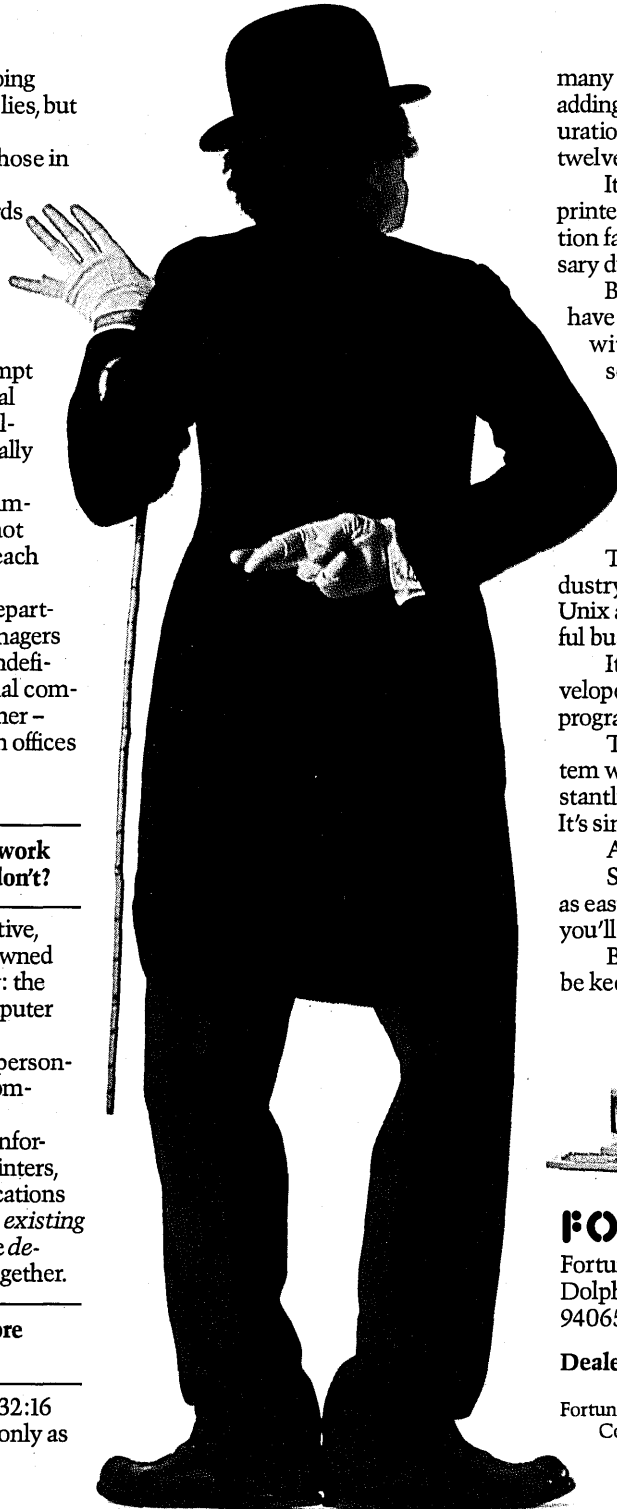
It's a computer for sharing information among users. Sharing printers, memory devices and communications facilities. And best of all, sharing *existing* multi-user applications software *designed* to allow users to work together.

---

## Did your PCs cost you more than a Fortune?

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Economically, the Fortune 32:16 multi-user system lets you buy only as



many workstations as you initially need, adding more later. Depending on configuration and application, it handles up to twelve users simultaneously.

It also requires no more than one printer, memory device or communication facility - eliminating much unnecessary duplication.

Because we don't think you should have to equip four or six or eight users with four or six or eight sets of personal computers, printers, disk drives and applications packages.

The Fortune solution comes as a complete, ready to use package - including software - designed from the beginning as a multi-user system.

The Fortune 32:16 runs on the industry standard Unix™ operating system. Unix affords you a wide variety of powerful business programs.

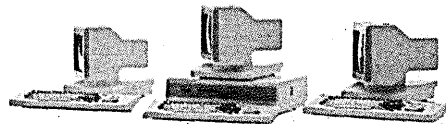
It's also an operating system developed for multi-user computers and programming flexibility.

The Fortune 32:16 multi-user system was made specifically for the constantly growing needs within businesses. It's simple, flexible and cost-effective.

And best yet, it's here now.

Someday, networking may become as easy as a multi-user solution. And then you'll see networked Fortune systems.

But until that day, a lot of people will be keeping their fingers crossed.



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# LOOK AHEAD

## EEC'S WISHFUL THINKING?

Is the European Commission dragging its feet in hopes that a sympathetic Democrat will be elected as U.S. President and help the EEC crack down on IBM for alleged abuses of its commanding share of the European computer market? That's what informed sources say. The EEC recently rejected undisclosed proposals made by IBM to settle a four-year-old antitrust suit, the only such action pending against the industry leader anywhere in the world, and is widely expected to rule against the company this summer. The Reagan administration is strongly on IBM's side, arguing to the EEC that its proposed remedies would help only Japanese competitors. If it does indeed find IBM guilty of abuse, the EEC may ask the firm to release sensitive interface specs on its mainframe products at the time they are introduced to market.

## TROUT SURFACING NEXT YEAR

Wall Street analysts are convinced that IBM has delayed the introduction of its high-end Sierra/Trout mainframes until next year because it won't need a year-end revenue kicker. Office systems, 308X machines, disk drives, and midrange mainframes are all doing well, say analysts. The company, however, may drop prices on the PC now that production has largely caught up with demand, and a 15% reduction on the 3380 disk is in the cards as well. Widely expected in the low-end processor arena is Montana, a desktop 4300 unit based on a microprocessor.

## AMDAHL MOVES TO ASPEN

The Sunnyvale, Calif., PCM is soon to introduce its timesharing system, named Aspen, to the marketplace. Field testing of the software, which is designed to run under IBM's MVS/XA, began at Amdahl cpu sites this quarter. Early reports indicate Aspen outperforms comparable IBM software two to 10 times. Meanwhile, reports circulate that former IBM Fellow Tom Simpson, who joined Amdahl to develop Aspen, may leave the company soon.

## NCR GOES LASER

The Dayton, Ohio, computer maker has signed a deal to market a laser printer from Siemens of West Germany. The NCR model 6480 handles backgrounds, logos, text, and signatures and can print gummed labels, envelopes, and other forms not normally handled by laser machines. Meanwhile, IBM is said to be looking at Canon's desktop laser unit for use with the PC family. No details on when such a product might be introduced, however.

# LOOK AHEAD

## IBM SUPERCOMPUTERS

Attendees at a recent meeting of the European SHARE users group say the industry leader is probably going to enter the supercomputer race with a midrange vector processing machine. Reportedly, users have been pressuring the firm for a 30 million floating-point instruction machine that would be front-ended by a standard 370 mainframe. Other features on the user wish list include 64-bit arithmetic and at least 32 megabytes of real memory.

## TALK NOT CHEAP

DP guru James Martin recently collected \$25,000 for spending a day talking with 70 top officials at the Treasury Dept. Seems they were trying to make strategic plans for using information technology, but at that rate they'll probably all turn consultant.

## SEAGATE PUTS 10MB IN 3.5 IN.

Later this year Seagate Technology, Chatsworth, Calif., is expected to introduce a 3.5-in., 10-megabyte hard disk, a 40MB, half-height, 5.25-inch unit, and an 80MB, 8-inch package. The loss of a chunk of IBM's PC business is not hurting the company, as orders from Digital Equipment, Convergent Technologies, and AT&T pick up the slack. Sources say the company is considering forward integration into controllers and complete subsystems. Industry sources predict that the next IBM contract with Seagate will have a \$330 to \$350 per 10MB drive price, and by next year a \$300 drive will be typical.

## RUMORS AND RAW RANDOM DATA

Videotex merchants are eyeing Apple Computer's bit-mapped Macintosh with interest. For instance, Faxtel of Toronto, which markets a stock quote/graphics videotex service, is understood to be writing a package called MacNAPLPS to develop videotex frames using the popular North American protocol....Watch for NCR to bring out Unix on its 32-bit chip set....Dataquest, the San Jose, Calif., market research firm, projects 1.3 million portable, as opposed to transportable, computers will be shipped worldwide in 1985, up from the 470,000 expected this year....Hardware to make the Digital Equipment VT-220 emulate a Tektronix graphics terminal will soon be available from Digital Engineering, Sacramento....Bank of America has signed 7,500 Northern Californian customers to its home banking service. It's now moving into the southern part of the state....Germany's Bildschirmtext videotex system may not go live until late summer, almost a year after its original target date. The IBM-developed system has run into further technical problems.

Now, there's a full line of band printers with the same performance you've come to expect from Printronix.

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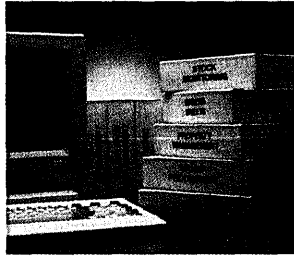
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**BUSINESS**



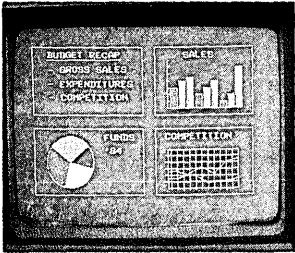
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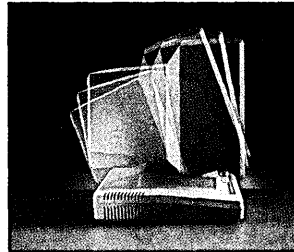
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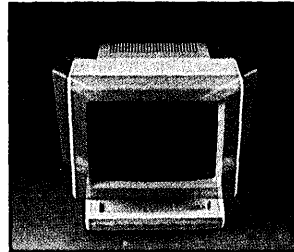
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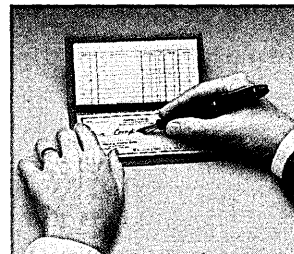
**WALL STREET**



**CHARLIE**



**MANAGEMENT**



**YOUR BUDGET**



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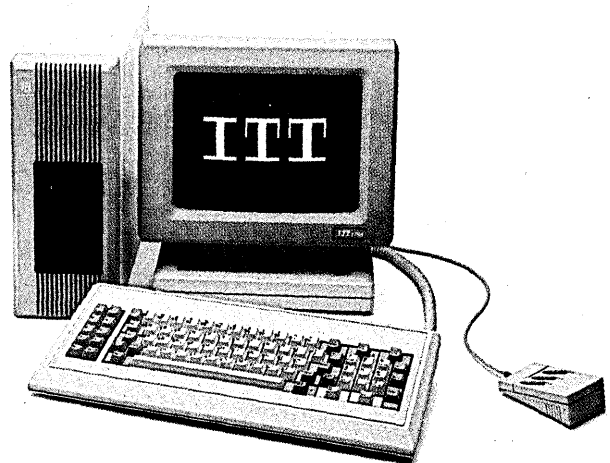
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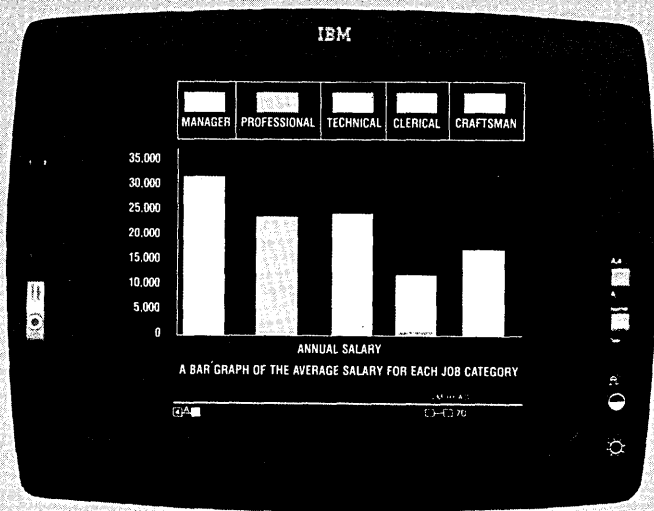
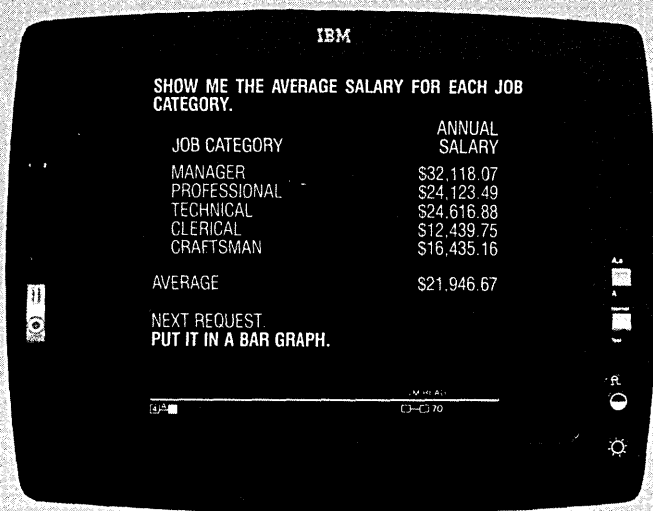
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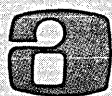
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CIRCLE 12 ON READER CARD



# LETTERS

## ONCE A YEAR ISN'T ENOUGH

Congratulations on your April (Fools') issue. It was with great relief that I read several articles exposing the "darker side" of the computer field.

In the article "Abends, Dinosaurs, and Micros" (Readers' Forum, p. 207), Jack Meredith publicly chronicled the private frustrations experienced daily by all users of large IBM data centers. "In Search of One Minute Megatrends" (p. 119) spoofed the field's "bandwagon" mentality, wherein hot issues instantly attract every fast-buck artist around. Stevanne Ruth Lehrman's account of buying her first microcomputer (p. 102) was gently humorous, but revealed the unpleasant truth: even micros aren't significantly more usable than their bigger, older siblings.

As a technical writer, I particularly enjoyed Marcia Willieme's article, "User Manuals as Art" (Readers' Forum, p. 212). She neglected to include commandments 11 and 12 for designing user manuals:

11. Don't include an index or any other means of locating a specific item of information in the manual.

12. Be sure the table of contents is an alphabetical listing of totally meaningless, arcane acronyms: "ADVWRK, AHOLIS, BAKKUP, DIDART. . . ."

Ms. Willieme hit home. How long are users going to put up with this dreck?

DATAMATION seems to continue its tradition of holding the lighter (and darker) material for its April issue. Jokes or no, your April 1 issue is more representative of the realities of life than the usual DATAMATION treatment, which tends to give the false impression that large systems projects are invariably successful, and that the field is populated exclusively by knowledgeable,

dedicated professionals. Those of us battle-scarred practitioners know that just doesn't wash. Let's have more April fools every issue.

PETER MARTIN  
Morristown, New Jersey

## HERE'S THE BEEF

Your article, "Technically Speaking" (April 1, p. 127) is a travesty—a ludicrous treatment of a critical business issue: communicating complex information.

Under the headline, "If you follow these simple guidelines," you proceed to give me 53 quick tips, any of which could trace its roots to pretechnology eras when people believed that the earth was indeed flat.

Your readers deserve new ideas, not rehashed rhetoric. How about some news? Where's your story that tells people about the exciting new understanding emerging in communications, thanks to research in artificial intelligence? Where's the integration of expert systems theory with technical communications needs? You don't have to be Sherlock Holmes to recognize that "Technically Speaking" is "elementary," absolutely elementary—a kindergarten approach to communications.

Grow up, DATAMATION. This is, after all, the Information Age.

ANETT D. GRANT  
President

Executive Speaking Inc.  
Minneapolis, Minnesota

## JAN'S FANS

After reading Jan Johnson's article "T-Net Twins Tested" (April 1983, p. 139), I feel compelled to tell you how much I enjoyed the piece. I believe it raised questions many

users of communications services have been asking, and the examination of the issues was done very well by Ms. Johnson. Her ability to take a complex subject and break it down into very digestible parts is indicative of her journalistic skills.

I also enjoyed her more recent article on Tymshare, "Selling Software to Go" (March, News In Perspective, p. 77). Both articles deal with pertinent questions and provide answers. Please convey my gratitude to Ms. Johnson for continuous enlightenment. Keep up the good work!

SAM DABNEY  
Dabney Associates  
Teaneck, New Jersey

## MARSHALLING THE FORCES

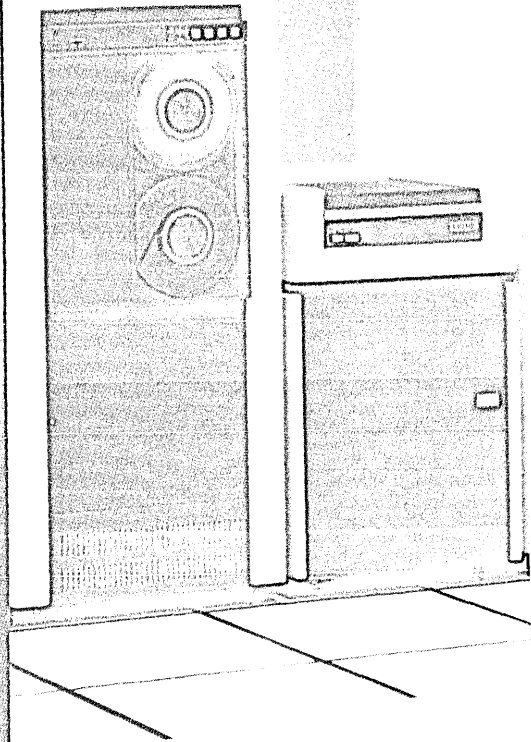
The Micro *what* Hits Town? (April 1, cover and p. 81). The difference between a marshal and a Marshall is that the first hits the town, while the second is the town. That's one SYNTAX ERROR for you!

SALLY TOBEY  
Director of Administrative Services  
SW & WC ECSU-MIS  
Marshall (sic), Minnesota

*While Webster's gives us a choice, it doesn't appear that the residents of Marshall, Minn. (or Marshall, Texas, for that matter) will be so lenient.—Ed.*

## ERRATA

In the March Applications Software Survey, a chart on p. 212 was incorrectly labeled. The ratings for the "Payroll/Personnel" package supposedly from Westinghouse were actually the scores for the Payroll Accounting System from MSA in Atlanta. Our apologies to both companies, as well as to you confused readers. —Ed.



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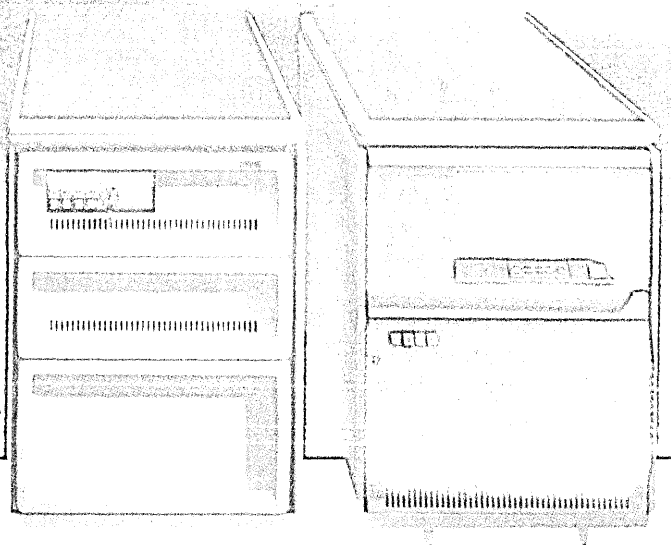
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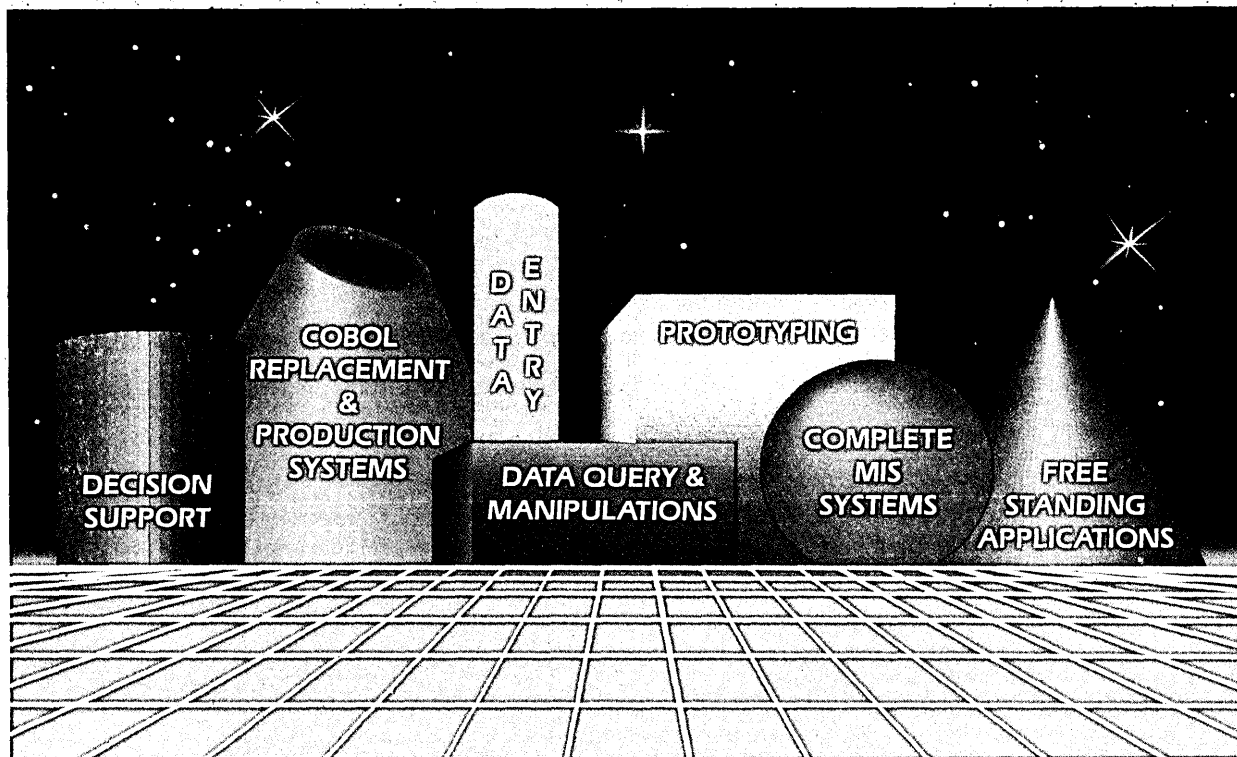
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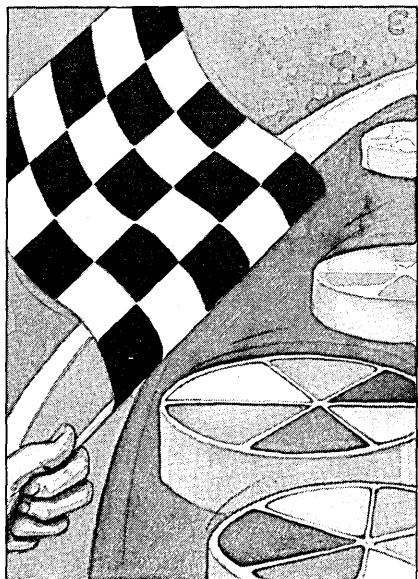
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# EDITORIAL

## NONTRIVIAL PURSUITS



It was June 1976. To put things in perspective, NCR had just introduced the Criterion, its first new computer line since the Century debuted in 1968. AT&T was clamoring that tolls for data communications would top those for voice communications by 1980. Dp managers were still debating the merits and demerits of putting a database on a minicomputer. Tymnet was seeking FCC approval to become a value-added network.

And DATAMATION had just published the first of what was to become an annual survey ranking by dp revenues the leading companies in the U.S. data processing industry.

Reporting on the year 1975, the lead article for the June '76 DATAMATION began: "While becoming a part of every other business, data processing has become big business in its own right. As this analysis will show, revenue from dp products and services now accounts for nearly \$23 billion annually."

Now, eight years later, the industry is more than four times larger. Indeed, IBM's 1983 dp revenues alone are 50% greater than sales of the entire industry in 1975.

As Pamela Archbold notes in this year's survey, which begins on p. 52, total data processing revenues for the Top 100 companies come to \$91.8 billion. As always, the concentration of revenues is at the top of the rankings. The top 10 companies, for instance, garnered 67%, or \$61.2 billion, of the Top 100 total. And the first 50 companies accounted for \$83.5 billion in dp sales for an astounding 91% of Top 100 dp revenues. We estimate that revenues of the DATAMATION 100 constitute 95% of total industry revenues. That puts the industry's size at \$96.7 billion for 1983.

That first DATAMATION survey of leading dp companies looks quite different from today's. Prepared by Oscar H. Rothenbuecher of Arthur D. Little Inc., the rankings showed IBM with a whopping 48% of total industry revenues. Today, the industry leader's share has shrunk to 37% of the total business.

Not surprisingly, eight of the top 10 companies of eight years ago are still among that prestigious group, although their individual rankings have varied through the years. While TRW ranked 10th in '75, the company today is number 12. Memorex no longer holds a ranking all its own, but rather is reported in with parent Burroughs Corp. Wang Laboratories, number 45 in 1975, now boasts the eighth slot in the lineup. And Xerox Corp., number 10 in this survey, was only number 29 in 1975. The lineup of companies below 10, however, is vastly different in today's rankings.

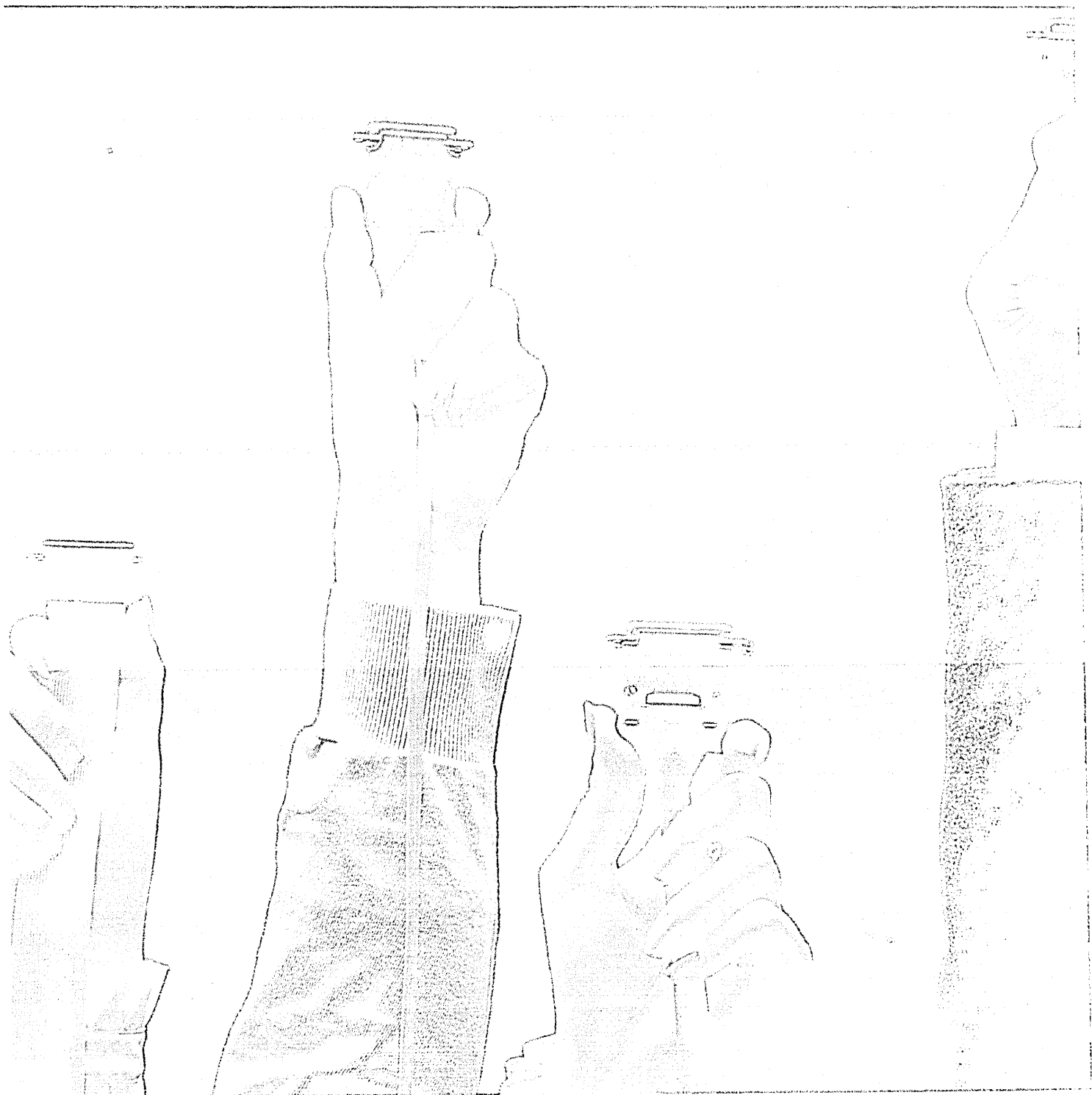
Eight years ago, personal computers were but a gleam in the eye of Steve Jobs, then 19 years old and today chairman of the 11th largest dp company, Apple Computer. Two other micro companies obviously absent from the ranks in 1975 now command slots 13 and 14—Tandy Corp. and Commodore International Ltd., respectively.

While 1975 seems such a short time ago, in the fast-paced world of data processing, it's eons away. We can even expect next year's DATAMATION 100 to look quite different from the one presented in these pages. For one thing, the long-expected shakeout in the micro market will undoubtedly take its toll of some Top 100 companies this year. And 1984 will be a telling year for AT&T. Until this survey, AT&T's Teletype unit alone served as the basis for the corporation's inclusion in the DATAMATION 100. AT&T has joined the ranks of the computer companies—and is already the 20th largest. Whether it can break into the ranks of the top 10 remains to be seen.

But for now, we present the domestic data processing world as it was in 1983. And how apt today is Oscar Rothenbuecher's remark about the 1975 industry: "Data processing has become big business in its own right"!

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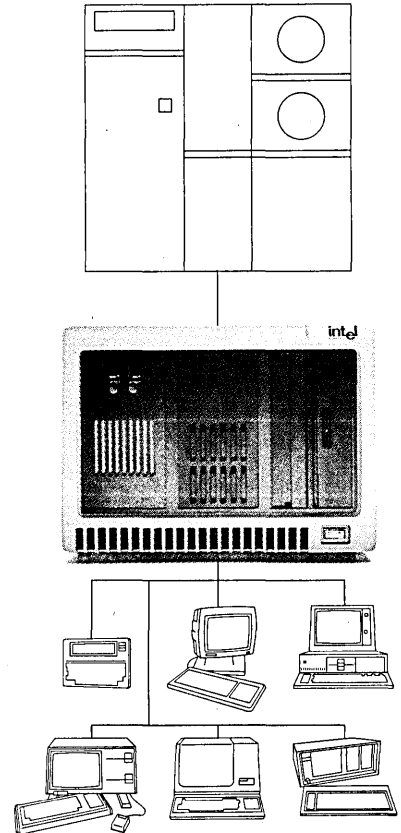
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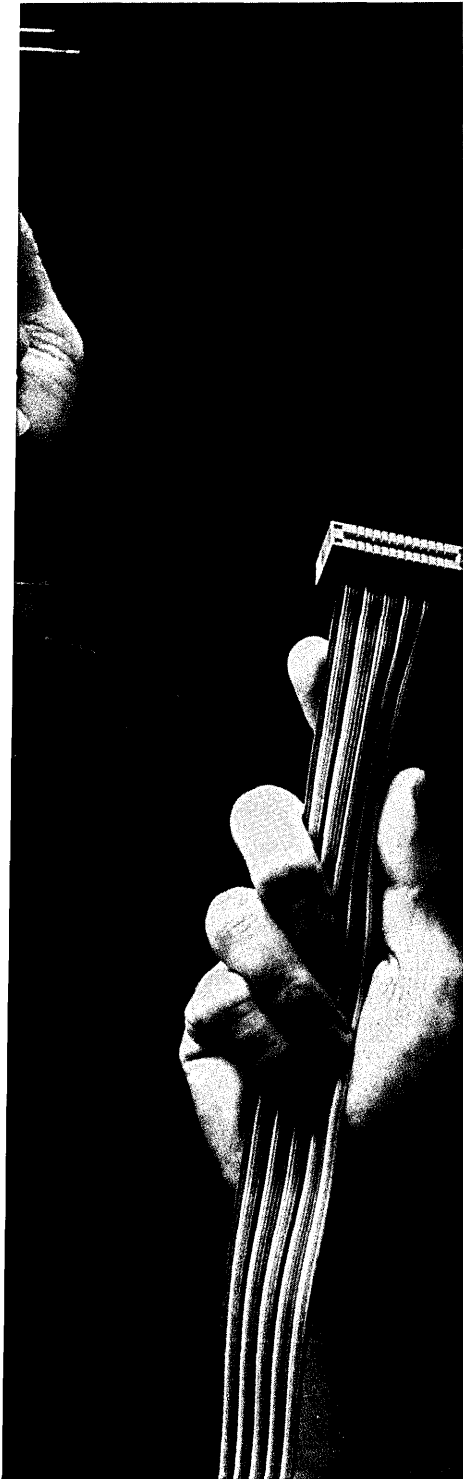
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\*\*According to the Gartner Group, who took the time to figure out all the hidden costs, each direct pc-to-mainframe connection costs approximately \$22,000. Each. \*Xenix and Multiplan are trademarks of Microsoft Corporation. © 1984 Intel Corporation.

CIRCLE 15 ON READER CARD



# INFOCUS

## THE NEW POLITICAL MACHINE

**Small computers are having a big impact in local elections.**

**by Rodney N. Smith**

Small computers are revolutionizing American life, in more places than the office, home, and local elementary school. No-where will their impact be greater in this election year than in politics. While main-frame computers have been used in presidential, gubernatorial, and senatorial campaigns for years, a new phenomenon now overshadows the use of big number crunchers on the campaign trail: the advent of small computers, which make it possible for campaigns at all levels, right down to local school board contests, to be affected by the new technology. Microcomputers can do everything for local candidates that the big old mainframes can do for presidential types. Maybe more. And the opportunity to become the computer guru of local elections is opening up new fields of adventure for dpcers, too.

Just about every candidate for public office in America can take advantage of computer technology. Indeed, many a candidate already owns one or has a supporter who does. Software packages to handle all the computer work a campaign needs are currently on the market at less than \$1,000 each. Even if a candidate has to go out and rent or buy a pc, the cost of a system is not beyond the reach of the average campaign.

American voters elect approximately 500,000 government officials in each election cycle, according to Stanley F. Reed, publisher of *Campaigns and Elections*, the how-to magazine of American politics. He estimates that of the 750,000 candidates who run for office, one third of them spend nearly \$5 billion from cash and noncash contributions. That makes the average U.S. campaign a shoestring operation spending only about \$20,000. Though that's not enough to even warm up a 3084, it is more than enough for a micro-managed mailing list campaign.

The speed and accuracy with which computers can do routine but necessary political chores give any computerized campaign a decided competitive edge. And as candidates are discovering, a computer rush is taking place as thousands of office seekers want that advantage and do not want to be at a similar disadvantage vis-à-vis an opponent.

Politicians first stood up and noted

the arrival of the personal computer three years ago, when a Montana dermatologist used an Apple computer to reverse a school construction referendum. After the voting records of the district's 550 voters and other public data were entered, lists of parents of school-aged children were generated for telephone solicitation by volunteers. The measure passed by 30 votes, after an earlier defeat, apparently because the telephone campaign found supporters who previously had not voted.

Since that fateful contest, use of personal computers in politics has extended beyond manipulating lists of potential voters. Computers are used to raise more money faster and to spend it better. They analyze where it is coming from and manage the budget. They handle candidates' schedules and their press release mailings. They help plan questionnaires and analyze the outcomes of opinion polls. They are used as word processors to contact voters or are put to more creative uses. Currently, local campaigns usually depend on them more for the great quantity of conventional tasks that have to be done than for *Star Wars* wizardry, but they can do some of that as well.

Money will not buy a local election, but it is the cost of admission, and microcomputers supply the tickets. Without the cash, candidates will not be able to acquaint voters with either who they are or what they

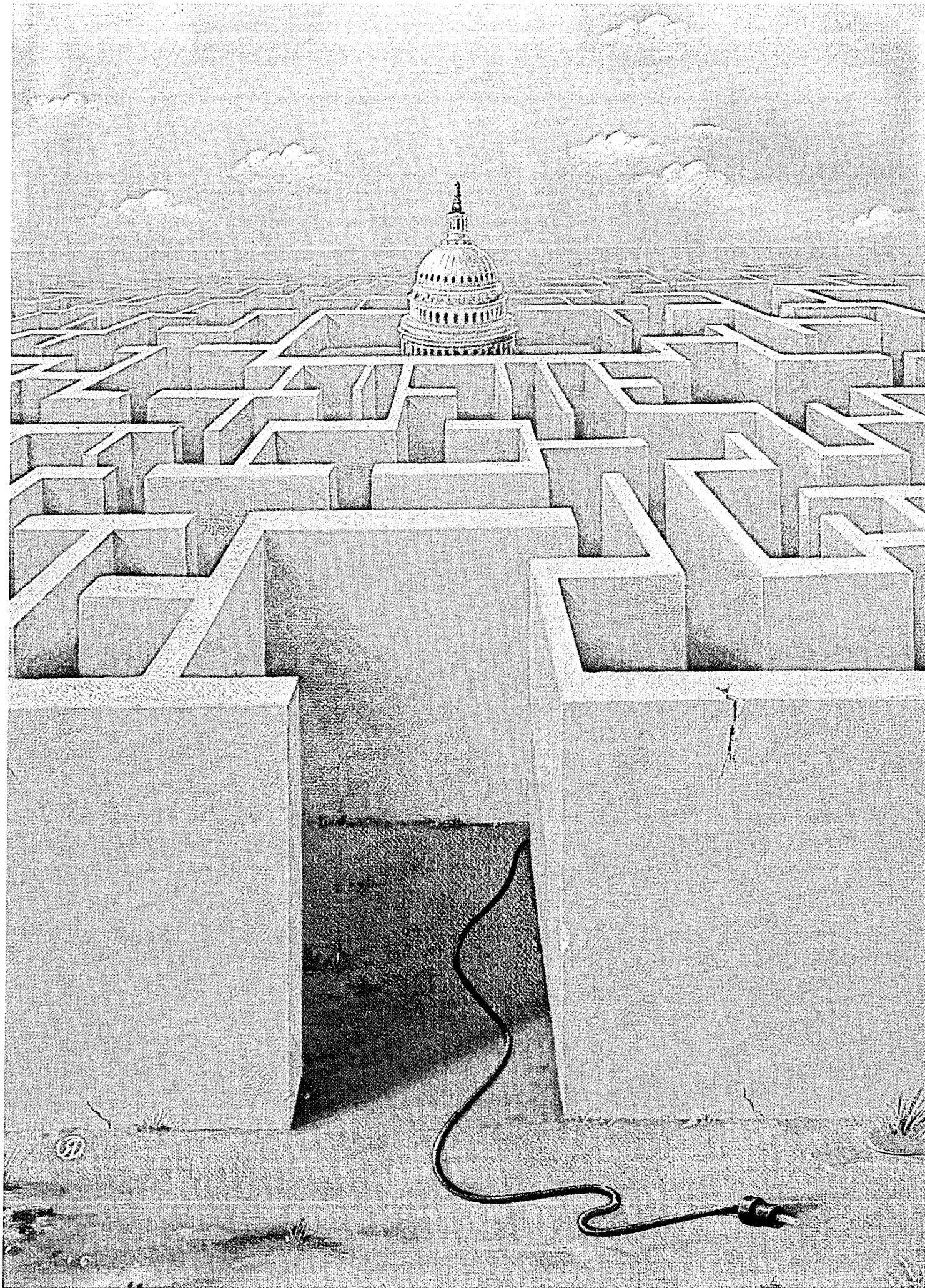
### **Personal computers help raise money, run direct mail solicitations, and help volunteers find potential voters.**

stand for, and they will not get the votes. Not only is raising money important, it is difficult. According to Rob Smith of Craver, Matthews and Smith, the liberal political mailing house, a direct-mail campaign that gets a 2% return and an average contribution of \$20 is considered very successful, but to raise the average campaign war chest of \$20,000 that way, it would have to mail 50,000 solicitations. It is clear direct mail will not raise much of anything without the help of a computer.

Much of the software for raising money already exists. For example, both Reps. Bob Carr (D-Mich.) and Don Ritter (R-Pa.) have bought a political software package for the IBM PC, Politech I from Political Technologies, Ellington, Conn., to help them deal with the problem of raising money. Both had volunteers back home who already knew how to operate computers and who can now put out their solicitations much more quickly, freeing other volunteers to march up and down the streets handing out literature and talking with voters. Doug Sosnik, Carr's top assistant, reports that the congressman considers

ILLUSTRATION BY RAFAL OLBINSKI





## IN FOCUS

Politech I "the bread and butter foundation of his reelection campaign." Politech I is a new system that is catching on fast. Political Technologies maintains 800 numbers, so customers in trouble can call in and get straightened out.

These new generation computers and special software also help provide the fund-raising analysis all campaigns need. They make it easy to see who has given and who has not. It is a secret of fund raising that the most likely contributor is someone who has already given. Computers can keep soliciting these contributors over and over again.

More fundamentally, some kinds of fund raising are more successful for some candidates than for others. Computers keep

### **A Virginia candidate for the local board of supervisors used electronic mail to attract supporters and picked up a full page article in the *Washington Post*.**

track of the nature of the contributions, whether they come from personal friends, professional colleagues, or institutional givers like PACs. They keep track of whether contributions come from any particular geographic area, and of whether they come from one particular type of event or another. For some candidates, one-on-one conversations work better than holding large events; for others, it is the other way around. A computer can tell not only which method it is but also which is more efficient in terms of the campaign's limited resources and the candidate's limited time.

Representative Nancy Johnson (R-Conn.) is a freshman Republican who wants to get reelected next fall from a Democratic state. She, too, has bought Politech I and is planning her fund raising around it. Her assistant, Kathleen Harrington, says they expect the system to be central to Johnson's fund-raising effort and to help compensate for the fact that women have more trouble raising money than men.

Campaigns do not just raise money, they also spend it, and every dime is better spent under the control of a computer. A basic spreadsheet operation can alert a campaign manager to when not enough money is being raised as well as to when too much is being spent.

No candidate wants to run out of money before Election Day. In 1976, Mo Udall's campaign went broke two weeks before the Wisconsin primary and the candidate had to put \$142,000 on his personal American Express card to get through the election. On the other hand, no candidate wants to lose and find out he took in far more than they spent. That happened to George McGovern in 1972 to the tune of \$4 million.

The most popular election software package sold to date is Campaign Manager, the brainchild of a 26-year-old computer junkie, Dean Phillips. After unsuccessful 1980 and 1982 congressional campaigns for his brother John, Dean realized that campaigns with micro power would succeed. He got it on the market early last year, before the competition, and has sold more than 1,000 copies through his company, Aristotle Industries, Rowayton, Conn. The Phillips brothers are not strangers to technocracy—John was the Princeton University student who caused a furor several years ago when he was able to design on paper, as a thesis project, a workable atomic bomb from information available in public documents.

Now the latest Phillips project is having equally explosive effects. Thom Serrani was one of the first candidates to use it and with it he masterminded his upset victory for mayor of Stamford, Conn., in 1983. George Jepsen, his campaign manager, says, "I purchased Campaign Manager and an IBM PC XT for the mayoral campaign. The polling, direct mail, and fund raising paid for the system, and we won an upset victory in the primary." Serrani's use of computer technology helped him spend more effectively, he adds.

The burdensome regulations placed on candidates are not widely understood, but computers can be used to make the reporting requirements much less onerous. The pcs produce reports for major campaigns in a matter of hours, and in minutes or at most an hour for lower-level contests. The reports include such details as professional and business affiliation of the contributors. If these are omitted, the computer automatically sends out a note asking for the information, as required by federal law. It no longer takes valuable staff time to get the letters out and follow up on getting the information.

Scheduling programs can be adapted to fit the unique characteristics and requirements of individual campaigns. Of critical importance to candidates on the road are the arrangements made in advance by local representatives. A scheduling program that includes the name, telephone numbers, and other pertinent information about the advance workers is a lifesaver for peripatetic campaigners. Equally important is the proper preparation for meeting local Big Contributors—a candidate always looks and sounds better if he or she knows something about the people in the room. Little details like when the candidate and the contributors last chatted and the names of children and spouses can be translated into more contributions instead of embarrassing snubs.

With a portable computer on the go with the candidate, storing those details pays off in big bucks. Senator Gary Hart

(D-Colo.), the Democratic Party's early dark-horse candidate for the presidency, uses several microcomputers in his campaign, including two lap-top TRS-100s for his scheduling.

The precinct-by-precinct results of past elections can be programmed into a computer along with related research. Computers can then merge that information, using it in preparing the questionnaire and in analyzing the results. The computer can alert the campaign workers to things they need to know about specific blocs of voters or to special problems and specific districts that need particular attention.

Senator Paul Tsongas (D-Mass.) used the volunteer services of Lowell University to produce his polls in the 1970s, but a few years ago he turned to Politech I to prepare and mail questionnaires. He says it took the polling out of the hands of amateurs and into the hands of professionals.

Campaigning is communicating with voters, and this is when computers help most. Computers send out fund-raising solicitations and thank you notes to donors and volunteers, personal letters to local officials and VIPs, and press releases. At the same time, they can maintain a filing system to track vital information on public opinion leaders, local officials, and prime contacts.

Traditionally, candidates wrote local leaders, asking for their support, and they in turn were responsible for getting

### **Scheduling programs can be adapted to fit the unique characteristics and requirements of individual campaigns.**

their members to the polls. But union members often resented their leaders, and the leaders were often less active than a candidate might want. Now, union members can be contacted directly—a piece of cake for a micro with word processing and mailing list software.

There are other political software packages available with shorter-term track records. One firm that entered the field late is Campaign Software, with a package for the IBM PC. It is offered only to Republican candidates from a one-room office in the Heritage Foundation, Washington, D.C. Dan Frahm and John Moslé, young republican activists, say they are selling their package only to Republicans because they want to influence elections. "Campaign is particularly effective for state legislative campaigns," Frahm explains. "At that level, the Campaign system can help identify and trace favorable voters, ensuring that they get to the polls on election day."

The package seems to have worked for John Russell of suburban Fairfax, Va., in 1983. A retired intelligence officer, he

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CIRCLE 16 ON READER CARD

## IN FOCUS

was running for the state legislature in a district that had never elected a Republican. He used Campaign to send mailings with an older-person-to-older-person appeal to all voters over age 55. "I didn't win by much," says Russell, "so it may have been the difference."

Rainbow Management Systems, Westport, Conn., came into the market right in the middle of the 1984 primary season. It offers The Campaigner, a package that can do just about everything the others can do—except polling, which is being worked on—and is competitively priced, but it lacks an 800 number.

Another package, SOLON, is put out by Q Systems, a Summit, N.J., IBM dealer, for the PC XT. A combined hardware and software package runs \$16,500. The price puts it out of the reach of many local campaigns because the company is aiming at major gubernatorial and senate races. It will sell the software separately, but at \$3,000 it still costs three times as much as most other packages.

Another package is Financial Reporting Services for the PC, put out by Fred Small of Annandale, Va., but it only handles financial reporting and costs \$5,000. Voter Contact Services, Honolulu, is also developing the software to get into the political market, but is unlikely to do so in time to have much of a role in the 1984 elections.

Campaigns are not limited to these political software packages. Among the

most common sights on the campaign trail these days, according to campaign managers, are high school computer hackers writing their own political programs.

Computerized campaigns are also not limited to routine word and number crunching. In 1983, Pat Watt ran for chairperson of the Fairfax, Va., board of supervisors. She used her TRS-80 about six hours a day to organize campaign financing, contributor lists, precinct work, and scheduling. Then she went beyond mere record keeping and entered notices into an elec-

### **Campaigning is communicating with voters, and this is when computers help most.**

tronic bulletin board, asking interested voters to comment on certain issues.

Watt's notices were tailored to a growing interest group: computer users. The issues she raised with them included building a high-tech center in northern Virginia and the proposed taxing of computer software as personal property. "I keep up with how computers are being used in politics, but I hadn't seen the bulletin board approach before," Watt says. "We'd have tried it earlier if we'd thought of it."

Her enthusiasm only begins to explain what happened. The electronic politicking attracted the attention of her hometown newspaper, in this case the powerful and prestigious *Washington Post*. A full-page article on her use of the computer

and electronic mail was a more cost-effective way of contacting voters than a box full of bumper stickers.

As more and more politicians, and their aides, recruit computers, their use may have some unintended consequences.

With the wide market acceptance of the new generation of computers and with all this relatively inexpensive software, computers may help reinforce the trend that has seen 85% of the congressmen seeking reelection since the Korean War returned to office. It may also reinforce the trend that has seen the candidates with more money also become more likely to get elected. Even though the software is not cheap, candidates recognize that they have to make some expenditures to get the benefits of the technology.

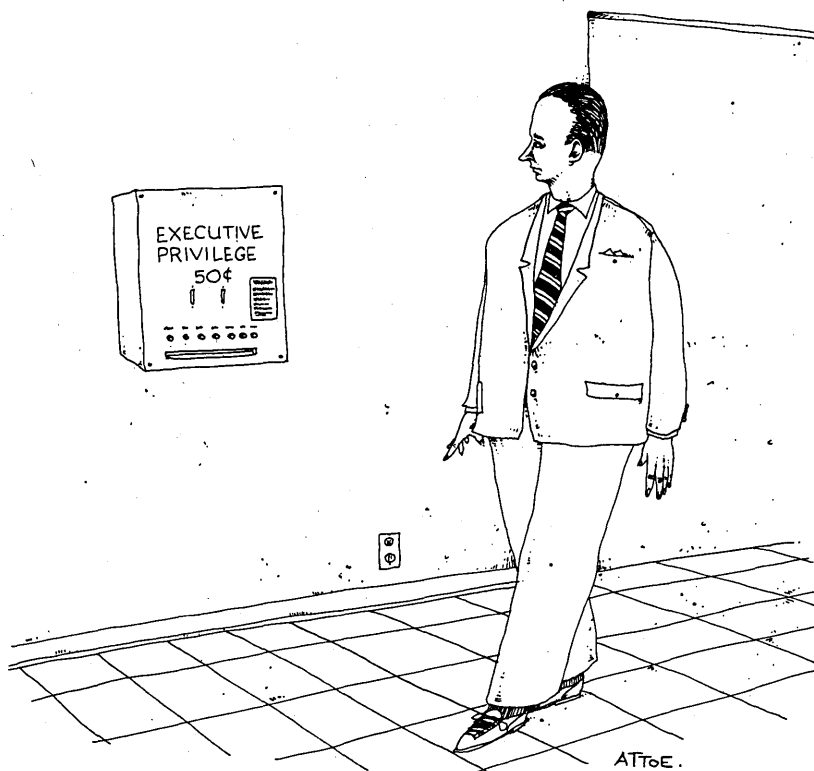
Money, however, has to be spent in all campaigns, and computers actually save campaign money. Indeed, one of the main ways in which citizens have an impact on campaigns is by working as volunteers, and computers magnify the impact volunteers can have.

For one thing, each volunteer who operates a computer can, in effect, contact many more voters than a volunteer who has to walk from door to door handing out literature. That, in turn, creates more work for volunteers to do in the office: computers type letters that have to be folded, stuffed, sealed, and stamped. Finally, computers free volunteers to hand out literature on the street and go door to door, trying to convince voters to support their candidate.

And because of the wide market acceptance and relative user friendliness of the computers, there is something new for computer owners and users to do in politics. Candidates and campaign managers may not understand how all this will work, but they will take little convincing when they see what computers can do.

The Republican National Committee has a large leg up on the Democrats. They already have an office to advise Republican candidates about computer technology. In fact, they assess the software packages and mail their candidates consumer reports. The Democrats have no such capacity, but it does not matter because for the average campaign, computers are a grass-roots phenomenon. Perhaps 1 million computer users already understand how computers can be used in campaigns—they do not need the National Committee to tell them. From the looks of it, a revolution in how campaigns are run is taking place all on its own. And it looks as if it could further democratize American politics. \*

Rodney N. Smith is a free-lance writer and fund-raising consultant in Falls Church, Va. He has worked extensively on Capitol Hill and in political campaigns.



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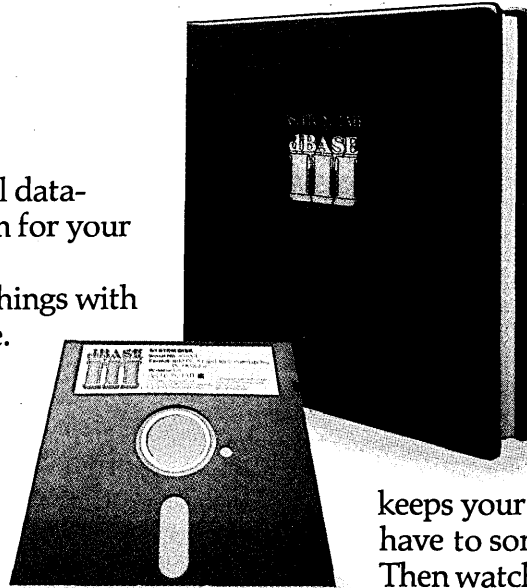
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# NEWS

## IN PERSPECTIVE

### OPTICAL DISKS FORESEEN

**Optical memories were just talk in the early '70s, but now the real thing is beginning to appear.**

**by Edith Myers**

*"Precision Instrument Co., Palo Alto, landed a second order for its trillion-bit laser recorder/reader storage system last month and said it will market a smaller 10 million-bit version."*—DATAMATION, July 15, 1970.

*"Lower component costs are being credited in price cuts for a read-only optical memory system announced only a year ago. A 25% drop, to 3 cents per bit for a 100Kb model in quantities of 100, is due this month from Optical Memory Systems, Santa Ana, Calif. Prices will get down to a penny a bit two years from now."*—DATAMATION, April 15, 1971.

*"Holographic memory systems with capacities in the 10 trillion-bit range and with microsecond speeds have long been talked about. They're still in the lab. But next month, first units of a holographic system are scheduled to be shipped by a new firm, Optical Data Systems, Mountain View, Calif., for field testing."*—DATAMATION, February 1972.

Glowing promises for optical memories in the early '70s turned out to be little more than that. Optical Memory Systems and Optical Data Systems have vanished, apparently without having delivered a product. Precision Instrument went into Chapter 11, was revived by the Heiser Corp. with \$26 million and a new name, Omex, but is now up for sale without ever having gone into production.

Optical technology, however, didn't go away and the promises are erupting once more—maybe this time with a little more substance. In mid-1983, the Mountain View, Calif., research firm Input Inc. talked about a plastic card containing the equivalent of 8,000 pages of typewritten text and about the *Encyclopaedia Britannica*, complete with illustrations, encoded on something the size of a phonograph record. These, the firm said, "only hint at the potential that optical memory systems have for changing present methods of information storage and retrieval."

Late last year, another California research firm, Dataquest Corp., of San

Jose, said, "Recent product announcements in the optical memory field signal the beginning of a new age in digital data computing."

Edward S. Rothchild, a San Francisco-based consultant who has been following optical memory technology for 10 years and who has been publishing a newsletter, *Optical Memory Report*, for three years, sets the total of installed optical storage devices worldwide at fewer than 1,000 and "two thirds of these are in Japan."

He notes, though, that the number of companies developing products is growing. "Early this year we listed 32 companies working in development of optical memory drives and 54 developing optical media. In two months, this went to 40 companies and 70 companies, respectively, a 20% increase."

Gerry Walters, vice president and chief scientist at the Docuvision division of Integrated Automation, Berkeley, Calif., predicts that 17 or 18 companies will announce delivery of optical disk products before 1985. Walters joined Integrated Automation in April to help move the company, which has been an image systems integrator, into optical-based memory products. He is the author of four books on optical data disk technology.

Optical memory systems generally fall into two categories: systems that store visual images and documents "juke box" fashion, and systems that store digital computer data for processing. Systems in the first category are the only ones to have been delivered to date except for a few field tests by Storage Technology.

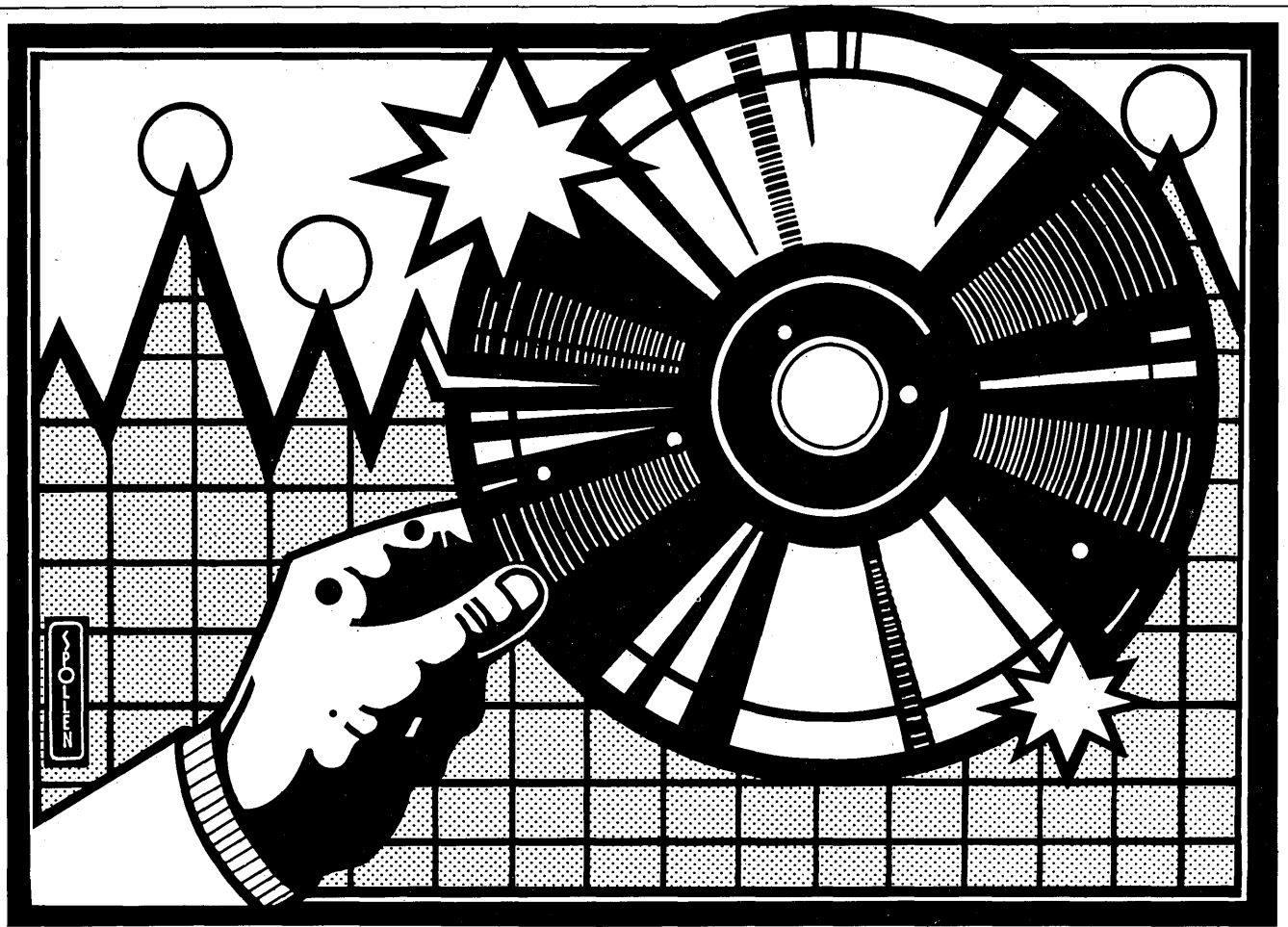
In the United States, Shugart Associates and Storage Technology have introduced products targeted for computer data storage. Larry Fujitani, product manager for Shugart's Optimem division, said in mid-April that the company was "just about" to ship its Optimem 1000, a 12-in.,

#### **In the U.S., only Shugart and Storage Technology have introduced products targeted for computer data storage.**

nonerasable optical disk with a 14,500 bpi<sup>2</sup> recording density and a price tag in the \$6,000 to \$10,000 range.

Bob Neilly, marketing communications manager for StorageTek, said at the same time that his company had shipped "a couple" of its model 7600 14-in. disk systems to beta test sites. He said the tests were "running well," and that actual shipments should begin at the end of the third or fourth quarter of this year. Storage Tech's drive sells for \$130,000. Neilly said recording densities of 300,000 bpi<sup>2</sup> are "easily foreseeable" with his company's technology and that the "theoretical limit is in billions of bits per square inch."





Shugart's Fujitani said he couldn't talk about orders but that those in hand cover a "very broad range of applications."

Neilly said StorageTek has two firm orders for the 7600: one is for use in processing weather tracking data, the other is unidentifiable.

Optical systems for image-filing purposes generally can tolerate error rates of  $10^6$  to  $10^7$ , unacceptably high for many data processing applications. Neilly said StorageTek has achieved an error rate of  $10^{14}$  or "one potential error in 14 quadrillion bits, and with four gigabits per platter that's one potential error in 40 platters. And we expect to do better."

Most work in the filing type systems has been done in Japan but RCA and Philips have also been working on the technology and Integrated Automation's Walters believes Siemens of West Germany is also involved. Philips is selling Megadoc, a juke box system, in Europe and the U.S.; RCA in late April announced a technique to simultaneously record information onto an optical disk using three semiconductor lasers on a single solid state chip.

Philips also is involved in a joint venture with Control Data Corp. called Optical Storage International, which will make and sell laser-based storage systems (Benchmarks, May 15). A CDC spokesman

says the relationship actually began two years ago when Philips's Optical Media Laboratory in the Netherlands did research and development in optical storage media and CDC's Optical Peripherals Laboratory in Colorado Springs did research on optical drives that included that media. He said OSI

### **OSI will take the media and the drives and move them into the marketplace.**

will market the media and the drives. The new company will be headquartered in Santa Clara, Calif. Disk manufacturing is expected to take place in Blackburn, England.

A product announcement is expected late this year. The CDC spokesman said it will be a 12-in. disk of two glass substrates bonded together with a thin layer of air separating them. A special metallic recording surface will be inside the glass and the whole package will be fitted inside a plastic cartridge. Anticipated price range is \$6,000 to \$10,000, similar to that of Shugart's—as is the size and, according to the CDC spokesman, the concept.

One expected user of the CDC drives will be FileNet Corp., a Costa Mesa, Calif., startup. It plans to integrate several CDC and Hitachi optical drives, magnetic storage, optical scanning, and large-screen

crt's to manage the flow of paper through the office. Once the paper is scanned into the system, it is indexed and stored on the optical drive. The product is slated for delivery in September and already four insurance companies and a bank have put in letters of intent.

The optical storage concept actually goes back about three years, says Walters of Integrated Automation. That was when France's Thomson-CSF introduced the first operational optical data disk systems, pre-dating by two and a half years the introduction by Japan's Matsushita that many believe to have been first.

Walters said Integrated Automation did the software for Thomson-CSF's system, "making it look like a Honeywell Bull mag disk," and has had a close relationship with the French firm ever since. Thomson, he said, licensed its technology to Shugart.

Fujitani of Shugart explained optical technology as allowing "the bit density to be the same as the track density, since a circular spot of light is used to read and write data on the disk. This high areal density allows up to 1 gigabyte of storage on a 12-in. disk. It works by focusing a read beam through a protective plastic layer. The focusing lens of the optical read/write head can be designed to provide 1 or 2 millimeters of space between the lens and the disk

## NEWS IN PERSPECTIVE

surface. This can be contrasted with the 1 to 2 ten-thousandths of an inch between the read/write head and the disk in current Winchester technology drives."

A limitation in many applications and an advantage in others is the fact that all optical memory systems available and announced today are nonerasable. "Banks like this feature," says Neilly of StorageTek, "because they want an audit trail that can't be written over."

StorageTek, however, like most other companies involved with optical technology, is working on erasable techniques. "It's a couple of years away," says Neilly.

Fujitani of Shugart says erasable technology "has been demonstrated in labs. A number of companies have done that but I think it'll be four or five years before you actually see them [erasable disks] in customers' hands."

Rothchild says there are three leading technologies for achieving erasability. The first, onto which, he says, "people in the magnetic camp are jumping on like a whole new bandwagon," is magneto-optics, which makes use of a variety of combinations of rare earth materials to create a magnetic surface on which a laser can write and from which a laser can read. Such disks, he said, "would be removable, would be recyclable, and would have only slightly less capacity than write-once optical disks."

Magnetic drive and media companies, says Rothchild, "are realizing that vertical magnetic recording isn't going to make it for three reasons: the media is not easy, there are head interface problems, and the disks wouldn't be removable."

So, he says, they are embracing magneto-optics because they don't want to

### **It would take an erasable optical memory to have a noticeable impact on the booming Winchester disk drive market.**

lose out to the optical companies. "My technical editor [of *Optical Memory Newsletter*], Leonard Laub, coined the term 'optically assisted magnetic recording' at a private meeting recently and both camps loved it."

Rothchild believes that magneto-optics soon "will take off like crazy and make inroads into the Winchester disk market."

The second most important erasable technology is described by Rothchild as "phase change or phase transition from amorphous to crystalline. The technique uses thin metal film that a laser doesn't burn but rather changes its reflectivity from transparent to absorptive. The structure changes from crystalline to amorphous. The laser senses the difference and trans-

lates this to a bit stream. Then the laser can restore it to the previous state."

Rothchild said Matsushita has demonstrated such a system with a 1 million erasure cycle. "It's a less complex technology [than magneto-optics] and makes it possible to have certain areas permanently recorded, offering the best of both worlds [erasable and nonerasable]. The only trouble is, no one except Matsushita has been able to achieve 1 million erasure cycles."

The third of the three major technologies for erasability, according to Rothchild, is potentially the cheapest. It uses an erasable polymer dye and uses plastic technology and coating as in photographic film. He says a number of photo companies are working on it.

It would take an erasable optical memory to have a real impact on the currently booming Winchester market. Most optical disks announced so far are intended to coexist with Winchesters. Their main threat now is to devices like micrographics systems, photocopiers, and paper-based filing systems.

What are the potential applications? Fujitani lists law offices, the patent office, medical records, and pharmaceuticals and sees the technology as enabling publishers of databases to sell these as well as peddling access only. Dataquest believes the "applications themselves will begin to shape tomorrow's optical systems."

Followers of the technology are unanimous in saying that IBM is definitely investigating optical disks. Rothchild believes IBM will announce an erasable prod-

uct in early 1985, "and there's a good chance they'll announce a read-only product sometime this year."

IBM's involvement in optical disk technology was evidenced by its entry into a joint venture with MCA, called Discovision Associates, which was subsequently disbanded. It was to have brought consumer and industrial videodisks to market but IBM backed out abruptly several years ago.

A recent visitor to a Hitachi plant in Japan said he saw some "little" optical disks "dressed in baby blue." Rothchild says Hitachi has some small optical disks for office automation document storage and retrieval and "IBM might be in on this."

Digital Equipment has been said for some time to be working on a 13-in. optical disk which will hold a half-megabyte of data. Burroughs worked on optical technologies at its Memorex subsidiary for a while, but has dropped out.

At the low end, in the 5 1/4-in. disk size, Fujitani believes, "there is a lot of work being done on this in back rooms."

So far, the only announcement in this area is from a startup in Calabassas, Calif., Laser Memory Systems, founded by Raymond Brooke, former president and founder of Computer Memories Inc., Chatsworth, Calif., and Donald F. Taylor, former vice president of marketing of Tandon Corp., Chatsworth. The company has contracted with Cambrian Consulting Inc., Calabassas, to research the technology and media, and expects to announce a read-only 5 1/4-in. drive with a 100MB to 200MB storage capacity by year-end. \*

## IBM READIES LAN

IBM in early May said its long-awaited token-passing-ring local network would not be available for another "two to three years." In a move to preempt other suppliers, the company introduced a series of cabling components with which users can wire their offices in anticipation of future local networking products.

Under pressure from Xerox's Ethernet and Wang Labs' Wangnet, IBM has been hinting at its work on local networking in technical papers over the past two years. The company said it is continuing to investigate competing networking schemes, namely, carrier sense, multiple access/collision detection (CSMA/CD), and broadband techniques. It gave no detailed timetable for introducing specific token-ring products. Industry sources say IBM is still working closely with Texas Instruments to develop low-cost VLSI device interfaces for the token ring.

The cabling gear, introduced to calm users who are growing anxious over IBM's apparent lack of a local network, consists of twisted copper pairs laid out in star patterns to connect individual wall outlets with wiring closets. The wiring is designed

to handle telephone and data traffic. Patch cords in the wiring closets are used to change the connection of terminal devices as they are moved within an office building. IBM said the cabling, which is designed to be permanent, reduces the cost of moving workstations sufficiently so that the new hardware will pay for itself in "a few years."

IBM said its new wiring hardware would connect "most currently available IBM products including workstations and small and intermediate computers." Large mainframes would attach through controllers, the firm said. Private branch exchanges from AT&T, Mitel, NEC America, Northern Telecom, and Rolm have been successfully tested in handling voice over the IBM cables, according to IBM.

Interestingly, IBM has no plans to install the wiring itself. Instead, it has authorized six distributors to sell the hardware and 15 companies to handle design and installation. Included are several former Bell operating companies and General Electric Supply Co. Orders will be taken beginning in July and deliveries are slated to begin in the fall, a spokesman said.

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CIRCLE 18 ON READER CARD

## NEWS IN PERSPECTIVE

### MICROCOMPUTERS

# HP'S TP: IT'S FOR THE LAP

**Hewlett-Packard hopes the initials TP will become as widely used as PC.**

by Edith Myers

Hewlett-Packard is moving from numbers to names. To be sure, products like the HP 3000 and the HP 150 will continue to be known by their numerical designations, but new products, like two introduced this month, will bear names that the Cupertino, Calif., company hopes the public will take to its collective heart.

These hopes are particularly high for The Portable, which HP is confident will become known by its initials, TP. The firm hopes these two letters will do as much for it as the letters PC have done for IBM. Could be—TP has a catchy ring to it and it's easy to remember.



**TABLETOP:** Hewlett-Packard's bid for the portable computer market, The Portable, has been introduced with a new ink-jet printer, the battery-powered ThinkJet. The \$495 printer can also be used with IBM PCs and PC-compatible machines, the company says.

HP's other named product, introduced at Spring Comdex, is also for the personal computer market. It's Laser Jet, a

low-end laser printer for under \$3,500.

Both products do have numbers: TP is Model 110 and Laser Jet is Model 2681,

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**CIRCLE 19 ON READER CARD**

but HP will not play these up.

TP was developed in Corvallis, Ore., where a Portable Computer Division was established two years ago. "We had the background in portable products, in calculators and battery power," said Nicholas Fowler, the division's product manager.

TP weighs in at 8½ lbs. and is 13 in. wide by 10 in. deep by 2⅞ in. high. It is powered by three rechargeable lead-acid D cell batteries which Fowler says will last on the average of two weeks between charges. He says the full life of a battery for the cpu is a minimum of five years.

Available for TP are two battery-powered peripherals, a disk drive with 3½-inch disks and a 710K byte capacity, and ThinkJet, a battery-powered ink-jet printer.

### HP is not overlooking the potential use of TP by airline travelers.

Fowler says the drive will operate eight hours on its battery and the printer will do 200 pages on its.

TP has some built-in smarts. Incorporated in ROM are its operating system, MS/DOS; Personal Applications Manager (PAM), the applications management software from the HP 150; Lotus 1-2-3; Memo-Maker; and HP word processing package

terminal emulation and help functions.

Because these are in ROM, not RAM, notes Fowler, they can't be erased, freeing RAM for storing data, not programs. Terminal emulation makes file transfer from an HP or an IBM mainframe possible but not manipulation of a host file. That's for the future. TP is compatible with the IBM PC and its clones and with the HP 150.

A small card is available that makes it possible to operate the software stored in TP's ROM from an IBM PC or a compatible. Obviously HP has bowed to the size of the IBM world. A similar card for the 150 is coming but hasn't been produced yet.

TP's display is a 16 line by 80 character LCD that Fowler says makes it the largest battery-powered display available. Contrast is controlled from the keyboard and it has an adjustable viewing angle. Price of the cpu is \$2,995. The disk drive is \$795 and the printer \$495.

HP is not overlooking the potential use of TP by airline travelers and has become a prime mover behind a standard of radio emission that would be the same level as that emitted by instruments in an airplane's cockpit. Fowler says TP meets this standard right now but he believes other manufacturers of lap-sized portables would have to do some reengineering.

As with TP, HP has targeted the IBM

PC and look-alikes market with Laser Jet. It has also made the printer compatible with the 150. Laser Jet is a product of the company's Boise division, which has been producing laser printers since 1980. Its printers ranged from \$12,800 to \$90,000 until now.

### The new laser printer will print eight pages a minute, which translates to 3,000 a month.

"That's too high for the PC market," says Alan Armstrong, product planning.

The new laser printer will print eight pages a minute, which translates to 3,000 pages a month, Armstrong says. He describes it as an alternative to letter quality daisywheel printers because of its 300-by-300-dot resolution. Multiple fonts can be used on a single page under software control.

All consumables (ink, etc.) are built into a disposable cartridge that sells for \$99 and is good for 3,000 pages, Armstrong says.

HP currently is testing Laser Jet with popular PC software packages. "It works with all basic spreadsheet packages pretty much as is," Armstrong says. "We're working with people who write software to make sure their next releases will work with our printer." \*

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CIRCLE 22 ON READER CARD

# A CHIP IN YOUR WALLET

**The so-called smart card is finding expanded use in France but is still looking for a major U.S. buyer.**

by James Etheridge

France's first home banking service was introduced in February, by Credit Commercial de France (CCF), a medium-sized retail bank with some 700,000 customers around the country. In March, an enterprising tv journalist demonstrated to his nationwide audience how easy it was to access a neighbor's CCF bank account through his own videotex terminal.

An embarrassed CCF could only respond by pointing out that once home banking services were operating through the medium of the smart card, the system would be foolproof and such facile breaches of security would no longer be possible.

Fortunately for CCF, its existing service, called videaccount, is limited to passive operations such as obtaining a statement, ordering a checkbook, or calling up exchange and interest rate data, so no serious damage can be done by pirates. But the tv show provided excellent publicity for the smart card and vindicated the decision of French banks at the end of 1983 to base their evolving electronic payments systems on a common technology tied to the smart card. A smart card is like any other plastic credit card except for a tiny microprocessor embedded in the top left-hand corner. Unlike an ordinary magnetic card, therefore, it has an autonomous data processing and storage capability, so that the details of transactions can be recorded on the card itself. This means that sensitive information need not be transmitted through public telephone or data networks; the only dialog that does take place is for identification and authorization purposes.

As a payment card, the smart card is more than just an electronic checkbook, since the issuing bank credits it with a monthly ceiling on the basis of the user's annual income, so the customer cannot use it once the funds have run out. That gives the bank added control, but relieves the shopkeeper of the eternal problems of dud checks and fraudulent credit cards. The user has his card recredited at the regular intervals and simply presents it at his bank's ATM for automatic revalidation.

While the smart card has numerous potential applications in the health and edu-

cation fields and as a multifaceted corporate ID card, it is in the payments fields that its possibilities can be best exploited in the short term, according to observers. It has the merit of being an all-purpose payment card, suitable for use in all commercial environments and providing the banks with all the benefits of an EFT system. But its overriding asset is its security, as André-Jacques Selezneff, advanced projects manager of Philips Data Systems (the French subsidiary of the Dutch giant), points out. "The security aspects of the smart card have come to interest the banks more than its virtues as a means of payment," he says. "As merely a payment card, it would not have any export potential, but on the strength of its security, it has many possibilities."

Philips Data Systems once developed its own dual-microprocessor card, but decided in the end that it was not an economic proposition. Instead, it signed a technical cooperation agreement on Feb. 7 last year with French computer manufacturer Bull, whose single-chip CP8 card has been adopted as the French norm and is to be the nub of the banks' EFT system. Philips has thus acquired the right to use Bull's technology, which is now the only one on the market. The CP8 chip is manufactured solely by Motorola at the moment, but Bull has concluded a second-source arrangement with the French firm Eurotechnique, a subsidiary of Thomson, for an identical chip.

Bull is producing 15,000 cards a month, but output will be up to 100,000 a month starting July. The unit cost is about \$3.75 at present, but Hervé Nora, manager of Bull's CP8 division, predicts that it should be down to \$3 or less within a year to 18 months, unless Japanese competition sends smart card prices down the same curve as that of 64K RAMs.

The French banks will start issuing the cards to replace current magnetic payment cards from the end of this year. The cards will be dual-microprocessor magnetic-strip cards, so that they can continue to be used with installed payment terminals

**"The security aspects of the smart card have come to interest the banks more than its virtues as a means of payment."**

and cash distributors. There are more than 6,000 POS terminals and many more cash distributors in operation in France at the moment, all of which will have to be modified or replaced in due course.

At the point of sale, it is only a matter of adding a smart card reader with the appropriate software interface, but converting or replacing cash distributors, priced at \$18,000 to \$25,000 a piece, will be a longer and costlier business. Over the coming

years, smart card terminals will be installed progressively in all environments where customers have to pay for goods and services, not just in retail outlets but also in service stations, car parks, and motorway toll booths. The French PTT is also introducing card-paying phone boxes; there will be 1,000 in use by the end of 1984, some 10,000 at the end of 1985, and an additional 20,000 a year thereafter, according to official plans.

While insisting on the importance of dual payment cards, Michel Maincent, director of the banks' smart card working party, expects France to be a "totally smart society" by the end of the decade. "In five years, after the transition period, the magnetic strips will no longer be used in France, only abroad," he says. The French banks are keeping a close eye on developments in other countries. Having secured unanimous agreement among themselves, they must now ensure that systems adopted elsewhere are compatible with their own. The French are reasonably optimistic that the smart card will be chosen by most other European countries. In Scandinavia, Belgium, and Germany, smart card trials are under way;

**Bull is currently producing cards for sale at about \$3.75 a piece, but the price is expected to drop as volumes rise.**

the German banks, for instance, have reportedly ordered several hundred thousand CP8s for their pilot project.

Bull's Nora says that "it is now vital that the major credit card networks follow suit," admitting that one of them has signed a contract with Bull for the necessary cards and equipment to carry out a test. Philips' Selezneff argues that only the credit card companies could get smart cards off the ground in the U.S. "The American market is highly fragmented, with all the different kinds of bank card, retailer card, and credit card. It certainly won't be the banks that promote the smart card in the U.S.," he says.

Smart cards may have greater potential in other applications, though. Philips supplied 3,000 cards to the Defense Department in 1983 for experimental use as an alternative to the ID cards carried by servicemen's dependents. This type of card is not being considered as a replacement for the metal tags worn by U.S. servicemen themselves; another type of memory card is being tried out by DOD for that, supplied by a Minneapolis-based company called Datakey Inc. Its "data tags" have a separate microprocessor and 64K reprogrammable memory, and they measure 2 by 1 by 9/100 inches. They also cost \$100 each, according to Datakey's president, John Underwood, who maintains his company is "not





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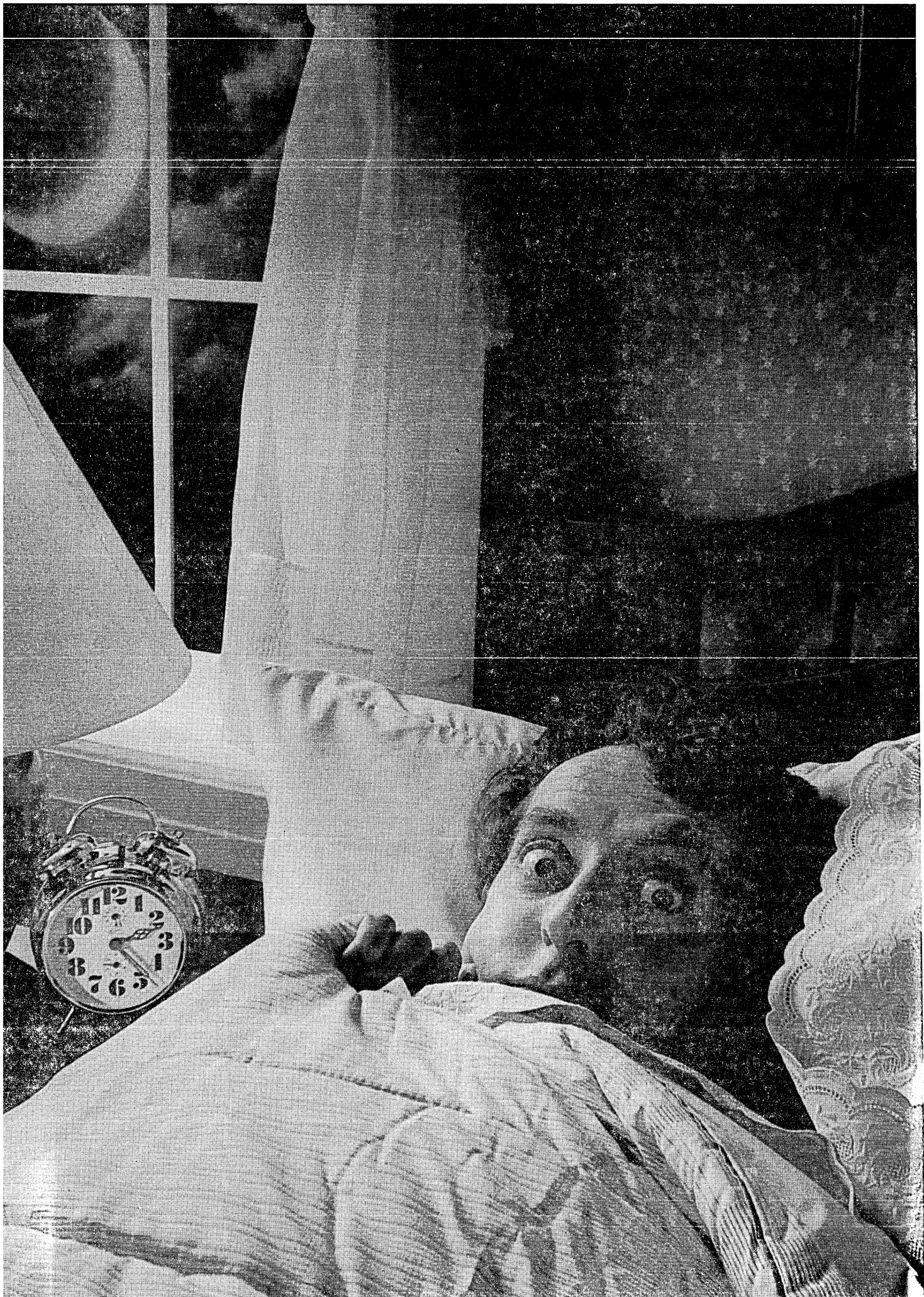
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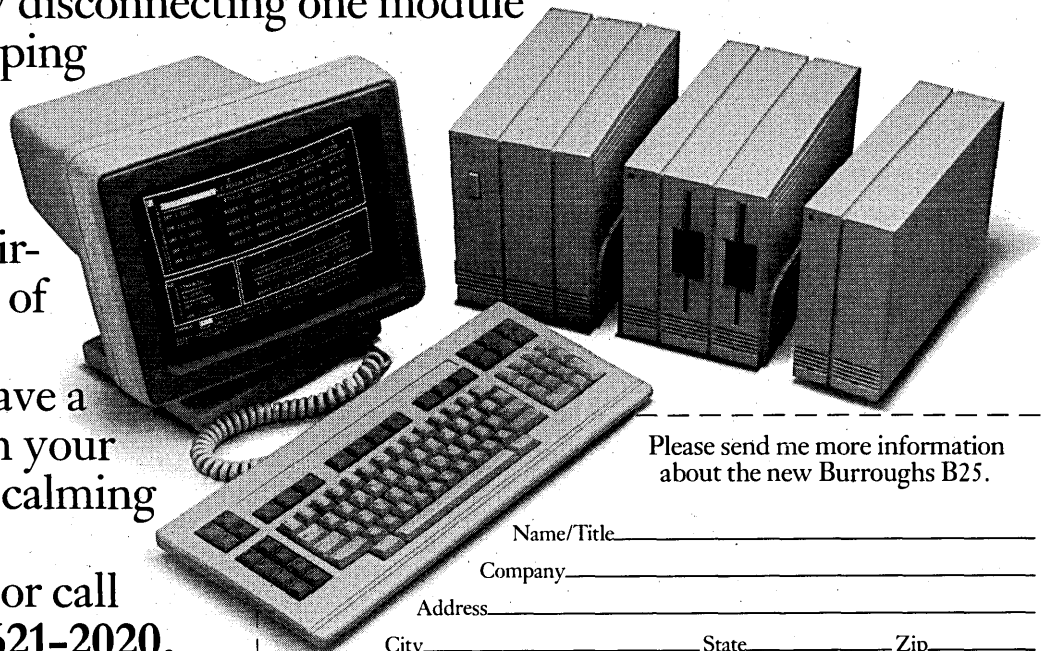
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## NEWS IN PERSPECTIVE

trying to compete with the smart card."

The regular smart card has considerable potential as an ID card, too. At Bull's head office, staff use the CP8 to gain access

**"It certainly won't be the banks that promote the smart card," says Philips' Selezneff.**

to offices and elevators and to pay for canteen meals. Nora argues that smart cards are no more expensive than other ID systems and are particularly appropriate where high

security is required and other functions are to be performed with it (such as accessing dp systems).

Bull is also doing business with hospitals and educational establishments in the U.S. It sees smart cards as a possible means of easing administrative workloads. Banker Maincent point out that Schlumberger Ltd., New York City, which produces a less sophisticated smart card than Bull's CP8, has arranged with Datacard Corp., also of Minneapolis, for the manufacture of a machine to "personalize" smart cards—which is to

say, to enter the personal identification number and other data peculiar to the bearer at the same time as embossing his name and other details on the outside.

"Datacard believes there is a big market for the smart card in the U.S. outside the banking sector," says Maincent.

As the U.S. prepares to enter the era of transactional videotex services providing home shopping and banking, Credit Commercial's public humiliation should be an added reminder of the critical importance of security. Although Americans were at first skeptical of this foreign technology, they could come to realize that the smart card may offer a solution to the thorny and expensive problem of check and credit card fraud. The hardest thing for French marketers, though, may be persuading the American public to accept just one little card, however smart, in exchange for the proliferation of multicolored plastic they now carry in their wallets. \*

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## IMPORTS/EXPORTS

# THE U.S. SHUNS IBI

**The Intergovernmental Bureau for Informatics will hold its transborder dataflow conference this month with little U.S. presence.**

by Willie Schatz

"We recognize the problem. We're as anxious as the third world to discuss it," says Joyce Rabens, assistant chief of the developed countries trade division at the U.S. State Department. She's discussing transborder dataflow, an issue that has become crucial to the management and further growth of multinational corporations.

While the U.S. and its trading partners in the so-called North seek a free flow of information and computing services across national boundaries, the South, or developing nations, seek control of their data borders to prevent what they claim is an ongoing exploitation of their resources, manipulation of their news media, and interference with citizens' personal lives.

"There's just no place where the developed and developing countries can talk," says Rabens.

Not exactly. There is the Intergovernmental Bureau for Informatics (IBI), a Rome-based organization that this month (from June 26 through 29) is sponsoring its

second world conference on transborder dataflow (TDF) policies. What better place for North and South to get together?

A great many places are better, says the U.S. In fact, even the United Nations would be preferable. That's why the U.S. seemed more amenable to the possible creation of a U.N. Commission on Transnational Corporations (UNCTC) ad hoc working group on TDF and transnationals. A similar proposal by the Group of 77 States, an organization of developing nations, was defeated last December by a coalition of developed countries.

The Group of 77 tried again, and lost again, at the UNCTC meeting in April, and, after extended debate, withdrew its proposal for an ad hoc group. The developed countries, led by West Germany, the United Kingdom, and the surprisingly negative U.S., complained that the proposal lacked focus and was too broad. A compromise was reached under which transnationals and TDF will be studied further and the establishment of an ad hoc group considered next year. So much for U.S. flexibility. Ironically, the subject of countries banding together to study TDF may well be discussed at the IBI meeting.

"No major providers of data are IBI members," Rabens says. That may come as news to France, which with Spain and Italy represents the developed members of IBI. The other nations are in various stages of development, and IBI is their forum.

"We're not impressed with the work IBI has done," Rabens explains. "They [IBI] haven't done in-depth studies. We don't like the way their policy leans."

That's probably because the organization slants directly toward the third world. Spun off from the 1962 UNESCO Conference on Informatics, IBI spent its first 15 years fulfilling its mandate of helping the developing world deal with multinational corporations (MNCs) and giving guidance

**"We're not impressed with the work IBI has done," says Rabens of the State Department.**

on what the developed world was doing in the information business.

Then Argentine professor Fermin Bernasconi became IBI's director general. The IBI quickly changed from passive to active, expanding its role into many other information areas, including TDF. Last year's SPIN II (Strategy and Policies for Informatics) in Havana attracted a large number of countries interested in improving their informatics status and vendors eager to help them do so.

The U.S., and IBM particularly, was conspicuous by its absence. If the U.S. shows up in Rome, it will probably keep a low profile.

"The IBI is less of a universal forum than the U.N.," Rabens says. "We have no intention of becoming members. If other developing countries joined, we would follow. But you can bet we won't be first."

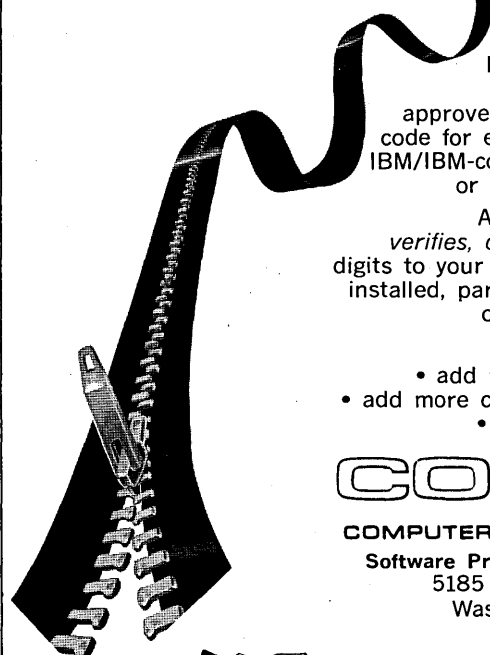
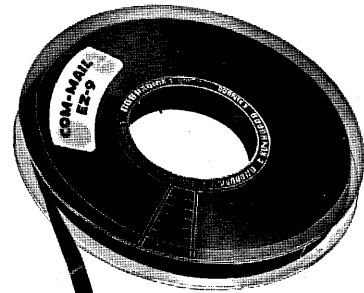
"The U.S. has always looked at IBI with a jaundiced eye," says Hugh Donaghue, Control Data's vice president of government programs and international trade relations and chairman of the State Department's advisory committee on international investment, technology, and development. "I don't know why. There were

a lot of private sector participants at SPIN II. They see IBI as a forum to learn what's going on in the third world and an opportunity to learn their informatics concerns and how that relates to the companies.

"I guess the government thinks there's no sense putting any more into a U.N. organization, since the U.S. has decided to withdraw from UNESCO. Then again, IBI's never solicited the U.S."

It doesn't appear as if heavy dating is imminent. Even a platonic relationship is asking a lot. IBI is determined to go its own

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## NEWS IN PERSPECTIVE

way with as little input as possible from big dp/TDF countries. The U.S. is equally resolved to have it its way as much as it can.

As king of the TDF hill, that position is easier for the U.S. to take than any other country. Existing Western TDF policy emanates from the Organization for Economic Cooperation and Development (OECD). Within OECD, the Committee for Informatics, Computers, and Communications Policy (CICCP) promulgates OECD privacy guidelines. OECD first proposed guidelines in 1980 to provide a unified approach to

assuming the protection of privacy of individuals across national borders. The U.S. didn't participate very heavily in developing the guidelines, and hasn't exactly killed itself since.

The guidelines provide minimum standards for multinational corporations that transmit data internationally. The idea is to keep as much money as possible within the host country's borders, not enrich the home base of the corporation. Third world countries are ecstatic over the potential of keeping to themselves what they see as

theirs to begin with. U.S. companies and the U.S. government are less than thrilled about the prospect, although more than 200 firms have endorsed the OECD personal protection guidelines.

"The OECD definition of TDF includes almost everything," says Ken Leeson, special advisor to Diana Lady Dougan, the State Department's coordinator for information and communications policy. "They're going a lot wider than we want to. In 1982 the U.S. proposed that the OECD Council of Ministers decide the direction OECD would take on TDF. We got no support from other members. But we do want to renew the mandate for the OECD Working Group on TDF.

"The thrust of our activity in developing countries is to develop private involvement in them. We think private enter-

**"The OECD definition of TDF includes almost everything," says Ken Leeson, special advisor to Diana Lady Dougan.**

prise, not government bureaucracy, is the best way to improve the information climate in developing countries."

The U.S. doesn't play as well as it talks, however. Behind all the rhetoric about the free flow of information across borders, the sanctity of corporate data, and the need for individuals' and companies' rights to privacy is the reality of stopping dataflow when and where it suits the government's political purposes.

"The U.S. doesn't have clean hands," contends Russ Pipe, publisher of *Transnational Data Report*, an international TDF journal based in Amsterdam. "Its government, for various reasons, interferes with the open flow of commercial and corporate information and the export of information technology products and services.

"The U.S. is trying to make information tradable, yet simultaneously argues it should be free. It now has begun to use information technology as a political and economic weapon. It screams and yells about free flow, but Carter asked Intelsat [the international satellite transmitter] to suspend transmission to Iran after they seized the embassy. We never cut Hitler off."

Intelsat told Carter to forget it. But that hasn't stopped the U.S. from trying, trying, trying again. To wit:

- When President Reagan ordered Dresser Industries to stop its French subsidiary from producing compressors for the Soviet pipeline, the company changed the access code to its Pittsburgh computer so French engineers couldn't access design data. The firm subsequently lost deals with Japanese and Australian firms.
- When Cuba asked for a certain number of satellite hours to transmit the Olympics

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**CIRCLE 27 ON READER CARD**

there, the State Department nixed ABC's deal with the country and imposed technical restrictions on the network that prevented it from transmitting via satellite.

- When a network was filming a documentary on life in Cuba, the State Department refused it permission to send the film by satellite to New York. The crew had to carry the film home.

- Worried that the Soviets had too much access to nonbibliographic information through the International Institute for Applied Systems Analysis (IIASA), a worldwide think tank in Austria, the administration withdrew its support, even though the data are available to thousands of people in the U.S. (including Soviet diplomats).

"There's no question we have been violative of TDF," CDC's Donaghue admits. "The reaction in Europe to the IIASA decision was pretty violent. The information isn't even created in the U.S., yet we cut off our support.

"When we do those kinds of things, it really bothers me. I have more troubles with the U.S. government than with foreign governments as far as TDF goes."

There could be more trouble right there in Capital City.

"The Dresser and Iran situations were part of national security," Rabens says. "You can't argue that governments shouldn't be allowed to invoke national security considerations and stop data accordingly. You may not always agree with when and how it's done, of course.

"There's no TDF action that we've taken that hasn't been under the national security rubric. They've all been legitimate. We're cleaner than any other country." That's what they all say. \*

# CRACKING DOWN ON SOFTWARE

**Defense Department plans to blockade illegal software exports to the Soviet bloc are angering vendors.**

by Willie Schatz

Call it the Washington version of Lola. Whatever the Department of Defense wants, it gets.

The newest item on DOD's want list is software. The department has made it perfectly clear that it will add commercially available software that has "potential military applications" (definition courtesy of DOD) to the list of high-tech exports it is

authorized to review. There are already controls on West-East trade and West-West trade in nuclear code and CAD/CAM software. DOD will extend these to the most basic West-West software exchanges.

"The U.S. and its allies have agreed for the last two years that we should be reviewing and licensing software," says Dr. Stephen Bryen, deputy assistant secretary of defense for international economic, trade, and security policy. "The French, especially, have been very concerned that intangible technology was not being dealt

with very well by Cocom (Coordinating Committee for Multilateral Export Controls, which oversees Western exports of high technology).

"The purpose is to narrow the areas with the highest leverage in terms of national security and military significance."

In theory, yes. In reality, no way, if even one of your company's products has survived the export maze and arrived overseas.

"It's just ridiculous," says Hugh Donaghue, vice president of government

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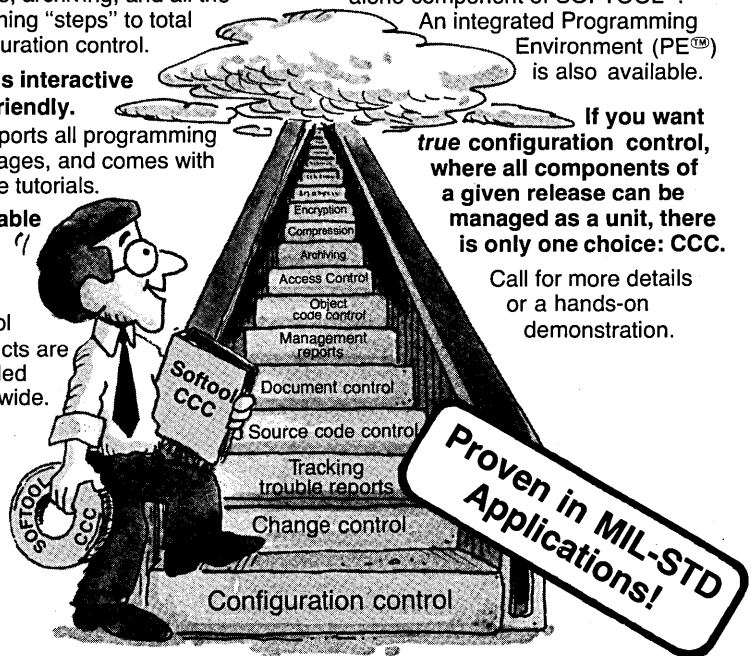
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CIRCLE 28 ON READER CARD

## NEWS IN PERSPECTIVE

### STRONG WORDS FOR DOC

It isn't often that IBM comes out punching, at least not on the public record and in such strong language.

"Additional administrative costs to U.S. companies and to the government will be completely out of proportion to any limited national security gain," the company stated in a 10-page letter criticizing proposed changes in the Department of Commerce's export distribution licensing procedures. "These costs and the antagonism created abroad by added extraterritorial controls will do much to destroy remaining U.S. competitiveness."

The department knew it was coming and had no one to blame but itself. When it proposed the changes to the licensing procedures required by vendors shipping computers abroad (see "Export Laws on the Line," March, p. 44), industry groups were given no chance to voice their opinions. Then, when the proposals hit the *Federal Register*, DOC offered all of two weeks for industry to comment. The ensuing howls were loud enough to force an extension of the comment period to two and a half months.

By April 6, DOC's Office of Export Administration had received 248 comments and finished with a .000 batting average.

"We believe your proposed changes do not properly balance enforcement interests on the one hand and the damage to U.S. exports and relations with friendly countries on the other," stated Edward G. Law, director of export regulation for IBM World Trade Corp. We are convinced such damage will be very severe, and that you will not have obtained a commensurate gain in your enforcement policy."

Meanwhile, Kasper Cassini, president of IBM Europe, answering a question at the opening of IBM's new European headquarters in Paris, called the proposals "misdirected" and said they would be "harmful to international trade."

"The existing regulations have worked satisfactorily for many years, and the few diversions that have taken place resulted from criminal actions that no regulations could prevent."

DOC's desire is to tighten considerably the licensing of computer and other technology exports. The proposals require individual shipments to be regulated while also calling for the licensing of reshipments—from an OEM to an end user, for instance. This has created a furor among European and U.S. vendors who would be hit

with an avalanche of new paperwork. The changes were proposed following several well-publicized interceptions by U.S. and European customs agents of computers being shipped illegally to Soviet bloc nations.

Meanwhile, the Europeans have kept up their pressure on the U.S. to relax the proposed changes. Following a strongly worded EEC letter sent to key senators and representatives in March, European commissioner for industry Viscount Etienne Davignon warned at an early April trade relations conference that the EEC was heading for "a major fight with the U.S. . . . which will make chicken feed of our agricultural disputes."

"With a \$70 billion trade deficit last year and an anticipated \$100 billion this year the administration should be extremely careful about additional unilateral controls, the need for which has not been established," IBM stated to DOC. "Very little evidence has been forthcoming that distribution license level products are being diverted in any quantity at all, let alone in sufficient quantity to justify such drastic, damaging changes as are proposed. We feel that these changes are unjustified and misdirected."

IBM supported its case by noting the retail availability in most Western countries of compact, low-level products and contending that unilateral controls will hand the business over to foreign competition. It also said that U.S. firms will be sorely discredited overseas and that governments would become even more skeptical than they are now about entering joint ventures with U.S. companies. The company also suggested several pointed changes to specific items in the DOC proposals.

"We foresee very severe business losses as well as significant administrative cost resulting from four of the proposed changes," IBM said. "Two additional changes will cause considerable business loss and could seriously hamper growth. Additional measures which do not add to existing regulations in respect to adversary communist countries but which do great harm to trade with friendly Western countries have to be questioned."

"Many of the requirements in the proposed rule will cause very severe export business losses without being at all effective in achieving their intended purpose. The proposed additional restrictions are not a balanced approach to the problems perceived. These proposals will significantly damage U.S. competitiveness and the U.S.

economy while contributing very little to any additional national security. We cannot believe such a result is intended by your department."

Neither can IBM's competitors, all of which echoed Big Blue's complaints and buttressed the industry position that this is a bad idea whose time should never come.

Some sample entries in the dump-on-DOC contest:

"We believe this proposal needlessly burdens U.S. industry with yet additional administrative costs and competitive disadvantages without achieving additional control over the diversion of sensitive products," Hewlett-Packard said. "This proposal is another in a series of Band-Aid approaches to a problem that has been continually described as a major hemorrhage."

"Sperry Corp. is deeply concerned over the Commerce Department's proposals to amend distribution license procedures. They adopt an approach which takes into account neither the exigencies of modern high-technology business nor the ingredients necessary to prevent the diversion of sensitive technology. Instead, they seek restrictiveness for its own sake and will succeed only in undermining the competitiveness of U.S. firms overseas."

"Independent foreign distributors and end users would reject U.S. suppliers because of the requirements for private and proprietary information (which in some cases will conflict with local data protection laws)," the Industry Coalition on Technology Transfer wrote, "and because of the inevitable delay and paperwork burden. It must be remembered that competitive products generally are available from non-U.S. sources without comparable restrictions."

DOC was uncertain when it would finish climbing the mountain of paper. It was equally unsure what it would do when it got to the top. The best guess is that it will propose new regulations, possibly—maybe even probably—reflecting industry's suggestions and criticisms. Then will come another comment period, after which the final regulations may be issued. Industry sources are resigned to some changes occurring. Their goal is to minimize them.

"Actually, after you get through all the smoke and the rhetoric, there are some very good, positive suggestions in all this," a DOC official says.

How well they'll be heeded is another story.

—Willie Schatz  
and Paul Tate

programs and international trade relations at Control Data. "When a computer manufacturer delivers a system abroad now, he lists the operating systems and other software. That's always been controlled. This looks as though DOD is attempting to throw

up the same net as it's done with hardware. What controls are they going to have, and how is it going to cost industry? Sophisticated software is being made in India, Singapore, and Pakistan. What they want is impossible."

"They've gone off the deep end," charges John McGuire, president of Software AG, Reston, Va. "They're being totally paranoid. They ought to leave us alone. Those of us who are conscientious don't sell to Communist countries anyway. We



don't. But we do 20% of our business overseas. This is a tremendous escalation that'll kill us. We've got 110 clients in Japan. How're you going to handle that, Mr. DOD?"

Quite simply, as long as you asked. Currently software is treated as "technical data." With a few exceptions, most exports to the free world don't need an individual validated license. All that's necessary is a letter of assurance from the overseas consignee that the software won't be reexported to Russia, Warsaw Pact countries, China, and a few other unsavory places. All software going to an Eastern bloc country requires a license.

According to DOC, there were 90,000 license applications in 1983, 9,000

**"The purpose is to narrow the areas with the highest leverage in terms of national security and military significance," says Bryen.**

of which concerned West-East shipments. DOD asked to see 3,000 of those but only 200 required an assistant secretary's review.

"Much of this equipment comes with its internal software prepared to be used," Lionel Olmer, DOC undersecretary for international trade, told the Senate Permanent Subcommittee on Investigation. The subcommittee is conducting an investigation to determine why the U.S. showed up at a Cocom negotiating session in December with DOC, DOD, and the State Department in total disagreement about U.S. export policy.

The new proposals, sure to be the subject of fierce debate and protracted negotiations at the Cocom meetings that opened last month, would require licenses for West-West trade. The few U.S. controls on such transactions are the most restrictive of any Cocom country.

"Right now our controls affect maybe 3% of all the software available in the world," says John Boidock, director of the Department of Commerce's (DOC) Office of Export Administration (OEA). "If these new proposals are accepted by Cocom, which we expect to happen, 10% of software would be affected. So we will get more license applications for software exports to the free world.

"This is hardly a quantum leap. We're remiss for not having done it sooner. This is not going to make it harder for industry to do business. We're going to control the absolute minimum."

They certainly are taking the minimum to the max. DOD wants limits on real-time software, including financial systems. Those might be convertible to computerized command and control systems that monitor military activities. Then again, the

DOD philosophy seems to be that any product can be converted to military applications until proved otherwise.

Even that Apple II+ on your desk. Next thing you know you'll get a call asking if DOD can borrow it for nuclear targeting practice.

Don't laugh. It's already happening. During recent testimony before the Senate Permanent Subcommittee on Investigations, assistant secretary of defense for international security policy Richard Perle cited "the extraordinary potential of small computers on the battlefield." Never mind potential. Perle regaled his audience with tales of the proficiency of the Apple II+ and the Grid Systems Corp. portable computer in targeting nuclear weapons. You can buy the associated equipment off the shelf. You'll have to get the Defense Nuclear Agency to modify the software.

And that's not all. Also on DOD's hit list are languages. Not esoteric computer languages, but C, Pascal, and Ada. Restricting Ada may make sense, because it is the official DOD-embedded computer language. (So what if it was developed in France?) In addition, operating systems, such as AT&T's Unix, are scheduled to be declared "technically sensitive."

"We're looking at Unix very carefully," Bryen admits. "I'm not sure about these other languages. I don't even understand them. But I know we're talking seriously about putting Unix on the Cocom list. Unix is particularly important in the VAX 11/780."

That Digital Equipment Corp. machine has made a great deal of news recently. A DEC shipment seized late last year by Swedish and German authorities yielded a

**"We're looking at Unix very carefully. It's particularly important in the VAX 11/780," Bryen says.**

VAX 11/782 accompanied by a software application that had been modified, possibly for military purposes, and had not yet been publicly released. Such modifications are what DOD has in mind when it talks about "dual use" software.

"There's so much emphasis on the VAX because it's the most heavily used computer in DOD," Bryen explains. "Its number-crunching capability and virtual memory capacity make it highly desirable for all sorts of applications. It's a major Soviet target because it's an ideal machine.

"There was a hell of a lot in that package that was seized. We think it's pretty significant. We haven't completed the assessment yet. But we know that the design information in there is particularly useful for making very large-scale integrated circuits. We consider that quite strategically important."

So what else is new? If it's not circuitry, then it's Pascal and C. And while DOD and DOC fiddle with Cocom, industry burns.

"They must think we're idiots," says a government programs director at one of the country's top five computer companies. "I don't see how DOD can be successful. As a practical matter there's no way it can work. There are all kinds of philosophical differences on what's militarily significant. Privately, people think it's a damn foolish foreign policy.

"Industry has absolutely no objec-

**"They must think we're idiots," says a government programs director at a major computer maker.**

tions to reasonable controls. We've already got them in West-East trade. What everybody's concerned about is West-West. In their frustration at being unable to stop the West-East flow, DOD is restricting West-West trade. It's absolutely horrifying."

And totally necessary, according to DOD. True, most of the attention has been focused on hardware diversion. That's something you can put your hands on. Software, especially what Bryen calls the "elegant help needed to make it work on a machine," is another story. It's intangible. It's a great deal harder to stop than hardware. By the time a diversion is discovered, it's history. As hardware gives way to software as the driving force in the industry, software will be scrutinized even more.

"I think we can realistically do this," Bryen says. "Software manufacturers are responsible and understand the rules. It's a difficult enforcement question, but in principle we should be able to do it. In America the amount of additional software controls won't even be noticed. There will be less controls because some things now caught will be defined out of the box, so to speak. Besides, industry knew about this. We've consulted them all along. I wouldn't know any other way to do it."

He may have found one. For most regulatory changes, DOD and DOC consult the Computer Systems Technical Advisory Committee (CSTAC). The group has subcommittees on hardware, software, and foreign availability. If they were approached by DOD and DOC on software, the discussions weren't directly on point.

"The only industry input on software was in an East-West context," CDC's Donaghue says. "There was discussion of real-time software, but only for East-West trade. They never brought up West-West restrictions. That's the tricky thing about these guys. What they're trying to do is absolutely unbelievable. They're living in a fantasy world."

It's all too real for industry. \*

## NEWS IN PERSPECTIVE

### BENCHMARKS

**SPARTACUS FEUD:** Spartacus Computers' founding chairman and recently installed president have left the company following a dispute between the two. George C. McQuilken, who founded the firm, and Carl Janzen, a former Burroughs and Nixdorf executive who joined five months ago, were both replaced by Dennis G. Sisco, a general partner in the firm's lead investors, Oak Investment Partners. "The problem Carl and I had was in focusing responsibility," McQuilken said. "There were some indistinct lines that can be a problem in a small company." The Bedford, Mass., company began shipments of its K102 processor, a VM-compatible 4300-class machine, in December, but they have so far lagged expectations.

**EXITS TRILOGY:** A flurry of resignations and reassignments shook Trilogy Ltd.'s management as the company tried to cope with technical problems and product delays. Vice chairman and cofounder Carlton Amdahl and computer development director James Dykstra resigned their posts, engineering vice president Richard Eppel was reassigned to become director of technology transfer, and two new executives were hired. Paul McEnroe, director of IBM's Raleigh Development Laboratory, replaces Eppel as engineering vice president, and David Anderson, formerly engineering vice president at Storage Technology Corp.'s Computer Research subsidiary, replaced Dykstra. Eppel, in his new post, will be responsible for acting as a liaison between Trilogy and its four technology transfer partners, Digital Equipment Corp., Sperry Corp., Control Data Corp., and CII-Honeywell Bull. Neither Amdahl nor Dykstra would say what their future plans are. Amdahl said that he had reached the decision to resign on his own over a period of several months and that the parting was amicable. He noted he had tired of the pace required in starting up the company with his father and the late Clifford Madden.

**OUTSIDERS:** Sperry Corp.'s Computer Systems operations has gone to the outside world to recruit corporate vice presidents in an effort to bring the company into closer touch with its user base and to create what is internally being called, "a new corporate culture." Myrddin L. Jones, the new vice president, commodity marketing, came from Commodore Business Machines Inc. where he was vice president of marketing. Gary S. Roberson, formerly vice president, marketing and sales for the business systems division of General Instrument, is vice president of public sector marketing for Sperry. Richard P. Hairsine, new vice president of financial industry marketing, was director of consulting services, finan-

cial institutions, with the New York CPA firm of Main Hurdman. Henry Adamany moved to Sperry from the brokerage firm of Ernst & Whinney where he served as the manufacturing industry consultant. At Sperry Computer Systems he is manufacturing industry vice president.

**BOOSTS DOS:** IBM announced a significant enhancement to the DOS/VSE operating system, giving users a 40MB virtual address space that they can split into three partitions. The enhanced operating system, called VSE/SP 2.1.0, also enables up to 31 model 4341 cpus to share disk storage. The package also supports networked IBM Personal Computers in the DOS environment. The VSE/SP 2.1.0 package costs \$48,500 for a basic license and \$43,650 under the Distributed System License Option. It will be available in April 1985. IBM first described the package to selected customers in March, but since then has kept quiet. "It's almost as if they don't want to sell it," said Peter Krass of Technology News of America, a New York IBM watcher. He added that it appears IBM is still trying to convince DOS users to shift to MVS and then MVS/XA, even though users believe that their 4300-class machines cannot benefit significantly from XA.

**APPLE GOES PORTABLE:** Apple Computer brought out the IIc, a portable model of its hugely popular IIe computer. The unit weighs 7½ pounds, less than the Macintosh and half the weight of the competing IBM PCjr. It will list for \$1,295. Apple also cut the price of the IIe in half, from \$1,795 to \$995. The IIc has 128KB of RAM, twice that of the IIe, and comes with a keyboard and video adapter, but no monitor. That costs \$200 extra. Apple said that it expects to sell the product primarily to home users, and secondarily to traveling business users. All software currently available for the IIe will run on the IIc, the Cupertino, Calif., firm said. Apple planned to spend \$15 million to promote the machine, including a daylong fete in San Francisco. President John Sculley said that the IIc is "just as important as the Macintosh" to Apple, and that the pair of products will carry Apple through the remainder of the decade.

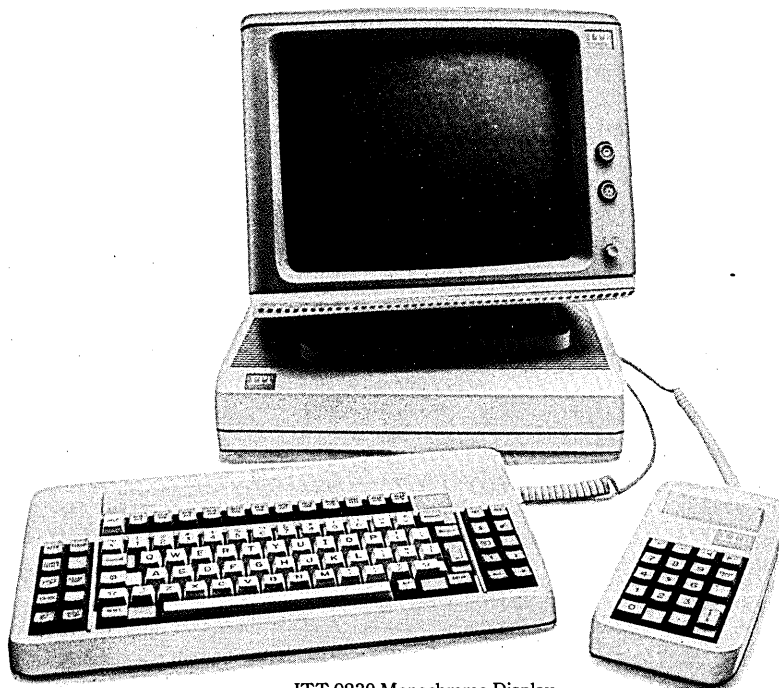
**NEW CYBER SERIES:** Control Data Corp. has all but retired the Cyber 170 line of mainframes with the introduction of the Cyber 180 line. The new line includes six processors, ranging from the model 810, 4341-class supermini to the 30 MIPS model 990. Three of the systems, the 835, 845, and 855, are identical to their counterparts in the 170 line. The model 830 replaces the Cyber 170,815 and 825 models, while the 990 and 810 represent new high and low ends to the line. All models use either the

new NOS/VSE operating system or the 170's NOS operating system. NOS/VSE gives CDC users virtual storage capability for the first time. Control Data also introduced a new database management package, written by Battelle Memorial Institute, and a Unix emulation, written by Human Computing Resources. CDC vice president of computer systems Larry E. Jodsaas said that the new software will enable the Minneapolis giant to expand its admittedly weak market share. Prices for the hardware range from \$250,000 for a typical model 810 to \$6 million for a fully configured 990. The 810 and 830 will be available by August, and the 990 will be delivered in 1985.

**CANCELS FLORIDA SITES:** IBM decided that Florida's unitary tax was not to its liking and canceled plans to expand the Boca Raton facility where its Personal Computer is assembled. IBM also decided not to lease additional facilities in Delray Beach and will sell a 1,986 acre site in Alachua. IBM paid Florida \$5 million in tax in 1982, which was expected to double to \$10.1 million in 1983. IBM said that three quarters of the increase was due to the unitary tax system, which it said "is a disincentive to new multinational business as well as established multinational operations." IBM said it would look for land in states without unitary tax systems for future land expansions. IBM employs 10,000 workers in Florida and does not plan to change any existing operations there, it said.

**PRESSURING IBM:** In an attempt to move IBM closer to a settlement of the 1980 antitrust suit charging the industry leader with abuse of its dominant market position, the European Economic Commission in Brussels sprouted leaks to the press in late April. Unidentified EEC officials said closed-door settlement talks had failed, despite proposals made by IBM in recent months, and that a judgment against IBM was likely to take place this summer. IBM said the talks continued, however. If a judgment is made, it would probably call for IBM to disclose peripheral interface specifications for new mainframes within a month after the products are introduced in Europe. Such disclosure, IBM has claimed, would do great damage because many non-European manufacturers, including the Japanese, would take advantage. How much damage may be done to IBM depends on how the final EED decision is worded. Reportedly, the decision could call for release of specs on all current and future machines; even though the suit was filed with 1970s-vintage 370 systems in mind. The suit was filed after eight years of inquiry, during which arguments were heard from U.S.-based PCM competitors including Amdahl Corp. and Memorex Corp. \*

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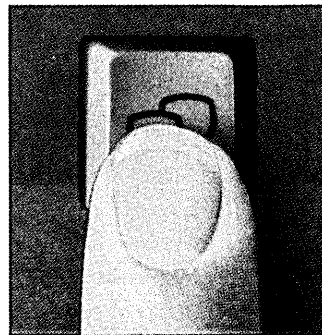
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The 9230 lets you change applications with one keystroke.

or 24-program function keypads.

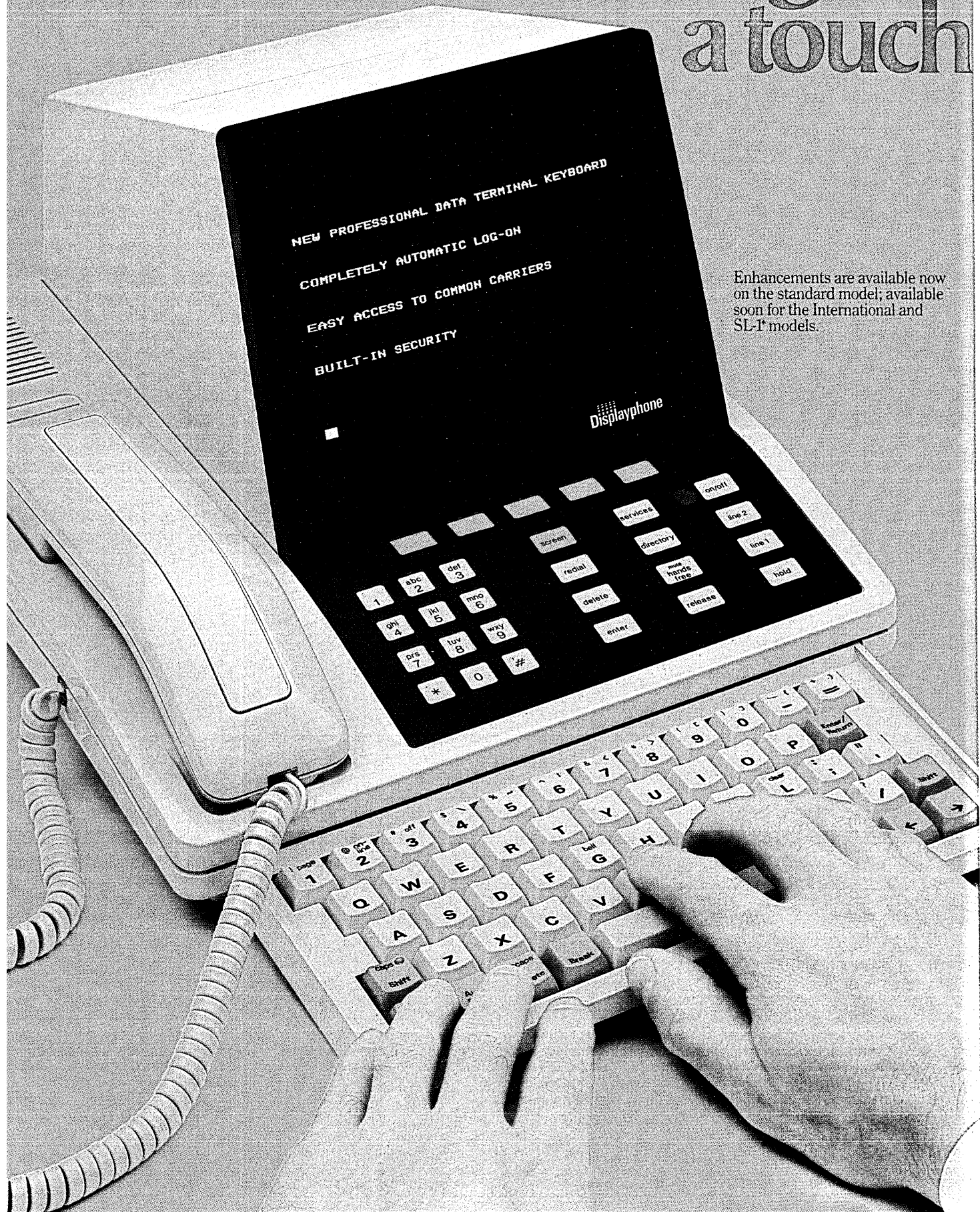
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# FATHOMING THE INDUSTRY

by Pamela Archbold

The data processing industry burst through the surface of the recession, with revenues up and earnings advancing swimmingly in 1983. Total revenues for the DATAMATION 100 companies increased 18% to \$91.3 billion. As for profits, the economic recovery also brought a brighter glow to the ledgers—only two dozen companies showed earnings declines in 1983, compared to double that number for the prior year. The improvement in bottom lines came as a result of cost-cutting as well as increased sales.

The industry learned during the recession that lean was as important as mean. Few companies allowed employment to grow significantly, and few companies increased research and development expenses lavishly. Another lesson can be seen in the growth in the number and size of niche companies supplying a few high-volume components or focusing on large end-user markets. Some of the largest percentage performance increases in DATAMATION 100 companies were posted by the niche players.

To qualify for the DATAMATION 100 a company needed data processing revenues of at least \$94.5 million, up 27% from the prior year's minimum of \$74.3 million (see Methodology, p. 57). The largest company, of course, is IBM, with \$35.6 billion in dp revenues, showing a renewed growth rate and displaying the aggres-

ILLUSTRATION BY PENDER GOEMER



Pender Goemert 8/84

# Revenues and profits rebounded after the recession, but a shakeout looms.

siveness of a company a fraction its size. Again in second place is Digital Equipment with \$4.8 billion in dp revenues.

A number of companies made their first appearance in the DATAMATION 100 in 1983. Included in this group are PBX and terminal maker Mitel, at number 49. Intel, known primarily as a chip maker, has developed a budding dp business, and made it to the list at number 66. Cullinet profited from the increased need for micro-to-mainframe links and entered the Datamation 100 at number 94. Other new entrants include Canada Systems Group, number 92; Docutel/Olivetti, number 96; and Mead Corp., number 100. Compaq, the portable personal computer maker, had the most startling growth of any dp company last year, starting 1983 with no revenues and ending up the year with sales of \$111.2 million; this record brought Compaq into the Top 100 at number 91.

Leaving the ranks of the leading dp companies were General Automation, Modular Computer, Anacomp, and Comshare. Lanier also leaves, as it was merged with Harris Corp. Tymshare's merger with McDonnell Douglas took place in 1984, so it's still included in 1983's rankings.

The results of the ninth annual DATAMATION survey of the domestic dp industry show a much healthier business than was the case in 1982, when 40 companies reported an earnings decline. In 1983 the number of companies with earnings declines shrank to 23, and many of these companies were conglomerates whose dp units fared fine while other business segments suffered. Among the members of this group are Allied Corp., General Electric, General Instrument, Gould, Schlumberger, and Signal Cos. Other companies, such as Apple, however, foundered on their dp efforts alone.

One sector of the hardware business suffered a public ordeal last year. Microcomputers cut into the sales of minicomputers, and price competition and widely publicized internal problems hurt Prime and DEC, as both were under earnings pressure. Other companies having difficulties included NBI, Paradyne, Management Assistance, Tektronix, and General Instrument. Everything from the collapse of the video game business to increased competitive pressure from IBM to government investigations affected this group. Check the profiles following this article for the gory details.

The number of companies reporting losses was high during 1982 but declined last year. During 1982 seven companies were in the red but in 1983 only five DATAMATION 100 companies lost money. AT&T, of course, was the big loser with its \$5 billion write-off for obsolete hardware as it entered the computer industry in a big way. StorageTek was also

FIG. 1

## MAINFRAME REVENUES

(\$ MILLIONS)

RANK	COMPANY	1983 REVENUES (\$ MILLIONS)	1982 REVENUES (\$ MILLIONS)	% CHANGE
1	IBM	11,443.6	10,661.8	7.3
2	Burroughs Corp.	2,000.0	2,000.0	NM
3	Honeywell Inc.	1,020.1	1,060.0	-3.7
4	NCR Corp.	1,000.0	1,100.0	-9.0
5	Control Data Corp.	775.0	705.0	9.9
6	Sperry Corp.	700.0	728.8	-3.9
7	Amdahl Corp.	570.7	412.0	38.5
8	National Semiconductor	200.5	175.0	14.5
9	Cray Research Inc.	169.7	141.1	20.2

AVERAGE: 8.20

NM: not meaningful

FIG. 2

## MINI REVENUES

RANK	COMPANY	1983 REVENUES (\$ MILLIONS)	1982 REVENUES (\$ MILLIONS)	% CHANGE
1	Digital Equipment Corp.	2,700.0	2,500.0	8.0
2	IBM	2,627.0	2,945.0	-10.7
3	Burroughs Corp.	950.0	900.0	5.5
4	Wang Laboratories Inc.	892.9	660.0	35.2
5	Hewlett-Packard Co.	736.3	655.0	12.4
6	Data General Corp.	705.0	670.0	5.2
7	Prime Computer Inc.	416.5	351.0	18.6
8	Tandem Computers Inc.	400.0	295.0	35.5
9	Gould Inc.	334.0	325.0	2.7
10	Honeywell Inc.	330.0	330.0	NM
11	Texas Instruments Inc.	310.0	300.0	3.3
12	Perkin-Elmer Corp.	225.0	205.2	9.6
13	Management Assistance	211.5	201.5	4.9
14	NCR Corp.	210.0	120.0	75.0
15	Mohawk Data Sciences Corp.	168.0	149.0	12.7

AVERAGE: 14.53

NM: not meaningful

pushed into the red by a big product write-off. In the doldrums for both years were Centronics and Tymshare. Docutel/Olivetti was in the red due to difficulties in its 1981 merger and weaknesses in its office automation product line.

## RISE OF THE MICRO

No advance has changed the industry more than the microcomputer. This revolution continued during 1983 with the micro manufac-

Indeed, the rise of the microcomputer has been a two-edged sword for the \$92 billion-plus industry.

turers surging ahead in the Top 100 rankings. Apple Computer posted calendar 1983 revenues of \$1.08 billion, and reached number 11. Following closely behind were Tandy, with dp revenues of \$945 million, at number 13, and Commodore, at number 14, with revenues of \$926 million.

The growth of these companies and the other vendors with important micro lines effectively pushed the mini makers down on the DATAMATION 100 list.

The micro influence was felt throughout the entire industry because a new breed of company has evolved in the dp business, the



FIG. 3

**MICRO REVENUES**

RANK	COMPANY	1983 REVENUES (\$ MILLIONS)	1982 REVENUES (\$ MILLIONS)	% CHANGE
1	IBM	2,600.0	500.0	420.0
2	Apple Computer Inc.	1,084.7	664.0	63.3
3	Commodore	926.7	367.8	151.9
4	Tandy Corp.	598.0	466.2	28.2
5	Hewlett-Packard Co.	399.4	258.0	54.8
6	Digital Equipment Corp.	300.0	200.0	50.0
7	Texas Instruments Inc.	150.0	233.0	-35.6
8	Compaq Computer Corp.	111.2	NA	NM
9	Wang Laboratories Inc.	100.0	NA	NM
10	NCR Corp.	83.2	NA	NM

**AVERAGE: 73.3**

NM: not meaningful NA: not available

FIG. 4

**OFFICE SYSTEMS REVENUES**

RANK	COMPANY	1983 REVS (\$ MILLIONS)	1982 REVS (\$ MILLIONS)	% CHANGE
1	IBM	1,600.0	2,000.0	-20.0
2	Wang Laboratories Inc.	800.0	661.5	20.9
3	Motorola Inc.	287.8	274.9	4.6
4	Harris Corp.	275.0	241.2	14.0
5	Burroughs Corp.	250.0	200.0	25.0
6	Xerox Corp.	230.0	160.0	43.7
7	Digital Equipment Corp.	200.0	100.0	100.0
8	Exxon Office Systems Inc.	200.0	165.0	21.2
9	CPT Corp.	192.1	158.5	21.1
10	Philips Info. Systems	175.0	176.0	-0.5
11	NBI Inc.	140.8	119.5	17.8
12	NCR Corp.	85.0	53.4	59.1

**AVERAGE: 21.3**

FIG. 5

**DP EMPLOYMENT****THOSE WHO STAFFED UP**

RANK	COMPANY	1983 DP EMPL	1982 DP EMPL	% CHANGE
1	Compaq Computer Corp.	614	96	539.5
2	Seagate Technology	2,100	339	519.4
3	Convergent Technologies	1,000	450	122.2
4	Televideo Systems Inc.	867	491	76.5
5	Micom Systems Inc.	1,559	915	70.3
6	NEC Info. Systems	650	400	62.5
7	Verbatim Corp.	2,840	1,790	58.6
8	NBI Inc.	1,665	1,096	51.9
9	Cullinet Software Sys.	1,050	706	48.7
10	Mead Corp.	1,040	700	48.5

micro component supplier. Niche companies like Tandon, SCI, and Seagate specialize in one product, such as disk drives, and are able to achieve fast growth because of low production costs and the astounding demand for personal computing power. During 1983 these niche players were among the fastest growing firms (see Fig. 7, p. 56).

It can be said that IBM is a primary factor behind the growth of niche companies. When it found itself without a personal computer in 1981, Big Blue decided to get one in a hurry by taking off-the-shelf parts and hiring outside contractors like SCI for subassembly. IBM took a shortcut from its normal demanding route of vertical integration to take advantage of the market window. SCI is a prime example of a niche company making good. During 1981 it achieved \$15 million in dp sales, but by 1983 dp revenues had increased to \$225 million.

The IBM decision to outsource subassembly of a product line to make a faster entry into the desktop market was quickly expanded upon by the rest of the dp industry. Vendors caught short without a microcomputer or intelligent workstation product arrived en masse in Silicon Valley, looking for a supplier to private label a desktop system for them.

A prime beneficiary was Convergent Technologies. Seeing the success of Burroughs with its use of Convergent Technologies' workstation—about 46% of CT's \$164 million in revenues was from Burroughs—other mainframers and older dp vendors opted for using outside systems suppliers. Convergent added a number of new customers, as companies like TRW, Basic Four, Raytheon, Mohawk Data, AT&T, Prime, and NCR signed purchase orders.

While niches are becoming fashionable in manufacturing, one of the earliest dp niches faces extinction. Nothing seems to help the remote services industry maintain the torrid growth and earnings momentum of the past. It's no secret that the remote computer services industry has been heavily hit by microcomputers. This is evident in the DATAMATION 100 rankings. General Electric reports that its GEISCO division was off 8%, causing GE to decline from the number 13 spot to number 18. Computer Sciences dropped from 18 to 23, while EDS slipped from 21 to 24. Boeing was the only remote services company that was able to move up, going from number 55 in 1982 to number 48 in 1983. As mentioned above, both Anacom and Comshare declined in revenues and fell off the list.

The mainframe software companies, however, were booming, in part due to the rising demand from microcomputer owners. Management Science America moved up in

## The microcomputer software companies exhibited strength, but did not keep pace with the micro hardware manufacturers.

the rankings due to the strength of its Peachtree Software Division. Cullinet joined the DATAMATION 100 for the first time.

While the micro software companies exhibited strength, they did not keep pace with the volume and revenue growth of the microcomputer hardware manufacturers and component suppliers. The revenues of Lotus, Microsoft, and VisiCorp were in the \$50 million range last year, which was only half the revenue of the company ranked lowest in the DATAMATION 100. The achievement of Lotus in selling \$50 million worth of its 1-2-3 integrated software package pales beside the \$111.2 million that Compaq racked up with its IBM-compatible portable. The widely predicted shakeout and consolidation of the micro software industry will undoubtedly put Lotus and other companies into the DATAMATION 100 next year.

### MERGERS IN 1983

Consolidation in the rest of the industry continued as the pace of mergers and acquisitions quickened in 1983. The biggest merger was the \$275 million that Harris paid for Lanier. Martin Marietta Data Systems expanded its product line by buying Mathematica and its RAMIS database management system. McDonnell Douglas made two smaller acquisitions and early in 1984 succeeded in buying Tymshare.

A number of companies bought pieces of other companies: AT&T, for instance, purchased 25% of Olivetti. The big surprise of the year, however, was IBM's purchase of 20% blocks of stock in Intel and later Rolm, after its quickie relationship with Mitel. For a company that adhered to the not-invented-here syndrome, IBM's moves to buy into other companies to ensure itself of technology and expand its product line was a remarkable event.

For Intel, the IBM investment helped finance additional chip production, much of which would be sold to IBM. After many years of marketing a modest office PBX, IBM's interest in fleshing out its office automation product line led to Mitel first, but IBM abandoned the Canadian-based company when development problems slowed the introduction of Mitel's voice and data switch.

A number of companies sold operations during the year. Dysan was the biggest seller, picking up \$41 million when it sold half of its holdings in Seagate Technologies. A host of other micro companies actually went bankrupt or came close. While executives at Fortune Systems, Victor Technologies, and Vector Graphic all had aspirations of entering the Top 100 as 1983 dawned, by year-end their biggest dream was keeping their firms operating.

Concern about keeping costs under

FIG. 6

### DP EMPLOYMENT

#### THE 10 WHO CUT THE MOST

RANK	COMPANY	1983 EMPL	1982 EMPL	% CHANGE
1	Tandon Corp.	1,700	2,500	-32.0
2	Harris Corp.	22,000	26,000	-15.3
3	Centronics Data	1,700	2,000	-15.0
4	Tektronix	20,605	22,924	-10.1
5	Planning Research	5,600	6,200	-9.6
6	National Data Corp.	2,253	2,458	-8.3
7	Tymshare	3,302	3,600	-8.2
8	Floating Point Systems	1,319	1,390	-5.1
9	McDonnell Douglas	7,177	7,500	-4.3
10	Diebold	5,824	6,051	-3.7

FIG. 7

### THE WINNERS

RANK	COMPANY	1983 DP REVENUES (\$ MILLIONS)	1982 DP REVENUES (\$ MILLIONS)	% CHANGE
1	Compaq Computer Corp.	111.2	NA	NM
2	Seagate Technology	221.0	57.0	287.7
3	SCI Systems Inc.	225.0	80.0	181.2
4	Commodore	926.7	367.8	151.9
5	Tandon Corp.	343.9	177.1	94.1
6	Harris Corp.	580.0	332.5	74.4
7	Televideo Systems Inc.	168.7	98.5	71.2
8	Cullinet Software Systems Inc.	108.0	63.6	69.8
9	Convergent Technologies	163.5	96.5	69.4
10	Amdahl Corp.	777.7	462.2	68.2

NA: not available  
NM: not meaningful

FIG. 8

### THE LOSERS

RANK	COMPANY	1983 DP REVENUES (\$ MILLIONS)	1982 DP REVENUES (\$ MILLIONS)	% CHANGE
1	Storage Technology	886.6	1,079.2	-17.8
2	Signal Co.	160.0	177.3	-9.7
3	Texas Instruments Inc.	850.0	900.0	-5.5
4	General Electric	820.0	862.0	-4.8
5	Planning Research	135.6	138.4	-2.0
6	Philips Info. Systems	200.0	203.0	-1.4
7	Honeywell Inc.	1,666.1	1,684.7	-1.1
8	Sperry Corp.	2,799.6	2,802.9	-0.1

## METHODOLOGY

Throughout the year, DATAMATION tracks over 175 companies on a worldwide basis. Our survey is meant to be used as a comparative analysis, and therefore all revenues and earnings figures have been adjusted to calendar year calculations. Because over half of the companies covered operate on a fiscal year that does not coincide with the calendar year, their revenues and earnings for purposes of this survey have been derived from quarterly reports. Numbers relating to R&D expenditures and total number of employees, however, are reported as of each company's fiscal year-end.

During 1983, a number of Top 100 companies restated their performance figures, whether to reflect changed accounting methods, mergers, spinoffs, or just plain errors in earlier reports. While each chart and table within the survey incorporates the restated numbers, we do not alter the prior year's ranking for the companies concerned even though in some cases the restatements would have moved a company up or down a few notches.

Also, please note that a company's internal sales, or sales made to other divi-

sions or units within the company, are excluded from the year's total dp revenues, as they are considered captive and not commercial sales.

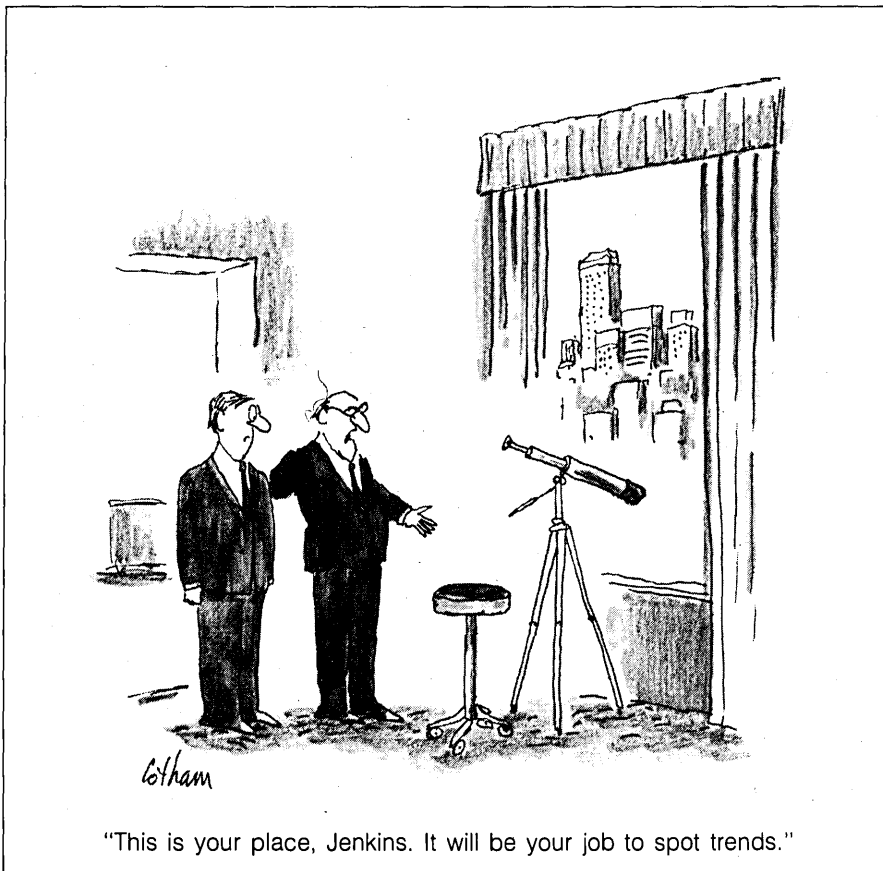
For purposes of the survey, dp-related revenue is defined as general purpose dp products and services generated by one or more of the following categories of equipment: mainframes, minicomputers, microcomputers, office systems, data communications, peripherals and terminals, software and services, and maintenance and repair. Explicitly excluded are data transmission or "basic" services revenues from specialized common carriers; standalone electronic and mag card typewriters and standalone electronic cash registers; instrumentation; semiconductors; printed circuit boards; automatic test equipment; and dp supplies, with the exception of magnetic media for disk and tape drives. All peripherals that attach to a system are included. For computer-based manufacturing systems, such as computer-controlled machine tools, only the computer and hard-copy output devices are included and not the machine tool itself.

control put more pressure than expected during a recovery on the research and development budgets at many dp vendors. The biggest single project cutback was based on technological prudence, not bean counter insistence. IBM canceled its long-standing research into Josephson junctions. Wall Street analysts estimate that IBM spent up to \$150 million on this project, but since IBM is so huge, this expense didn't cause a blip on its profit and loss statement. That wasn't the case at DEC and StorageTek, where canceling projects also canceled some earnings. At Storage Tek, the cancellation of its CMOS mainframe cost the company about \$65 million, but the investors looking for a tax shelter ended up with a wipeout. This cancellation may eventually cost a lot more because the research partners have instituted a lawsuit against StorageTek.

One particularly thorny issue in their suit is the fact that StorageTek told them that all was well just a few short weeks before it canceled the project. Meanwhile, on the other coast, DEC caused a fury among its users by dropping its research on the Jupiter project to upgrade the DECsystem 10 and 20 mainframes. This change of mind cost DEC an estimated \$50 million.

The future looks ominous to many hardware vendors, in part because of high interest rates, but mostly because of the entry of American Telephone and Telegraph into the marketplace with competitive minicomputers and a strong software head start with its Unix operating system. Confusion over whether Unix will become a de facto standard in multi-user environments, and IBM's reaction to that possibility, led many dp managers to wonder about the future of their corporations' expenditures for MS/DOS-driven personal computers.

In last year's overview for the 1982 DATAMATION 100, we suggested that the data processing industry's challenge would be to react nimbly to quickly changing conditions. The industry did indeed face an enormous amount of turmoil, and seemed to heed our advice, as profitability improved greatly. In the coming year, the most successful companies should be those that meet the burgeoning demand for enduser computing and resolve the standards dilemmas. \*



CARTOON BY FRANK COTHAM

Reprints of the DATAMATION 100 survey, including individual company profiles, are available in quantities of 100 or more. Details may be obtained by telephoning Mary Ann Hariton, (212) 605-9729 or by writing to DATAMATION, 875 Third Ave., New York, NY 10022.

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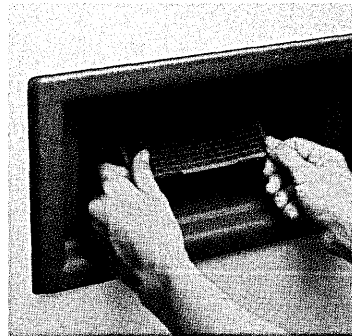
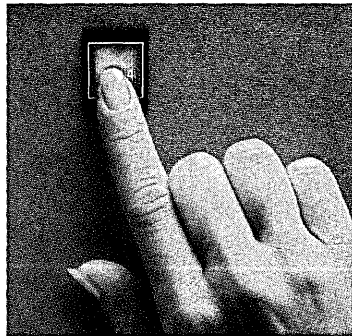
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COM DIVISION

# THE DATAMATION 100

## THE LEADING U.S. DP COMPANIES

1983 RANK	1982 RANK	COMPANY	1983 TOTAL REVENUE	1983 DP REVENUE	1982 DP REVENUE	DP REV % GROWTH	DP REV AS % OF TOTAL
1	1	International Business Machines	\$40,180.0	\$35,603.0	\$29,265.0*	21.6%	88.6%
2	2	Digital Equipment Corp.	4,826.9	4,826.9	4,018.8	20.1	100.0
3	3	Burroughs Corp.	4,389.7	4,000.0	3,848.0	3.9	91.1
4	4	Control Data Corp.	4,580.0	3,500.0	3,301.0	6.0	76.4
5	5	NCR Corp.	3,731.0	3,333.2	3,149.1*	5.8	89.3
6	6	Sperry Corp.	4,745.3	2,799.6	2,802.9*	-0.1	58.9
7	7	Hewlett-Packard Co.	4,858.0	2,496.0	2,218.0*	12.5	51.3
8	9	Wang Laboratories Inc.	1,792.9	1,792.9	1,321.5	35.6	100.0
9	8	Honeywell Inc.	5,753.1	1,666.1	1,684.7	-1.1	28.9
10	10	Xerox Corp.	8,463.5	1,200.0	1,000.0*	20.0	14.1
11	19	Apple Computer Inc.	1,084.7	1,084.7	664.0	63.3	100.0
12	14	TRW Inc.	5,493.0	1,015.0	825.0	23.0	18.4
13	16	Tandy Corp.	2,703.8	945.0	725.0	30.3	34.9
14	29	Commodore International Ltd.	1,042.3	926.7	367.8	151.9	88.9
15	11	Storage Technology Corp.	886.6	886.6	1,079.2	-17.8	100.0
16	15	Data General Corp.	867.1	867.1	803.8	7.8	100.0
17	12	Texas Instruments Inc.	4,580.0	850.0	900.0*	-5.5	18.5
18	13	General Electric Co.	26,797.0	820.0	862.0	-4.8	3.0
19	17	Automatic Data Processing Inc.	816.5	816.5	704.0	15.9	100.0
20		American Telephone & Telegraph	69,403.2	807.1	802.2	0.6	1.1
21	53	Northern Telecom Inc.	2,610.2	807.0	754.8*	6.9	42.4
22	26	Amdahl Corp.	777.7	777.7	462.2	68.2	100.0
23	18	Computer Sciences Corp.	718.9	718.9	683.4	5.1	100.0
24	21	Electronic Data Systems	718.8	718.8	555.6	29.3	100.0
25	20	ITT Corp.	20,200.0	600.0	525.0*	14.2	2.9
26	34	Harris Corp.	1,642.2	580.0	332.5*	74.4	35.3
27	27	Rolm Corp.	549.3	549.3	447.7	22.6	100.0
28	22	Datapoint Corp.	547.8	547.8	512.9*	6.8	100.0
29	24	McDonnell Douglas Corp.	8,000.1	542.5	476.4	13.8	6.7
30	25	Comdisco Inc.	538.0	538.0	491.4*	9.4	100.0
31	28	Prime Computer Inc.	516.5	516.5	435.8*	18.5	100.0
32	23	Motorola Inc.	4,328.0	514.0	484.9	6.0	11.8
33	33	Tandem Computers Inc.	450.5	450.5	335.3*	34.3	100.0
34	30	National Semiconductor	1,385.0	425.5	365.0	16.5	30.7
35	35	Computervision Corp.	400.4	400.4	325.2	23.1	100.0
36	31	Management Assistance Inc.	388.2	388.2	354.2	9.5	100.0
37	37	Racal Data Communications Inc.	387.0	387.0	300.0	29.0	100.0
38	32	Mohawk Data Sciences Corp.	400.0	382.0	349.0*	9.4	95.5
39	41	C. Itoh Electronics Inc.	440.3	360.3	290.6	23.9	81.8
40	54	Tandon Corp.	343.9	343.9	177.1	94.1	100.0
41	39	Dataproducts Corp.	343.5	343.5	311.4*	10.3	100.0
42	36	Gould Inc.	1,324.8	334.0	325.0	2.7	25.2
43	37	Tektronix Inc.	1,208.8	300.0	300.0	NM	24.8
44	40	Tymshare Inc.	288.6	288.6	271.6*	6.2	100.0
45	42	Raytheon Corp.	5,937.3	285.0	283.0	0.7	5.0
46	44	3M	7,039.0	260.0	225.0	15.5	3.6
47	63	Intergraph Corp.	252.0	252.0	155.6	61.9	100.0
48	55	Boeing Co.	11,129.0	250.0	171.0	46.1	2.2
49		Mitel Corp.	241.0	241.0	181.7	32.6	100.0
50	61	NEC Information Systems Inc.	230.0	230.0	160.0	43.7	100.0

Ranking is by dp revenue in millions of dollars.

\*Restated figure

NA: not available

NM: not meaningful

1983 EMPL	1982 EMPL	DP REV PER EMP (DOLLARS)	R & D		NET INCOME	RETURN ON ASSETS	% DP REV FROM FOREIGN SOURCES	FISCAL YEAR END
			1983 (\$ MILLIONS)	% OF TOT REV				
369,545	364,796	96.3	3,582	8.9	5,485.0	14.7	38.0	Dec.
78,500	68,000	61.4	544	11.2	262.1	5.7	36.0	June
64,000	62,000	62.5	248	5.6	196.9	4.7	NA	Dec.
55,858	56,000	62.6	270	5.9	161.7	1.8	33.0	Dec.
62,000	63,000	53.7	257	6.9	287.7	8.5	46.0	Dec.
43,738	42,356	64.0	296	6.2	176.7	3.3	33.0	March
72,000	68,538	34.6	494	10.1	432.0	10.3	41.3	Oct.
NA	19,700	NA	117	6.5	179.0	10.6	33.0	June
94,062	93,514	17.7	428	7.4	231.2	4.9	26.0	Dec.
107,100	109,940	11.2	555	6.5	466.4	5.0	NA	Dec.
4,582	3,400	236.7	71	6.5	59.0	10.6	25.0	June
88,374	85,099	11.4	133	2.4	205.2	6.1	24.0	Dec.
32,000	31,000	29.5	NA	NA	278.5	10.5	17.0	June
NA	4,100	NA	37	3.5	65.8	NA	35.0	June
NA	NA	NA	NA	NA	-40.9	-31.5	20.0	Dec.
15,400	14,765	56.3	84	9.7	29.0	3.4	34.0	Sept.
80,696	80,007	10.5	301	6.5	145.4	5.3	NA	Dec.
340,000	367,000	2.4	NA	NA	1,817.0	7.8	NA	Dec.
15,500	15,000	52.6	29	3.6	68.7	9.7	NA	June
NA	NA	NA	NA	NA	-4,874.7	NA	NA	Dec.
39,318	34,449	10.0	256.6	10.0	212.0	10.7	NM	Dec.
6,600	6,000	117.8	101	13.0	46.5	8.2	NA	Dec.
13,200	13,700	54.4	NM	NA	15.9	4.4	NA	April
13,500	13,148	53.2	NM	NA	67.4	16.6	2.0	June
278,000	283,000	2.1	1,024	5.0	674.5	4.9	NA	Dec.
22,000	26,000	26.3	90	5.5	63.7	4.6	30.0	June
7,604	6,020	72.2	41	7.5	34.1	4.2	NA	July
8,914	8,822	61.4	47	8.6	13.0	2.2	NA	July
7,177	7,500	75.5	NM	NA	274.9	5.7	14.2	Dec.
450	350	1,195.5	NM	NA	49.0	5.0	NA	Sept.
6,000	6,000	86.0	51	9.8	32.5	8.6	NA	Dec.
88,800	78,800	5.7	336	7.7	244.0	7.5	NA	Dec.
NA	3,600	NA	39	8.7	33.7	13.9	NA	Sept.
40,000	38,267	10.6	114	8.2	24.2	2.8	NA	May
5,000	4,130	80.0	43	10.9	35.3	10.1	NA	Dec.
6,049	5,800	64.1	18	4.6	1.0	0.4	44.2	Sept.
4,900	4,800	78.9	NA	NA	NA	NA	26.0	March
5,500	5,400	69.4	23	5.7	9.6	2.6	35.0	April
1,140	800	316.0	NA	NA	NA	NA	45.0	Dec.
1,700	2,500	202.2	16	4.7	27.2	8.7	7.0	Sept.
5,500	4,300	62.4	NA	NA	19.1	7.6	NA	March
20,651	19,976*	16.1	111	8.4	79.2	4.9	13.0	Dec.
20,605	22,924	14.5	131	10.8	48.3	4.4	36.9	May
3,302	3,600	87.4	NA	NA	-1.6	-6.1	NA	Dec.
76,100	72,000	3.7	NA	NA	300.1	8.0	NA	Dec.
85,847	87,388	3.0	384	5.4	667.0	11.5	NA	Dec.
2,500	1,800	100.8	28	11.1	29.3	NA	29.0	Dec.
84,600	95,700	2.9	NA	NA	355.0	4.7	71.0	Dec.
NA	NA	NA	28	11.8	NA	NA	NA	March
650	400	353.8	NA	NA	NA	NA	NA	March

# THE DATAMATION 100

## THE LEADING U.S. DP COMPANIES

1983 RANK	1982 RANK	COMPANY	1983 TOTAL REVENUE	1983 DP REVENUE	1982 DP REVENUE	DP REV % GROWTH	DP REV AS % OF TOTAL
51	45	Perkin-Elmer Corp.	1,066.6	225.0	205.2*	9.6	21.0
52	95	SCI Systems Inc.	300.1	225.0	80.0	181.2	74.9
53	51	Telex Corp.	306.6	221.7	194.7	13.8	72.3
54		Seagate Technology	221.0	221.0	57.0	287.7	100.0
55	57	Shared Medical Systems Corp.	210.8	210.8	165.7	27.2	100.0
56	60	General Instrument Corp.	891.7	210.0	163.0	28.8	23.5
57	48	Paradyne Corp.	209.0	209.0	207.3	0.8	100.0
58	58	Exxon Corp.	94,591.0	200.0	165.0	21.2	0.2
59	50	M/A-Com	654.4	200.0	200.0	NM	30.5
60	49	Phillips Information Systems	200.0	200.0	203.0	-1.4	100.0
61	46	Sanders Associates	646.5	200.0	175.0*	14.2	30.9
62	56	Informatics General Corp.	197.9	197.9	170.2*	16.2	100.0
63	62	CPT Corp.	192.1	192.1	158.5	21.1	100.0
64	75	Dun & Bradstreet Corp.	1,616.9	185.0	132.4	39.7	11.4
65	68	Dysan Corp.	180.0	180.0	142.8	26.0	100.0
66		Intel Corp.	1,121.9	175.0	140.0	25.0	15.5
67	72	Continental Telecom Inc.	2,101.3	174.8	139.3	25.4	8.3
68	69	Cray Research Inc.	169.7	169.7	141.1	20.2	100.0
69	88	Televideo Systems Inc.	168.7	168.7	98.5	71.2	100.0
70	65	BASF Systems Corp.	165.0	165.0	150.0	10.0	100.0
71	73	Centronics Data Computer Corp.	164.1	164.1	138.4	18.5	100.0
72	89	Convergent Technologies Inc.	163.5	163.5	96.5	69.4	100.0
73	65	Diebold Inc.	445.9	160.0	150.0	6.6	35.8
74	59	Signal Cos.	6,151.0	160.0	177.3*	-9.7	2.6
75	84	Gerber Scientific Inc.	159.1	159.1	114.7*	38.7	100.0
76	77	Martin Marietta Corp.	3,899.3	154.0	125.0*	23.2	3.9
77	78	Quotron Systems Inc.	153.8	153.8	120.9	27.2	100.0
78	70	Wyly Corp.	153.0	153.0	140.5	8.8	100.0
79	67	Allied Corp.	10,022.0	152.2	147.1	3.4	1.5
80	87	Verbatim Corp.	147.0	147.0	98.6	49.0	100.0
81	86	Management Science America Inc.	145.2	145.2	101.2	43.4	100.0
82	79	Reynolds & Reynolds	263.9	145.0	120.0*	20.8	54.9
83	71	Nixdorf Computer Corp.	141.1	141.1	140.0	0.7	100.0
84	81	NBI Inc.	140.8	140.8	119.5*	17.8	100.0
85	73	Planning Research Corp.	318.0	135.6	138.4	-2.0	42.6
86	76	Lear Siegler Inc.	1,527.4	130.0	128.0*	1.5	8.5
87	82	Bradford National Corp.	144.4	127.4	115.4*	10.3	88.2
88	80	National Data Corp.	127.0	127.0	120.3	5.5	100.0
89	83	Recognition Equipment	117.0	117.0	112.4*	4.0	100.0
90	97	Micom Systems Inc.	113.7	113.7	78.0	45.7	100.0
91		Compaq Computer Corp.	111.2	111.2	NA	NM	100.0
92		Canada Systems Group	109.5	109.5	99.8	9.7	100.0
93	85	Commerce Clearing House Inc.	378.8	109.2	104.5	4.4	28.8
94		Cullinet Software	108.0	108.0	63.6	69.8	100.0
95	99	Schlumberger Ltd.	5,797.5	108.0	76.2	41.7	1.8
96		Docutel/Olivetti Corp.	215.0	105.0	90.0	16.6	48.8
97	100	Decision Data Computer Corp.	103.8	103.8	74.3	39.7	100.0
98	98	Printronix Inc.	101.3	101.3	77.4	30.8	100.0
99	91	Floating Point Systems	100.2	100.2	89.0	12.5	100.0
100		Mead Corp.	2,366.6	94.5	66.2	42.7	4.0

Ranking is by dp revenue in millions of dollars.

\*Restated figure

NA: not available

NM: not meaningful



1983 EMPL	1982 EMPL	DP REV PER EMP (DOLLARS)	R & D		NET INCOME	RETURN ON ASSETS	% DP REV FROM FOREIGN SOURCES	FISCAL YEAR END
			1983 (\$ MILLIONS)	% OF TOT REV				
14,372	14,100	15.6	80	7.5	51.8	5.8	NA	Dec.
4,006	2,920	56.1	NA	NA	8.4	6.8	NA	June
3,923	3,933	56.5	14	4.6	33.8	NA	13.0	March
2,100	339*	105.2	5	2.5	29.6	15.8	NA	Dec.
2,400	1,825	87.8	17	8.3	27.3	NA	NA	Dec.
NA	22,000	NA	38	4.3	52.0	6.4	NA	Feb.
3,500	3,072	59.7	19	9.3	3.7	1.4	NA	Dec.
3,000	3,000	66.6	NA	NA	4,186.0	6.6	NA	Dec.
9,508	8,739	21.0	26	4.0	NA	NA	NA	Dec.
NA	1,632	NA	NA	NA	NA	NA	NA	Dec.
9,394	7,859	21.2	24	3.8	42.6	9.1	NA	Dec.
2,822	2,600	70.1	7	3.7	8.5	5.9	9.5	Dec.
1,636	1,458	117.4	9	4.6	17.2	NA	NA	June
26,361	25,681	7.0	84	5.1	167.4	14.1	10.0	Dec.
NA	2,900	NA	35.0	19.0	48.9	20.0	NA	Oct.
NA	NA	NA	142	12.6	116.1	6.9	NA	Dec.
22,154	21,698	7.8	NA	NA	172.4	4.0	NA	Dec.
1,551	1,352	109.4	25	15.0	26.1	9.3	NA	Dec.
867	491	194.5	6	4.0	22.4	12.4	NA	Oct.
NA	1,200	NA	NA	NA	NA	NA	NA	Dec.
1,700	2,000	96.5	11.7	7.0	-7.7	NA	NA	Dec.
1,000	450	163.5	16.4	10.0	14.9	17.3	NA	Dec.
5,824	6,051	27.4	8	1.9	49.1	18.5	NA	Dec.
55,000	42,600	2.9	443	7.2	103.0	1.9	NA	Dec.
1,500	1,300	106.0	8	5.5	11.3	9.1	NA	April
42,000	40,900	3.6	95	2.4	141.3	4.9	40.0	Dec.
1,425	1,164	107.9	10	7.0	23.9	NA	NA	Dec.
1,875	1,850	81.6	9	6.4	0.2	NA	NA	Dec.
117,750	44,337	1.2	394	3.9	98.0	1.2	32.0	Dec.
2,840	1,790	51.7	11	7.8	15.0	13.2	15.0	July
1,866	1,348	77.8	28	19.9	10.8	6.7	21.0	Dec.
3,365	3,349	43.0	7	2.9	13.8	9.4	NA	Sept.
1,700	1,700	83.0	NA	NA	NA	NA	NA	Dec.
1,665	1,096	84.5	NA	NA	3.5	2.1	NA	June
5,600	6,200	24.2	NA	NA	11.3	7.1	NA	June
20,000	22,000	6.5	30	2.0	73.4	8.2	NA	June
NA	3,000	NA	NA	NA	0.4	NA	NA	Dec.
2,253	2,458	56.3	2	1.7	11.3	12.0	2.1	May
1,944	1,924	60.1	6	5.4	9.6	NA	NA	Oct.
1,559	915	72.9	10	9.0	18.3	26.1	23.2	March
614	96	181.1	NA	NA	4.7	NA	NA	Dec.
NA	NA	NA	NA	NA	0.8	NA	NA	Dec.
5,654	5,300	19.3	NA	NA	24.9	8.2	NA	Dec.
1,050	706	102.8	10	9.6	15.3	NA	NA	Dec.
NA	NA	NA	NA	NA	1,084.3	13.8	NA	Dec.
NA	NA	NA	6	2.7	-14.0	-58.3	NA	Dec.
1,160	1,100	89.4	5	4.9	5.4	NA	NA	Nov.
1,320	1,097	76.7	4	4.1	6.9	10.9	13.0	March
1,319	1,390	75.9	12	12.2	13.1	NA	NA	Oct.
1,040	700	90.8	NA	NA	30.0	5.5	NA	Dec.

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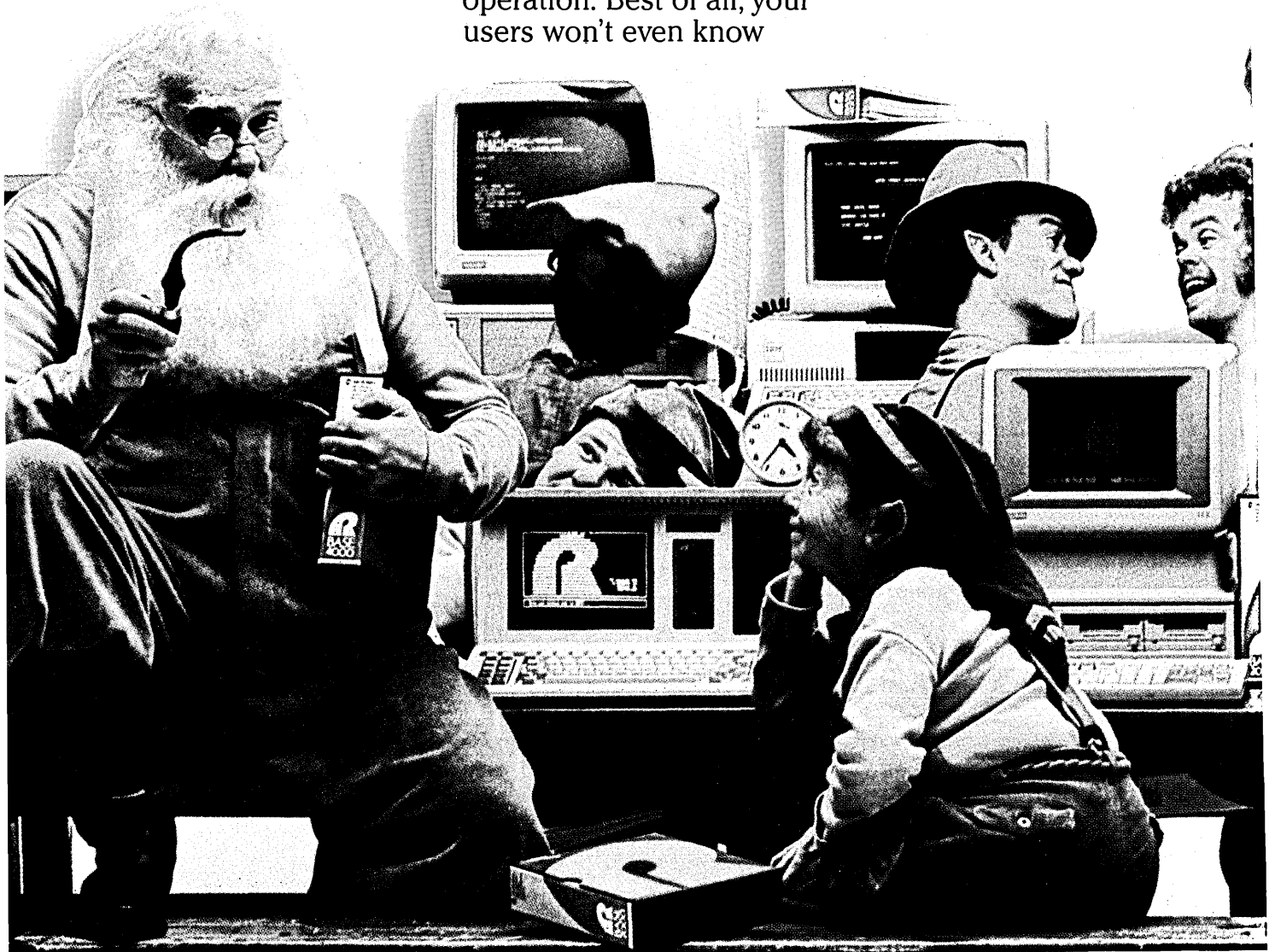
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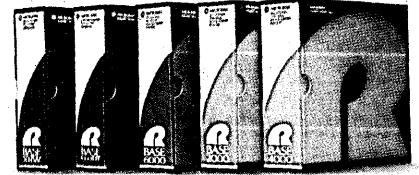
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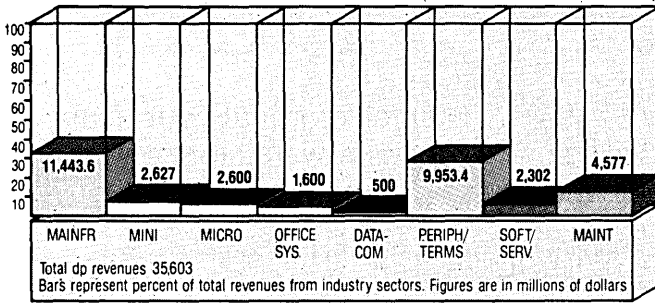
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# 1



## INTERNATIONAL BUSINESS MACHINES

Old Orchard Road  
Armonk, NY 10504  
(914) 765-1900

IBM rode the recovery to yet another record year in 1983, this time with corporate revenues topping the \$40 billion mark. Once again Big Blue was the most profitable manufacturer in the country, with net earnings up 24% to \$5.5 billion. Because IBM does not report specific product revenues, the overall dp and product category revenues listed here represent DATAMATION estimates. In 1983, dp revenues rose 22%, to \$35.6 billion from \$29.3 billion, with most business segments performing well.

It was one of the most eventful years in IBM's history. In February, chief executive officer John Opel succeeded Frank Cary as chairman of the board, and his influence was immediately felt. IBM pursued new and existing markets with vigor, continued its push to become the preeminent low-cost producer, chased some competitors in court, and embarked on ventures it had never before tried.

The company introduced several new processors during the year, beginning with the long-awaited System/36 in May. That machine replaced the most widely installed computer in IBM's history (PCs excepted), the System/34. IBM also brought out two high-end models of the 4300 mainframe line and new models in the System/38 and Series/1 lines.

But the most attention was paid to a rash of new products introduced in the PC line, which in January consisted of only one model. First came the PC XT, which was announced in March. That was followed by products that allowed 3270 terminals to act as PCs and vice versa, and in October, by the 3270 PC and the PC XT/370. Finally, in November, IBM admitted to the worst-kept secret of the year, the PCjr.

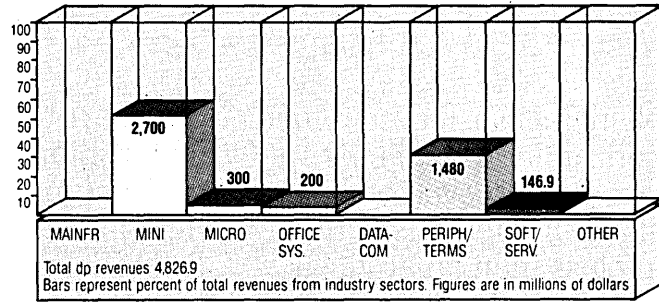
IBM also introduced the 5080 color graphics system, the Database 2 mainframe DBMS, several printers, the 4730 personal banking ATM, and the 7540 manufacturing system. The year also saw the first deliveries of two major IBM products, the 3084 top-end mainframe and the MVS/XA operating system.

IBM also came closer to its goal of being the industry's low-cost supplier. While revenues increased 17% and income 24%, the payroll grew only 1.4%, indicating IBM was able to earn significantly more money per employee than in the past.

When it wasn't premiering new products, IBM was suing competitors such as Hitachi and National Advanced Systems on a variety of trade secrecy charges. Both companies eventually relented under the pressure of IBM's lawyers.

IBM also got under the skins of Intel and Rolm, but in a more positive vein. The company acquired substantial chunks of both Silicon Valley firms, the first such investments in IBM's history. At year-end, IBM owned close to 20% of each firm.

# 2



## DIGITAL EQUIPMENT CORP.

146 Main St.  
Maynard, MA 01754  
(617) 897-5111

Calendar 1983 was a bad year for DEC, even though revenues climbed a respectable 20% to \$4.8 billion. Earnings fell dramatically in the third quarter, dropping net income for the year 24.5% to \$262.1 million from \$347 million in 1982. DEC's management received low marks for its handling of the bad news; it had told security analysts in September to expect a strong quarter, only to report a few weeks later that the quarter's earnings were off 72%. "This doesn't speak well for their internal control system," Ulric Weil of Morgan Stanley commented at the time of the announcement.

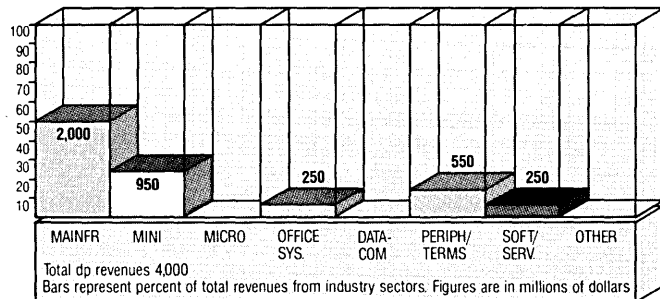
Two factors were primarily responsible for Digital's breakdown. First, the company decided in the spring to cancel the Jupiter upgrade to the DECSYSTEM 10 and 20 mainframes. Jupiter, which would have used ECL circuitry to run at 2.5 to 3 MIPS, had cost some \$50 million at the time it was canceled. DEC set up a clearinghouse at the Marlboro, Mass., plant where the DECSystems were manufactured, so that users could help each other migrate to the VAX line of superminicomputers.

The VAX line, however, was the second major cause of DEC's earnings tumble. The high-end VAX-11/780 has been on the market for close to seven years, and products from IBM, Data General, and Prime have all eclipsed the 780 in processing power. DEC's upgrade, the 11/785, was finally announced this past April, three years late. Moreover, the Venus project, which will provide a processor to top off the VAX line later this year, was also delayed during 1983. Digital had its problems in the peripherals area too, because it encountered production difficulties related to its new disk drive.

In response, DEC moved forcefully on one front, changing its management style away from the separate product groups and into a more cohesive organization. Even as it was doing so, however, it was hemorrhaging vice presidents. By the end of the year, half a dozen senior executives had left DEC for other Massachusetts firms. Perhaps the loss that hurt the most was that of C. Gordon Bell, DEC's chief engineer and the architect of much of DEC's computer systems product lines.

Despite the problems, Digital had a few occasions to celebrate in 1983. It introduced two new machines for the low end of the VAX line, the 725 and the MicroVAX1—the first VAX on a chip. In addition, the company introduced the VAXclusters concept to enable users to form networks of closely connected VAX machines. DEC also announced that, after Venus debuts at the high end, a new low-end machine dubbed the MicroVAX2 would follow by year-end.

# 3



## BURROUGHS CORP.

Burroughs Place  
Detroit, MI 48232  
(313) 972-7000

They're playing a new song in this part of the Motor City. Burroughs no longer wants to be known as a run-of-the-mill manufacturer of hardware and software. In 1983 the company announced its transformation to a total service organization that would be "second to none" in its commitment to service.

Burroughs may indeed have kept its word, although it finished second to a few in 1983. It was a slow first nine months, but fourth quarter orders 25% above those of 1982 changed the agony to ecstasy.

Overall revenue increased 5% to \$4.39 billion. Net income jumped 67% to \$196.9 million. The comparisons are skewed by a fiscal year change and significant write-offs at the end of the 1982 calendar, but they still tell a good story.

Possibly more important from the company's standpoint, Burroughs was very active in new products and developments. The company put its money where its mouth was by increasing its R&D budget a healthy 13%.

Foremost among the new products was the A9 series of mainframes. It comes in B, D, and F models, ranging from 1.2 to 2.5 MIPS. It's officially designed to replace the B6900 series and unofficially aimed at countering the new IBM 4361 and 4381 models introduced last fall. Delivery on the F model began in the second quarter; the other two will be available in the first quarter of 1985.

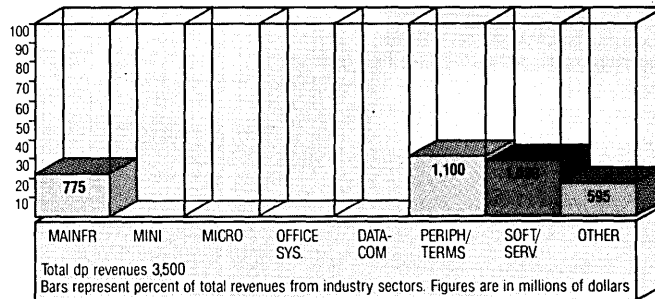
Other new products included the ET1100 and ET2000 electronic workstations, the B95 addition to the B90 family, the B1990 small system, and the B2925 midrange system.

These new offerings were nevertheless mere precursors to the expected introduction of the intelligent workstation, the B25, which one security analyst called "a critical ingredient in Burroughs' 1984 performance." Burroughs has big plans for this machine, the successor to the unspectacular B20 and also bought from Convergent Technologies. The company is bypassing direct distributors, preferring to go through independent dealers. To show it means business, Burroughs plans to increase that force from 200 to 700.

A joint venture was formed with Telex Computer to investigate gas plasma display technology. Graphics Technology Corporation (Graftek), a CAD/CAM manufacturer and distributor, was acquired in February. In addition, U.S. and international sales were brought together for the first time under Worldwide Marketing, an international advisory board.

Burroughs has undergone many such transformations in the last three years, causing much management turmoil. The year 1984 should determine whether the latest will be the last.

# 4



## CONTROL DATA CORP.

8100 34th Ave. S.  
Minneapolis, MN 55420  
(612) 853-8100

Control Data continues to set itself off from the rest of the BUNCH by concentrating on supercomputers, peripherals, and services. Indeed, less than 20% of its business currently competes directly with IBM, and that has enabled the company to withstand both the recession and IBM's more competitive posture. As a result, corporate revenues continued their climb, growing 5.5% to \$4.58 billion in 1983, while net income increased 4% to \$161.7 million. Dp revenue increased 6% to \$3.5 billion.

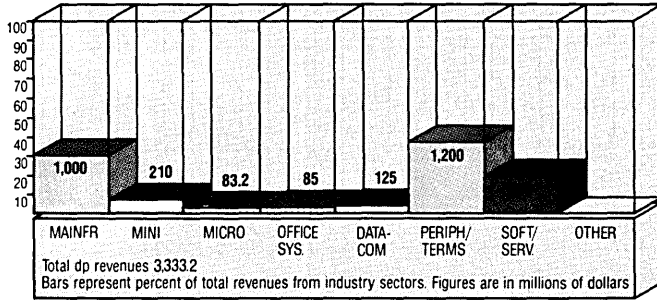
Although CDC is often considered a mainframer, its largest businesses are peripherals and services. The peripherals segment, which sells a wide range of disk and tape drives that are compatible to IBM equipment, remained flat at \$1.1 billion in 1983, but it introduced several products at the low end that are expected to have an impact in 1984 and beyond. Control Data is so far the only major supplier with a foot in the sub-5¼-inch disk drive market, which it entered in May 1983 with the Cricket series of 3½-inch floppy disk drives. And while the high-end 33800 IBM-compatible thin film disk drive did not contribute to revenues in 1983, it should reach volume production this year. Even though IBM has had a year-long jump on the 33800-compatible market, analysts expect that Control Data should be able to ship 800 to 1,000 of the 33800s in 1984.

Control Data is also the largest remote computing services company in the world, chalking up a solid 11% gain in revenue, to \$1 billion in 1983. The processing services revenues are divided among the Business Information Services division, the Cybernet scientific and engineering services offerings, and the PLATO educational service. In the fourth quarter of 1983, PLATO finally achieved profitability, and the company expects that it will become a major contributor to the company's earnings in the future. More than 12,000 hours of courseware are available.

Control Data's CYBER series of supercomputers continues to battle crosstown-rival Cray Research in the upper echelons of MIPSdom. The CYBER 205 and 170 lines grew at a 10% clip in 1983, reaching \$775 million in revenues.

The company cut back its R&D expenses severely in 1983, a 17% drop to \$270.7 million, but it increased its stake in two cooperative ventures. The Microelectronics and Computer Technology consortium—which William C. Norris, Control Data's chief executive, founded in late 1982—established a permanent headquarters and staffed seven major research projects during 1983. The Semiconductor Research Corp. funded 47 grants to 32 universities covering basic technology fields in 1983.

# 5



## NCR CORP.

1700 South Patterson Blvd.  
Dayton, OH 45479  
(513) 445-5000

NCR celebrates its 100th anniversary this year. It should be one hell of a party.

The company finished its 99th year by setting records in revenue and net income: revenue increased 6% to \$3.73 billion; net income rose an impressive 23% to \$287.6 million.

So while many of its competitors struggled through 1983, NCR reaped the benefits of an expanded product line and strong order gains, particularly in the retail sector. This reflected the favorable reception given to NCR's new products, ranging all the way from micros to the initial models on its new 9300 mainframe line. Stringent cost controls, imposed early in 1980, also were a significant factor in contributing to what one Wall Street analyst called "an eminently successful year."

Things could get even better in 1984. NCR plans to further enhance its product line, which increased significantly in 1983. Several peripherals, productivity tools, and utilities transformed the Tower 1632 dp unit, released in late 1982 to oem markets, into a fully featured end-user system. NCR and Intel announced a new midrange, local area network called Mirlan. That was followed by the addition of seven new models to NCR's V-8600 family of large-scale computers. The company also entered the burgeoning telecommunications market by forming NCR Telecommunications Services Inc.

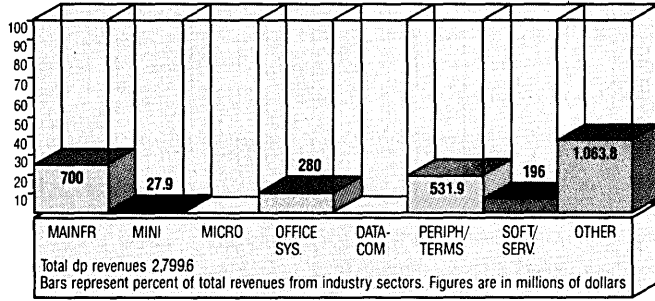
The company picked up in 1984 where it left off in 1983. A flurry of new products was highlighted by the NCR 7950, a general purpose clustered terminal system designed to be plug-compatible with the IBM 3270 operating in a communications intensive SNA/SDLC environment, and the NCR 5310 and 5320, a computer output microfilm system controlled by a personal computer.

NCR and Honeywell agreed that Honeywell will use NCR's 32-bit VLSI processor chip in the development of a future small- to medium-scale computer system. The companies will also jointly develop a custom chip.

"NCR begins 1984 in the strongest financial position in recent company history," declares president and ceo Charles Exley, who assumed those offices in April 1983 upon William Anderson's retirement. "We are very optimistic about our future prospects."

They have every reason to be.

# 6



## SPERRY CORP.

1290 Avenue of the Americas  
New York, NY 10104  
(212) 484-4444

Sperry came close to reversing its long slide during 1983, recording a slight drop in most areas but a hefty 29% jump in net income, to \$176.7 million from \$137.2 million. Corporate revenues declined just over 1%, to \$4.75 billion from \$4.8 billion. Dp revenue, which represents slightly less than 60% of the company's business, also dropped 1%, to \$2.79 billion from \$2.80 billion. On the expense side, R&D funding increased 1% to \$296.4 million from \$293.5 million—about 10.5% of dp revenues in both years. Sperry also paid off a large chunk of its corporate debt, which improved its financial picture (1982 revenues have been restated in light of an accounting change made last year).

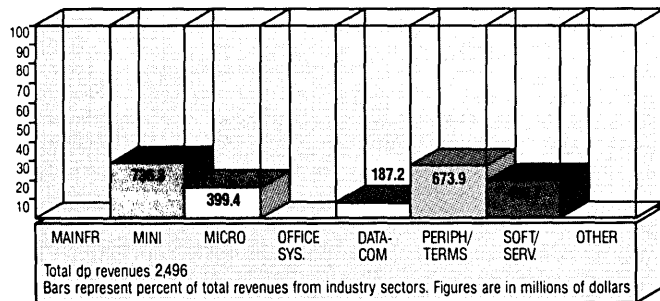
Sperry's performance was bolstered by two major government contracts. On Jan. 27, it bested Burroughs to snag a \$476 million, eight-year contract with the U.S. Air Force. The contract—the largest dp contract in history—calls for Sperry to install 153 of its midline 1100/60 mainframes and more than 20,000 terminals at all major Air Force bases around the world. Then, on May 30, Sperry beat IBM for the right to supply the Navy with a new generation of shipboard combat computers. That deal, which calls for 770 AN/UYK-43 computers and 300 spares, is worth \$433.2 million to Sperry over five years.

Despite those two contracts, Sperry's mainframe revenues continued to decline during 1983, slumping 4% to \$700 million from \$728 million, as the company's user base continued to erode. Revenues from minicomputers and peripherals were flat over the year, and software revenues dropped 22% to \$196 million. Nonetheless, the Mapper application development software prospered, surprising Sperry executives who did not want to sell it.

On the positive side, maintenance and repair revenues were up slightly over 1982, and office systems revenues grew a healthy 11%, largely because of the early success of the Sperrylink office automation system introduced late in 1982. Other dp product revenues, mainly defense related, improved 6% to \$475.9 million.

While the Sperrylink, Mapper, and 1100/90 products began making their ways into user installations, Sperry continued to introduce new products. Substantially behind all of its major competitors, Sperry introduced its first personal computer in November, a modification of a Mitsubishi pc that is also being marketed by Leading Edge. Sperry said that the pc is being sold primarily to its mainframe user base.

Sperry's dp operations were renamed the Computer Systems Division in the spring, dropping the venerable Univac name.



## HEWLETT-PACKARD

3000 Hanover St.  
Palo Alto, CA 94304  
(415) 857-1501

If its competitors had this kind of a year, they'd be dancing in the streets. At Hewlett-Packard, they just go about their business.

The world's second largest minicomputer maker went about it pretty well, thanks. Corporate revenues increased 12% to \$4.86 billion. Dp revenues did slightly better, jumping 12.5%. So did all the components, led by micro sales, which leaped 54.8%. Net earnings were ahead 13%, to \$432 million.

Orders were up 18%, resulting in a \$1.01 billion backlog at the end of 1983, compared to \$768 million in 1982; third and fourth quarter orders showed the best year-to-year gains since 1980. All four of the company's business segments reported increased business. Total employment rose by about 4,000. And research and development increased 14.4% to \$494.5 million, matching HP's goal of 10% of sales.

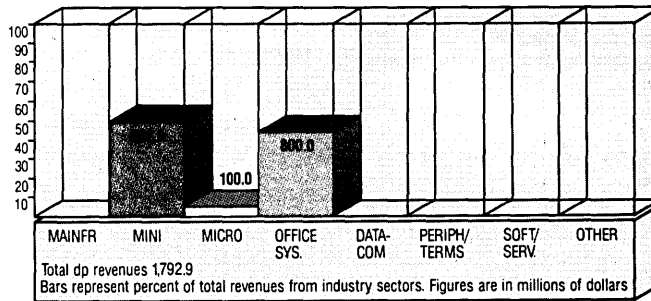
So what's so bad about feeling good? Well, '83 didn't quite match '82, when HP's revenue swelled 17.3% and earnings soared 25%. The company also continued to have troubles overseas, where a strong dollar led to HP's U.S.-manufactured products being less competitive in non-U.S. markets.

Speaking of U.S.-manufactured products, HP stepped full force into the volatile personal computer market with the HP 150. All users have to do is touch the screen, and their wish is the 150's command. To support this market entry, the company plans to triple its 450 retail outlets and has launched a \$10 million television advertising campaign.

In another significant move, HP and AT&T Information Systems (ATTIS) completed joint certification testing of the HP 3000 business computer, the HP 150, and HP data workstations to use with ATTIS' Dimension System 85. This represented part of HP's effort to offer the industry's most comprehensive interconnect services.

HP was equally active with overseas firms, forming what president John Young termed a "very significant" joint venture with Samsung Electronics Company of Korea to manufacture computer products and sell and support HP products in Korea. HP also increased its stake in a Japanese joint venture to 75% from 49% by buying more than \$35 million of new stock in the company, Yokogawa-Hewlett-Packard Ltd. of Tokyo. Trying to prove good things come in threes, HP entered into a joint venture with Genetech Inc. to develop instruments and systems for use by biotechnology industries.

Management indicated it was approaching the first half of 1984 "with caution," but was "optimistic" about prospects for the year. Odds are it's understating the case.



## WANG LABORATORIES, INC.

1 Industrial Avenue  
Lowell, MA 01851  
(617) 459-5000

Dr. An Wang's prescription for success continued to pay off in 1983. The company's vital signs are good, but not great. Total corporate revenues, which leapt by 31% in 1982 and 48% the year before, grew by 26% in 1983 to almost \$1.8 billion.

One Wall Street firm, recommending Wang as a company that "will move well ahead of the overall market," predicts the company will post annual earnings increases of about 30% through the rest of the middecade. Wang has set \$5 billion as its target for 1990 revenues, and analysts seem to think a bull's-eye quite probable.

But year-end reports showed that while revenues were up, the strength of the dollar and competitive pricing had hurt the level of Wang's profits. For example, pretax profits for the fourth quarter of '83 (12.1%) were off slightly from fourth quarter '82 (12.6%). Still, these figures are higher than those for the rest of the minicomputer/office automation vendors—operating margins for the industry averaged 10.1% for the year.

In October, Wang held a press conference to announce what one observer called "everything but the kitchen sink. And if you could attach a kitchen sink to a personal computer, they would have announced that too." Some of the announcements revealed that a strategic shift had taken place at Wang.

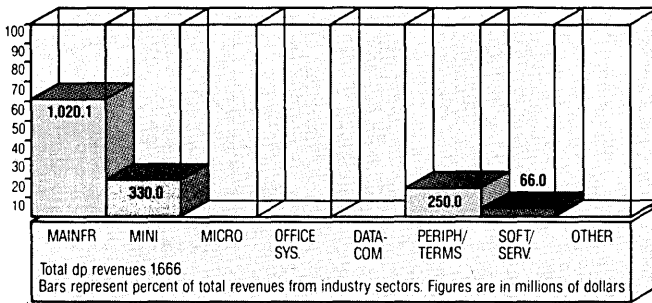
Wang's Information Distribution System is a family of software products that provide a pathway to support services and applications between Wang VS systems and IBM or IBM plug-compatible hosts over an IBM 3270/SNA or BSC network. Wang admitted the announcement was equal to a de facto surrender to IBM standards. IDS is a first step toward an open architecture, says John F. Cunningham, Wang's chief operating officer. The significance of IDS "lies in the fact that most large companies have equipment from a number of vendors." So IDS will support IBM, UNIX, DEC, and X.25 protocols.

IDS did not mark a complete surrender, however; proud of its eminence in word processing, the text and document standards under the IDS umbrella are Wang's own.

Announced at the same time was Wang Office, a set of mail, directory, time management, and file management services; PACE, a fourth generation database management system; WP Plus, an enhanced word processing system; a clustered personal computer network; and PIC.

PIC, the Professional Image Computer, is based on Wang's Professional Computer. The desktop-sized PIC will scan images and digitize them for manipulation by the user.

Wang's pc continued to poke along, having sold only about 75,000 units since it was introduced. And one observer notes that what sales were made came at the expense of Wang's own word processing and minicomputer systems.



## HONEYWELL INC.

Honeywell Plaza  
P.O. Box 524  
Minneapolis, MN 55440  
(612) 870-5200

Honeywell started 1983 as if it were still hung over from 1982, which was not a very good year.

Overall revenue was up 4.8% to \$5.8 billion from \$5.5 billion. Ordinarily that means a good year, but not for Honey; well this time. Net income, the only number that matters, dropped 15.3% to \$231.2 million from \$272.9 million.

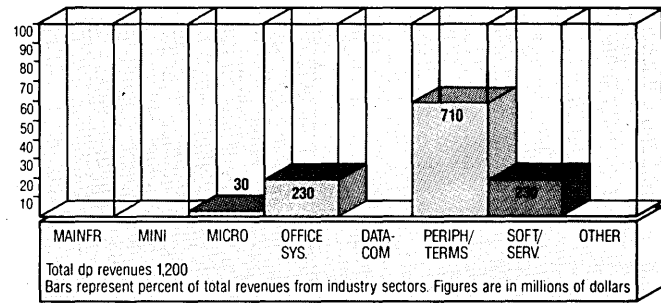
Most of that decline occurred in Synertek, the company's semiconductor operation. Synertek's orders improved significantly in the fourth quarter, but its dependence on the electronic games business, particularly Atari, kept it in the red.

The good news was that Honeywell Information Systems (HIS), which accounts for more than 30% of Honeywell's revenues, showed its strongest signs of life since 1980. In 1981-82, more than 2,500 employees were released by HIS. That cost-cutting measure and a sharp increase in orders in the second half of 1983 yielded a hefty 63.7% increase in profits, to \$131 million from \$80 million, even though revenue decreased to \$1.67 billion from \$1.69 billion. The performance was an impressive comeback from 1982, when HIS revenues fell 50%. The situation is expected to further improve this year, as HIS struggles happily with a large order backlog. Volume shipments of DPS 88 systems should also contribute to revenue growth.

Honeywell was active on the products front, adding several new items to the low end of the line. The microSystem 6/10 is designed to be an end point in a larger network. The microSystem 6/20 provides for a cluster of up to four stations. The DPS 6/40 can handle as many as 28 stations.

The most significant new product comes not from Minneapolis but Japan. Like most of the BUNCH, Honeywell is having a rough time in the mainframe seas. It abandoned at least part of the ship by announcing it will buy some of its mainframes from NEC of Japan, marketed under the Honeywell label. If all goes well, Honeywell may produce the machines itself. The two companies will also jointly develop future large-scale products.

Ironically, NEC was an original licensee of Honeywell's technology, using that license to enter the computer market. Now it's helping its benefactor. Honeywell also teamed up with NCR to develop a custom integrated circuit chip for small- to medium-scale systems. All parties involved are hopeful these ventures will be mutually beneficial.



## XEROX CORP.

P.O. Box 1600  
Stamford, CT 06904  
(203) 329-8700

Xerox has yet to duplicate its original success in the copier business. When the copier king lost the crown and, alas, some revenue, it began to search around for new realms of opportunity. The office automation kingdom was a natural choice—but so far, not a profitable one.

Xerox's OA and copier operations have indeed become a drain on the company's resources, but those resources are still quite considerable. Xerox reports its dp revenue in 1983 nudged up slightly to \$1.2 billion; corporate revenues were flat, at \$8.5 billion. Corporate net income increased 27% to \$466 million, but the company's profit margin of 5.5% lagged past performance and industry averages.

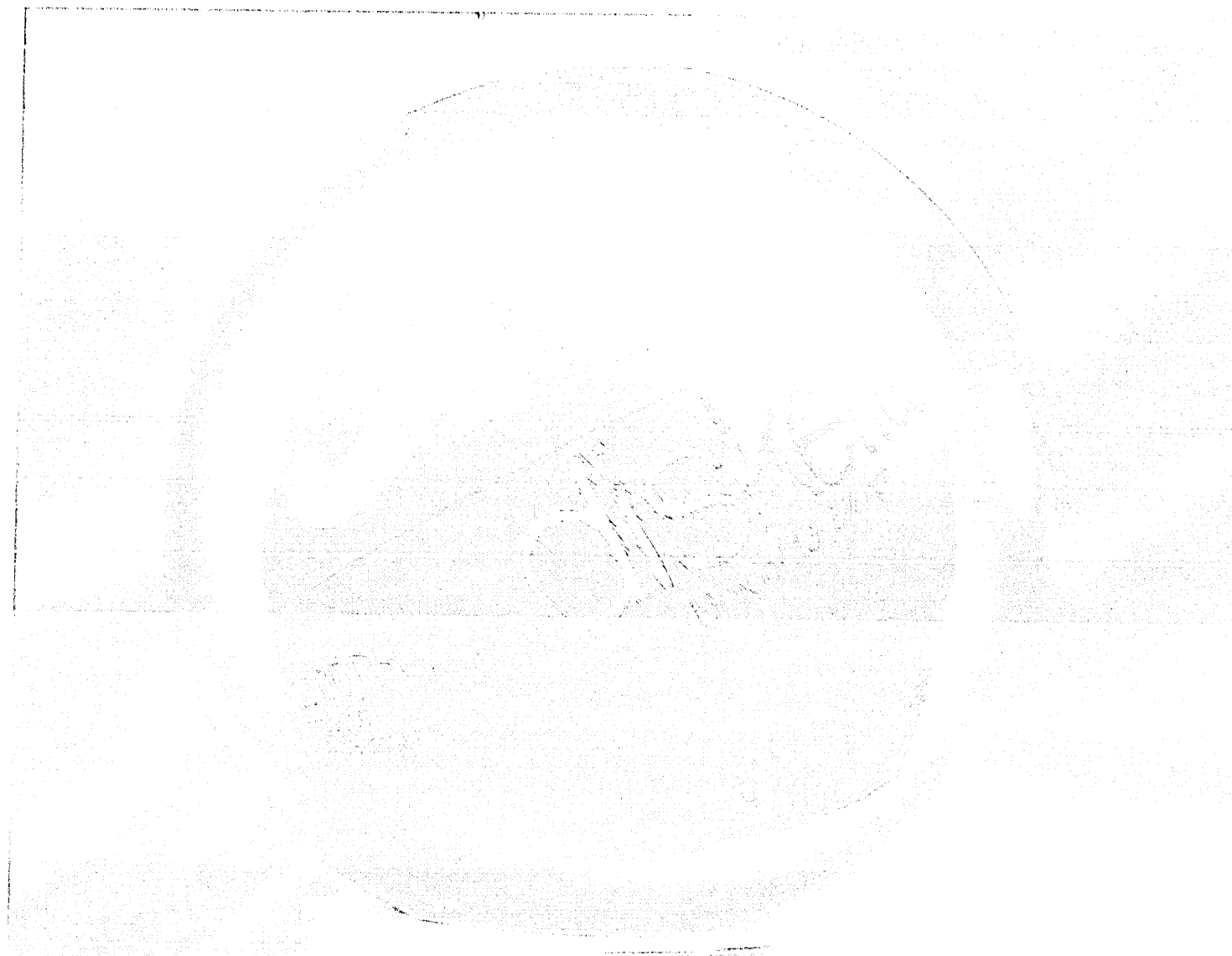
There were no spectacular increases on the data processing front either. DATAMATION estimates the biggest gains were scored in the office systems category, where revenues reached \$230 million, up 15% from the year before. At the opposite extreme were terminals and peripherals, which fell off 6% to \$780 million. Micros also remained static at \$30 million and software and services inched up only 1% to \$260 million.

Xerox had a relatively poor showing in the peripherals arena. It still hasn't managed to get the most out of such peripherals subsidiaries as Shugart Associates, Versatec, Century Data Systems, and Diablo. Indeed, the sale of printer products was way down last year, say industry insiders. One estimate is a \$50 million pretax loss in the disk drive business. One bright note was the 200 series printer, which is doing very well.

Xerox must find customers for its office automation wares. Strong on the technology side, the company can't seem to translate that strength into earnings. Early this year it came out with two new 8010 Star workstations designed to broaden its customer appeal in the fiercely competitive OA market. One is a standalone system priced at \$9,995 and the other is a remote workstation selling for \$8,995. Xerox also slashed the price of the 8010 Star Ethernet workstation by 34% to \$15,055. The company hopes the price cut will help pick up sagging sales.

Last June, Xerox formed a "corporate office" that includes three of its top executives. The triumverate consists of president and ceo David Kearns, chairman C. Peter McCollough, and William Glavin, president of Xerox's business equipment groups. Glavin's elevation to this elite corporate circle indicates that Xerox is serious about its office efforts, but it doesn't look as if the turnaround, expected for the last few years, is in the cards in 1984 either.





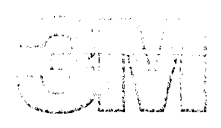
# Predictable

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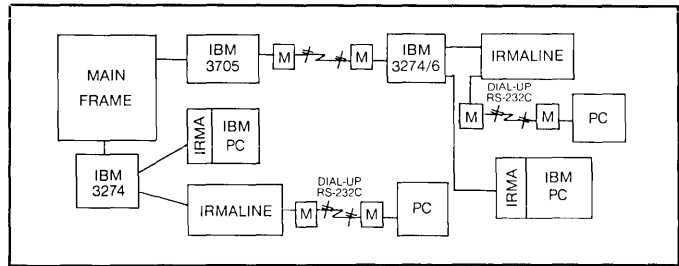
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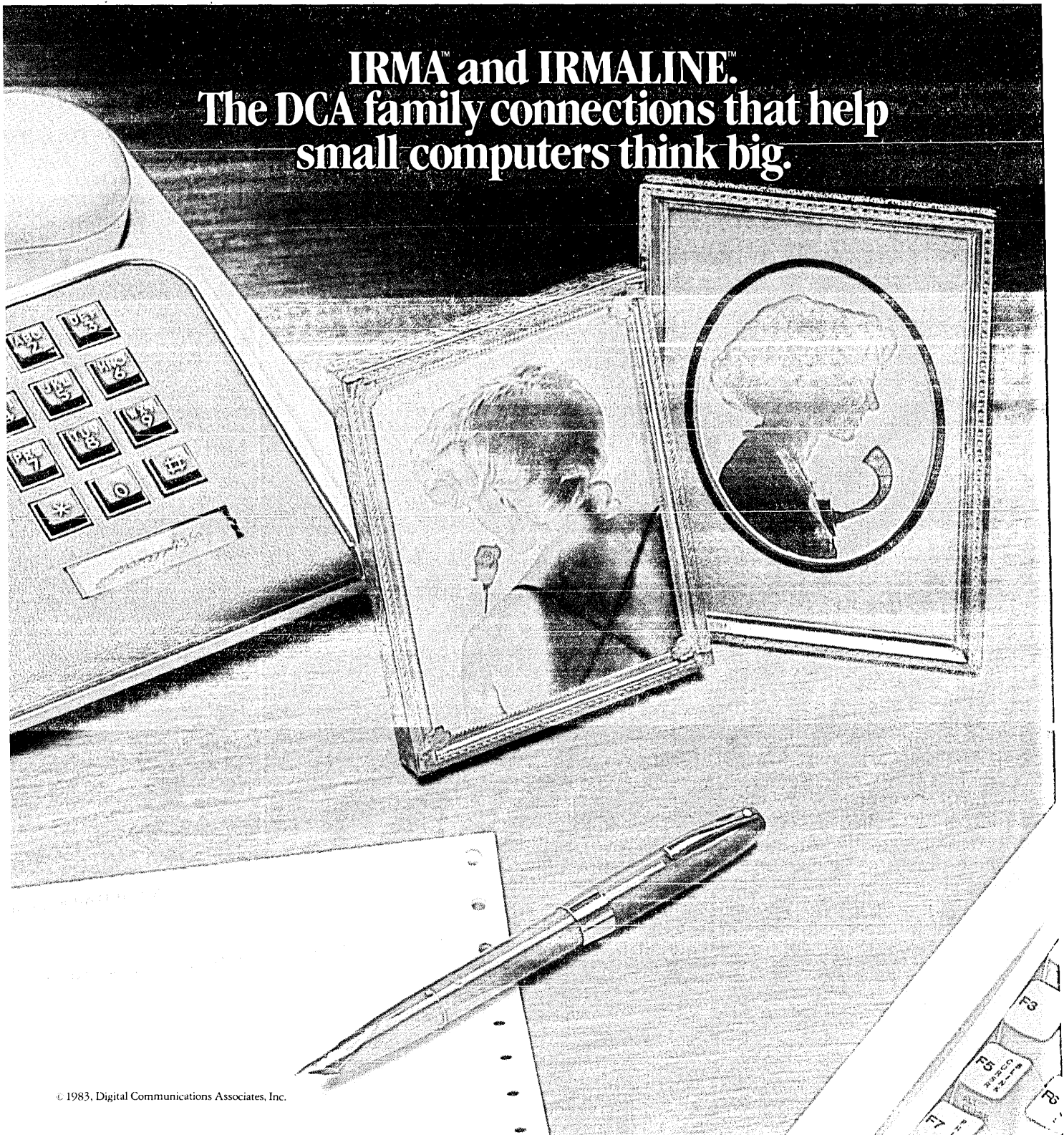
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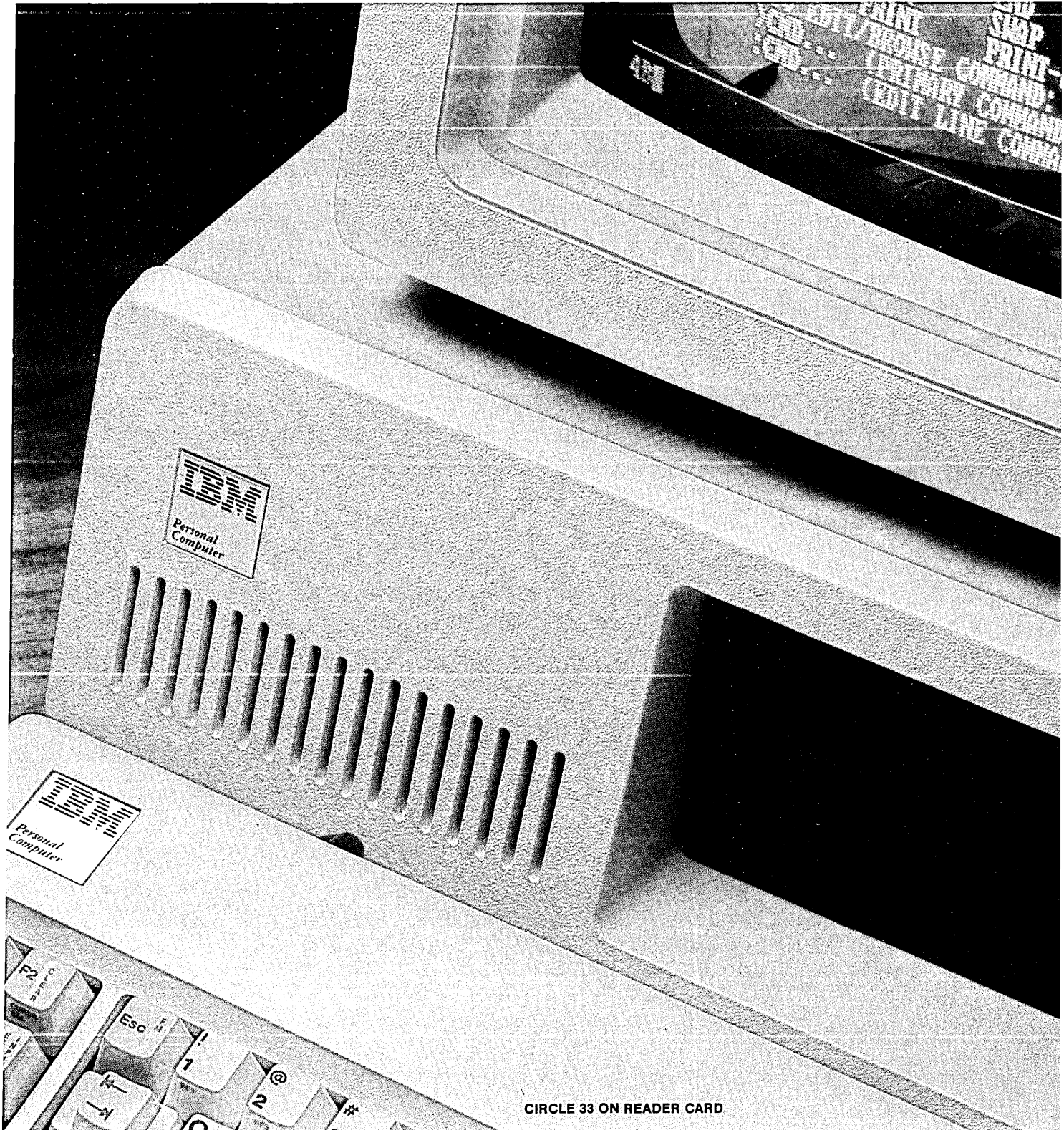
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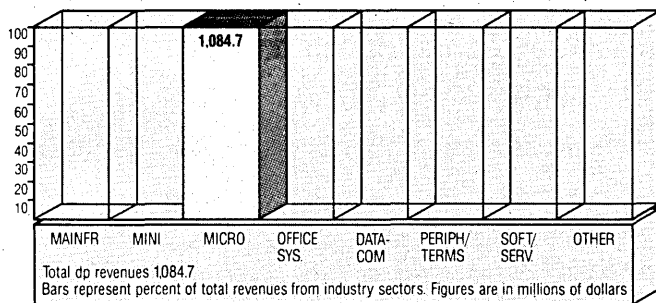


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CIRCLE 33 ON READER CARD

# 11



## APPLE COMPUTER INC.

10260 Bandley Drive  
Cupertino, CA 95014  
(408) 973-3145

Growing up is hard to do, and 1983 was a very difficult year for Apple. The goal for 1983 was to crack the IBM-dominated office market in a big way with Lisa, its \$10,000 pc. The results are in, and Apple failed. In the process it lost its dominance of the pc market and posted a 17% decline in earnings. On the brighter side, Apple's Macintosh was introduced to mostly raves and may reverse a depressing 1983.

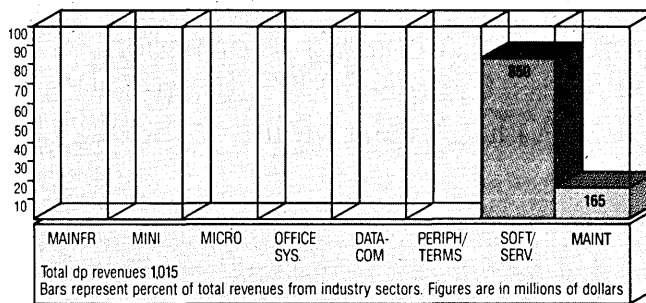
While 1983 revenues were impressive—a 63% increase to \$1.08 billion—earnings began falling in the September quarter and fell even faster by December. For the calendar year, earnings were \$59 million, down 17% from 1982.

The strategy for Lisa was simple, sell to the Fortune 1,000 companies. These customers were less than enchanted with Lisa's price/performance, however, as well as with Lisa's inability to connect with their dp departments. By September, Apple revised its plans, and started pushing Lisa without its software and at a substantially reduced price. The strategy, effected by Apple's new national sales force, not only failed to stimulate business, but upset the company's independent dealers. While Apple was struggling with its ill-suited product and poor marketing plan, IBM took over the market.

By November, newly appointed president John Scully from PepsiCo could see red ink. Reacting quickly, he developed, then announced, a long-term strategy. The main theme was a family of 32-bit micros marketed to smaller companies through the independent dealers. The next phase was to be a new 32-bit micro, which turned out to be Macintosh. Scully stressed the importance of building communication bridges for its computers to the IBM mainframe environment. In addition, he announced plans to introduce new products for the Apple IIe to take advantage of the installed base.

These plans seem more realistic than that of tackling the Fortune 1,000 with the untested Lisa. Early indications are that Macintosh is now the number one pc, thanks to Scully's carefully laid out marketing plan, which featured an intimidating tv commercial that prompted an enormous number of sales on the day Macintosh was released. To really do justice to many of the advanced third-party programs being written, larger memory and storage capacities are required. (In its first configuration, the Mac comes with only 128K memory and no hard disk storage.) Apparently, though, Apple is learning that the best route to profits is through keeping the customers happy, and that's what Mac seems to be doing.

# 12



## TRW INC.

23555 Euclid Ave.  
Cleveland, OH 44117  
(216) 383-2121

A company called TRW makes a lot of money—\$5.49 billion in 1983—making a lot of things, and some of that money is made in dp. Last year, TRW's dp ventures produced revenues of \$1.015 billion, most of it from services and software—\$850 million—and the rest from third-party maintenance and repair—\$165 million. These dp revenues were about 23% higher than those for 1982. Since TRW's overall revenues only improved by about 7% over the year before, dp was obviously one of the bright spots in this veteran conglomerate's portfolio of businesses.

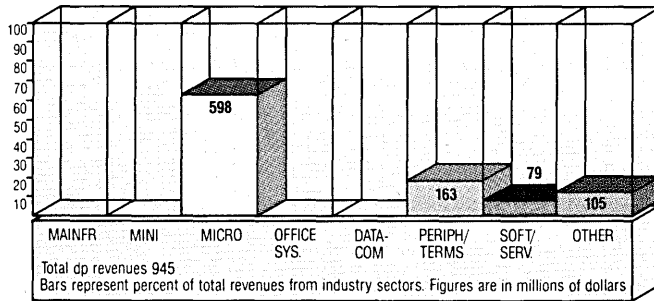
People who imagine conglomerates to be recent phenomena should note that TRW began life in 1901 in Ohio as the Cleveland Cap Screw Company. And while TRW, like most conglomerates, is better known for acquiring companies, it is sometimes forced to shed them: last year TRW dropped out of the TRW-Fujitsu Co. (TFC), ceding most of this point-of-sale, bubble-memory-equipped terminal business to its partner in the onetime joint venture.

The company's biggest dp money-maker was its credit analysis operation. Running on IBM equipment, TRW maintains trade payment data that demonstrate the payment habits of nearly 8 million business locations from all industries. About 7,000 companies contribute automated and manual accounts receivable information to the database every 90 days. Last year, TRW boasted that its files contained "over 20 million lines of payment experiences."

The consumer credit part of the business maintains credit information on more than 90 million consumers, and supplies credit reports to 24,000 customers doing business at 35,000 sites. TRW says it can generate as many as 250,000 credit reports a day. (Management is said to view this U.S.-centered business's 12 inoperative hours a day as wasted profits, prime time for new business. There is talk that expansion of the service to customers in Europe and the Far East could mean a round-the-clock production cycle and round-the-clock profits. In 1983, 24% of the company's dp revenues came from abroad, down from the 28% that was posted in 1982.)

Last year was the middle year in TRW's five-year plan aimed at increasing software productivity. The company says the results have been promising: it claims that doubling productivity by 1985 and quadrupling it by 1990 are realistic aims.

# 13



## TANDY CORP.

1800 One Tandy Center  
Fort Worth, TX 76102  
(817) 390-3700

In the rough and tumble world of personal computers, Tandy was one company that did not gain ground during 1983. Its sales were up, but not as much as Commodore's, Apple's, or IBM's. Yet considering that Texas Instruments was falling by the wayside, Tandy's performance has to be considered good. Dp revenues were up 30% to \$945 million from the \$725 million posted in 1982. Corporate net income increased 24.2% to \$278 million from the \$222.4 million of 1982.

It seems that Tandy, like Apple, was suffering from IBMitis during 1983. Despite the natural advantage of its own retail outlet, with over 400 computer stores, Tandy's computer business was hurt by Big Blue. The new model 2000 was introduced in December, touted as being three times faster than the IBM PC and 25% cheaper. But few were available because of the shortage of its brain, the 80186 microprocessor from Intel.

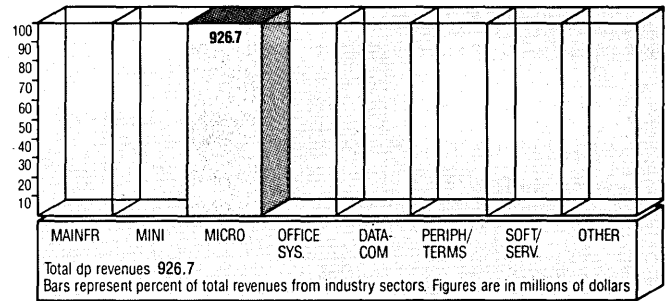
The 2000, available in two versions, has a main memory expandable to 768K RAM. The basic system, with 128K of memory and including two disk drives for storing 1.4MB, is priced at \$2,750; the version with a 10MB hard disk drive is \$4,250. Tandy claims the 2000 can read information on disks created on the IBM PC.

Tandy claimed to have a product that was compatible with existing packaged software; however, the Intel 80186 chip limited the machine to relatively few such packages.

Tandy had high hopes for the 2000, aiming it at IBM's traditional office turf and Tandy's weakest market. The company was counting on the 2000 to improve its consumer toy image and to slow the ascent of the IBM PC as the de facto industry standard. A number of software companies had promised to produce software for the 2000 to give it the extra push needed to stop IBM's momentum. IBM, however, remained supreme, because Tandy's machine didn't quite deliver the goods.

Ironically, Tandy's portable machine, the model 100, was a big success during 1983; many buyers picked up the inexpensive lap model as a traveling notebook. But many other companies have entered this business. If Tandy hopes to be a competitor in dp, it must develop a marketing strategy to outwit Big Blue and add to its profits column in a big way.

# 14



## COMMODORE INTERNATIONAL LTD.

950 Rittenhouse Rd.  
Norristown, PA 19403  
(215) 666-7950

Commodore rode the crest of the micro wave to new heights in 1983. Corporate revenues increased 127% to \$1.04 billion, up from \$459.8 million in 1982. Earnings also skyrocketed 91.6% to \$126.1 million, up from \$65.8 million in 1982.

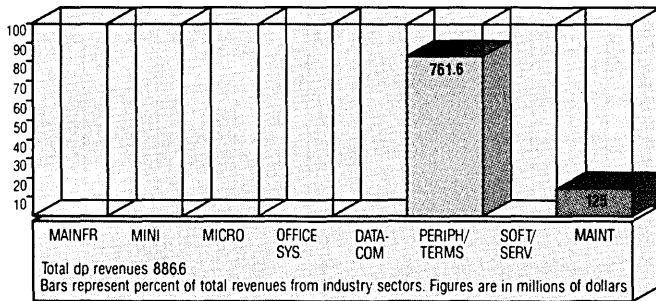
These gains were made while its major rivals were floundering in the price-cutting environment of 1983. Atari and Coleco were both having problems and losing money. Texas Instruments went for 10 rounds and then quit, a definite loser. Apple watched as its perfect earnings record went down the tubes. Commodore's success in the competitive year led one analyst to comment, "Commodore has out-Japanesed the Japanese."

Upon reaching the billion dollar sales mark, however, Commodore seemed to trip up. Founder and president Jake Tramiel abruptly resigned, and was quickly followed by four other top executives. The reason for Tramiel's departure was a disagreement with board chairman Irving Gould over a new executive hire. The resignations sent tremors through Wall Street and the dp industry. As the dust settled, observers began commenting on Tramiel's well-known erratic management style and the furor seemed to die down. Analysts point out, however, that Commodore is poised for further expansion, and changes in the executive suite were not likely to derail the company.

During 1983, Commodore passed a number of milestones. One important one was in the software arena, in which Commodore has been weak. In June, the company introduced 70 software packages for its computers, all priced under \$100. Among them were the new Magic Desk, which competes with Apple's Lisa and provides users with an integrated set of functions, including word processing and file updating. Analysts predict these products should generate \$200 million in revenues in the next two years.

One well-known aspect of Commodore's success is its integrated manufacturing abilities and strategically placed plants. Another is its dedication to its independent dealers, as evidenced by the time Commodore, behind because of production problems, began overnight shipping at its own expense to get its product to its dealers. These dealers have paid Commodore back in loyalty. During 1983, a considerable number of new dealers were added to Commodore's network: K-Mart, Sears, and J.C. Penney have all agreed to carry the Commodore line.

# 15



## STORAGE TECHNOLOGY CORP.

2270 South 88th Street  
Louisville, CO 80027  
(303) 673-5151

Murphy's law is alive and well and living—nay, thriving—at Storage Technology Corp. Whatever could have gone wrong during 1983, with scant few exceptions, did go wrong, at the worst possible time and in the most embarrassing manner. The year was, in short, an epic disaster of titanic proportions.

The financial results only begin to tell the story. After over a decade of steeply rising revenues and profits, culminating in 1982 with \$1.08 billion in revenues and net profits of \$64.7 million, revenues shriveled to \$886.6 million and profits evaporated completely. Net income totaled 3 cents per share in the first quarter, more than a 90% drop from the same period a year earlier. Then the picture got worse, with a profit of 1 cent per share in the second quarter and sizable losses—StorageTek's first ever—in the last two quarters. Over the year, the company lost \$40.9 million.

The firm's fortunes in general throughout the year were even worse than the financial nosedive. The late 1982 field replacement of defective head-disk assemblies in the 8650 disk subsystem cost the company a pretty penny early in the year, and endless delays on the 8380 disk drive line kept costs mounting through the year. The large-scale disk subsystem did not begin shipping in volume until the late fall.

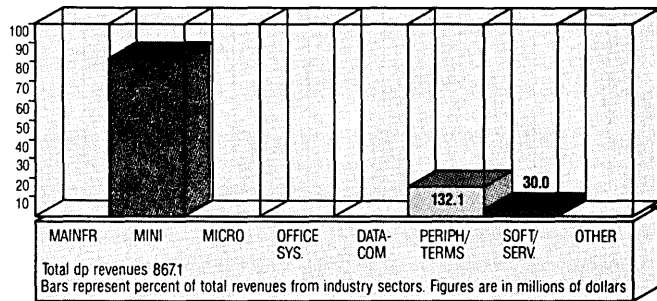
StorageTek had similar problems with both disk drive lines in 1982, but the firm's tape drive business was healthy enough to sustain the financial health of the company. In 1983, however, the tape business itself weakened, resulting in a \$9.4 million loss from continuing operations.

The lion's share of StorageTek's financial woes, however, is due to the steep development costs of two new products, an optical disk drive capable of storing 4GB per platter and a midrange mainframe computer. The optical drive was one of 1983's only bright spots, since it was announced on time and within the \$50 million budget raised by limited partners.

The mainframe project, though, was the most conspicuous of Storage Technology's many disasters during the year. It was designed to implement power and space-saving CMOS technology, but cost overruns and technical problems prevailed. StorageTek decided in January 1984 to cancel the cash draining project, resulting in an \$18 million write-off.

And if StorageTek's product woes weren't sufficient, the executive offices of the company became something of a revolving door, with several top aides to chairman Jesse Aweida resigning. Nonetheless, many analysts believe that StorageTek—which changed its logo from STC early in 1984 to avoid a trademark infringement suit—will rebound in the next few years because it is currently at the beginning of several product life cycles, which will generate more revenue as they age.

# 16



## DATA GENERAL CORP.

4400 Computer Drive  
Westboro, MA 01580  
(617) 366-8911

This time, mighty Casey did not strike out. Instead, with his back against the wall after two bad years, Data General ceo Edson de Castro hit a grand slam home run. The company's revenues climbed 7.9% to \$867.1 million; its net income leaped 125% to \$29 million; its operating margins turned sharply upward after hitting bottom in the fourth quarter of 1982, reaching 10% early in 1984; and its stock price increased by 350% since August 1982. So there is indeed joy in Mudville, and in Westboro, and on Wall Street, for Data General has roared back to life.

The company's financial success marked a major turnaround, as Data General resumed the upward spiral it enjoyed through the first decade of its life. Yet the extent of the turnaround is only partly measured by the financial results. It is also apparent in the firm's ability to attract nine new officers to the company to complement company founders de Castro and executive vice president Herb Richman, and in its products. Data General completely updated its superminicomputer line in 1983, snaring the technological lead from archival Digital Equipment.

The 32-bit Eclipse line, whose first member was introduced in 1980, three years after DEC created the market, was expanded at both ends, with the top-end MV/10000 providing twice the power as the top-end DEC VAX-11/780 at about the same cost. The low end was extended with the MV/4000, and two MV/8000 models updated the midrange. The Eclipse MV line continues to account for the largest portion of Data General's revenues and is sold through both the oem oriented Technical Products division and the commercially oriented Information Products division.

Data General also introduced its second stab at the microcomputer market in 1983, the Desktop Generation line. The line ranges from a low-end model 10, comparable to many other pcs, to a high-end model 30 capable of running minicomputer applications. The systems can all run DG's AOS operating system, providing a family of completely integrated products from the low-end model 10 micro to the high-end MV/10000 supermini.

The firm was active on the software side as well, landing two of the largest software contracts in history. Both the U.S. Forest Service and E.F. Hutton signed multimillion dollar contracts to use the CEO line of office automation software. DG also combined with Rolm to offer one of the three certified Ada compilers currently available, and joined forces with both Northern Telecom and AT&T to offer computer-to-PBX connections.

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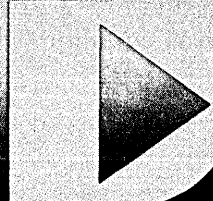
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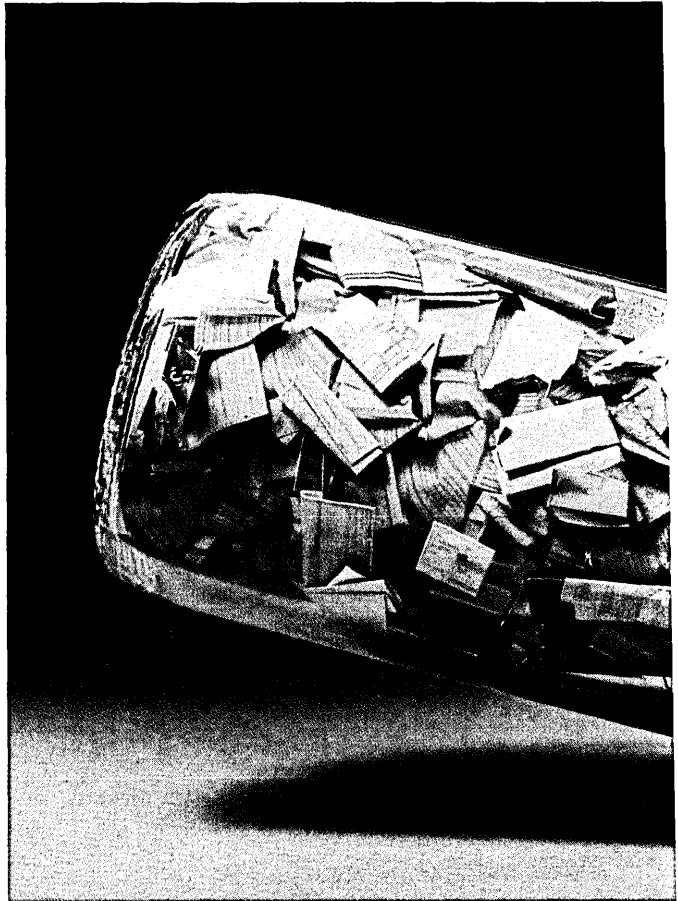
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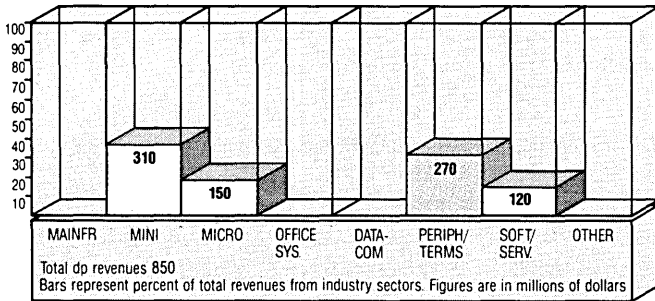
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## TEXAS INSTRUMENTS INC.

P.O. Box 22574  
 Dallas, TX 75265  
 (214) 995-3773

The Yellow Rose of Texas turned bright red last year. Texas Instruments did indeed have a lot to blush about in 1983, when it was forced to bolt the home computer business, saddling the company with a walloping \$660 million pretax loss. Result: TI took to the debt trail, reporting a consolidated after-tax loss of \$145.4 million compared with net income of \$144 million.

TI's total corporate revenue inched up 6% to \$4.58 billion. The company claims its 1983 dp revenues crawled up a mere 1% to \$680 million after the pc fiasco. Most of the dp revenues stem from the minicomputer arena, which posted a 1% increase to \$330 million. Terminals and printers contributed \$260 million—down slightly from 1982.

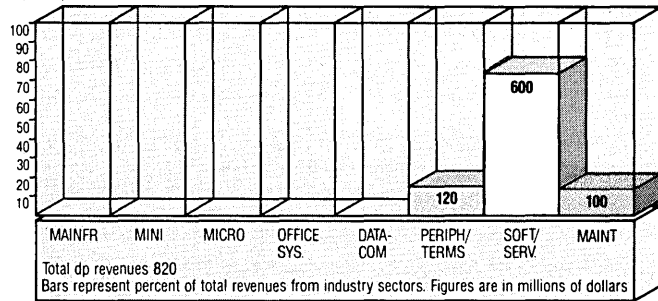
Overall, 1983 was a year of sluggish sales and shipments for one of TI's more dynamic divisions. Contradicting this trend was the TI Professional Computer. Sales of the system, which is aimed at the business market, continued strong throughout the year, especially in the last quarter. TI's Business Systems series minicomputers didn't fare as well, reflecting the general trend in the industry. Nevertheless, sales of the mini began to pick up in the second half of 1983. The company itself admitted year-end results for its digital systems operation were depressed by new product development and marketing costs.

The digital products sector, however, was a veritable gold mine compared to TI's consumer electronics group. There were no happy trails, only tears for TI as it slashed the price of its ill-fated 99/4A home computer below \$100. This drastic move didn't help earnings; sales of the system and its associated peripherals and software continued to drop last year, and operating losses continued to mount.

Then finally it happened. The eyes of Texas and the world were on TI as it gloomily announced its withdrawal from the home computer business on Nov. 1. Following that announcement the company summarily fired 1,000 employees at its Lubbock, Texas, plant, the home of TI's troublesome home computer. In abandoning this market, the company is also abandoning a concept that it can truly be successful in the consumer marketplace.

Helping to mitigate against this disheartening loss was good news on the semiconductor front. Like other semi manufacturers, TI was greatly helped in its semiconductor business by the overall market recovery. Decent sales were also reported by the company's defense electronics operation.

Having tossed out its earnings sponge—the home computer operation—the giant electronics company is now free to get on to more profitable business pursuits. Leading TI in that pursuit will be J. Fred Bucy, succeeding Mark Shepherd Jr., who retired as ceo.



## GENERAL ELECTRIC CO.

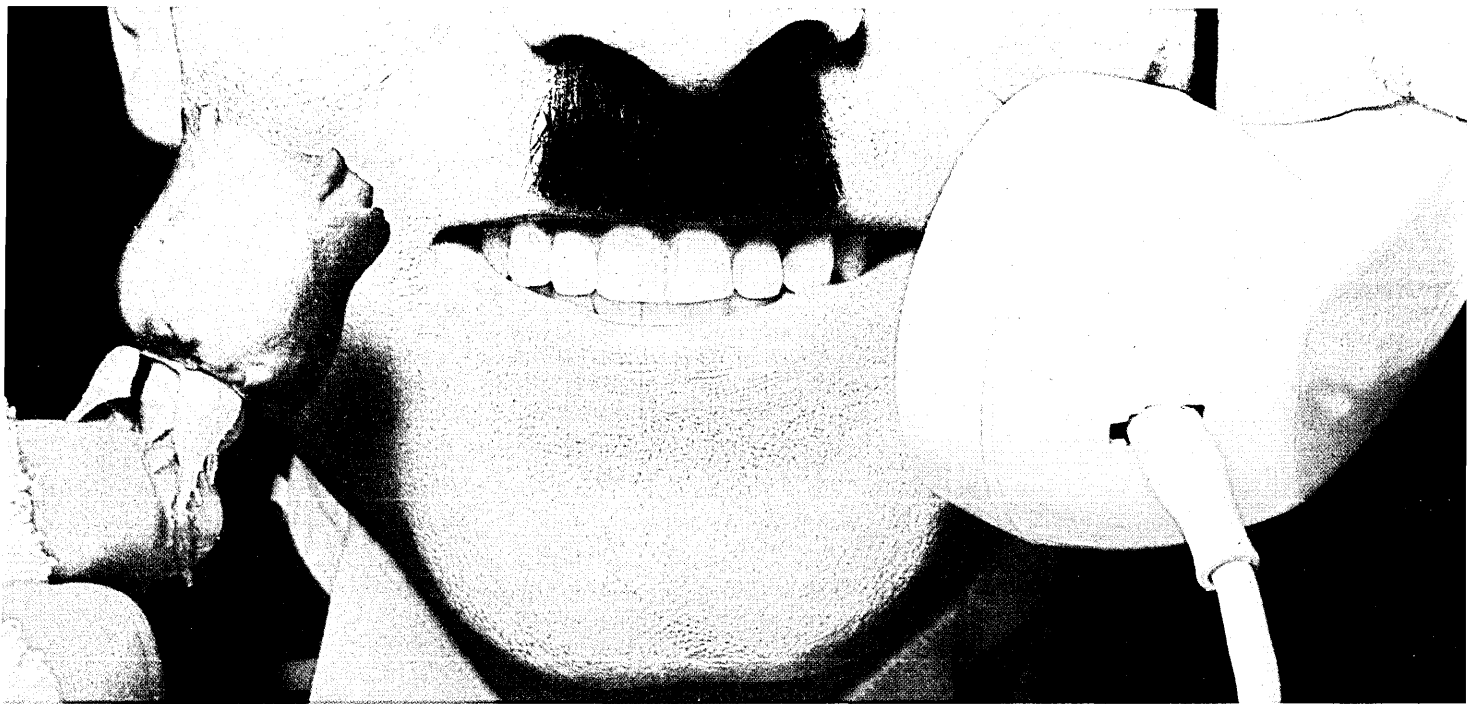
3135 Easton Turnpike  
 Fairfield, CT 06431  
 (203) 852-8200

Despite the economy's general improvement, General Electric continued to have difficulty in 1983. Revenues picked up 1% after a 3% drop in 1982, finishing at \$26.8 billion on the year. Net income increased 11% to \$2 billion from \$1.8 billion in 1982. Even those modest increases were substantial compared to GE's dp business segments in 1983, however. Revenues from dp fell 5%, to \$820 million from \$862 million. And while the firm would not be specific, it did report that net income for the dp-related businesses was also sharply lower on the year.

By far, the largest portion of GE's dp business is the General Electric Information Services Co. (GEISCO) subsidiary, where 1983 revenues dropped 8.5% to \$600 million, from \$655 million in 1982. In large part, that drop reflects the general decline of the timesharing industry as in-house computing capabilities increase; it also reflects a change in GE's strategy. GEISCO's greatest source of revenue continues to be the Mark III teleprocessing network, the world's largest such commercial network, but GE is shifting its emphasis to distributed computing services provided by the network. This shift comes from GEISCO's attempt to tie personal computers into Mark III. In January, GEISCO became an IBM value-added dealer so it could sell its customers IBM PCs; it then enhanced Mark III to accommodate—and encourage—the use of pcs rather than terminals.

The results of that strategy shift are apparent in GE's 4% gain in peripherals revenues, to \$120 million, as users began shifting to the high-ticket pcs rather than the cheaper terminals. The peripherals revenues were also aided by a micro-to-mainframe communications board sold by GEISCO's subsidiary, Software International Corp., which provides financial software products for both micros and mainframes. The Smart-Link hardware/software combination for linking pcs to central hosts was introduced in February.

General Electric also manufactures and sells the Calma line of CAD/CAM/CAE design equipment. Calma recorded an 8% gain in 1983, to \$100 million, as the CAD/CAM industry continued to grow explosively. Calma broadened its electronic design software offerings by acquiring TEGAS Systems, a computer aided engineering software firm.



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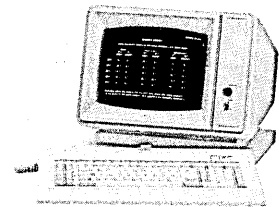
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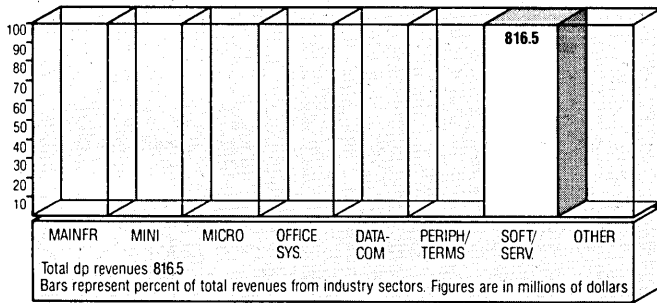
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THE RIGHT DECISIONS**

CIRCLE 36 ON READER CARD

# 19



## AUTOMATIC DATA PROCESSING INC.

One ADP Boulevard  
Roseland, NJ 07068  
(201) 994-5000

ADP is the only company in the industry to have produced its own U.S. senator, founder Frank Lautenberg. More impressive, however, ADP has achieved earnings and revenue growth of over 10% for each of the last 23 years, a record unmatched by any other company listed on the New York Stock Exchange.

Last year, the company's total revenues hit \$816.5 million, up 15.9% over 1982. Net income rose by 14.5% to \$68.7 million. At year's end, the corporate purse was plump: \$52 million in cash was on hand.

Research and development costs hit \$29.5 million last year, an increase of 18%. Some of this increase was due to the company's expansion of its brokerage services from the back office into the front office. Quotron, the longtime leader in front-office information distribution, is already said to be feeling the heat of ADP's foray into this market. Prudential-Bache is working with ADP on this project, but ADP will be free to market the service to the financial industry just six months after Prudential-Bache goes on-line.

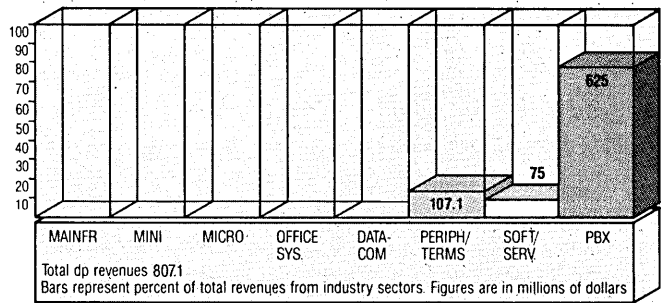
ADP's acquisitions last year also demonstrated the important place brokerage services will play in its future: in June it bought Computer Information Service Inc. (CIS), and in August, GTE Telenet Information Services. CIS is a veteran supplier of back-office, record-keeping services to brokers and traders, and CIS delivers database and quotation services for the brokerage and investment community. ADP says these acquisitions will "accelerate" its development of an interactive workstation for sales, trading, and operational personnel in the securities industry.

About a third of ADP's income comes from its payroll business, an area that has recovered from the staff reductions with which many of its client industries responded to the recent recession: there are more customers and the average number of employees on each payroll has increased.

Electronic funds transfer is one area of ADP's business that still hasn't made any money. Losses of between \$300,000 and \$400,000 per month were common last year. But the company says it will stop losing money there by the end of 1984.

When the silver-haired, silver-tongued Lautenberg left for the marble pastures of D.C., there were some who feared for ADP. Better they should have bought stock.

# 20



## AMERICAN TELEPHONE & TELEGRAPH

550 Madison Ave.  
New York, NY 10022  
(212) 393-9800

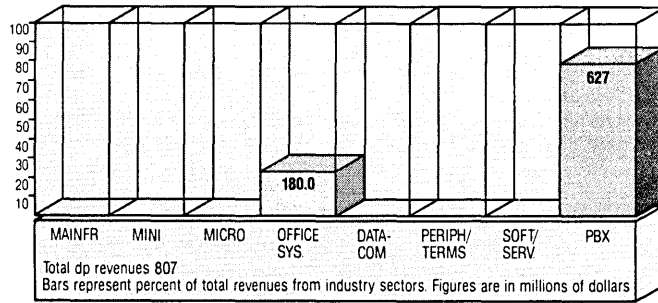
What a difference a year makes. As the crowds milled in Times Square to ring in 1983, we still had Ma Bell to kick around. Twelve hours later, a multibillion dollar subsidiary called American Bell was weaned, and vice president Archie J. McGill introduced AT&T's first digital PBX. Six months later, McGill was gone. By the time the crowds milled in Times Square to ring out 1983, American Bell was gone too, and so was Ma Bell's venerated Bell System. In the end, the familiar names of Long Lines, Western Electric, Bell Laboratories, and Teletype had either been obliterated or obscured; we now have AT&T Communications, AT&T Technologies, AT&T Information Systems, AT&T Bell Laboratories, and AT&T Teletype. All of this left the accountants with the nightmarish task of sorting out Ma Bell's finances.

Those finances, as it turns out, were less than overwhelming. AT&T's 1983 corporate revenues came to \$69.4 billion, a 7% rise from 1982, while 1982's \$1.5 billion net income became 1983's \$4.9 billion net loss. Early in 1984, AT&T ceo Charles Brown announced that for the first time in history AT&T's earnings could not cover its declared dividend, but it would be paid anyway. Future dividends were left in question.

The dp side was no better, with revenues outside AT&T gaining 1% to \$807.1 million. Bell's revenues from the Unix operating system and a host of applications software packages were flat on the year at \$75 million, and AT&T's PBX business picked up a mere 4%, to \$625 million. DATAMATION estimates that upwards of 90% of that PBX business was for analog switches, with the System 85 voice/data digital switch pulling in the remainder.

The Teletype subsidiary's sales outside AT&T of terminals and data communications equipment fell 7% to \$95.8 million, and its maintenance and repair revenues dropped 47% to \$11.3 million. The drops are due more to an increased percentage of sales into the Bell System—to 71% in 1983 from 62% in 1982—than to weakness in the business. None of AT&T's approximately \$600 million worth of 1983 sales of the 3B series of minicomputers were included in its dp revenues, because the hardware was sold exclusively into other parts of the massive company. Those sales will be included in 1984 because of the divestiture of the local operating companies—the largest users by far of the 3B line—and the March 1984 announcement that the line would be sold to others outside AT&T.

# 21



## NORTHERN TELECOM INC.

259 Cumberland Bend  
Nashville, TN 37228  
(615) 256-5900

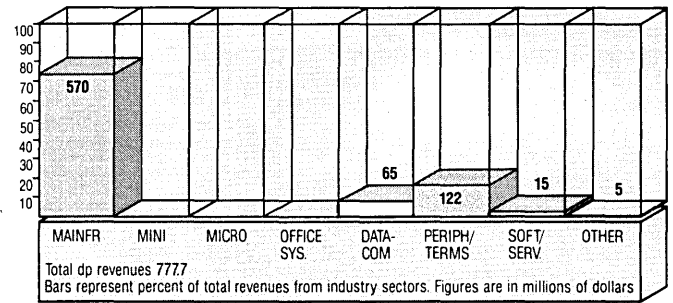
Northern Telecom's acute embarrassment in the computer industry finally ended last year. The Canadian telecommunications hardware vendor bought several U.S. data processing companies in the late 1970s in the hopes of meshing their terminals and cpus with its PBXs and other gear and creating the office of the future available from one vendor. Instead, it lost key dp designers and marketers, customers, and money. In 1983, however, the hemorrhaging ended when the company announced that the last consolidation of its dp operations, into an Electronic Office Systems (EOS) group, led to break-even or marginally profitable operations at year-end.

Included in Northern's \$1.9 billion in sales is about \$180 million in terminals and other office hardware and \$627 million in digital PBXs that switch voice and data communications; the rest of the revenues represent specialized switches for telephone companies. Corporate net income soared last year 93% to \$268.4 million, in part due to the carrying forward of tax losses from prior years and the economies of scale in its PBX business, increased sales to the Bell operating companies, and the cauterizing of the losses at EOS. R&D funding was sharply boosted, to \$324 million from \$241 million in 1982, as the company continued its efforts to make its PBXs and other hardware compatible with dp equipment made by other firms.

This "open world" policy provided for bridges to hardware built by more successful dp players, such as Digital and Sperry. The company's PBXs now include optional cards for handling IBM PC transmissions and moving analog data to other areas of an organization without modems.

After shoring up the weaknesses in its EOS, the company began a new disk and tape drive venture in Ann Arbor, Mich., site of one of the companies folded into Northern six years ago. If the company is to meet its goals of increasing revenues and earnings by more than 25% this year, its ventures in the dp business must be more successful than in the past.

# 22



## AMDAHL CORP.

1250 E. Arques Ave.  
Sunnyvale, CA 94086  
(408) 746-8510

Everything came together for Amdahl in 1983 as the company hit new highs in revenues and earnings. Revenues soared 68%, to \$777.7 million, on the strength of demand for the Model 580 family of IBM plug-compatible mainframes. It was the earnings side, however, that showed the most improvement—net income up 621% to \$46 million. Only \$3.2 million of that was an extraordinary gain; the rest was real profit. Amdahl's earnings were very depressed in 1982 owing to production and reliability problems with its new large-scale processors. Once Amdahl solved these problems, it began to reap the benefits.

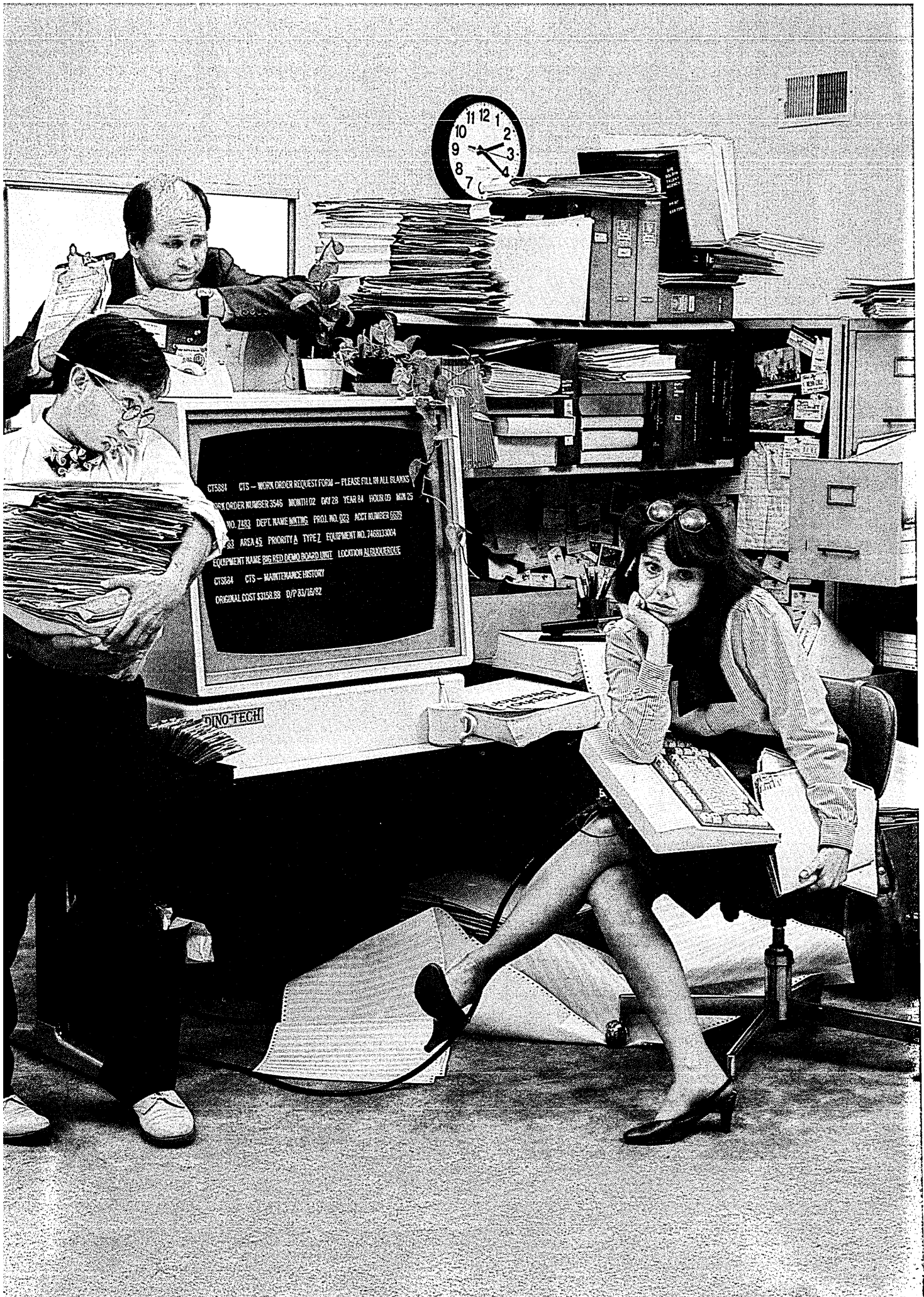
The uniprocessor 580 and its dual-processor siblings, the 58XX series, were subject to the usual combination of turbulence from IBM and skittishness from customers. A major reliability problem with the processors was resolved in what one observer called a mind-boggling troubleshooting effort.

By year-end the company had shipped about 200 processors, including the last of the old 470 systems. Estimates of 1984 processor shipments start at around 50% over the 1983 level, indicating that Amdahl may survive the short-term impact of price cutting announced by IBM late last year for its big machines.

Over the long term, the 10% or so price reductions for 308X series machines are expected to be a big challenge for Amdahl sales personnel, or at least until a new big processor box is introduced to reestablish the typical price/performance trade-off Amdahl has enjoyed in the past. Pressure on the company's order books for the new Sierra line from IBM will no doubt increase the suspense about whether the plug-compatibles have a promising future.

Wall Street analysts are particularly happy with Amdahl's success in the disk business. They estimate that Amdahl, which started with nothing in 1982, shipped close to \$100 million worth of Fujitsu's Eagle disk drives during the year, and they expect the company's peripheral business to increase to \$250 million to \$300 million in 1984, partly because of rising sales of data communications gear.

There were rumors during 1983 of a possible AT&T-Amdahl marriage, but Fujitsu, which has owned 30% of Amdahl for years, recently upped its stake to 49.5%, putting an end to such rumors. The Fujitsu disk drive connection in 1983 showed just how profitable Amdahl could be. More technological exchanges are expected in the future.



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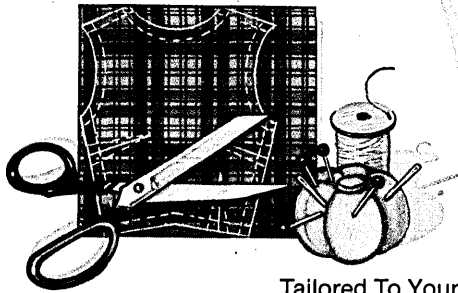


*The unassuming ITT Courier 1700 display.*

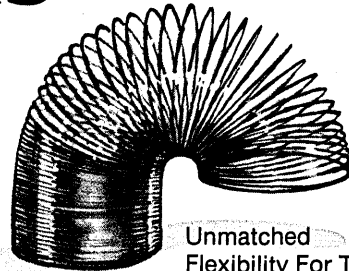
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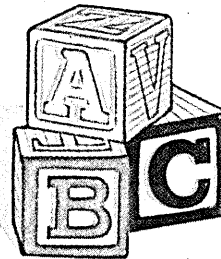
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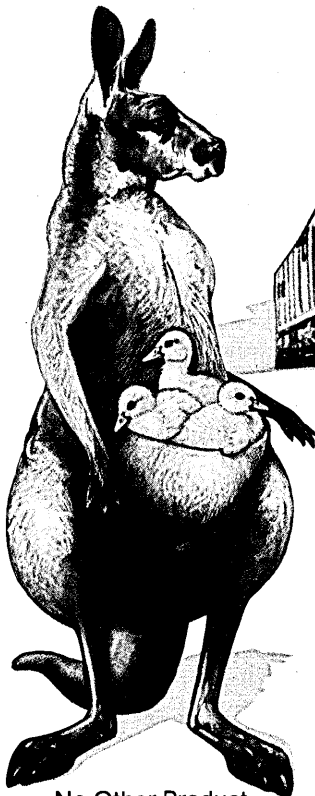
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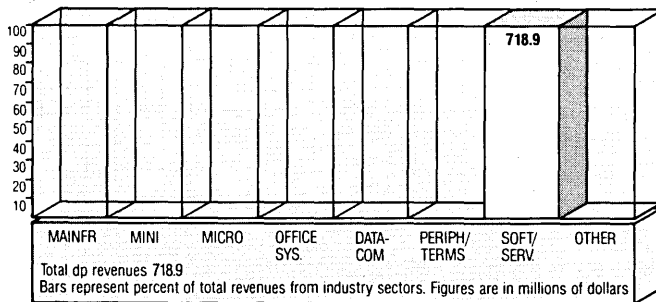
**(800) 323-7335**

Pansophic Systems, Inc., 709 Enterprise Drive, Oak Brook, Illinois 60521. In Illinois, call (312) 986-6000.

CIRCLE 38 ON READER CARD



# 23



## COMPUTER SCIENCES CORP.

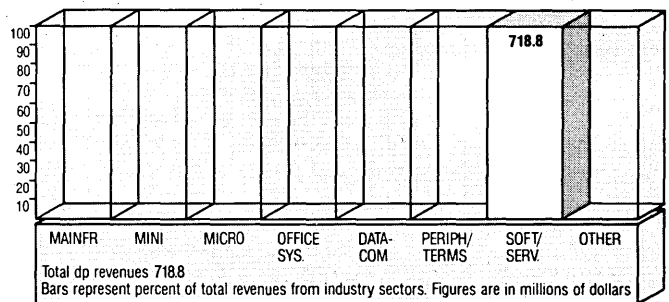
650 N. Sepulveda Blvd.  
El Segundo, CA 90240  
(213) 615-0311

Computer Sciences slogged through an off year despite a 5% increase in revenues, to \$718.9 million from \$683.4 million. Net income was off nearly 20%, to \$15.9 million from \$19.7 million. Part of the problem was that the firm spent almost as much time in the courtroom as it did in the boardroom. It won a \$1.5 million settlement against ITEL Corp., but spent \$4 million in a separate case, related to a completed contract with the U.S. General Services Administration for remote computing services. The company also suffered because of the continuing decline in the use of timesharing services experienced throughout the industry. CSC sold some accounting services in September to hasten its exit from the timesharing business.

Computer Sciences breaks its business into two segments, data services and contract services. The data services operation provides customers with remote dp services using proprietary packaged software and the Infonet timesharing network. Revenues in this area continue to climb slowly, but income has been evaporating, dropping from a pretax high of \$24.8 million in fiscal 1980 to \$6.8 million last year. Despite the fall, there were some bright spots for the data services operation. It completed the upgrade of its Sperry mainframes ahead of schedule, and boosted its IBM systems as well. Applications on the Infonet service include credit reporting, tax processing, payroll, accounting, and distribution management services.

The contract services operation picked up strongly in 1983 after a lackluster 1982. The operation provides custom-designed computer and communications systems, support of client technical activities, and management of client computer facilities. It also develops and markets turnkey systems for government customers. CSC was particularly strong in dealing with the Defense Department last year, securing several contracts for command and control, weapons systems, communications, simulation, training, logistics, and management coordination. CSC teamed with Sperry in 1983 to win the largest dp contract ever awarded, a \$476 million pact with the Air Force.

# 24



## ELECTRONIC DATA SYSTEMS

771 Forest Lane  
Dallas, TX 75234  
(214) 661-6177

Apparently, last year EDS chairman Ross Perot engineered not a single international jailbreak. In 1983, the headlines earned by EDS were all on the business pages. Total corporate revenue rose from '82's \$562.6 million to \$718.8 million, up almost 28%. Net income rose by just a hair less, a little over 27%, from \$53 million to \$67.4 million. While things haven't been so wonderful for some companies in computer services, this firm has been growing steadily for almost a decade, and has paid its stockholders—Perot, the largest, holding 29% of the shares—handsome dividends since 1973.

A lot of EDS's new business in 1983 continued to come from contracts with local, state, and federal government agencies. In fiscal 1983, fully 24% of EDS's revenues came from deals with federal agencies. (EDS's \$656 million deal with the U.S. Army, signed in 1982, is the largest single contract ever awarded in the computer services industry.) In October, for example, the U.S. Postal Service signed EDS to a seven-year, \$200 million contract to support airmail. In addition, Medicare and Medicaid programs in Alabama, Colorado, Florida, Idaho, Mississippi, Tennessee, and Texas will use EDS facilities. EDS has deals with welfare agencies in Mississippi, New Jersey, and New York and will support New York City's Welfare Management System. Further government contracts were signed with the Departments of Interior, Energy, and Agriculture, the U.S. Navy, the U.S. Army, the National Institutes of Health, the Social Security Administration, and the Immigration and Naturalization Service. While "big government" is not politically popular, it has demonstrable charms for EDS salespeople.

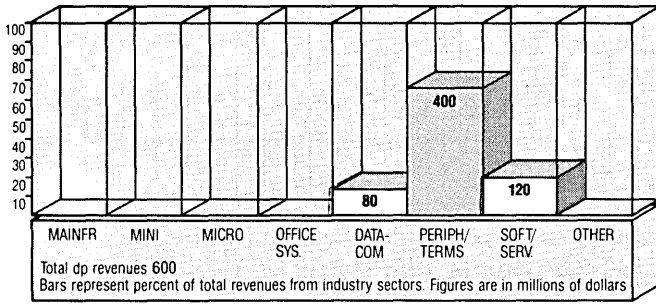
Another big customer for EDS has been the nation's banking and thrift industry: during the third quarter of '83 alone, EDS signed contracts with 79 new credit unions, and added 22 banks and several existing customers to the user list of its Inform community banking service.

Among EDS's 1983 acquisitions were credit union processing companies in Virginia, Wisconsin, and Texas; the U.S.-based business of Datacrown, a Canadian teleprocessing service; and the data center operations of Computer Usage Corp.

One entry on EDS's balance sheet raised further memories of the company's involvement in Iran: in June, after two years of negotiations, EDS managed to collect a \$16.5 million court judgment from the Khomeini government for work that had been done for the Shah's Social Security Organization.

Between new business and old, EDS has about \$2.8 billion in confirmed orders on its books. Scheduled for delivery over the next few years, this business should ensure that EDS's annual revenue gains will continue to be robust.

# 25



## ITT CORP.

320 Park Ave.  
New York, NY 10022  
(212) 752-6000

An idle viewer of ITT's ubiquitous television commercials might assume it had invented everything up to and including sliced bread. But if it didn't invent everything, it certainly seems able to sell everything. Nestled among the other businesses of this largest of conglomerates was about \$600 million in 1983 sales of dp and terminals, about 14% over its 1982 level. The dp upturn looks even better when viewed against a 4% drop in overall corporate revenues, down to just over \$20 billion from \$21 billion. Despite the downturn, profits were up 1.8% to \$674.5 million, partly because the company continues to trim its huge staff, now hovering at just about 278,000.

(One very visible change at ITT in 1983 was its new name. The International Telephone and Telegraph Corp. dropped everything but the acronym by which it had been known for years, and ITT now stands for nothing more than ITT.)

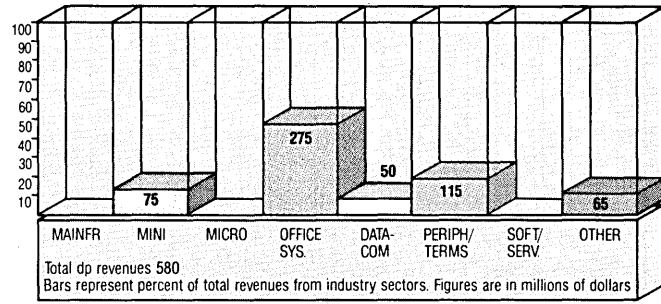
Data communications accounted for a little over 13% of ITT's dp revenues last year, about \$80 million, and this segment of ITT's business is expected to grow if access to its new packet switched network increases. Announced last summer, the network can now be used by customers in five cities, and while the company says more cities will be added by the end of 1984, the network has grown more slowly than expected.

Qume, the San Jose-based maker of printer and memory devices that ITT bought in 1978, is estimated to have about \$200 million in revenues. But profits in this field are under intense competitive pressure: early this year, Qume announced its last domestic factory would close and manufacturing would move to existing plants in Taiwan and Puerto Rico.

ITT Courier Terminal Systems announced late in '83 it would be selling an IBM PC lookalike, the Xtra, with shipments to begin around tax time this year. Deliveries were delayed and the first machines should be reaching stores as you read this, priced just under IBM's machine. It's expected Xtra will do better in European markets where ITT's dealer network is strong and well established.

Whether or not Xtra adds much extra cash to ITT's bottom line, this year will probably mean increased sales for the company because of the AT&T breakup. With the regional Bell operating companies forced to seek hardware from sources other than Western Electric, ITT's new digital switch could add more customers. Southwestern Bell has already ordered \$30 million worth of telephones from ITT. So the company that began decades ago when AT&T divested its foreign operations could do almost as well out of the current divestiture.

# 26



## HARRIS CORP.

1025 W. NASA Blvd.  
Melbourne, FL 32919  
(305) 727-9100

The news from Harris headquarters is mixed. For calendar 1983, total corporate revenues increased 6.1% to \$1.64 billion while net income dropped 6.4% to \$68 million. These results, however, are difficult to compare because of the 1983 merger with Lanier Corp.—Harris hasn't restated its results for 1982 with the inclusion of Lanier as yet, and therefore these figures could change. DATAMATION estimates that dp revenue for the combined company reached \$580 million, including an estimated \$275 million from Lanier's word processing line.

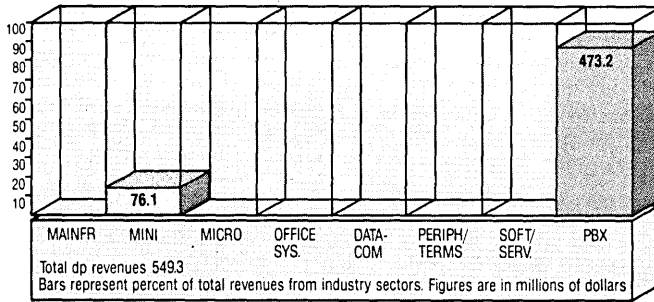
The merger with Lanier was done on a stock swap basis, but the value of the deal was about \$275 million. Wall Street skepticism about the merger pushed Harris stock down; since then the stock has recovered.

Harris is divided into five operating groups. The largest of these is the government sector, which contributes about half of Harris's total revenues. The communications sector, with a large portion of its sales overseas, particularly in developing countries, has had depressed revenues. Harris is therefore trying to redirect its marketing efforts toward developed countries, particularly the U.S. The semiconductor sector is experiencing increased sales as demand grows. Harris is in a particularly good position in semiconductors because it has redirected its product line away from the competitive RAM market and into the 16-bit CMOS microprocessor market.

The information systems sector, which is primarily data processing, has problems, the main one being the terminal business that DATAMATION estimates was relatively flat for calendar 1983 with sales of \$115 million. Another factor hurting the information systems sector was its dependence on overseas business, where the ongoing recession caused sluggish sales for Harris.

In Lanier's Atlanta headquarters there has been good news. This manufacturer of dictating machines and word processing equipment has been successful with its latest line of wp equipment after switching from a line manufactured by another firm.

Wall Street analysts remain skeptical about Harris's future in dp. The big question is, how will the merged companies combine Lanier's marketing ability with Harris's technology to become a strong contender in the office automation market? It will take two or three years to answer that question.



## ROLM CORP.

4900 Old Ironsides Rd.  
Santa Clara, CA 95050  
(408) 983-2900

There is an old Chinese curse to the effect, "May you live in interesting times." Rolm certainly found 1983 to be interesting. Revenues continued to rise, income was up, major new products were announced on schedule, lawsuits were begun and completed with minimal disruption of business, and, oh yes, IBM deigned to take an interest in the company.

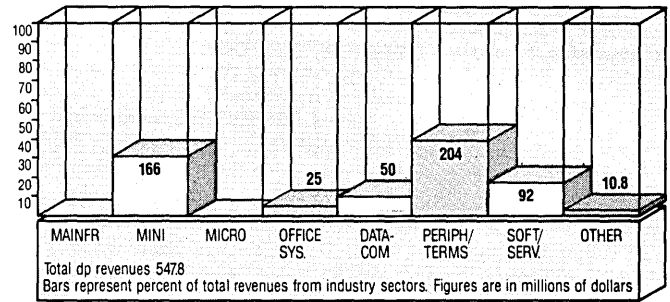
For the year, revenues climbed 23% to \$549.3 million while earnings inched upward 3.3% to \$34.1 million. While still healthy—especially considering Rolm's size—1983 did mark a slowing from previous years. In 1982, by comparison, Rolm's revenues grew 35% over the previous year and income jumped 26%. A significant amount of would-be net income was invested in R&D, which jumped to \$41.3 million, 42% more than 1982.

Both of Rolm's primary businesses fared well during the year. The Mil-Spec division, which sells minicomputers to the military, saw a 22% gain in revenues, to \$76.1 million. The business communications division, which is the CBX family of private branch exchanges, grew 23% to \$473.2 million.

The CBX business hit the headlines several times throughout the year. In February, Rolm sued Plessey Telecommunications Ltd., a British firm that Rolm said misused Rolm technology and copyrighted software. Rolm sought to enjoin Plessey from selling a PBX it said was based on the CBX, and asked for \$100 million in damages. By November, however, the two sides had agreed to an amicable settlement in which Plessey would pay Rolm an undisclosed amount for a licensing agreement so that the former could continue to sell its PBX products.

Also in November, Rolm introduced the first major revision of the CBX switch, called the CBX II. The product will replace four of the five types of switches Rolm sells. Its largest configuration can handle 4.4Gbps, which gives users ample room for future expansion of their voice and data communications networks. The CBX II family is completely compatible with the CBX family, which was limited to 740Mbps. Rolm said the CBX II, which cost \$80 million to develop, will eventually account for 70% of its corporate revenues. By comparison, the CBX family currently accounts for 86% of corporate revenues.

The news that got Rolm the most headlines during the year, however, was its partial purchase by IBM. The leading computer maker agreed in June to purchase less than 30% of the company, and as of early 1984 had 19.1% of the shares of the company and two representatives on Rolm's nine-member board of directors. Both companies were developing ways for IBM computers of all sizes to communicate over Rolm data communications switches. That intent was apparent even in February, when Rolm announced a gateway product that allowed the CBX to connect into SNA networks.



## DATAPoint CORP.

9725 Datapoint Drive  
San Antonio, TX 78284  
(512) 699-4428

Datapoint returned to profitability during 1983, but the disastrous accounting scandal took its toll on the company. Revenues for calendar 1983 rose 6.8% to \$547.8 million, from the \$512.9 million reported a year earlier. Earnings increased also, but were far from Datapoint's historical levels. The company posted earnings of \$13 million for calendar 1983 vs. the loss of \$7.9 million in 1982.

The accounting scandal of late 1982 took Datapoint and Wall Street by surprise. The company responded by firing a number of executives, and taking huge writeoffs during the year. Time spent on financial problems would have been better spent on new products, because Datapoint lost some of its competitive edge in a number of markets. The next generation of products isn't due out until mid-1984 and will not help the company much during 1984.

New products in 1983 were limited to enhancements of the existing product line. For example, at the lower end, Datapoint announced the 1560 Small Business Computer System, an entry-level system that can expand from a standalone system to multiple interconnected processors on an attached resource computer or local area network. Datapoint also upgraded its 8600 series system with the lower-cost 8625, the 10MB disk, 1MB diskette system. Late in the year, Datapoint introduced the 8640 system, which features 512K memory, and adds a new disk system expandable to 130MB.

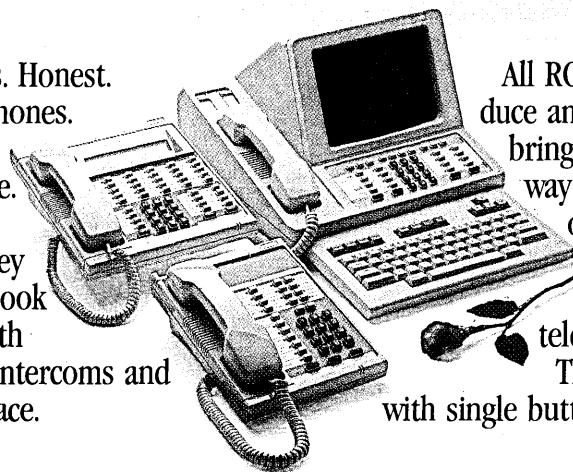
To make sure another scandal never darkens its doors, Datapoint brought in a number of new executives from such classy companies as Data General, Motorola, Sperry, Digital Equipment, and Xerox.

Datapoint also divested itself of a few subsidiaries during 1983. It sold its subsidiary in Denmark and its 50% interest in Texas Peripherals to its partner, Tandy. In addition, Datapoint transferred the assets of its money-losing Communications Products Division to a new entity. Datapoint retained a minority interest in the new company.

Datapoint's management kept a tight lid on expenses during 1983, but did increase R&D a bit to \$47.3 million, up from \$44.6 million in 1982. Obviously management is hoping that new products will pull the company out of its doldrums.

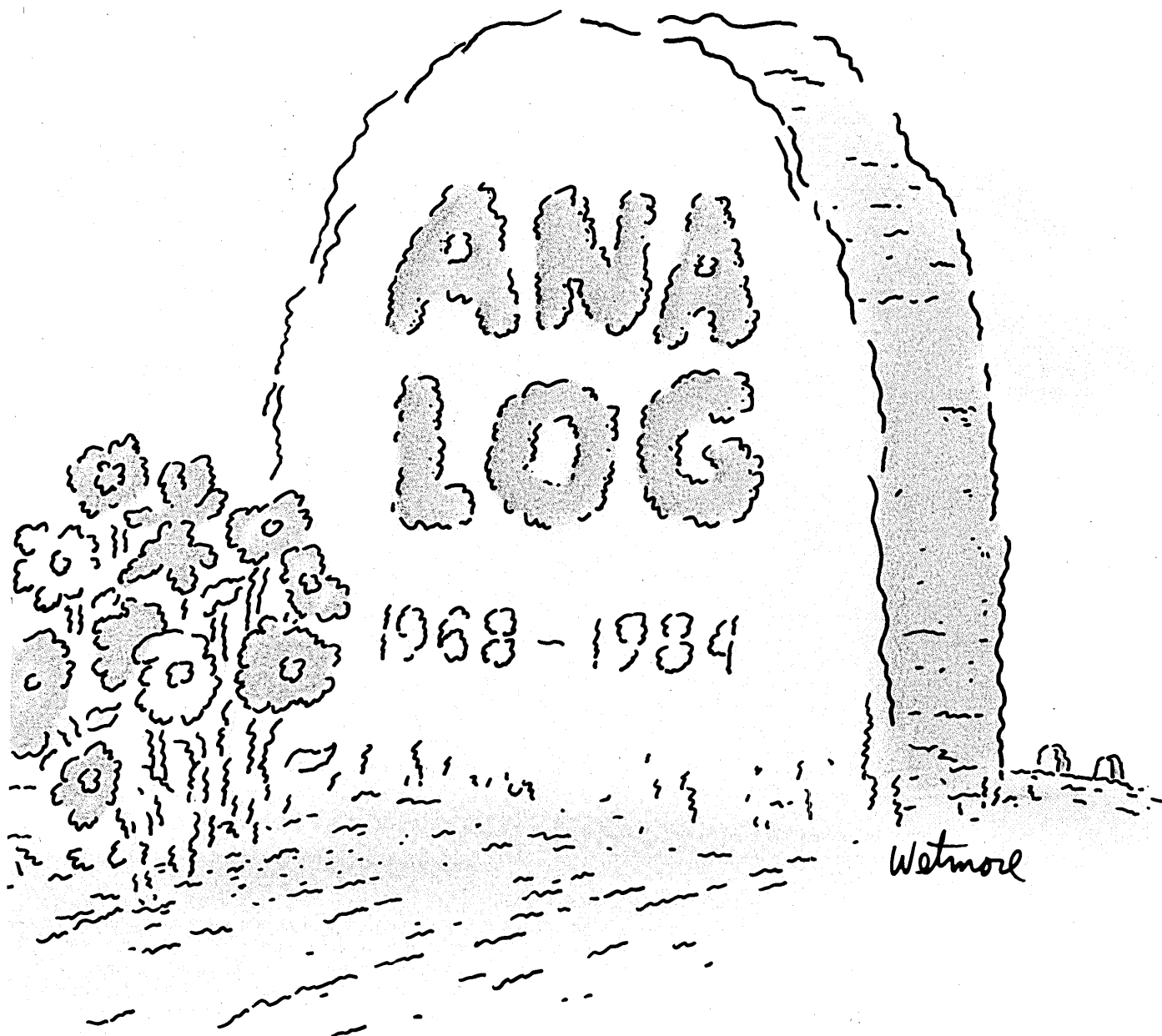
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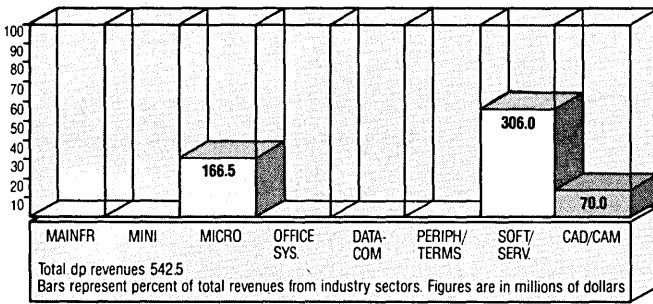
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## MCDONNELL DOUGLAS CORP.

P.O. Box 516  
 St. Louis, MO 63166  
 (314) 232-0232

Everything was up, up, and away for McDonnell Douglas Automation Company (MCAUTO). Even Wall Street's disapproval of the parent company's acquisition of Tymshare couldn't alter the company's direction.

The statistics went only one way. The bottom line on total corporate revenue was \$8.1 billion, an 11% increase over 1982's \$7.3 billion. Net income more than doubled that performance, rising 28% to \$274.9 million from \$214.7 million.

Dp was a major player in this movie. Total dp revenue from commercial sales also went up, jumping 14% to \$542.5 million from \$476.4 million. Total dp revenues, including sales to internal divisions, reached \$780.5 million, a 4% increase over 1982's total of \$747.9 million. There was much cheering over MCAUTO's commercial revenue performance. That rose 15% to \$376 million. Thus MCAUTO accelerated the 1982 trend of selling more to outsiders than insiders.

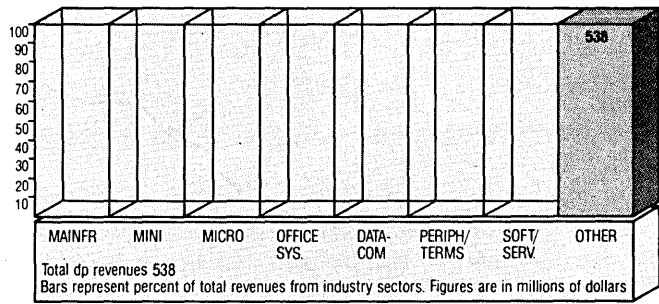
McDonnell's other dp arm, Microdata, also had a good year. Sales were up 12% to \$166.5 million from \$148.1 million. Unigraphics, the company's CAD/CAM system, won the gold star: sales jumped 47% to \$70 million.

Not content with playing a pat hand, both MCAUTO and its parent added significant new cards to their deck. MCAUTO in May bought the assets of Insight Technology, Whitinsville, Mass. Three months later, MCAUTO acquired a minority interest in Sanus Corp. Health Systems.

These acquisitions were part of a grander scheme, which culminated with the purchase of Tymshare. McDonnell Douglas had been coveting the timesharing company since November. The two parties had actually agreed—at least in principle—to a deal wherein McDonnell Douglas would pay \$31 per share for Tymshare. That deal fell through about a month later. But the two resumed discussions early this year, which eventually led to McDonnell Douglas's forking over \$25 per share.

McDonnell Douglas then played its trump card. It announced in March the formation of an Information Systems Group, composed of MCAUTO, Vitek, and Microdata. Tymshare will be added as soon as the paperwork is straightened out. The new group is chaired by McDonnell Douglas president John McDonnell.

The group expects sales to reach \$1 billion in 1984. A large portion will undoubtedly come from the newly formed McDonnell Douglas Health Systems, which includes MCAUTO's Health Services Division and Vitek. The Health Services Division provides dp services to one out of every five hospitals in the U.S. Vitek alone serves 330 hospitals in the U.S. The company clearly expects those numbers to rise, just as its performance did in 1983.



## COMDISCO INC.

6400 Shafer Court  
 Rosemont, IL 60018  
 (312) 698-3000

Comdisco has existed as a flea on giant IBM's back, and 1983 proved to be a bumpy ride for the computer leasing company. For one thing, the giant became a direct competitor to Comdisco, as IBM stepped up its leasing activity with a partnership of two financial powerhouses, Merrill Lynch and Metropolitan Life. Despite this new competition, Comdisco's performance for calendar 1983 appeared good: revenues increased 9% to \$538 million, and earnings soared 52% to \$49.0 million from \$32.2 million a year earlier.

Behind these numbers, though, linger big problems for Comdisco. The roof fell in in October, when a magazine article questioned Comdisco's accounting practices and the whole process of third-party leasing. The power of the press was immediately apparent. Leaseholders got nervous and stopped leasing. The IRS got curious and began investigating. And shareholders got scared and started selling. By February, when the annual meeting took place, the stock had dropped 70% of its value, and first-quarter earnings were off 25%.

Kenneth Pontikes, founder and chairman, explained at the annual meeting that the questioned practices only accounted for 12% of Comdisco's total revenues in fiscal 1983, but that hasn't convinced investors—the stock still languished in the low teens, from a high of \$40.

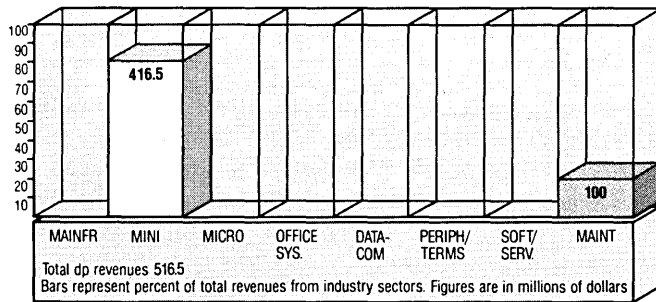
Security analysts remain optimistic. They say that if the tax shelter aspect of such deals can't be sold, then the leasing industry will, in the long term, raise rates to compensate for the loss of revenue. As John Keefe of Drexel Burnham Lambert explains, "Right now there is uncertainty, and how long this will last is hard to say, but Comdisco's basic strengths are strong."

Comdisco introduced new products that don't rely on the tax shelter approach. One program permits a customer to shop around and pick out the equipment that it wants; then Comdisco purchases it and leases it back to the company. This gives the lessee much more control over the equipment it uses. Another program allows a customer to test IBM's new extended architecture equipment before committing to a purchase.

One of Comdisco's big hopes has been long in materializing. The Disaster Recovery Service division, hot sites filled with IBM mainframes and available in case of a disaster, remained in the red in 1983. Pontikes, however, predicts a profit for 1984.

With 1983 ending up a very volatile year for Comdisco, the company faces many unknowns, which will certainly test Pontikes's management skills.

# 31



## PRIME COMPUTER INC.

Prime Park  
Natick, MA 01760  
(617) 655-8000

Prime found 1983 tough going. Revenues were up a respectable 19% to \$516.5 million, but earnings fell 27.6% to \$32.5 million from the \$44.9 million of 1982. Most of the earnings slack came early in the year, as Prime struggled to get costs under control. One move to cut costs involved the direct sales force, since the number of branch offices were cut from 44 to 58. In addition, a number of sales management layers were eliminated to centralize selling to major accounts.

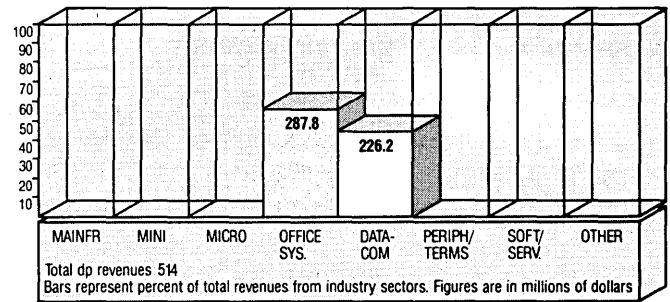
These moves were of limited financial success during the year, in part because of the tremendous competition in the mini-computer market. Data General currently has the price/performance lead with the MV/10000 and is putting a great deal of pressure on the market. Sales of Prime's high-end 9950 supermini were strong after its midyear introduction, and analysts estimate this machine now represents about 20% of total volume. The earnings decline does show that Prime's prior premium pricing approach is now softening. The 9950 was also the first commercial minicomputer to use emitter coupler logic (ECL) chips, though other companies soon followed.

Prime's fastest growing business is in the CAD/CAM market, which analysts expect to remain hot in 1984. Prime acquired the Medusa (solids modeling) and other software packages, such as EDMS (electrical design) and PDMS (plant design), and they are considered critical to the company's long-term future. Indeed, Prime's CAD/CAM revenues are now less than 20% of the total but could exceed 40% in the next three years if the company's planned efforts are successful.

Prime faces a much tougher environment than ever before. How its 9950 supermini will stack up against DEC's forthcoming top-of-the-line entry remains to be seen. The company is also facing a number of unknowns in the small supermini market, where its model 2250 faces DEC's MicroVAX models and Data General's MV4000, formidable competition both.

The company lost a number of senior sales and research people last year, as president Joe Henson revised the corporate culture to reflect a more mature organization. Several of Prime's former executives left to form other companies now in the supermini business, but Henson is optimistic about the company's future: "During 1984, we plan to continue our aggressive new product introduction schedule, and our strategic investments in R&D, customer service, and marketing programs. We believe our investments in 1983 have positioned us well to benefit from an improving economy."

# 32



## MOTOROLA INC.

Motorola Center  
1303 E. Algonquin Road  
Schaumburg, IL 60196  
(312) 397-5000

Motorola's semiconductor business drove its revenues and profits in 1983: last year's operating profits from chip sales exceeded the company's whole pretax income for 1982. Net sales hit \$4.33 billion, up just over 14% from the year before, and net earnings were \$244 million, up 37%. Dp revenues—from office systems and data communications—kicked in \$514 million to total revenues but contributed little or nothing to profits.

The Codex Corp., Four-Phase Systems, Universal Data Systems, and the International Division make up Motorola's Information Systems Group, and in 1983 the information wasn't terribly cheering. Four-Phase discontinued a line of central processing equipment in the fourth quarter and the resulting \$11 million write-off produced a \$5 million loss for the group. Despite a big order from the IRS and in-house optimism about MAESTRO, a software development system built by the European software house Softlab, the news from Four-Phase is expected to remain gloomy for a while longer. An expected strong performance from Codex and a probable improvement in international trade, however, should help boost the group out of the red for 1984.

The news from Motorola's communications businesses was better, but not thrilling: profit margins that had traditionally held at about 12% dropped last year to 5.7%. But a turnaround that began in the third quarter and intensified in the fourth quarter suggests that much rosier reports will be written about 1984's performance. Sales of Motorola's early entry in the advanced car-telephone sweepstakes are encouraging. Certainly, Motorola means to buy a hunk of future success: it accelerated its communications R&D investment by 24% in 1983. (Overall corporate R&D spending rose to \$336 million from 1982's \$278 million, an increase of just over 20%.)

Motorola's Communications Group is the source of a marketing victory that has cheered other companies faced with competition from the Japanese. The battle ground: pagers. When the intrusive little devices took off, the Japanese moved in. But Motorola fought back, and the pager remains an item in the American profit column.

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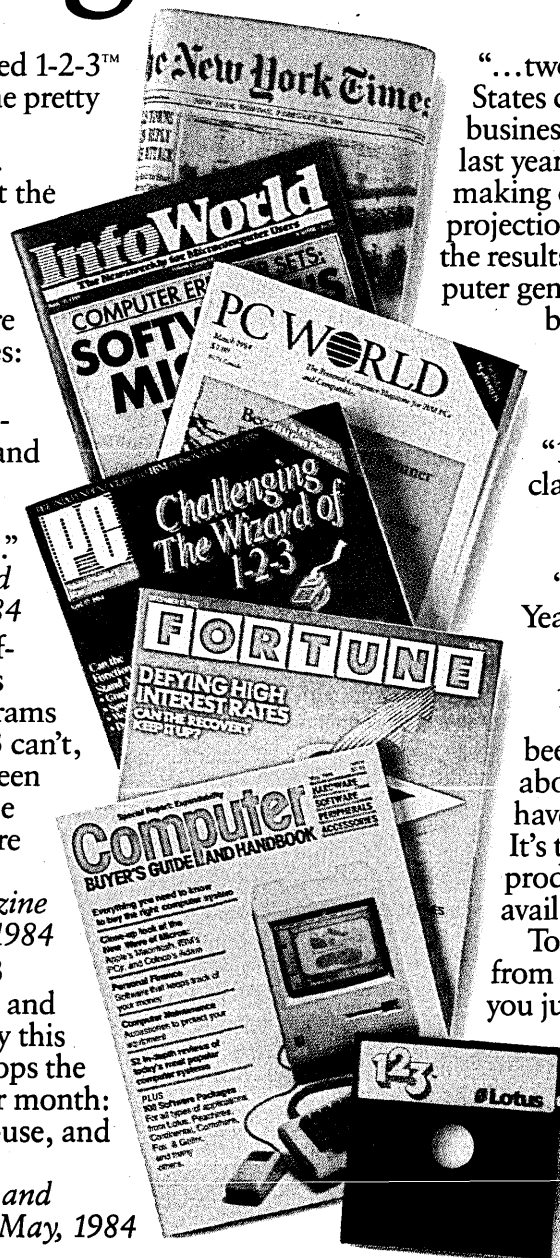
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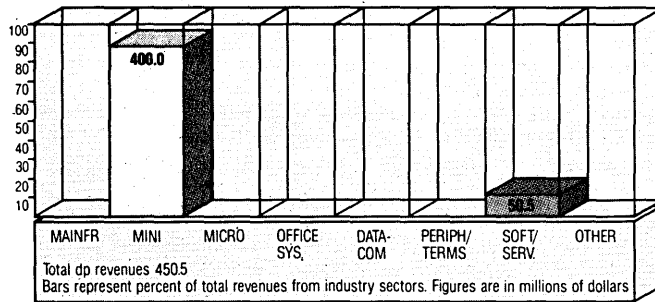


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## TANDEM COMPUTER INC.

19333 Valco Parkway  
Cupertino, CA 95014  
(408) 725-6000

The days of runaway growth have slowed for Tandem Computer. Last year the Cupertino company's dp revenues, according to DATAMATION estimates, were up only 34% to \$450.5 million, compared to the 41% and 88% gains posted in 1982 and 1981, respectively. That 34% increase is still nothing to sneeze at.

Tandem is indeed in the pink of health—an examination of its finances proves that. Helping out those finances is mini-computers, which continue to be the mainstay of the company's business. In 1983, Tandem's total revenues in that sector were up 28% to \$400 million.

A pioneer in the fault tolerant systems field, Tandem was in the black in its third year in business. And that business began booming. That boom was reflected by the company's phenomenal growth rates—growth that has gradually tapered off in the past few years. Also getting smaller are the company's inventories. Last year, Tandem launched a major effort to reduce its high inventories, a move that caused its per share earnings to dip slightly.

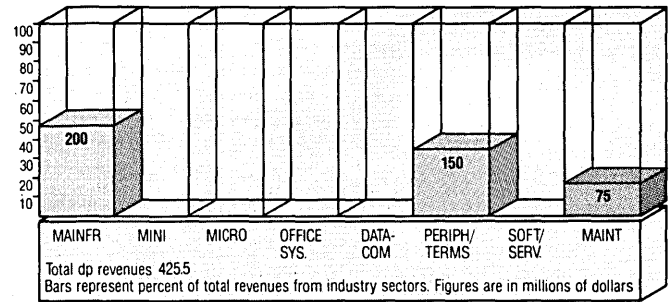
Tandem also increased capital spending and enlarged its sales force, setting up a separate federal government sales division. There was no such expansion drive in Europe, where Tandem decided to consolidate its operations, which pull in approximately 24% of the company's revenues.

On the manufacturing front last year, Tandem opened up a new automated facility for board assembling and testing in Watsonville, Calif. It also opened up an LSI lab for prototype chip development.

The company continued to be one of the major players in the on-line transaction processing market—a market that is expected to be worth a whopping \$28 billion by 1986. Tandem's 16-bit NonStop line of fault tolerant systems, introduced 10 years ago, got a big piece of that action, and its new 32-bit line of processors, the TXP, is doing well. Since then, the company has steadily increased its customer base. Last year it signed up 126 more customers, 47 of them in the fourth quarter.

To enhance its fault tolerant family, the company came out with Fox, a fiber optic extension that can tie up to 224 NonStop processors into a local area cluster. On the software side, Tandem announced the Snax package, which enables its Expand network customers to access SNA facilities.

More than 75% of Tandem's NonStop systems are sold to end users who develop their own application programs. The remaining 25% are oems and hardware/software development companies. Tandem seems to be putting more emphasis on the software side. Last year it launched the Alliance program to strengthen its relationship with software houses, and further insulate it from the recent entries in the fault tolerant market.



## NATIONAL SEMICONDUCTOR CORP.

2900 National Semiconductor Drive  
Santa Clara, CA 95051  
(408) 749-7420

The sharp turnaround in the semiconductor trade left National Semiconductor Corp. gloating over its revenue gains. And rightly so. Following two successive years of disheartening losses, National Semi finally returned to profitability in 1983, with net earnings skyrocketing threefold to \$24.2 million.

National Semi's dp revenue in 1983 rose 16% to \$425.5 million. The bulk of those earnings stemmed from the main-frame side, which posted a 14% revenue increase to \$200.5 million. Responsible for this revenue rise is National Semi's National Advanced Systems unit, which peddles Hitachi's medium- and large-scale IBM compatible systems. National Semi also derived some additional revenue on the peripheral side from Hitachi. In the peripheral and terminal sector, the company scored a 25% increase, bringing the total take there to \$150 million.

Some of that revenue was contributed by National Semi's point of sale (POS) operation. That operation was in turn helped out by the acquisition during the year of Data Terminal Systems Inc., the Maynard, Mass., maker of computerized cash registers and checkout systems. On the heels of the takeover last June, six executives resigned from DTS, which had reported a 34% drop in revenues to \$78 million in 1982.

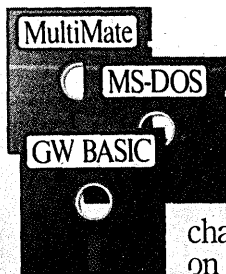
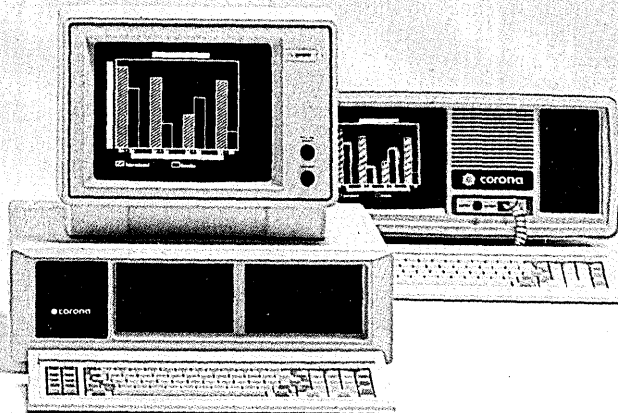
Undisturbed by this decline, National felt the DTS products would help expand its line of supermarket checkout systems. The new subsidiary, which combines the two operations, is called National Semiconductor Datachecker/DTS Corp.

During 1983 the company's NAS unit expanded its top-of-the-line AS/9000 series to include five processors that compete with the IBM 3081 and 3084. On the peripherals front, National announced several new products including the 7380 disk storage subsystem and two entry-level tape drives/controllers.

National also continued to spend heavily on R&D last year. During FY83, R&D expenditures climbed 13.6% to \$109 million. Much of that investment is directed at new products, and many of those new products are in the semiconductor sphere. While not included in this survey, semiconductors, which are the backbone of the dp industry, are the real basis of National's business. Last October, the Silicon Valley firm announced the 32032, the industry's first commercially available 32-bit chip, which sells for \$220 in quantities of 100 or more.

A month after this announcement, IBM amended its complaint that alleges NAS stole trade secrets from the company. IBM's claimed damages ranged between \$750 million and \$2.5 billion. Most industry watchers and Wall Street analysts don't believe the suit will amount to much. They're also predicting that the explosive demand for semis will rocket National Semi's earnings ever higher.

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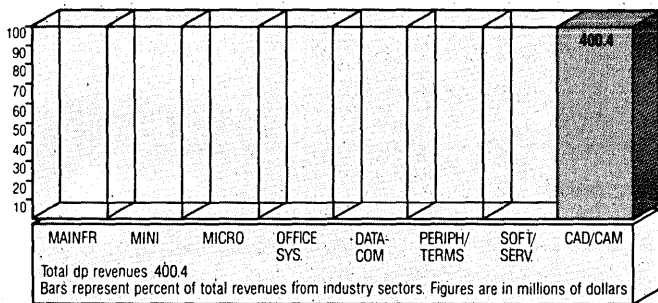


# THE CORONA PC

© Corona Data Systems 1984. 1. TM Micropro Corp. 2. TM Ashton-Tate. 3. TM Lotus Development Corp. \*HTS driver needed for graphics only.

**CIRCLE 41 ON READER CARD**

# 35



## COMPUTERVISION CORP.

201 Burlington Rd.  
Bedford, MA 01730  
(617) 275-1800

For Computervision, 1983 was mediocre. Revenues in 1983 climbed 23% to \$400.4 million, keeping the company firmly entrenched as the market leader in CAD/CAM and computer aided engineering products. Income, which grew by a measly 2% in 1982, climbed 9% to \$35.4 million in 1983. The company's work force however, grew in parallel to revenues, with the payroll totaling 5,000 employees, a 21% hop over 1982.

Clearly, all is not well at Computervision. For while it grew modestly and reversed its declining revenue growth trend, its competitors soared during 1983. Intergraph, the leading challenger to Computervision's dominance, grew 62% to \$255 million in 1983 from \$155.6 million in 1982. So while Computervision is still the market share leader, its position may be threatened in the next few years by Intergraph and by other competitors like Auto-Trol and GE's Calma.

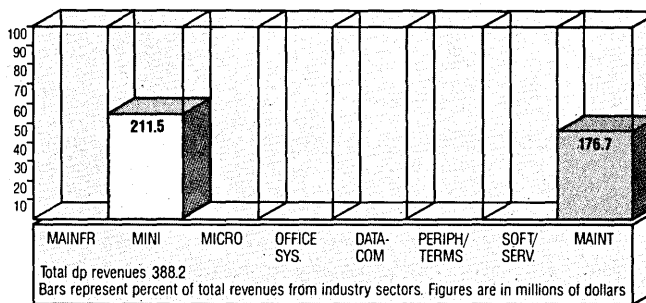
Computervision's inability to keep pace with the exploding market is directly attributable to the company's past insistence on a vertically integrated approach. It has been the only company to build its own hardware rather than buy hardware from outside sources and write software for it. Intergraph, for instance, has been highly successful buying DEC minis as host processors. Analysts of the company for years have been stressing the importance of dropping the hardware component of their product and replacing it with purchased hardware, to no avail.

The rationale for keeping the hardware development in-house is that the company could then guarantee upgrade paths for its users. The drawback is that Computervision's hardware line is almost entirely 16 bit in an age where 32-bit cpus are increasingly common in CAD/CAM. The result is that some of Computervision's customers have been switching to other vendors. Backlog at the end of 1983 was \$91 million, only 16.7% greater than at the end of 1982, indicating that the first half of 1984 could mark a renewed decline in earnings growth.

Computervision took the first steps away from vertical integration in 1983 when it announced two separate oem agreements through which IBM and Sun Microsystems would begin providing hardware to the company. And the company boosted R&D spending 20%, to \$36.3 million, indicating that it is prepared to spend the money necessary to rewrite its applications software for the purchased 32-bit systems.

Company management recognizes that the firm is in for a rough 1984. The CDS-4000 and Designer V-X systems, introduced last year, incorporate the new CADDs 4X software, which should help the company's revenues substantially. That may be offset by continued erosion of foreign earnings because of the strength of the dollar overseas.

# 36



## MANAGEMENT ASSISTANCE INC.

560 Lexington Ave.  
New York, NY 10022  
(212) 909-1400

Management Assistance Inc. had in 1983 what its management called "a year of transition." Hardware sales at the Basic Four subsidiary fell for the second year in a row while service/maintenance revenues rose at both Basic Four, internationally, and Sorbus, domestically.

Total revenues for MAI in calendar 1983 were \$388.2 million, up from the \$354.2 million registered the year before. Profits, however, fell to \$1 million from the previous year's \$6.3 million. Service revenues totaled \$169.2 million while minicomputer revenues were pegged at \$211.5 million.

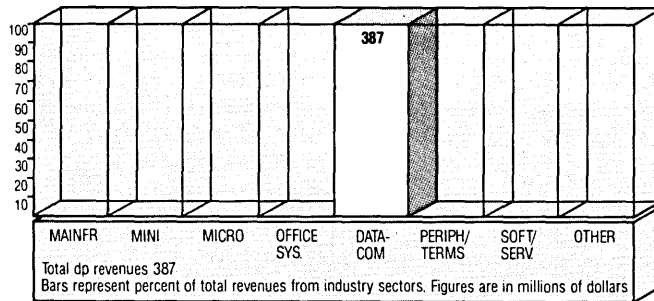
While continuing to build small business systems that run a proprietary operating system, Basic Four last year moved to strengthen its standing in the packaged software market. In addition to sharpening its focus on a number of vertical markets where it competes with specialized software companies, Basic Four repackaged its general accounting software for the IBM and Tandy personal computer markets. The company sees its new software business as a promising new revenue stream as well as a long-term opportunity for future upgrades of pc users to the Basic Four hardware line. The software will be sold through Radio Shack computer stores for use on that firm's TRS-80 model 2000 and through other retail outlets for IBM PCs.

Basic Four last year also introduced the first model in a new line of 32-bit virtual memory systems, the MAI 8000. It uses proprietary hardware configured in a multiprocessing, multi-user system and sells in the U.S. for \$30,000 and up.

Basic Four showed a loss of \$10.2 million for fiscal 1983, compared to a profit of \$6.99 million the previous fiscal year. In contrast, the firm's service operations—handled by Sorbus in the U.S. and Basic Four abroad—showed a profit of \$28 million for fiscal 1983. Approximately 40% of Sorbus' revenues come from servicing Basic Four equipment in the U.S., with the rest derived from maintenance contracts with other manufacturers and contracts with end-users for servicing a wide range of IBM equipment. Sorbus last year moved aggressively to expand its servicing of personal computers of all kinds, offering depot maintenance for small users and on-site services for large corporations that use a mix of different machines.

MAI entered 1984 with its management trying to fight off a dissident shareholder, arbitrator Asher Edelman. At the annual meeting, Edelman won four seats on the company's board. Both Edelman and MAI's management announced they had had talks with several companies that had expressed interest in acquiring MAI. Edelman, however, vows to fire MAI's chairman Raymond P. Kurshan, but comments that he doubts that he has enough votes right now. Keep tuned for the perils of MAI.

# 37



## RACAL DATA COMMUNICATIONS INC.

8600 N.W. 41st Street  
Miami, FL 33166  
(305) 592-8600

Modems mean money to Racal-Milgo, the separately run American subsidiary of the \$1 billion British company Racal Electronics Plc. Last year was another good year for the merry modem maker, which registered a 29% revenue rise to \$387 million. This was an improvement from 1982, when it recorded a 25% revenue hike.

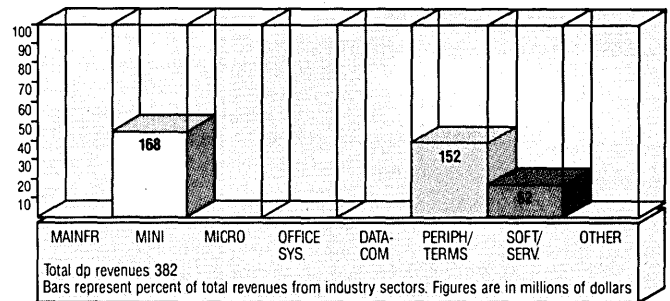
All these sales didn't generate happiness, apparently, because the British parent sent in a new manager during the year. Edward Bleckner was appointed president, and later promoted to chairman, and ceo. Apparently the problem was an accounting nightmare blamed on Racal-Milgo's fast growth. The problem was solved only after 40% of the work force was laid off. To boost its revenues and image, the parent has opened a New York office and hired a public relations firm. Another expected move is a big push into the CAD/CAM market, where Racal Electronics claims to have captured 44% of the business in Europe. Approximately 26% of Racal-Milgo's revenues are generated from foreign sales.

The company was formed in 1955 as Milgo Electronics Corp. and was bought by Racal in 1977. The Milgo operation handles higher-speed modems and the more sophisticated peripherals. Racal Electronics has also purchased Vadic, which produces low-speed modems.

One of its more sophisticated peripherals—the dial-up Datacryptor II—was unveiled last year. The \$2,300 device encrypts data on circuit-switched networks. It operates in half- or full-duplex modes, synchronous or asynchronous, at up to 9.6Kbps. In early 1984, Racal-Milgo introduced two cost-saving options for its Omnimux series of statistical multiplexors.

When Racal Electronics Plc. announced its midyear results, it became apparent that the parent was very happy with the changes in Miami. As Sir Ernest Harrison predicted, "The Data Communications Group will be the largest contributor to sales and profits by the end of the current fiscal year, due in large measure to the strong performance in the United States."

# 38



## MOHAWK DATA SCIENCES CORP.

7 Century Drive  
Parsippany, NJ 07054  
(201) 540-9080

Mohawk Data Sciences muddled through 1983 much as it did in 1982. Once again, revenues increased modestly and earnings fell more significantly. In 1983, corporate revenues increased 10.7%, to \$400 million from \$361.3 million, while income dropped 29%, to \$9.6 million from \$13.5 million. In 1982, by comparison, revenues rose 12.6% and income fell 18.3%.

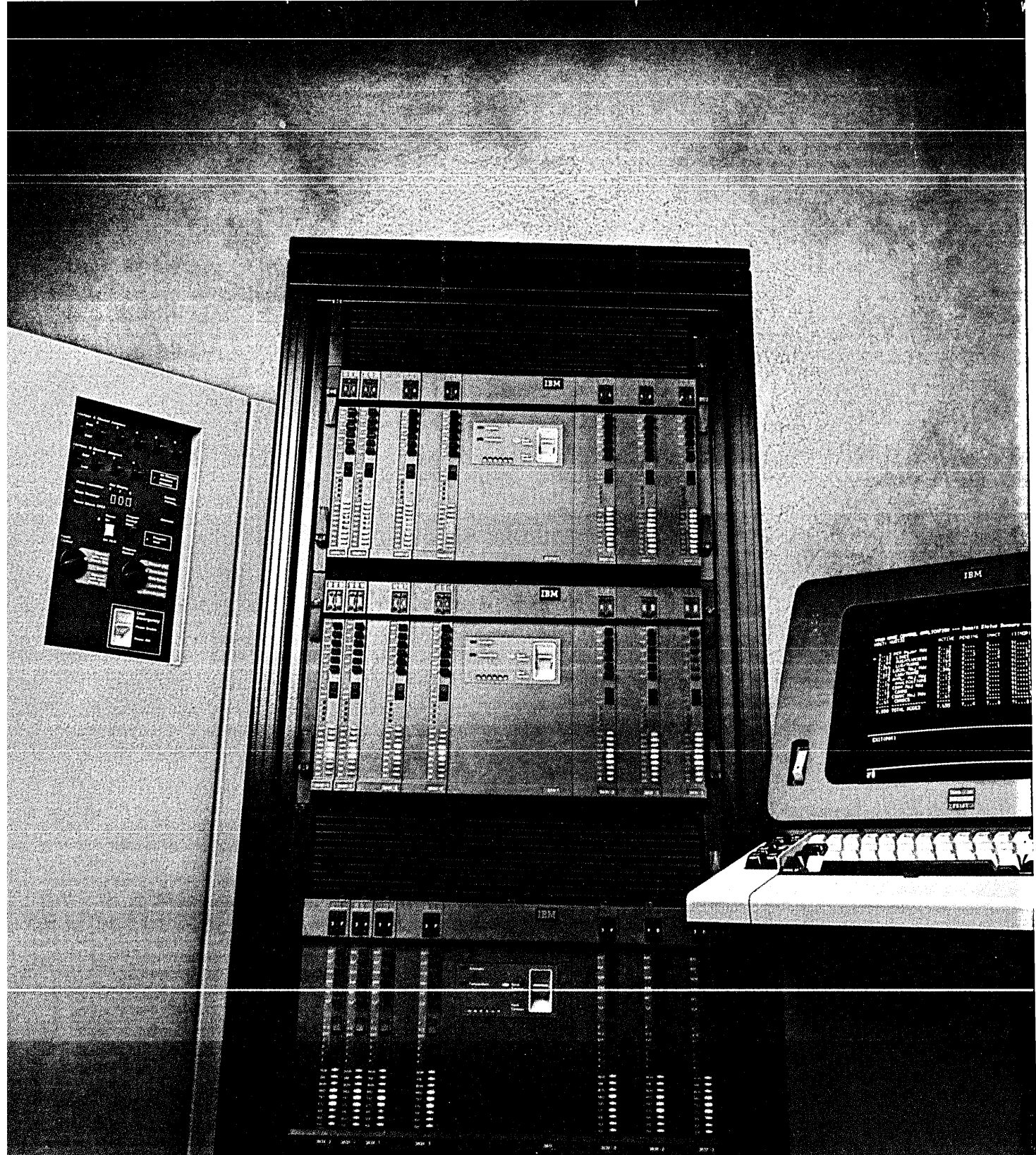
Dp accounted for over 95% of corporate revenues, down slightly from 1982, but that is due more to the strength in MDS's Dek Identification Systems division, which makes color photo identification cards for drivers' licenses. Dp revenues grew 9.5% in 1983, to \$382 million from \$348.9 million.

The MDS Systems division, which sells distributed processing systems into the IBM mainframe environment, was sluggish throughout the year. Profits were depressed also, in part because it conducts 35% of its business overseas and was hit with currency-translation losses. The division introduced the Personal Computing Attachment to its Series/21 line of processors. Essentially, it allows Series/21 terminals to access CPM software stored in the host processor; the terminals are still dumb, however. The division also premiered the Hero intelligent workstation, a version of Convergent Technologies' N-Gen 16-bit microcomputer custom modified to operate in the Series/21 environment; it was the first version of N-Gen to make it to market. Over the year, the Systems division recorded a 4.8% increase in peripherals and terminals revenues, to \$152 million, and a more substantial increase in processor revenues.

The MDS Qantel division, acquired in 1982, continued to perform well, registering a 12.8% growth rate. The division continued to specialize in selling minicomputer-based vertical market turnkey systems. A majority of the teams in the National Football League, a handful of professional baseball teams, several college football teams, and other sports franchises have installed the Sportspak version of the Qantel computer systems. Late in the year, Qantel introduced a hotel and motel management system similar in nature to the sports management system.

The MDS Trivex division, formerly an independent supplier of 3270-compatible terminals, essentially disappeared during 1983. The Systems division absorbed all of its U.S. business, including the name, while in Europe the division's name lives on, although its product line has been merged into the Systems division.

R&D expenses remained constant at \$23 million, less than 6% of 1983 revenues, despite the introduction of the Qantel vertical package and the two Systems products. Employment increased 2%, to 5,500 worldwide. Management expects that 1984 and the future years will see MDS rebounding, as the new products reach their peak earning potential.



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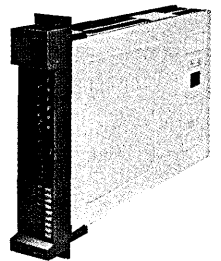
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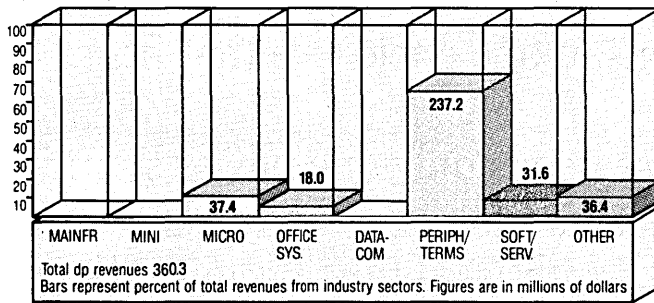
Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_

# 39



## C. ITOH ELECTRONICS INC.

5301 Beethoven St.  
Los Angeles, CA 90066  
(213) 306-6700

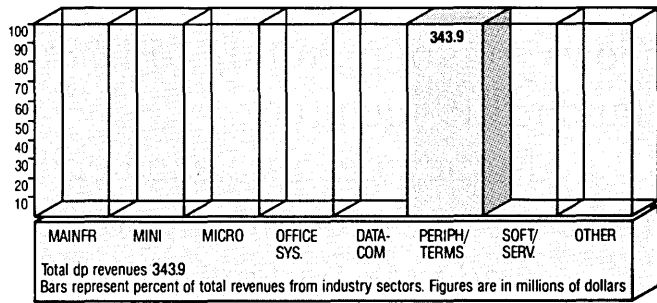
This U.S. subsidiary of the Japanese trading firm C. Itoh & Co. had revenues of \$440.3 million last year, \$360.3 million of which was derived from computer-related equipment. These figures compare favorably with last year's, which showed revenues of \$326.4 million overall and \$290.6 in the dp field. While building no hardware itself, C. Itoh Electronics imports micros and small peripherals into the U.S. market and exports U.S. goods to foreign markets, particularly Japan.

Last year saw C. Itoh Electronics record micro revenues of \$37.4 million, office systems sales of \$18 million, and peripherals sales of \$237.2 million. In addition, revenues of \$31.6 million in software and \$36.4 million in miscellaneous dp goods were recorded. Employment rose to 1,140 persons, up from 800 in 1982.

The company established a new subsidiary, CIE Terminals Inc., in Irvine, Calif., to sell terminals and printers to oems and distributors. Among several new products introduced last year were the CIE 7800, a line of 3270-compatible units, a color terminal, and products designed to display graphics. Approximately \$22 million worth of terminals were sold last year.

C. Itoh Electronics' export activities include shipping goods to Japan and Europe from more than 50 U.S. manufacturers. In the U.S., it represents more than 10 Japanese makers of peripherals and systems including General Corp. and Tokyo Electric. The company is also involved in venture capital financing of technology oriented companies.

# 40



## TANDON CORP.

20320 Prairie St.  
Chatsworth, CA 91311  
(213) 993-6644

Sirjang Lal (Jugi) Tandon's company could be rated an overnight success. Started on a shoestring investment of \$7,000 in 1975, the company was well on its way to becoming the industry's dominant 5¼-inch disk drive supplier by 1979. Today Tandon is 50 times the size in both sales and assets that it was back in 1979, when the first disk drive rolled off the production line. Those drives are continuing to roll off and the profits are also continuing to roll in. Last year Tandon's dp revenue skyrocketed 94% to \$343.8 million, making it one of the top growth gainers in the DATAMATION 100. Profits blossomed also, up to \$27.2 million, a 43% increase over 1982's \$19 million.

That profit picture would have been even brighter if Tandon had not made a \$12 million provision for bad debts because of its riskier microcomputer customers, like Victor Technologies. Despite this \$12 million receivable, Tandon is continuing to ship, on a cash basis, to the financially troubled micro maker. There is no such risky business on the part of IBM, a large and loyal Tandon customer. In fact, Big Blue was responsible for approximately 21% of drive sales in fiscal '83.

Tandon's business is drives—floppies, Winchester, and tape cartridge varieties. The company's 1983 share of the U.S. and European market for 5¼-inch oem floppies was estimated at 50%. In July, Tandon bolstered that position by capturing a \$310 million contract from a mystery micro maker.

Tandon's success formula, however, is no mystery. Low pricing strategies have clearly put the company in the driver's seat in the drive market. It has managed to consistently achieve those low prices by cutting costs through vertical integration and use of efficient automated production techniques.

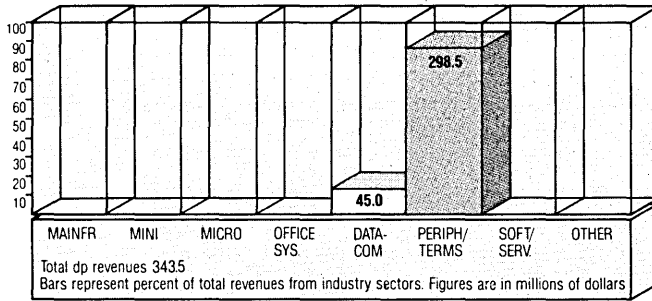
To keep those all-important low-unit costs, Tandon poured \$21.2 million into new facilities and equipment last year. Some of those big bucks went into expanding production capacity at the company's five disk drive and subsystem plants in Southern California and Singapore. Engineering and R&D expenditures more than doubled in FY 83 to \$13.7 million. Gross profit was 27.5% of sales—down from 36% because of costs associated with new product introductions and related expenses.

Tandon hedged its bets by focusing on the high as well as the low end of the microcomputer market. The company came out with a 5¼-inch Winchester subsystem that expands IBM PC memory capacity either 10MB or 15MB for under \$2,000. For the transportable pcs, Tandon unveiled the Thinline family of 5¼-inch Winchesters that are 1.6 inches high and micro-floppy drives that use 3½-inch diskettes.

In 1984 Tandon seems set to repeat the success formula that's made it the envy of micro drive suppliers everywhere. With drive like that, the company will be hard to stop.



# 41



## DATAPRODUCTS CORP.

6200 Canoga Ave.  
Woodland Hills, CA 91365  
(213) 887-8451

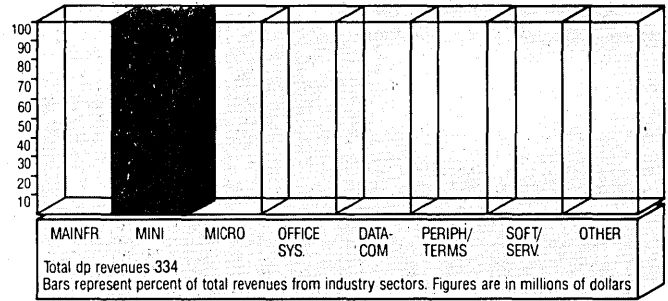
Dataproducts came bounding out of the recession with its best year ever in 1983. The company recorded \$343.5 million in revenues, a 10% increase over 1982. Net income rebounded with an 83% gain to \$19.1 million after a 50% decline in 1982. The company's backlog at year-end was a record \$185 million, \$50 million more than a year earlier, owing to the booking of \$110 million of orders in the fourth quarter. During 1983, Dataproducts installed productivity programs to improve its profits picture. These programs have put the company in a good position for continued profits in 1984.

Dataproducts is still the leading independent printer supplier, and in recent years it has moved forcefully to diversify its printer offerings. As late as 1978, it offered line printers and nothing else. Since then, the company has expanded its low-end offerings to include several matrix printers, a daisywheel family, band printers, and thermal printers. In mid-1982 Dataproducts acquired Integral Data Systems, a New Hampshire printer manufacturer concentrating on these low-end systems, and by last year the merger was operating smoothly. Much of the increase in Dataproducts' business, in fact, can be directly attributed to the success of these low-end printers, says company president and ceo Charles Dickinson.

Dataproducts sells its high-end line printers primarily through computer system manufacturers acting as oems, while others are sold more frequently to smaller accounts, such as sophisticated end users who package their own systems. Both ends of the line performed well in 1983, with the line and band printers retaining their market dominance, matrix printer volume increasing, and daisywheel printer shipments beginning to reach volume quantities.

During 1983, like many other dp companies, Dataproducts announced the formation of joint ventures. In July, it entered into an agreement with 3M for the development of printers using nonimpact technology. The first printer, for which Dataproducts will develop the application software and interface, is expected to be shipped by mid-1984. Dataproducts also teamed up with Quality Micro Systems Inc. in a joint marketing agreement under which Quality will supply intelligent graphic controllers for use with a Dataproducts dot matrix printer.

# 42



## GOULD INC.

10 Gould Center  
Rolling Meadows, IL 60008  
(312) 640-4000

The recession stifled Gould's computer business last year, but as the economic turnaround progressed, orders rebounded for the company's lines of high performance 32-bit superminicomputers and hardened dp gear. Total corporate revenues inched ahead 5.7% to \$1.3 billion in 1983 and dp revenues similarly slogged ahead modestly, to \$334 million, up 2.7%. Net income dropped 30% to \$64.1 million, mainly because of losses from discontinued operations like its recently sold battery division.

Gould is known as a provider of heavy duty computing power for scientific and government applications. Since it acquired Systems Engineering Laboratories in 1980, new product development has increased and otherwise strengthened the Ft. Lauderdale vendor. Last year the 32-bit line was broadened for commercial markets. New software and terminal products, like Unix, Ethernet, and a line of workstations from Convergent Technologies, look good on paper but haven't helped the company break out of its narrow niche.

Competition among suppliers of 32-bit minis and factory automation equipment known as programmable controllers was fierce last year owing to the dearth of orders from industrial customers. Gould notes that prices plummeted as competitors tried to expand market share. The factory automation market is crowded with powerhouses like Texas Instruments, Westinghouse, General Electric, and a host of smaller players, while the 32-bit field is especially tough with Data General, Prime, Digital Equipment, and other broad suppliers focusing on some of the engineering niches once the exclusive province of SEL and Perkin-Elmer.

R&D spending seems to be part of the prescription for keeping ahead of the competition. At 8.4% of revenues or \$111.4 million, Gould's spending is growing faster than revenues.

Now that Gould's chairman William Ylvisaker has kicked out the last of the company's old electrical products, his electronics company has to prove to the outside world that the turmoil in Rolling Meadows during the past four years was worth it. Profit margins and return on equity are not exactly robust, and 1984 will be the first year that the company can be judged strictly on the merits of what it has become, rather than on the hopes and dreams of its chairman.

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C BASIC Compiler	✓	✓	✓	✓	✓
Pascal/MT+	✓	✓	✓	✓	✓
Level II COBOL	✓	✓	✓	✓	TBA
PL/I	✓	✓	✓	✓	TBA
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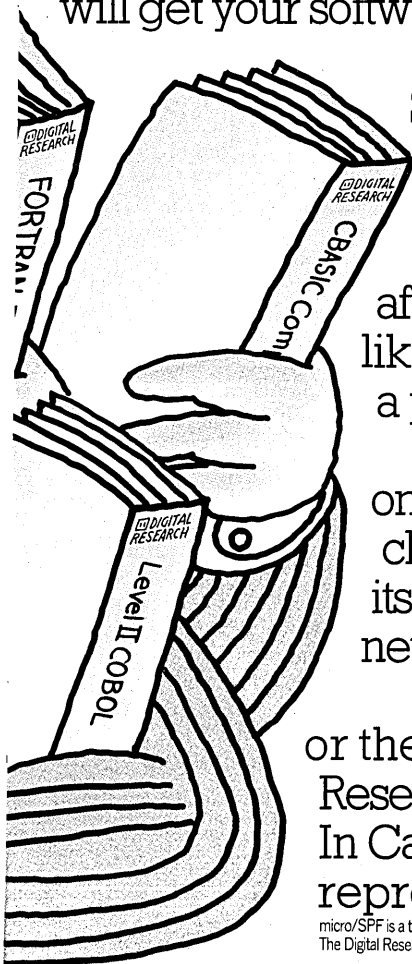
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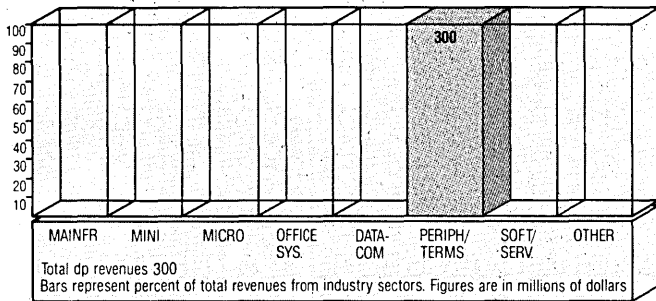
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# 43



## TEKTRONIX INC.

4900 S.W. Griffith Drive  
Beaverton, OR 97077  
(503) 627-7111

The opening statement in Tektronix's annual report says it all: "The dill-pickle look on your face says you have just read our highlights, as they are euphemistically called. They once again reflect a tough year. Our earnings took a pasting."

And what a pasting it was. Net income for the year ending Nov. 30 plummeted 39% to \$49 million; total revenues at \$1.2 billion were relatively flat, as were data processing revenues. All of this left Tek's high-tech spirits pretty low.

DATAMATION estimates that Tektronix's dp revenues for 1983 remained at the 1982 level of \$300 million. Included in this dp category are graphics terminals and displays, computers, and hardcopy output devices such as copiers. A world leader in cathode ray oscilloscopes, Tek used to be at the forefront of the graphics terminal trade, but intense competition from new start-up companies dimmed the glow for the Oregon company. Bidding for a comeback, the energetic company has launched an ambitious campaign to recover the lost graphic ground. The enthusiasm is there—at least among Tek employees at the Wilsonville, Ore., plant, who proudly displayed bumper stickers last year declaring, "The Graphics Empire Strikes Back."

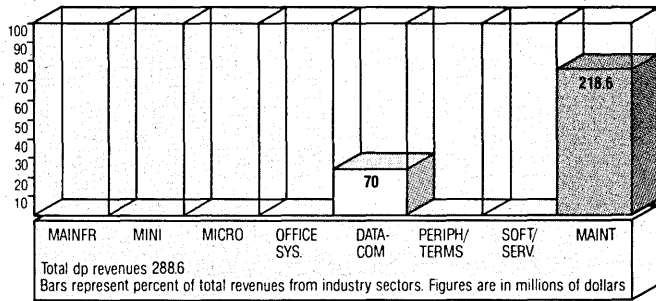
It will take more than employee enthusiasm, however, to bring the company back to the position of preeminence it had in the '70s in the graphics terminal realm. Tektronix does nevertheless have a fighting chance. And fighting it is with such products as the high-end 411B and low-end 4107 Unicorn series graphics terminals—both of which were being shipped on schedule last year. Tek is hoping the Unicorn in particular will score big sales, helping it in its comeback campaign.

Realizing that users needed software for specific graphics problems, Tektronix, which has been weak in software development, brought VR Information Systems on to the TEK team last year. The small Austin, Texas, software house specializes in computer aided design applications for electrical engineering. Also on the software side last year, Tek came out with Lands, a software development tool that runs under Pascal.

Some of Tek's problems come from its decision to decentralize its operations. Starting in 1981, the company began dividing up its divisions into business units. Tek believes this divide and conquer approach, which initially creates job duplication, will streamline the company's internal operations, making it more responsive to market and customer needs.

Tektronix is also hoping this strategy will help it avoid the large layoffs it was forced to make in 1982 and 1983. Those were admittedly painful decisions, but necessary if the company was to make it against tough competition. The company is counting on conditions getting better—as one Tek vp described it, "cycling through the whoopsies."

# 44



## TYMSHARE INC.

20705 Valley Green Drive  
Cupertino, CA 95014  
(408) 446-6000

Times have been tough for Tymshare, a pioneer computer services company. So tough in fact, that the company accepted a proposed merger with McDonnell Douglas, which Tymshare had jilted just a few months before. Tymshare's dp revenues edged up 6% to \$288.6 million in 1983. The company pulled in the largest chunk of its revenues in the software and services category—\$218.6 million, up 3% from 1982. The biggest gains, however, were recorded by the company in the data communications sector, which in Tymshare terms means its successful Tymnet data communications network. In the datacom category, Tymshare's revenues were up a healthy 14% to \$70 million.

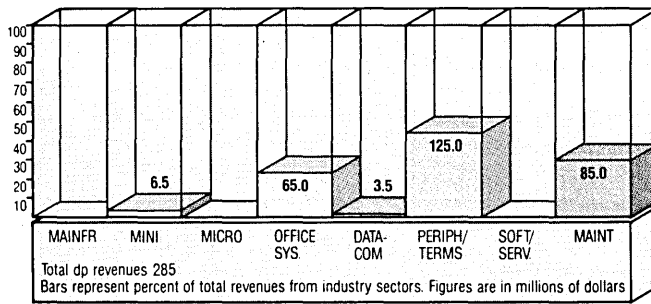
Approximately 40% of the company's operations are devoted to Tymnet, which now spans 450 cities in the U.S. and Europe. Tymshare added numerous cities to the sprawling network last year and plans to add more in 1984. Also on the datacom front last year, Tymshare inked an agreement to acquire international record carrier FTC Communications Inc. It also came out with Micro Engine Inc., a desktop version of its internally designed communications processor.

There is no doubt that the datacom side of Tymshare's business is where the action is. It's also where the action is in the dp industry. Activity in Tymshare's other major business—computer services—has slowed considerably. Market erosion in this sector has been due to falling hardware prices and the arrival of the microcomputer.

This sluggishness in the computer services industry has hurt the 18-year-old company. Realizing the damage, Tymshare had launched various campaigns in an effort to carve out new dp niches. It's also tried to minimize its losses by concentrating on a winner—its Tymnet operation.

This winner was unable to brighten the dismal profit picture. During 1983, Tymshare's net income plummeted a drastic 119%, putting the company in the red by \$1.7 million. Burdened by this debt, Tymshare became an obvious takeover candidate. In September, office automation specialists Wang Laboratories Inc. made an unsuccessful stab at Tymshare, acquiring a 4.3% stake. Shortly thereafter, Tymshare began preliminary discussions with McDonnell Douglas. Unable to whittle down the going price of \$420 million, the aerospace giant got cold feet and backed out. In early 1984, however, Tymshare lowered the price and is now part of the aerospace industry.

# 45



## RAYTHEON DATA SYSTEMS

1450 Providence Highway  
Norwood, MA 02062  
(617) 762-6700

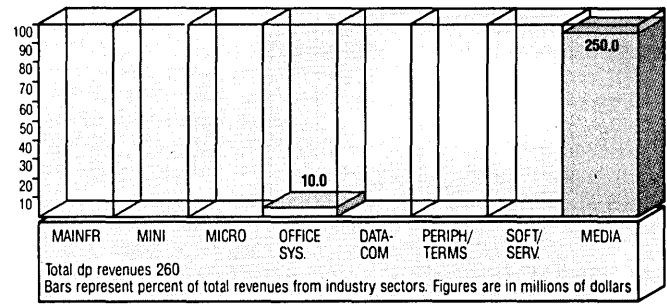
When the 1983 figures were released, the good news-bad news jokes could have saturated the office networks at Raytheon: sales were up, profits were down. Revenues rose 7.7% to \$5.94 billion, but, under pressure from what the company called increased R&D, administrative, and sales costs, profits were off 5.9% at \$300.1 million. One of the areas reporting increases in all these costs was commercial data processing.

But that expensive R&D is likely to make Raytheon Data Systems' future much sunnier. The end of '83 and the beginning of '84 saw the announcement of several encouraging new products. Already a veteran supplier of 3270-type, IBM-compatible equipment, Raytheon Data Systems announced in September the PTS-1000/4000 family of 3270-compatible displays, printers, and control units. The company plans to make the ergonomic design features of this line a major selling point.

Raytheon is also going after the office automation market with intelligent terminals and microcomputers. Early this year the RDS Signature 8200 workstation made its debut, built around a central processing unit developed by Convergent Technologies using the Intel 80186 microprocessor. The 16-bit machine is IBM compatible, and Raytheon describes it as a "multifunction office system," usable as a standalone micro, a word processor, or a module in a data processing network. The machines will run three operating systems: the RDSOS "host," CP/M-86, and MS/DOS. (The company also announced a sister machine, the 8400, that adds Unix V to the menu of operating systems.) Raytheon obviously hopes the product will broaden its customer base, heretofore concentrated in the defense and airline sectors.

Raytheon can give wide support to its entry into the OA race, with huge corporate resources and 130 facilities and offices located in 35 countries. Building on the experience it has gained in the word processing market since it bought the Lexitron Corp. in 1978, Raytheon must be considered a serious contender in the OA competition.

# 46



## 3M

3M Center  
St. Paul, MN 55144  
(612) 733-9572

3M has come a long way since the 1940s, when it introduced the first commercial magnetic recording tape in the U.S. Today, the Minneapolis media pioneer can claim a product portfolio bulging with over 40,000 items. Most of these, however, are not data processing wares. In fact, the \$7 billion company derives only 3.7% of its total revenue from dp.

DATAMATION estimates 3M pulled in approximately \$260 million in dp revenues last year—up 16% from 1982. Most of the sales were in the area of magnetic storage media, which hauled in \$250 million. This represented an 11% increase over the previous year. The remaining \$10 million in revenue came from the office systems side, which includes such things as facsimile and communications terminals, computer output microfilm (COM) equipment, and computer assisted micrographic retrieval systems.

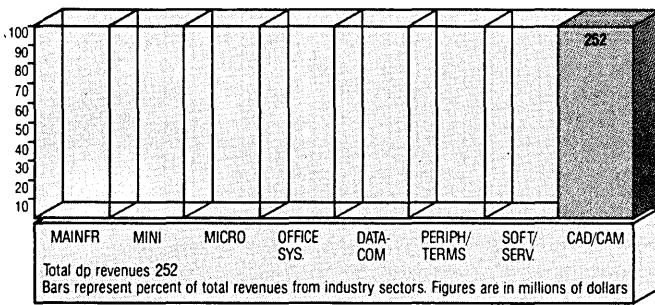
During 1983, 3M continued to focus on the office. To clarify that focus, the company last year merged its Office Equipment and File Management Divisions to form a new Office Systems Division. 3M launched an overall reorganization effort between 1981 and 1982. The revamp, which helped coordinate marketing and planning among the company's sundry divisions and groups, resulted in the creation of four main sectors. The data processing activities were slotted under the Electronic & Information Technologies Sector.

Some of the advanced R&D work at the company is channeled into this sector. Last year, 3M spent \$384 million on R&D, compared to \$349 million the year before. The company is currently working to develop thin-film magnetic media to meet future computer storage needs. The company is also experimenting with optical technologies that promise high-capacity, direct read-after-write capabilities needed by the next generation of systems.

All this optical research work does not mean 3M has given up on magnetic storage media. A leading mag media producer, 3M continues to concentrate on tape systems and flexible disks, which it expects will achieve a 40% annual growth rate in sales.

3M is also strong in the field of electronic document transmission. The company bolstered that strength this year by coming out with the Whisper Exchange. This system consists of a network of teleprinters that send and receive messages under computer control over telephone lines. Such developments, coupled with the new marketing momentum, should help 3M gain strength through 1984, when the company is expected to post an overall revenue increase of around 13%.

# 47



## INTERGRAPH CORP.

One Madison Industrial Park  
Huntsville, AL 35807  
(205) 772-2000

There seems to be no end in sight to Intergraph's phenomenal growth over the last five years. Since 1979, revenues have grown 750% and earnings over 1,000%. In 1983 alone, revenues leaped 62% to \$252 million from \$155.6 million and earnings bounded 125% to \$29.3 million from \$13 million. Employment rose almost 40%, to 2,500—a far cry from the 765 employees on the payroll only three years earlier.

Intergraph's growth is even greater than the booming CAD/CAM industry in which it participates. For example, the leader in the industry, Computervision, was only able to post a 23% revenue gain and a 9% income gain in 1983. Intergraph has clearly surpassed GE's Calma, Auto-Trol, and others as the primary challenger to Computervision's dominance in the industry, though it is now only 63% the size of Computervision.

There are several reasons for Intergraph's continued surge. The company has committed itself to developing CAD/CAM/CAE software, using purchased DEC hardware to complete its turnkey systems. The R&D budget was increased 43%, to \$28.2 million in 1983, and much of that went to the continuing conversion of Intergraph's applications code to run on the 32-bit VAX superminis. (Computervision, by contrast, is still developing its own hardware and selling 16-bit software.)

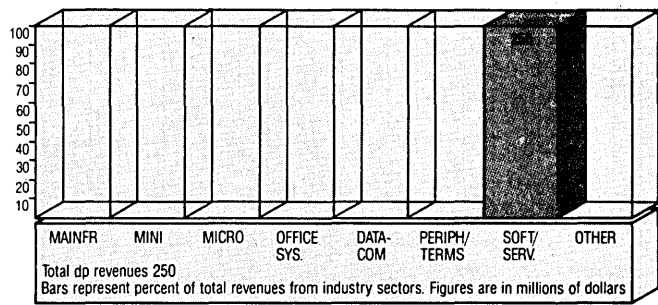
Intergraph has also focused its software on eight specific markets rather than selling its product line to all takers. These areas are mechanical design and manufacturing, electronics design, plant design, architectural and engineering design, cartography, geographic information processing, energy exploration, and utility facility management.

The software is written primarily for VMS-based VAX hardware, and can interact with other VMS applications from third parties. The Interactive Graphics Design Software (IGDS) provides a set of programmed design and drafting tools. It features a database with 4Gb resolution per dimension in a three-dimensional design space, allowing massive designs and maps to be constructed. IGDS comes with a library of design symbols, which can be expanded by users, as well as editing facilities and automatic dimensioning.

Intergraph's other primary software product, DRMS, is a data management and retrieval tool for nongraphic information. It allows users to organize statistical data, part numbers, pricing information, material characteristics, and text in support of graphic designs.

These products—and customized versions of them—are sold by Intergraph through a direct sales force in the U.S. and through wholly owned subsidiaries in Brazil, Korea, Japan, and Europe. The company had 800 installed systems worldwide at the end of 1982, the last year that statistics were available.

# 48



## THE BOEING CO.

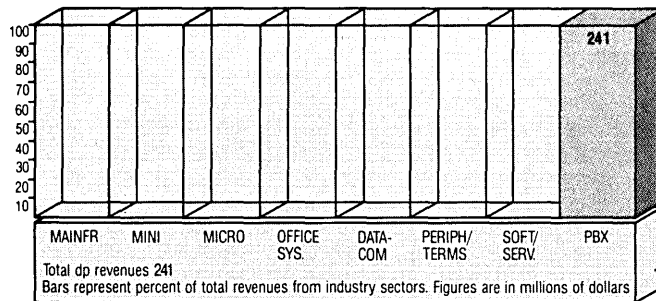
P.O. Box 3707  
Seattle, WA 78124  
(206) 655-1131

It's no secret that the remote computer services business is suffering since the advent of micros. Therefore, Boeing Computer Services president Robert L. Dryden had an attentive audience when he addressed the October ADAPSO meeting. Dryden got their attention when he said that "remote computing services companies will not be around in the future unless they meet the challenge of change."

BCS has the distinct advantage of being able to act on Dryden's wisdom because it has a captive audience on which to try new ideas. Boeing produced 60% of the free world's aircraft in 1983, chalking up revenues of \$11.13 billion. Net income was equally impressive at \$355 million, up 21.5% from 1982's \$292 million. BCS had 1983 revenues of about \$600 million, of which more than half was from the parent company. Outside revenue was reported at \$250 million, up 46% from the previous period.

BCS made many moves during 1983 to combat lagging demand. It expanded its international operations to include Japan and Saudi Arabia, and formed a major systems support group to pursue federal government business. Some of these moves paid off last year as Boeing attracted new clients like the IRS and the Department of Transportation.

Dryden says that by adapting to Boeing's needs, BCS was able to determine what other corporations needed. Therefore, BCS was working on an SNA and X.25 service to include in-house network development and management. In response to the shortage of in-house solutions and technical personnel, BCS is selling training and other services combined with its information processing.



## MITEL CORP.

350 Legget Drive  
Kanata, Ontario  
K2K 1X3 Canada  
(613) 592-2122

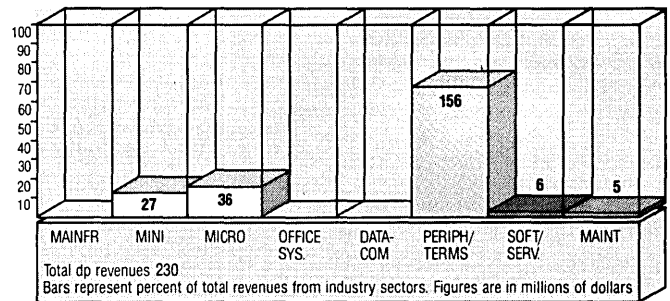
This Canadian datacom supplier grew substantially in 1983, but earnings were dismal. DATAMATION estimates Mitel's revenues for calendar 1983 at \$241 million (U.S.). Mitel's earnings, however, plummeted for the nine months ending Nov. 31—the company reported a loss of \$7.2 million (Canadian) vs. a profit of \$10.6 million the year earlier. Mitel points out that R&D expenses have grown to \$42 million (also Canadian), from the \$21 million reported earlier, mainly due to the development of its sx2000 integrated Communications System, which has been stalled in development. One bright note was the fact that initial testing by the British Telecom has been completed and the sx-2000 has been granted approval.

During 1983, Mitel introduced two other new products—Generic 100, which enables the installed base of sx-200 users to integrate voice and data while doubling the capacity of the system, and ACD plus, based upon existing sx-100 and sx-200 hardware. The ACD manages incoming calls for up to 30 telephone agents.

Mitel joined with two U.S. companies in 1983 for a variety of products. A deal with Johnson Controls, of Milwaukee, will provide an interface between Johnson's computerized building automation system and Mitel's "superswitch." This will allow users to manage heating, lighting, air conditioning, and security in conjunction with the data communication system. The partners expect to have a system on the market by mid-1984.

Mitel's other U.S. connection is with Skyswitch Satellite Communications of Denver, which hopes to manufacture and market satellite communications technology previously developed by Mitel.

While moving on many interesting fronts in 1983, it is clear that Mitel had best get its main business and its sx2000 on the road—before a competitor beats it to the punch.



## NEC INFORMATION SYSTEMS INC.

1414 Massachusetts Ave.  
Foxborough, MA 01719  
(617) 264-800

Japan's number three computer maker, NEC Corp., has yet to make a major dent in the U.S. market. Its seven-year-old State-side subsidiary, NEC Information Systems, has suffered from sluggish sales on the dp equipment front. NEC is nevertheless racking up respectable revenues in America. Last year, dp revenues shot up 44% to \$230 million. Most of that revenue came from oem peripherals, such as its popular line of printers, sales of which rose 64% to \$156 million. Minicomputer revenues were up over 50% to \$27 million, while microcomputer revenues dropped 14.3% to \$36 million.

NEC currently has approximately 2% of the U.S. pc market—a poor showing for a company that has managed to capture 45% of its home market. Part of the problem stems from the fact that its 8-bit PC-8000 doesn't run under CP/M. Sales of its newer 16-bit APC (Advanced Personal Computer), which was announced in 1981, are picking up, however.

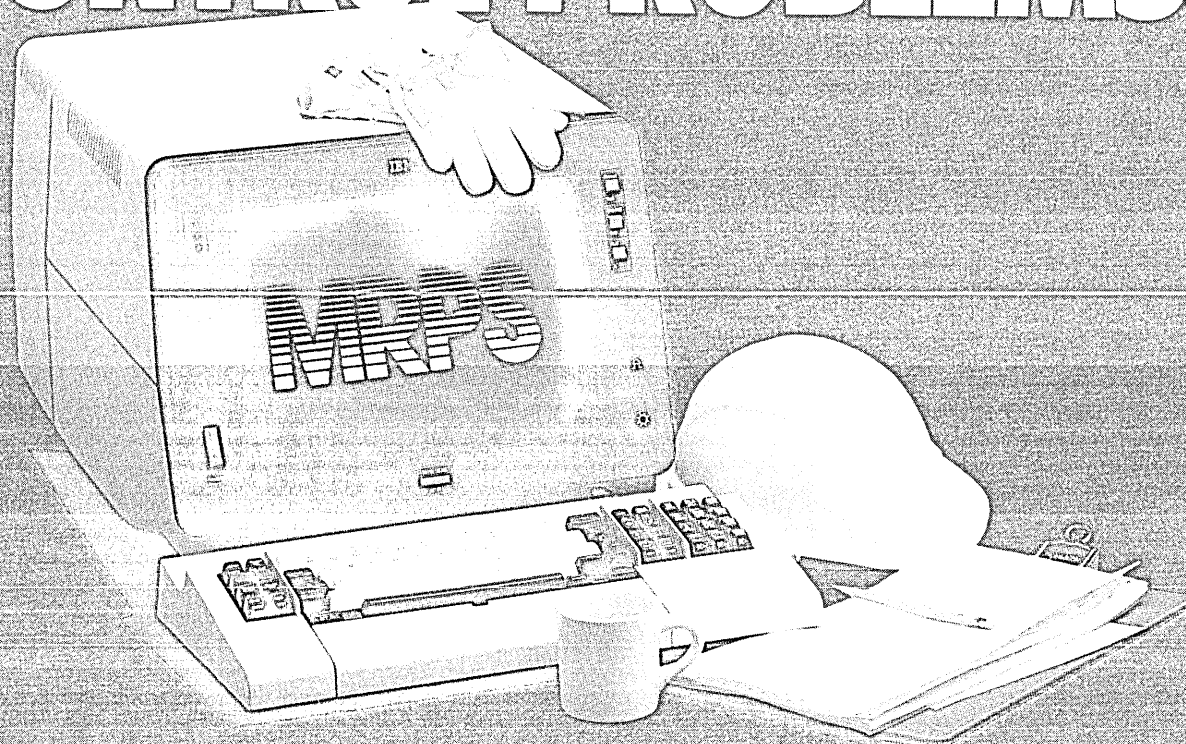
In addition to the pcs, NEC Information Systems also sells the Astra small business computer in the States. So far the system has not had great success. Maybe the company will have more luck at the high end of the market. That's a hope shared by Honeywell.

Last year the two vendors began negotiating a pact that would give Honeywell exclusive marketing rights to NEC's top-of-the-line Acos 1000 mainframe in North America, Australia, and parts of Europe. Under the deal, the two companies will jointly develop large mainframes and exchange licenses on various equipment patents.

Actually, NEC started in the computer business by licensing Honeywell systems over two decades ago. The new alliance, seen as a counteroffensive against IBM, got both companies out of the sticky situation that found them competing against each other on an important GE Information Systems (GEISCO) contract bid.

NEC's so-called C&C strategy, which combines computers and communications, has worked very well for the company in Japan. It could also work well in America. Earlier this year the company's U.S. communications subsidiary, NEC America Inc. in Melville, N.Y., captured contracts to supply PBXs to several newly unbundled Bell operating companies—U.S. West, Ameritech, and Bell Atlanta. NEC is clearly after a bigger slice of the U.S. PBX pie. This could also be a plus for NEC Information Systems, since NEC PBX customers could well be interested in other NEC wares—namely, small business systems and pcs. If this twofold strategy works, NEC could gain a valuable foothold in the American dp market—a market that has so far eluded the \$7 billion Japanese conglomerate.

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## 51

### PERKIN-ELMER CORP.

Main Ave.  
Norwalk, CT 06856  
(203) 762-1000

For Perkin-Elmer, 1983 was a year in which everything changed except the numbers. Corporate revenues were up a mere 5.5%, to \$1.07 billion, while net income inched forward 1%, to \$51.8 million. The Data Systems Group, the firm's only division selling dp equipment, did somewhat better, with a 9.6% increase in revenues, to \$225 million. Its pretax profits held steady in the 8% range. Other indicators were also flat: employment increased 1% to 14,372, and R&D stalled at \$80.3 million, about 7% of revenues.

Beyond the financial results, however, the Data Systems Group was very much an organization in transition during the year. It began the year as a broad-based minicomputer supplier, selling a range of 32-bit machines to all comers. Most of its sales, however, were to technical and scientific installations. Through the year, the company realized it could not compete with powerhouses such as DEC, IBM, and Data General, and it moved toward a niche approach similar to Gould S.E.L.'s past philosophy. Perkin-Elmer began to concentrate on its scientific and analytic users, and on users who were already familiar with the P-E name from the firm's instrument, semiconductor equipment, and optical products groups. The Data Systems Group also expanded its line of software offerings, hoping to become more of a turnkey vendor to its selected niche.

The company made several new product announcements during the year. It topped off its 32-bit line with the 3200MPS, a multi-processing system that can be expanded as users' needs increase by plugging in up to eight additional auxiliary processors. Perkin-Elmer also rounded out the low end of the 3200 line with the 3205, a low-priced model designed to appeal to new customers. Later in the year, the 7500 Professional Computer, a 16-bit micro, was introduced. It is the same machine as the desktop micro previously announced by another P-E division for the analytical chemistry market.

Among the most significant of Perkin-Elmer's transitions was a move toward a more open architecture designed to operate in multivendor environments. The PENnet local area network was introduced as the focal point of P-E's new Everywhere strategy, which essentially makes P-E equipment capable of running in a wider range of installations. By giving its equipment that capability, Perkin-Elmer hoped to increase its attractiveness in scientific niches within IBM or other foreign shops.

The company was also active on the software side, introducing a major new version of its Edition VII of the Unix operating system, several communications protocols, and a range of application software packages.

## 52

### SCI SYSTEMS INC.

5000 Technology Dr.  
Huntsville, AL 35805  
(205) 882-4800

SCI's 1983 revenues and income soared as high as did some of its magnetic core memories for computers used in the MX missile. This rapid growth can be directly attributed to IBM, which awarded SCI Systems a contract to assemble the circuit boards for the IBM Personal Computer. In calendar 1983, total dp revenues were up more than 200% to \$225 million from \$80 million in 1982. Corporate revenues were \$300 million, up from \$133 million in 1982. Net income for the year increased 60% to \$6.6 million, as compared with \$4.1 million in the preceding year.

Customer orders with a total value of \$386 million were received during FY '83 to bring the company's year-end order backlog to \$522 million. This represents a 64% increase from the \$318 million backlog at the end of the previous fiscal year. They must say "bless the PC" every night.

In addition to the PC, SCI has a family of small business computers that support multiple users in a multitasking environment and also offer a variety of office automation, data processing, and software development capability. The company's rotary printer is sold as a printing mechanism or a complete printer and is part of a number of commercial and military terminals developed by SCI.

During the year, SCI occupied and brought on stream a new manufacturing plant in Alabama, apparently for the PC, and hired more than 1,000 people, bringing the work force to 4,006, up from 2,920 in 1982.

SCI is broadening its traditional customer base from military and aerospace contracts, and has established itself as a low-cost producer of commercial products in large volumes. SCI's success in custom manufacturing the PC will play an important role in the company's plans as long as Big Blue doesn't go elsewhere.

## 53

### TELEX CORP.

6422 E. 41st St.  
Tulsa, OK 74135  
(918) 627-1111

Telex continues to practice the art of beating IBM to the punch in the 3270 terminal and controller markets. While that's not always a good idea—as its fiasco with tape drives a decade ago made clear—it has enabled the company to maintain its position as the second largest 3270-compatible supplier. The firm recorded solid growth for the second year in a row, with revenues climbing 20% to \$306 million and net income hitting \$33.8 million. Revenues from dp climbed 14% to \$221.7 million in 1983.

Telex is divided into two subsidiaries, Telex Computer Products (TCP) and Telex Communications Inc. (TCI). TCP's portion of the company's business continues to rise, hitting 77% of corporate revenues and 84.5% of corporate pretax profits last year. In 1983, TCP benefited from the first significant sales of a pair of products launched in 1982, the TCP-178 display terminal and the PROFFIT desktop workstation.

The TCP-178 is a scaled-down version of the TCP-278 terminal, which is a substitute for the IBM 3278. The 178 was announced nine months before IBM came out with its own 3178 terminal, giving Telex a substantial lead in getting the smaller terminals installed.

The PROFFIT (Professional Office Terminal) was one of the first combination terminal/microcomputer products offered. The product is an attachment to the 278 terminal that gives it CP/M compatibility. While the 8-bit architecture and the need to use two separate housings is behind what is currently considered state of the art, such as the IBM 3270 PC, the product's immediate availability has been attractive to users impatient with IBM's lead times.

## 54

### SEAGATE TECHNOLOGY

920 Disc Drive  
Scotts Valley, CA 95066  
(408) 438-6550

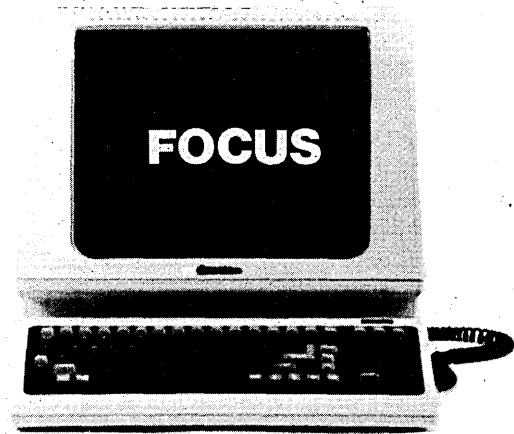
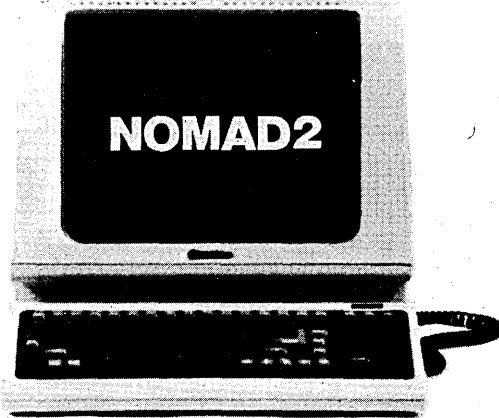
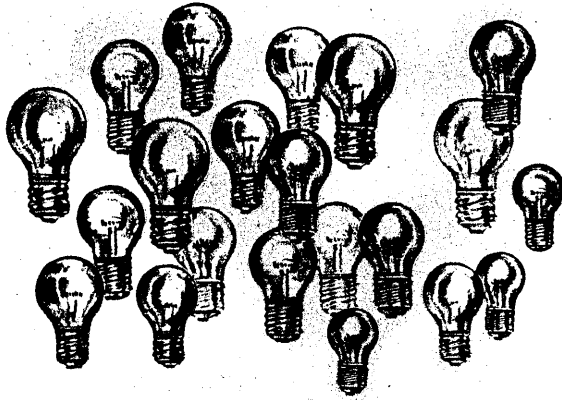
Seagate jumped into the DATAMATION 100 with a threefold increase in revenues to \$221 million, up from the \$57 million of 1982. Earnings moved at a faster pace, up 400% to \$29.6 million.

It's a case of being in the right place at the right time and, happily, with the right product. Formed in November 1979, Seagate entered the disk drive market as a producer of the 5¼-inch Winchester disk drives. The demand for these products has been nothing short of spectacular, and Seagate has been able to capture large customers, including IBM.

During 1983, Seagate took a number of steps to insure its continued success. For starters the company raised \$72 million in a new stock offering. Putting this cash to use was easy. Seagate expanded its production facility in Scotts Valley fivefold. Then it planned construction of a new factory in Watsonville, Calif. In addition, the company opened a new R&D center and a Singapore arm to produce subassemblies.

Perhaps the most important move of the year was establishing a zero defects production line, apparently as a result of vendor concern that the entire disk drive industry was not performing up to par. The company overhauled its operations and opened the Seagate Quality Institute to improve employee training and motivation.

Management was broadened with the appointment of a number of new executives, including Tom Mitchell as president and ceo.



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Wilton, CT 06897  
or call Roger Cox at (203) 762-2511

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This was done to give founder Alan Shugart more time to focus on the future. Considering how well Shugart has done so far, there probably isn't a more qualified candidate anywhere.

## **55** **SHARED MEDICAL SYSTEMS CORP.**

51 Valley Stream Pkwy.  
Malvern, PA 19355  
(215) 296-6300

SMS continued its history of major growth in revenues and earnings, and displayed a financial performance that compares favorably with the best in the business. Revenues of \$210 million were up 27% last year from 1982 and net income also soared to \$27.3 million. Its return on assets and net profit margin are traditionally in the double digits, and expectations are that the growth and financial performance will continue for the next several years for this supplier of dp services for hospitals.

The big question mark on the horizon is the effect of new federal regulations on medical spending. Medicare reimbursement rates for hospitals will be under a new program with set rates, and hospitals will have to have a better handle on their costs and patient mix. So on the one hand SMS's customers are being forced to cut costs, such as dp spending, while on the other hand the only way hospitals will be able to control the money is with more dp. Taking advantage of the situation, SMA introduced a number of new software packages to help its current and new clients manage their finances.

In addition to its timesharing of data processing for medium-sized hospitals, the company has become a value-added reseller of IBM PCs and other desktop units, adding its financial and resource management software to offer a less expensive networked system for smaller hospitals.

## **56** **GENERAL INSTRUMENT CORP.**

1775 Broadway  
New York, NY 10019  
(212) 974-8700

General Instrument bottomed out last year, smarting from the beating it took when video games turned into horror shows and small home computers stopped going home with consumers. Sales of the components it made for these industries plunged. And the scaled-back plans of CATV suppliers hurt General Instruments' sales of its newest generation of addressable cable tv converters. Also, volume shipments of new memory and telephone dialer chips fell behind schedule. Startup costs on new products were higher than management had expected. In a year of

widespread economic recovery, General Instrument's corporate revenues dropped from \$1 billion to \$891.7 million, a fall of over 10%. The bright spot, however, was dp revenues, up almost 23% from 1982's \$163 million to \$210 million last year.

The company sees a return to the company's past growth pattern in the coming year, but some problems remain despite cost cutting and the introduction of new products. The new components—for the automobile, personal computer, and telephone industries—upon which it is banking for renewed growth won't produce the fat margins that video game and home computer chips engendered. Problems with volume production were also rumored at one of GI's two new semiconductor plants.

Good news for the company included an extension of its contract with Connecticut's Off Track Betting, a deal valued at more than \$60 million. (GI also has high hopes for its Teletrack data system if, as is expected, California okays off-track betting this year.) GI also continued its winning ways in the state lottery business, installing a multistate central processing center in Augusta, Maine, from which it handles the lotteries of Maine, New Hampshire, and Vermont.

Aquisitions of Charter Data Products and, in late '82, Energy Management Corp., and the increase of its investment in Sytek Inc. also revealed the company's beefed-up dp plans for local area networks, the expansion of its bank-remittance processing, point-of-sales systems, and microprocessor-based energy control.

In 1983, GI continued to be the world's number one producer of ROMs, and also leads in EPROMs. Its microelectronics group is investing heavily in speech synthesis and recognition: when better news is reported about this company's turbulent bottom line, one of its own products may well speak the lines.

## **57** **PARADYNE CORP.**

8550 Ulmerton Rd.  
Largo, FL 33540  
(813) 530-2000

The embattled Paradyne Corp.'s 1983 net income plunged 23.2 million to \$3.6 million, as compared to 1982 net income of \$26.8 million, in the wake of its legal problems with the Securities and Exchange Commission. Revenues barely broke even, inching up a little more than a million dollars to \$208.9 million.

"Paradyne experienced a difficult year," says Robert S. Wiggins, chairman, president, and ceo of the company, in summing up Paradyne's woes.

Paradyne cited "substantial" legal costs in defending itself against the SEC allegations filed in federal court that the company was putting its own labels on another company's computers in its efforts to obtain a

\$100 million contract from the Social Security Administration for 1,850 microcomputers. Paradyne got the contract, but though the company denies any improprieties, it also got a peck of trouble.

Management said it spent more than \$2.5 million on outside legal counsel during the year. According to the company, these fees represent payments incurred defending itself in the SEC action, as well as against subsequently filed private actions and "collateral matters."

A bright spot in the midst of Paradyne's legal problems appeared when it reported its one-year backlog of unfilled orders, due for shipment in 1984, had a purchase value of \$147 million, up from the \$134 million backlog reported a year ago. The company also upped its sales force to 245 persons in the United States during 1983, and made several organizational changes in its upper management.

## **58** **EXXON CORP.**

1251 Avenue of the Americas  
New York, NY 10020  
(212) 398-3093

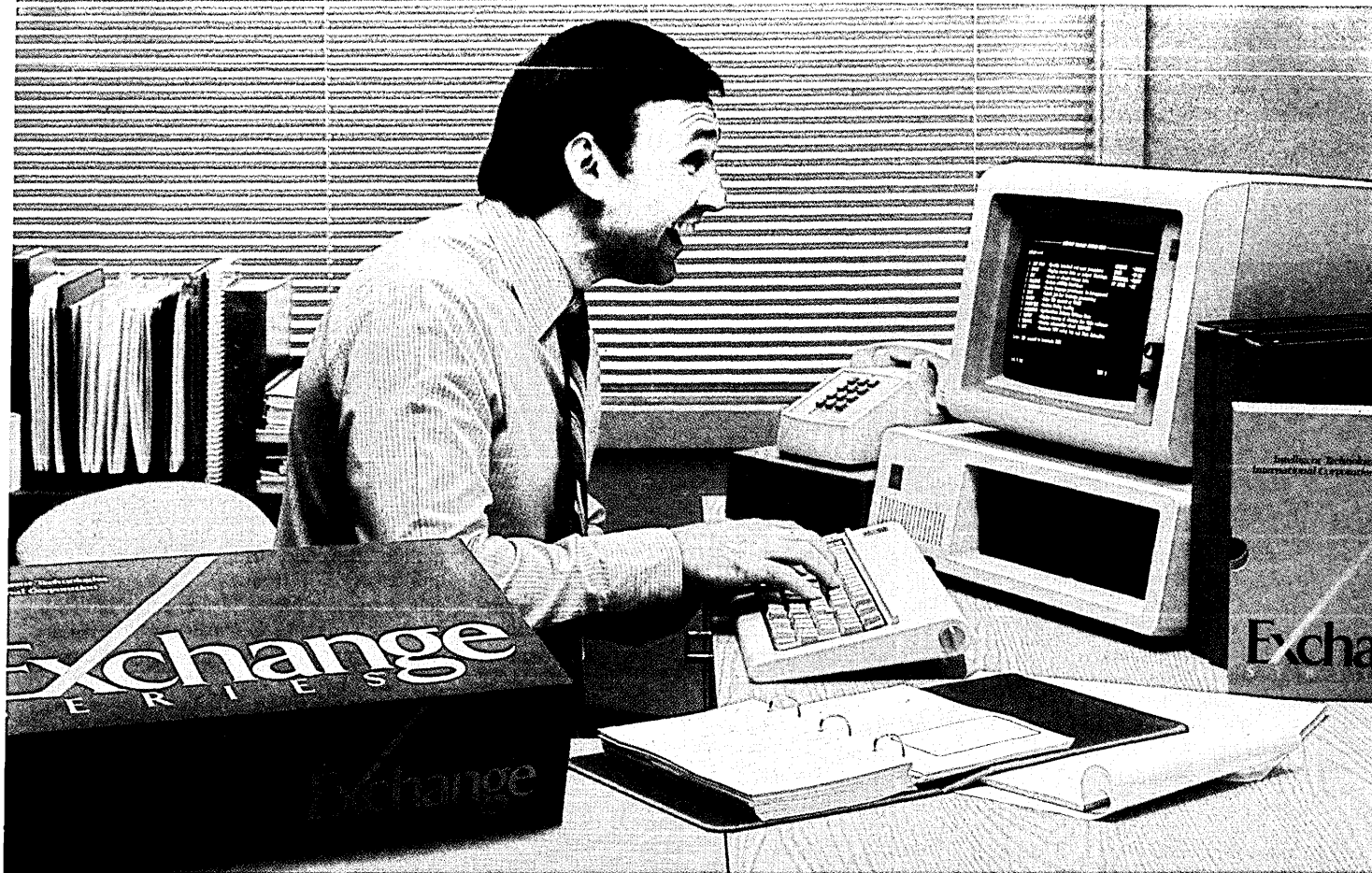
Life was somewhat crude at the world's largest oil company last year. Things were more refined at its Exxon Office Systems (EOS) subsidiary, though.

Exxon Corp.'s revenues fell 9.4% to \$94.59 billion. Remarkably, net income posted an impressive 19% gain, reaching \$4.19 billion. Contributing to that performance were EOS and Exxon Corp.'s other electronics businesses, known as "other operations" within the corporate conglomerate. These have rebounded nicely from a \$48 million loss in 1981.

DATAMATION estimates that EOS's sales were \$200 million last year, a 17.5% increase over 1982. While Exxon refuses to provide figures, it is quite likely that EOS is still losing money.

EOS hopes to become a winner through a number of new products. The 3270 Emulation software enables any Exxon 500 Series workstation to emulate a 3270 terminal, using a third-party protocol converter that can support either bisync protocols or Systems Network Architecture (SNA) protocols. WP-CP/M Integration software allows users to transfer files bidirectionally from word processing mode to CP/M mode. The Legal Administrator Applications Program should make life easier for attorneys. The 210 Intelligent Typewriter led off a 200 Series family in which the high-end 220 will eventually offer a 32-character display and 12Kb to 36Kb of memory.

Exxon was busy on the legal front as well. Its Zilog subsidiary, maker of the successful Z-80 chip, the System 8000 supermicros, and winner of major contracts from Commodore and the Internal Revenue Service during 1983, filed a complaint with the



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CIRCLE 48 ON READER CARD

International Trade Commission alleging patent infringement and unfair import practices by Nippon Electric Co. (NEC). Separate suits in Philadelphia and South Carolina charged employees of Exxon Enterprises, parent of EOS, with stealing trade secrets.

Life may get a little cruder this year.

## 59

### M/A-COM

South Ave.  
Burlington, MA 01803  
(617) 272-9600

Reorganization was the news at this mini-conglomerate last year. M/A-COM's 21 operating companies were consolidated into eight operating divisions. The company sold its optical fiber cable business and its microwave point-to-point business. And Richard T. DiBona posted yet another title on his door: he's now billed in the annual report as "chairman of the board of directors, president, and chief executive officer."

Inspiration for these moves is evident in M/A-COM's numbers, none of them terribly cheerful, especially for a company that's grown used to mammoth annual jumps in both sales and profits. Total corporate revenues for calendar 1983 rose just over 7% to \$654.4 million from \$610.9 million, but profits were down slightly, dropping to \$30.3 million from '82's \$30.8 million. DATAMATION estimates that M/A-COM's dp revenue, all of it earned in data communications, stayed flat at about \$200 million for the year.

Wall Street analysts seem to think the bad news is over. One Texas brokerage told its customers to buy M/A-COM stock, predicting its earnings will jump by 45% this year, based on the economic recovery and on the company's extensive product line.

The last quarter of 1983 seemed to back up the most optimistic forecasts: it was the best first fiscal quarter in the company's history, with sales of \$168.5 million, up 11%, and orders of \$179.2 million, up 28% over the previous year.

More good news came just after the new year when M/A-COM was named program manager, systems architect, and systems integrator of a satellite-based, high-speed facsimile network for Federal Express.

## 60

### PHILIPS INFORMATION SYSTEMS INC.

4040 McEwen Ave.  
Dallas, TX 75234  
(214) 386-5580

Like many other conglomerates now in the dp business, Philips is confusing to outsiders. The fourth largest electronics firm in the world, with revenues exceeding \$16 billion, it has a worldwide dp presence of about \$1 billion, including \$200 million in 1983 rev-

enues in the U.S. The parent company, Philips N.V., is headquartered in the Netherlands, but it has offshoots everywhere.

U.S. entities, such as Ludwig drums, Sylvania television sets, and Carolina bus routes, are owned by the North American Philips Corp. The parent owns 59% of the stock of this operation, but it is held in escrow at a Connecticut bank. Then there is Philips Kommunikations Industrie AG, a German company 70% owned by the Netherlands Philips, which in turn owns a U.S. dot matrix printer business, Philips Peripherals. Then there is the Canadian based Philips Information Systems Ltd., an OA company with a large U.S. sales subsidiary that had 1983 sales of \$200 million, or about 20% of the estimated total worldwide dp revenues of Philips N.V. and its assorted interests. Philips is included in the DATAMATION 100 on the basis of this subsidiary's revenues.

Last year the Netherlands parent started to consolidate its U.S. operations, with Philips Information Systems, located in Dallas, taking control of the printer business. An intriguing part of the new U.S. operation is its optical disk storage subsidiary, Megadoc, which last year introduced an office equipment version of the consumer video disk system developed by Philips N.V.

## 61

### SANDERS ASSOCIATES

Daniel Webster Highway S.  
Nashua, NH 03061  
(603) 885-4321

Investors have made a lot of money playing the stocks of this defense contractor and computer graphics specialist. Sanders' 1983 revenues and profits suggest that the news from Nashua will continue to be good. Last year's revenues were up 32%, rising to \$646.5 million from '82's \$487.8 million, and the profit picture was even prettier, with earnings of \$42.6 million, up more than 44%.

Sanders' presence in the dp business dates from 1980 when it bought Calcomp, a builder of computer graphics systems. For the first couple of years, the purchase didn't pay off. The product line was mature and competition was heavy, particularly from Hewlett-Packard. But new products, a profitable arrangement with IBM, and intense cost-cutting are making the picture brighter.

Two new belt-bed plotters, the 945 and the 965, are doing good business, and the graphics terminal Sanders makes for IBM, the 3250, has also sold well as it nears maturity. Sanders is phasing in a new, interactive graphics terminal for IBM, the 5080. Sanders' IBM business accounts for about 13% of sales and 28% of operating profits, leaving it vulnerable to possible IBM in-house production or margin pressure. As has proved true so often before, an IBM imprimatur has meant sales to other vendors as well. For example, shipments of Sanders' Talos digitizer tablet picked up when it was chosen for the 5080.

The improvement in the building business has also meant good things for Sanders: sales of architectural, construction, and engineering end-user graphics devices are running ahead of projections.

## 62

### INFORMATICS GENERAL

21031 Ventura Blvd.  
Woodland Hills, CA 91364  
(213) 887-9040

Informatics had a mixed year in 1983, with software products performing very well and timesharing services declining. Overall, the company's revenues rose 16% to \$197.9 million, with net income jumping 57% to \$8.5 million. Revenues from dp totaled \$150.5 million, up 17% from 1982. Software products revenues climbed 34% to \$90.8 million, with net income before taxes for those products climbing 49% to \$5.2 million. Timesharing revenues dropped negligibly from \$60.3 million to \$59.7 million, and income before taxes fell 18% to \$3.3 million. While corporate net income jumped, employment grew more slowly, an 8.5% rise to 2,822.

These numbers are a result of Informatics' continued marketing of a range of cross-industry and vertical market products and timesharing services. The cross-industry products, such as the Mark IV and Mark V batch and on-line program development products and the Answer/DB database management system, represent an older, declining portion of the business. Revenues for these types of products and services fell 2% to \$95.1 million, and net income before taxes fell 35% to \$4.4 million. Informatics developed a micro-mainframe connection in conjunction with VisiCorp during the year, providing a gateway to Answer/DB databases from VisiCalc.

The vertical markets areas are booming. Revenues for these products and services hit \$100.4 million, a steep 35% increase over 1982. Income before taxes jumped off the scale, a 121% leap to \$8.2 million. The company's offerings in the accounting, legal, and insurance fields grew 70%, 54%, and 45% respectively during the year.

Even while reaping the rewards of the current generation of vertical market software, Informatics was preparing for the next generation, kicking in \$7.4 million toward R&D in 1983. That represents a 27% increase over the amount spent in 1982 and 4% of 1983 corporate revenues.

## 63

### CPT CORP.

8100 Mitchell Rd.  
Eden Prairie, MN 55344  
(612) 937-8000

CPT Corp.'s growth in 1983 was less dramatic than in previous years, yet the company did

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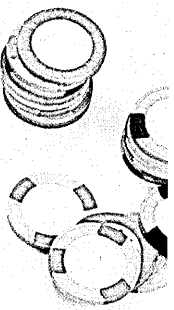
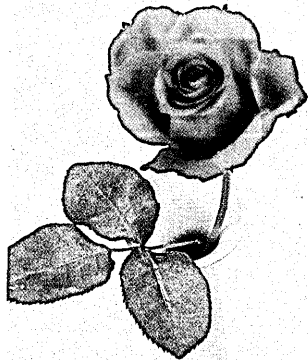
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post gains in both revenues and income. Revenues from its line of office automation equipment were up \$30 million to \$192 million. Net income increased 12% to \$17.7 million.

Even though revenue and income were up, the company categorized FY '83 as "difficult, yet extremely productive," adding it was pleased with its growth despite the weak worldwide economy and the strong U.S. dollar abroad.

To improve its trading position in Europe, the company opened a manufacturing facility in Ireland. CPT says its manufacturing and distribution costs have been lowered since it opened the technical support center in County Cork.

During 1983, the company introduced more new products than in any previous year, but it reports that inventory levels did not increase significantly from 1982. One product it introduced was the Dialog system, a shared intelligence network that allows a large number of workstations to share information. Dialog includes mass storage, database management, teletext, electronic mail, scheduling, and calendaring.

Last April, the company introduced two shared resource systems, the SRS 40 and SRS 65. According to the company, these systems offer cost-effective solutions when central mass storage is required for two to 16 workstations.

CPT says it is stepping up its research and development efforts. Last year the company spent \$9 million, an increase of 34.3% over 1982.

## **64** **DUN & BRADSTREET CORP.** 299 Park Ave. New York, NY 10015 (212) 593-6800

Like many other old-line publishers, Dun & Bradstreet continued its rapid move into the information processing market last year. Fresh from the recent acquisition of McCormack & Dodge, coupled with D&B's computer-related revenues from National CSS, the company's total dp revenues soared in 1983. Much of the success was due to M&D's mainframe software products.

The company reports that dp revenues exceeded \$177 million, up 40% from the \$132 million recorded in 1982 (after subtracting the 4% of revenues derived from other parts of the broad-based supplier of business information services.) The parent company had 1983 revenues of \$1.6 billion and net income of \$167 million, up 11% and 18%, respectively.

Other parts of D&B's dp-related business didn't fare as well. The company reported that NCSS, now known as D&B Computing Services, "suffered a decline in revenue, reflecting industry-wide contraction in the timesharing business." Competition from inexpensive micros was cited by the company

for the decline. In response, D&B Computing cut its overhead and introduced some new products.

DunsPlus was unveiled as the alternative to the user-surly nature of most micro-to-mainframe and micro-to-database links. The company became a value-added remarketer of the IBM PC and the 1-2-3 integrated software package from Lotus Development Corp., and together with D&B databases and other software, created the "most user-friendly system in existence," the company claims.

M&D's recently introduced Millennium series of mainframe software packages for payroll and accounting did well in the market, and the company announced its Interactive pc link for uploading and downloading mainframe and pc data.

## **65** **DYSAN CORP.** 5201 Patrick Henry Drive Santa Clara, CA 95050 (408) 988-3472

Last year Dysan made a lot bigger profit in the stock market than it did in its real business, rigid and floppy disk storage. It sold about 4 million of the shares it held in Seagate and realized a net gain of \$41.22 million. After the sale, Dysan still owns 13% of Seagate, about the same size as the chunk it sold. It is a vivid reminder of how much a smart investment can appreciate in an industry like dp: all of Dysan's Seagate shares had cost it only \$450,000.

Meanwhile, back at Dysan's disk business, news was okay but not thrilling. While revenues for the year were up more than 27% to \$180 million, profits—discounting the enormous contribution from the Seagate sale—were off from 1982's \$9 million. President and ceo William L. Harry said the windfall from the Seagate deal will be used to finance the further expansion of Dysan's "disk business and the activities of our seedling affiliates."

Indeed, expansion seems to be what Dysan is up to these days. Abroad, the company opened a software duplication and translation facility in Belgium, a distribution center in the U.K., and a new sales office in West Germany. At home, the company says, "We currently have two additional facilities under construction in Santa Clara and are planning to build two manufacturing facilities on our property in Colorado Springs, Colo."

This growth doesn't come cheap. Nor does the R&D that's required to stay ahead of the pack, and Dysan is expected to continue spending between 15% and 20% of its revenues on R&D.

While revenues will undoubtedly rise in the growing—by 30% annually—disk market, it's expected that Dysan's profits won't begin to show the same improvement for a couple of years.

## **66** **INTEL CORP.** 3065 Bowers Ave. Santa Clara, CA 95051 (408) 987-5090

The year 1983 marked two firsts for Intel Corp. It was the first time total corporate revenues exceeded the billion dollar mark and the first time this company has appeared in the DATAMATION 100.

While total corporate revenues registered \$1.12 billion, up from almost \$900 million in 1982, total dp revenues were also up \$35 million to \$175 million. Peripherals and terminal revenues were \$125 million, and software and services revenues made up the additional \$50 million.

The economic recovery reached Intel by midyear, and the company was able to start phasing out the pay cut and freeze that had been in effect since January 1983.

As the demand for Intel's chips soared, corporate annual revenues grew by 25% and operating profits increased nearly fivefold from the company's depressed 1982 levels. In addition, interest income increased by over \$28 million, resulting in net income increasing nearly fourfold and earnings per share more than tripling to \$1.05. In the fourth quarter, revenue was up 39% over the previous year.

But such a strong and positive change in business conditions did bring problems for the company. Part of the growing pains had to do with difficulties in producing product fast enough to meet demand. To counter this, the company's work force and facilities are being expanded.

During the year, Intel introduced the Systems 86/310 and 286/310, single-board processors based on its 8086 and 80286 microprocessors, and the iSBc 186/51, a single-board computer offering both the computing power of the 80186 and the local area network control capability of the 82586. Also new was the Xenix operating system for the 80286 microprocessor, and the company announced that a version of the Unix System V operating system would be available for the 286 in 1984.

## **67** **CONTINENTAL TELECOM INC.** 245 Perimeter Center Parkway Atlanta, GA 30346 (404) 391-8000

Contel didn't wait until Jan. 1, 1984 for the breakup of AT&T. Back in 1978, the company realized big changes were ahead for the telephone industry and it began diversifying into other industries. Contel made a number of acquisitions in the data processing industry that added to the company coffers in 1983. Out of the total corporate revenues of \$2.1

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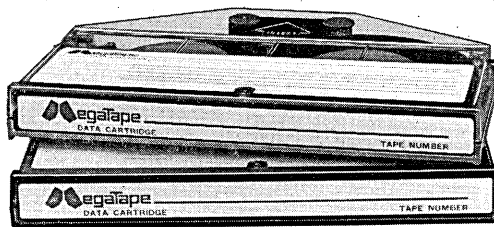
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billion, only \$174.7 million comes from dp, but Contel is happy with the profit margins, and is introducing a number of new products for the industry.

Cado, acquired in 1983, was responsible for \$53.5 million in dp sales, up from the \$33.7 million of 1982. Cado's profits weren't individually released, but Contel claims office automation vendor Cado has gone from a loss to a profit. During the year, Cado introduced the Tiger family of multi-processor 16-bit supermicros, which can handle 64 users. Contel expanded Cado's manufacturing facilities—as well as beefing up R&D—with two new manufacturing facilities in 1983, one in Torrance, Calif., and the other in Cork, Ireland.

Other Contel acquisitions in the dp market include STSC Inc., the large supplier of remote services and software products, and NaBanco, a credit card-checking company in the remote processing services market. In addition, International Computing Co. and Network Analysis Corp. were acquired and joined together to form Contel Information Systems. These various software operations added up to \$105.3 million in revenues for 1983.

A new dp revenue producer is expected next year, when Executone, purchased in 1978 by Contel as the first step to diversification, produces a planned line of digital PBX systems for the small business market. Executone is already a prime supplier of telephone gear, with \$178 million in 1983 sales.

Contel is proud of the fact that 31% of its total revenues and 10% of net income come from nontelephone operations. The company plans to expand these figures even further, toward its goal of 35% of revenues and 25% of earnings.

As the telephone industry remains in turmoil, Contel is able to post higher earnings and still keep an eye on what the FCC is proposing to do about access charges. While the 10% earnings appear small, they loom large when compared with Contel telephone operations earnings, which grew only 2.5%. The nontelephone operations are already an important factor for Contel, one the company will no doubt support and nurture.

## 68

### CRAY RESEARCH INC.

608 Second Ave. South  
Minneapolis, MN 55402  
(612) 333-5889

Cray Research set company records for system deliveries, revenue, and earnings in 1983. Revenues for the year hit \$169.7 million. Net earnings grew 37% to \$26.1 million.

During the year, the firm installed 16 new systems worldwide, bringing the number of its supercomputers in operation to 65. Of the 16 systems, six were Cray X-MPs. By the end of 1983, Cray was shipping one X-MP a month. The company says the X-MP, which

carries a price tag in excess of \$10 million, has become the "financial engine of the company."

During 1983, Cray received orders for 25 systems. Of the 25 contracts, 12 were from new customers, and 10 of those were commercial accounts. Almost half are first-time supercomputer users. Of the remaining 13 contracts signed by existing customers, nine are for the X-MP.

Research expenditures declined \$3.2 million to \$25.5 million—roughly the same percentage of the total budget the company spent on R&D in 1982—despite challenges from national programs in Europe and Japan that are developing large-scale computers and the technology to support them. Furthermore, cooperative programs and consortia have been established in Europe and the U.S. to develop supercomputers, and new companies are entering the field regularly.

To counter these supercomputer challenges, Seymour Cray and his design team produced their first gallium arsenide devices at the company's new fabrication facility in Chippewa Falls, Wis. Cray's other developments were in the software area. The company released a new version of its COS operating system and selected Unix as the operating system for the Cray-2.

## 69

### TELEVIDEO SYSTEMS INC.

550 E. Brokaw Road  
San Jose, CA 95131  
(408) 993-1320

TeleVideo had a great year in 1983; it increased revenues 71% to \$168.7 million, up from \$98.5 million in 1982. In addition, TeleVideo had a whopping earnings increase as well, which few Top 100 companies were able to match. Earnings were up 76% to \$22.4 million, from \$12.7 million for the previous period.

TeleVideo was able to post these all-time high earnings and revenues figures at the same time that it was broadening its traditional marketplace and entering a whole new market. At the end of 1982, TeleVideo was a leader in the terminal market, but by the end of 1983, it was a force to be reckoned with in the pc market through its TS 800 workstation and TS 804 multi-user system.

In the middle of the year, TeleVideo changed from the operating system CP/M standard to IBM's PC/DOS, which it recognized early on as the standard operating system for pcs. This enabled the company to grab a large volume of sales through an all-important connection with Computerland.

TeleVideo financed this growth with an initial public offering in early 1983, netting \$91 million. The year saw the number of employees grow 77% to 867. Research and development was a high-priority item, growing 123% to \$6.9 million. A number of steps were taken to expand capacity during the year, including the purchase of a plant in

Korea for pc manufacturing.

Dr. K. Philip Hwang, chairman, has an eye for the future, including smart telephones and other data retrieval devices for the executive's desktop.

## 70

### BASF SYSTEMS CORP.

Crosby Drive  
Bedford, MA 01700  
(617) 271-4000

The company that invented magnetic tape in 1934 continues to be a leader 50 years later. BASF pulled in \$165 million from magnetic media in 1983, according to DATAMATION estimates. BASF markets a full line of media for large and small systems, including disk packs, cartridges, and computer tape for mainframes and minis, as well as floppy disks and tape cartridges for smaller systems.

The company has increased its emphasis on using resellers rather than dealing directly with even large customers. Currently, more than 50% of all the company's magnetic media products are sold through its authorized reseller network.

BASF's products are manufactured in three facilities around the world. The U.S. headquarters in Bedford uses specialized quality control procedures to ensure product uniformity and performance. The \$16 billion corporation spends about \$200 million a year on research and development in magnetic media, most of which goes into the dp industry (Some goes into audio- and videocassettes and tapes for consumer and entertainment industry use.)

BASF's primary dp business is still magnetic tape. It currently sells two lines, the Endura and the 2000 AD. The 2000 AD line is essentially a premium quality Endura, selected only from custom lots and certified reel by reel to be error-free at 75% higher tolerances than tape drive requirements. The disk business, especially the FlexyDisk floppy disk segment, has been growing rapidly in the past few years, owing to the rise of micros.

## 71

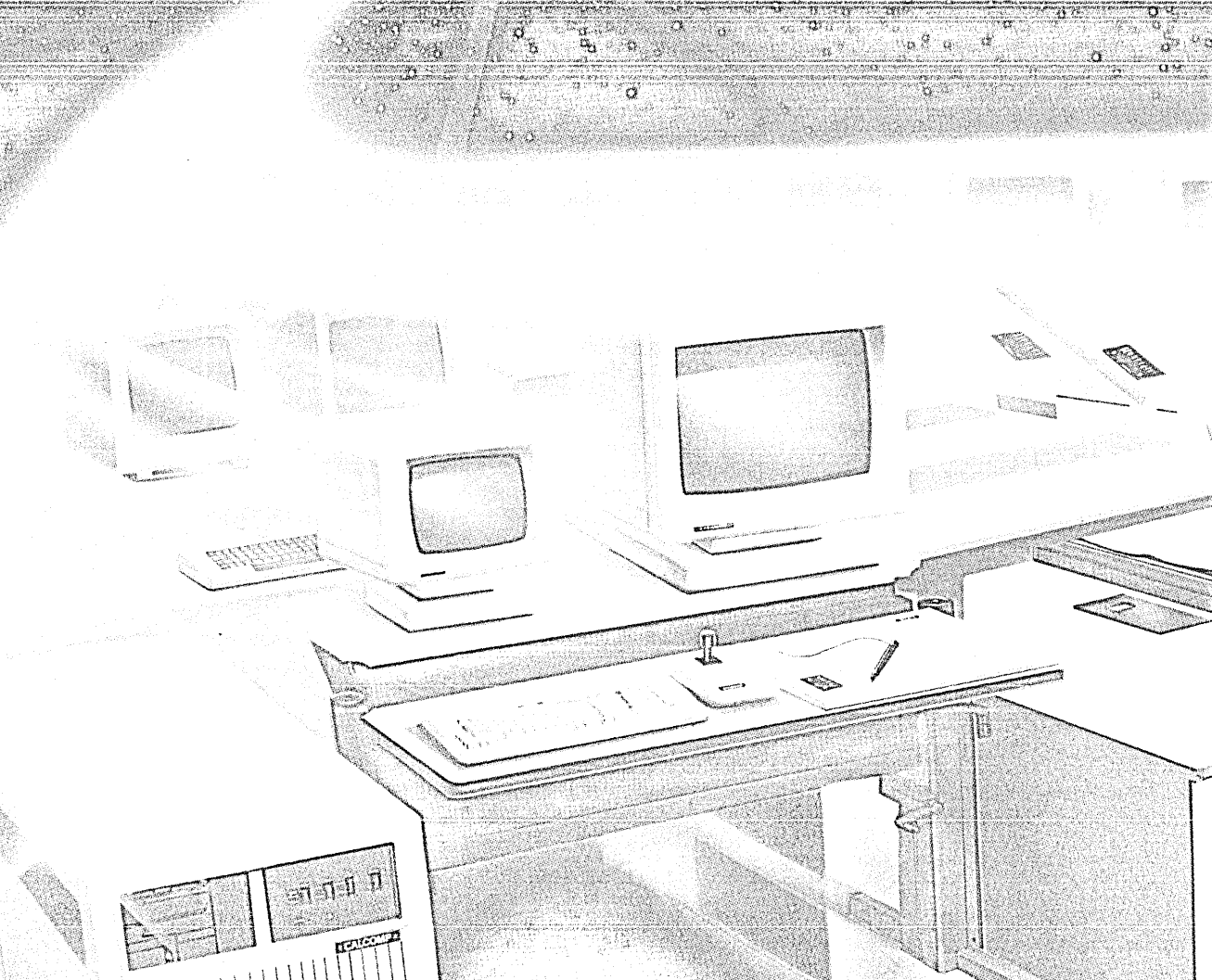
### CENTRONICS DATA COMPUTER CORP.

One Wall St.  
Hudson, NH 03051  
(603) 883-0111

This well-established printer company found 1983 a disappointing year, despite having reduced substantially its operating losses and repositioning itself to address broader markets. Centronics made efforts to reassert itself in the oem markets, particularly for low-end matrix printers, where it has lost much ground in recent years.

Centronics' sales for 1983 were \$164.1 million on which the firm reported a loss of \$7.7 million. The previous year's loss

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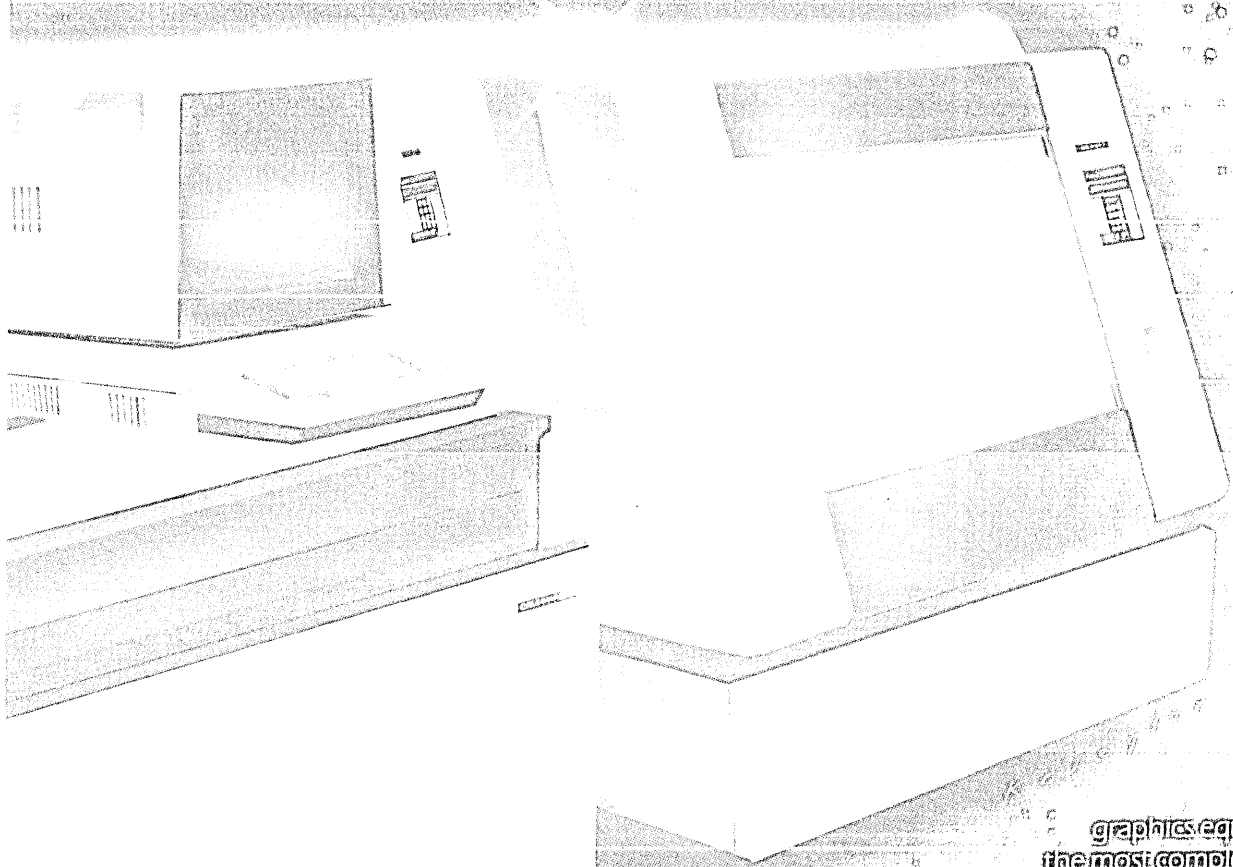
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had been \$32.3 million from revenues of \$138.4 million. The firm attributed much of the poor showing in 1983 to high costs. To rectify matters, Centronics last year established a new centralized management structure, began investigating the procurement of subassemblies in the Far East, where labor and materials are cheaper, and began redesigning its own manufacturing facilities to take advantage of automated techniques. It also reduced employment to 1,700 from 2,000 people.

Centronics also introduced new models of its Linewriter band printer family and unveiled a new series of low-cost matrix printers, the Horizon line. The former is aimed at oem customers that tend to make lengthy evaluations of products and therefore are slow to make commitments to large volumes. The Horizon line is aimed at small systems and personal computer applications and complements the firm's Printstation line of matrix machines. In both arenas, however, the company faces stiff competition from Japanese and other foreign suppliers. Centronics has, though, continued its relationship with Japanese manufacturer Brother Industries Ltd.

## **72** **CONVERGENT TECHNOLOGIES INC.** 2500 Augustine Drive Santa Clara, CA 95051 (408) 727-8830

Despite the fact that Convergent Technologies' sales increased \$70 million in 1983 to \$163.5 million, operating income decreased to \$11.9 million from \$18.2 million in 1982.

The company attributed the decrease in income to a general pricing decline in the workstation market and the price reductions of its AWS and IWS workstations during the second half of 1983.

While sales were up for the entire year, sales growth slowed because there were fewer orders than expected from the company's larger oems. They reduced purchases of the AWS and IWS products during the second half of the year in anticipation of CT's new workstation, the N-Gen.

Last year also saw CT stray from its original niche as a manufacturer of desktop computers and roll out MegaFrame, a processor that can be upgraded from an eight- to a 128-user superminicomputer. By the end of the year, orders for the MegaFrame were ahead of company projections. Another new product was WorkSlate, a lap computer.

CT began shipping limited quantities of N-Gen, but shipments of the product were below expectations and costs higher because of a slow manufacturing start-up and an inability to obtain parts from Intel.

A significant event that occurred in the final days of 1983 was the announcement that AT&T Information Systems had awarded CT a contract to design, develop, and manu-

facture certain products in the wake of the communication giant's decision to enter the general purpose computing arena.

## **73** **DIEBOLD INC.** 818 Mulberry Rd. S.E. Canton, OH 44711 (216) 489-4000

"Easy Money" ought to be the motto for this company, which at one time was run by Eliot Ness of *The Untouchables* fame. The 125-year-old company is the largest builder and seller of automated teller machines, with more than 6,000 units shipped last year, or almost half of total U.S. shipments. The cash machines have proved to be a boon to banks, brokers, gas station operators, and other retailers. Diebold's revenues, profits, and operating ratios are at the peak of their form, despite competition from archrival Docutel as well as from IBM, NCR, Burroughs, and a host of other computer companies.

Total revenues were up 4% to \$446 million, and net income jumped 18% to \$49.1 million. DATAMATION estimates dp revenues were up a modest 6.7% to \$160 million, representing the revenues from its ATMs, which are really peripherals attached to a bank's mainframes.

To keep on top, Diebold boosted research and development spending 76% to \$24 million, most of it going to hardware and software development to keep its line of teller equipment, both automated and manual systems, state of the art.

Diebold rolled out several new products late last year to encourage its customers to replace units as the ATM market matures. The new ATMs are geared for self-service locations in supermarkets and other retail locations. A new desktop microcomputer line was also introduced to broaden Diebold's profile in the bank automation business.

Diebold as a company was stunned by the sudden death in February of this year of its president and ceo, Earl F. Wearstler, after a short bout with heart disease. He had been a 37-year veteran of the company and had only recently attained the ceo title. In early 1984, Robert Mahoney was named president.

## **74** **THE SIGNAL COS.** 11255 North Torrey Pines Rd. La Jolla, CA. 92307 (619) 457-3555

Most of Signal's \$160 million in data processing revenues comes from its Ampex Corp. subsidiary in Redwood City, Calif. While Ampex's main business is manufacturing videotape recording equipment and media, its Computer Products Division also supplies crt terminals, core and semiconductor memory systems, and Winchester disk drives

and related media.

While Signal's revenues for 1983 were recorded as \$6.15 billion, up from \$3.73 billion, most of this growth was due to the 1983 merger with Wheelabrator-Frye and to an accounting change. Net income from the merged entity dropped to \$103 million from 1982's \$113 million. DATAMATION estimates that total dp-related revenues dropped to \$160 million from \$177.3 million.

Last year saw Ampex begin full-scale production of Winchester disk drives ranging in capacity from 6.7MB to 27MB, and an increase in shipments of fixed-removable disk drives in the 165MB to 330MB range. The company installed a new automated thin-film disk platter production line that is expected to turn out more than 1 million oem units this year.

Meanwhile, Ampex's crt terminal business, with manufacturing based in Taiwan, expanded its product line with a low-priced family and a series of multiprotocol workstations developed by ECS Microsystems, which was acquired in 1983. The Computer Products Division also hired a new general manager last year, who it hopes will help the company reverse its sales slide.

## **75** **GERBER SCIENTIFIC INC.** 83 Gerber Road West South Windsor, CT 06074 (203) 644-1551

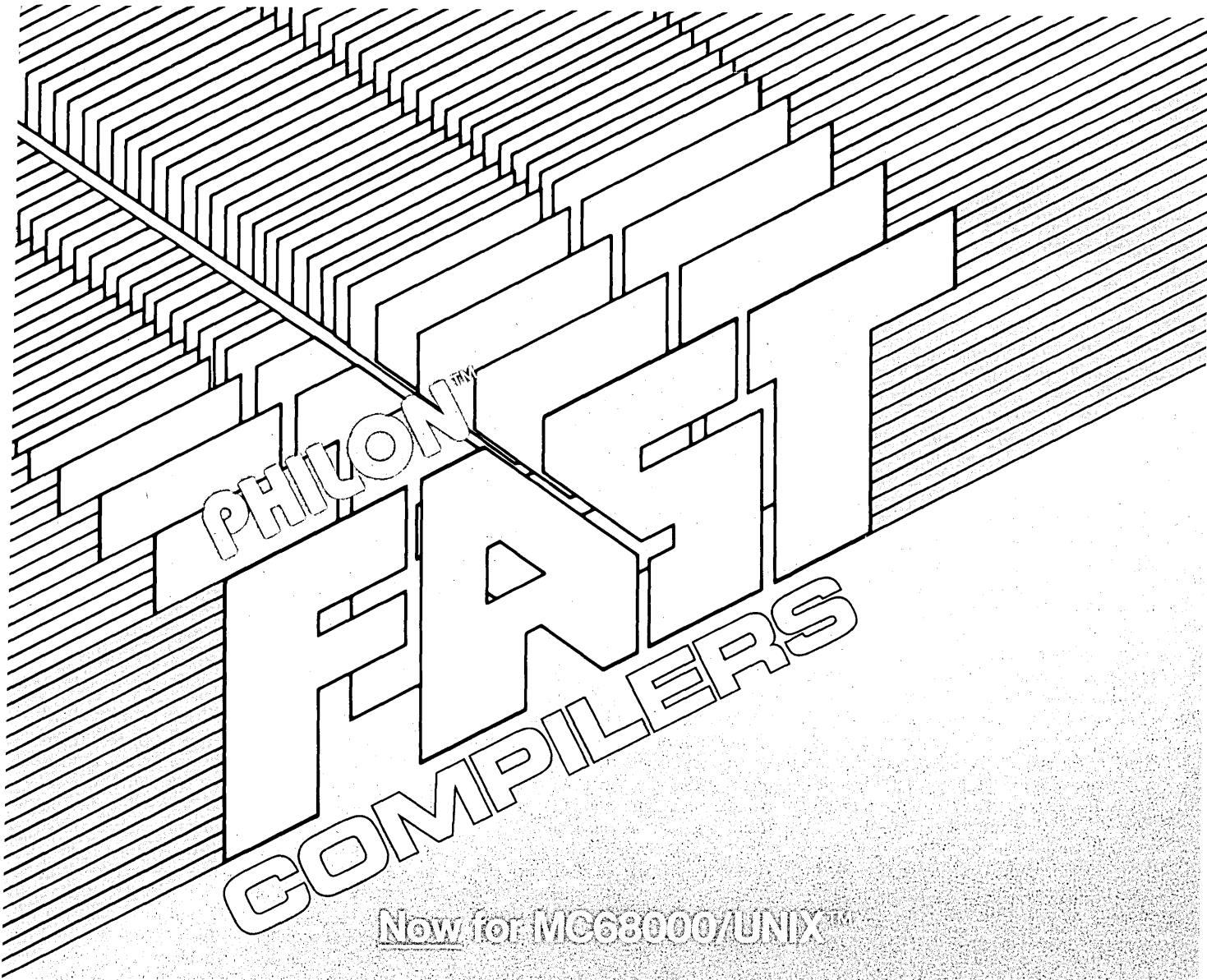
As the U.S. economy picked up, so did Gerber Scientific's fortunes. The company, which is a specialist in CAD/CAM production, had a hard time in 1982 when the economy soured. But as the economic clouds cleared, Gerber was able to post increased revenues and earnings. Revenues increased 38.7% to \$159.1 million in calendar 1983, up from \$114.7 million for the previous period. Net income was up a spectacular 222% to \$11.3 million from \$3.5 million in 1982.

The CAD/CAM market is set for explosive growth and is expected to become a \$4 billion market by 1986. Gerber is uniquely poised to make the most of this growth. The company is divided into four operating subsidiaries, each geared toward a particular market. In addition, Gerber established a venture capital subsidiary during 1983 to help it invest in emerging companies.

The largest operating subsidiary is GSI, aimed at the electronics and graphic arts industries. The mainstay of this subsidiary is the PC-800 model 13, which aids in the design of printed circuit artwork and the manufacturing of tooling and documentation. Another GSI product is the task-oriented AutoPrep 5000, developed to meet the graphic arts industry's need for fast response and high quality.

Gerber's main effort in the CAD/CAM market has been with its GGT subsidiary, which specializes in the designing, grading, and cutting of flexible materials from fabrics to composites at high speed with great accu-





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racy. The backbone of this operation is the GERBERcutter, which has increased production 300% at some locations.

## **76** **MARTIN MARIETTA** **CORP.**

6303 Ivy Lane  
Greenbelt, MD 20770  
(301) 982-6500

Martin Marietta knew it had a good thing in its Data Systems Division. It was such a good thing that the giant conglomerate decided to spin it off into a separate operation—Martin Marietta Data Systems (MMDS)—four years ago. Attesting to that success is MMDS's data processing revenues, which reached \$154 million, a 23% jump over last year.

Most of that revenue stems from the software side, where MMDS pulled in \$116 million, a 35% increase over 1982. The company offers timesharing services and a range of off-the-shelf and customized software. Particularly strong in the application software area, MMDS markets the popular MAS (Modular Application Systems) software, which has gone over big in the manufacturing industry.

To bolster this software strength, Martin Marietta acquired Mathematica Inc. last year for \$30.8 million plus securities. The software house, which chalked up a net operating revenue of \$36 million in 1982, was melded into the MMDS operation.

Mathematica was quite a catch for MMDS. The company's RAMIS II is the industry's leading fourth generation language, with over 500 installations. It operates on either IBM or compatible machines, using a variety of operating systems. Mathematica's other operations include Mattech, which is involved in the development of packaged software and the sale of software-enhanced micros, and Mathematica Policy Research, a market research and consulting group specializing in formulating state lottery systems. Mathematica had a number of suitors, but opted for the MMDS offer because of the broad financial base it offered.

Also in 1983, MMDS bought American Management Systems' suburban Washington data center. The company now has three data centers in operation. Setting its sights on the future, MMDS is currently experimenting with new teleconferencing techniques, optical memory, fiber optic networking, large-scale database integration, and robotic simulation.

## **77** **QUOTRON SYSTEMS INC.**

5454 Beethoven St.  
Los Angeles, CA 90066  
(213) 827-4600

Quotron's terminals can be found in the offices of most money managers and Wall Street research analysts, scrolling the latest

stock quotes and investment information. The omnipresence of Quotron in the instant financial data market combined with high volume on the nation's trading floors has meant continuing growth for this company.

Last year, Quotron's revenues increased by just over 27% to \$153.8 million, and net income rose by 41% to \$23.98 million. Also increasing was the number of employees, to 1,425 from 1,164 in 1982. But Quotron's hold on its markets is being threatened. Big customer Merrill Lynch—accounting for about 25% of Quotron's current revenues—is developing its own system with Monchik-Weber. It will use IBM 3270 PCs as terminals, allowing Merrill Lynch customers to call up quotes on their own machines.

Increased competition is also coming from the other data services, ADP and Allied Corp.'s Bunker-Ramo Information Services. Observers say that Quotron's future growth will come in the banking and thrift industries, shielding the company somewhat from the effects of any Merrill Lynch action. Nevertheless, investors have proved wary: while it still sells at a hefty price/earnings ratio, Quotron's stock has not recently approached the high of 32 it posted last summer.

To further counter these threats, Quotron has turned up the R&D flame. In 1983 it spent \$10.8 million, up from \$7.3 million the year before. Some of this money was spent on a new line of products, Quotron 1000, that will deliver a rich menu of office automation features as well as financial data.

For the latest on this company, keep your eye on the screen of one of its own products.

## **78** **WYLY CORP.** UCC Tower Exchange Park Dallas, TX 75235 (214) 353-7100

One of the staples of recent business journalism has been the story noting the recovery of this services, software, and turnkey system vendor.

Following a string of disappointing years that included a bankruptcy in 1976, and after a glum 1982 for which the company posted losses of \$7.8 million on sales of \$140.5 million, Wyly actually earned some money in 1983. Not much to speak of, but enough to suggest to the financial community that the new management installed in 1983 might finally get this company shaped up: about \$200,000 on revenues of \$153 million.

The company put some new software on its menu, closed some unprofitable operations, cut costs, and—as *Value Line* reported—“spruced up the balance sheet.”

Problems continue, however. Wyly's computer services operation in the United Kingdom remains awash in troubles, and Digital Systems in Florida hasn't performed as hoped.

The improving news includes a big chunk of cash on hand, the result of more money recently kicked in by the company's largest stockholder, the Swiss-based Careal Holding, and the successful sale of 2 million shares of common stock in April 1983. Wyly will use this \$40 million kitty to expand its software offerings through beefed up R&D—almost doubled in '83 to \$9.9 million—and by acquisition.

In September, Wyly bought Open Systems Inc. for \$15.5 million. The Minneapolis-based firm writes accounting software for microcomputers, further strengthening Wyly's hand in its bid to be an across-the-board dealer of financial and accounting wares.

If things keep on improving Wyly can use its own improved performance to advertise the goods.

## **79** **ALLIED CORP.** Columbia Rd. and Park Ave. Morristown, NJ 07960 (201) 455-2000

Buried beneath the \$10 billion in Allied's annual revenues are several computer businesses, though the crush of natural resources and basic manufacturing operations tend to hide the fact. Several years ago Allied bought Bunker Ramo, a dp hardware, software, and services vendor that has been falling on hard times. DATAMATION estimates that total dp revenues were up slightly in 1983, to \$152 million from the \$147 million of the prior year. According to Allied, BR's operations were “marginally profitable” last year, not much to say for a business that cost Allied \$347 million in 1981.

Any disappointments that BR management felt last year were due to the rapid technological changes taking place in the financial services industry as well as those in the dp worlds.

BR's basic businesses—terminal hardware and software for banks and brokerage firms—were buffeted by the trend to replace dumb terminals like the aging BR line with personal computers. BR tried to stay competitive but its new workstations just didn't provide the IBM PC capabilities and features that end users wanted.

The on-line information business, stock quotes and the like, that BR supplies to brokerage firms also changed from a leisurely business to a cutthroat arena. GTE sold out to ADP, and Quotron was threatened with the loss of its biggest customer, Merrill Lynch.

BR's moves to prepare for the future included increased spending on research and development and a joint venture with Fortune Systems, a Silicon Valley firm with an advanced personal computer. Fortune's fortunes faded fast, however, when the software for its 32:16 workstation proved unreliable. Allied has gone back to the drawing board, looking for a quick fix to its pc needs.

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**80****VERBATIM CORP.**

323 Soquel Way  
Sunnyvale, CA 94086  
(408) 245-4400

Verbatim ended 1983 on a profitable but cautious note. Revenues were up 45% to \$147 million from the \$98.6 million reported a year earlier. Earnings also increased rapidly, to \$15 million from the \$11.5 million of 1982. These figures, however, hide the dismal performance in the fourth quarter of 1983; earnings fell 25% from last year's \$2.8 million. Verbatim explained the poor performance on order softness from oem customers and a large product return from a major oem customer.

All during 1983, Verbatim battled such problems, but this versatile producer of floppy disks managed to prevail. The competition in the disk market became tougher, and Verbatim moved on a number of fronts to increase its market share. First of all, to round out its product line, Verbatim introduced its Optima series, which is used on high-performance micros like Apple's Lisa.

Verbatim then moved its products into the consumer market by signing 2,000 national chains like Computerland and Macy's. In addition, Verbatim increased its advertising budget and appeared in consumer publications like *Time* and *Cosmopolitan*.

Another Verbatim effort at the consumer market was the introduction of the Disk Drive Analyzer, which evaluates drive head media positioning, drive hub clamping operation, drive speed, and data storage accuracy. This is the first product from Verbatim's Data Encore subsidiary, which is exploring the software duplication market for future products and profits.

Verbatim realized that with success comes competition, and in response pushed its R&D budget up almost 50% to \$11.5 million. Meanwhile, Verbatim is cutting corners in other areas, like layoffs of production workers, to control costs. With personal computer sales continuing their sizzling pace, the lean, mean Verbatim is ready to fight for the flow of user dollars.

**81****MANAGEMENT SCIENCE AMERICA INC.**

3445 Peachtree Rd. N.E.  
Atlanta, GA 30326  
(404) 239-2000

In the last few years, MSA has blossomed from a mainframe-focused, privately held company into a software-for-everything, sweetheart of the stock markets. But last year, as they say in Wall Street, MSA didn't "make its numbers," and the stock took a drubbing in a down market.

Nevertheless, MSA's sales jumped last

year by more than 44% to \$145.2 million. (Over the past two years, the increase has been more like 100%.) Income before taxes hit \$19.5 million, up 38% over 1982, and net income grew to \$10.5 million. The increase in net income was held to a respectable 17% by what the company called a "substantially higher" tax rate, caused by MSA's decision to treat R&D tax credits conservatively.

The overpriced dollar abroad was also a brake on MSA's momentum: the percentage of MSA's revenues that came from foreign sources dropped from 23% in 1982 to just under 21% last year. MSA continued to add products to its lineup by acquiring companies. It entered the educational micro software field, a market that's expected to grow by 70% a year in the near future, when it bought EduWare Services Inc. MSA's purchase of Computeristics Inc. added still more items to the company's menu of IBM mainframe software.

MSA also beefed up its R&D budget in '83, pushing it to \$28.9 million, up from \$21.8 million in 1982, continuing a trend set the year before when this seed-money budget item also rose by about a third. With R&D costs running at about 20% of gross revenues, MSA seems determined to further reduce its dependence on the unpredictable fourth quarter payoff that results from relying on financial software as its core business.

**82****REYNOLDS & REYNOLDS**

800 Germantown St.  
Dayton, OH 45407  
(513) 443-2000

Last year, this venerable company's revenues moved out of the slot where the recession parked them a couple of years ago. DATAMATION estimates that dp revenues grew last year by about 24%, going from \$120 million to \$145 million. (Reynolds & Reynolds' total revenues, \$263.9 million, include its sales of standard and custom business forms, which first led it into the computer services field.)

Most of Reynolds & Reynolds' business has come from the nation's automobile dealers, among the businesses hardest hit by the recent recession. The recovery has been kind to the diminished car business, and by the fourth quarter of 1983, revenues and gross profits from the computer systems division were up by about one third over the fourth quarter of the year before.

Last year also saw the inking of a joint venture pact in Europe with the French Sligos S.A., Paris. Sligos & Reynolds S.A. will sell computer systems to French automobile dealers. Reynolds & Reynolds is also doing business in Australia, New Zealand, the U.K., and South Africa.

In April, the company closed down development of a specialized contractor system, saying that "to continue development of the system in the face of a closing market window would be imprudent." But by the end of the year, management was optimistic

about tests of a new medical system, and planned to introduce it in 1984.

The company got itself out of the computer-building business in 1983, dropping its E-6000 and replacing its TC 1000 micro terminal with the IBM PC. Early in '84, chairman and veteran ceo E.F. Strasser stepped down in favor of Terry D. Carder, who had been president and ceo. Strasser, who said ill health forced the move, will remain as chairman and consultant.

**83****NIXDORF COMPUTER CORP.**

300 Third Ave.  
Waltham, MA 02154  
(617) 890-3600

Revenues for the American arm of Heinz Nixdorf's computer company stayed pretty flat for '83, with sales totaling \$141.1 million, just \$1.1 million more than the previous year. The parent company, headquartered in Paderborn, West Germany, came closer to piercing the \$1 billion ceiling, with revenues up to \$997 million from '82's \$961 million.

The mainstay of Nixdorf's business continues to be its 600 product line, launched more than 10 years ago. But buoyed by a 29% boost in R&D spending, the company sent new products flowing into the U.S. and international markets, among them the 8890 mid-range computer system, aimed primarily at Fortune 500 companies, and the 8860 network system. Last year, a major bond servicing company installed an 8860 system in 110 banks, and more sites are scheduled. Point-of-sale systems for the retail marketplace, particularly hotels and restaurants, are a major target for Nixdorf, and last year the 8812 POS system made its debut, serving a large California restaurant chain.

Two products announced last year will make it into the U.S. market in 1984, the 88BK voice recognition system and the 8832 fault-tolerant computer. The fault-tolerant system was developed with Auragen Systems Corp., Fort Lee, N.J., and will be sold by both companies. Nixdorf claims "almost 100% system availability" for the 8832.

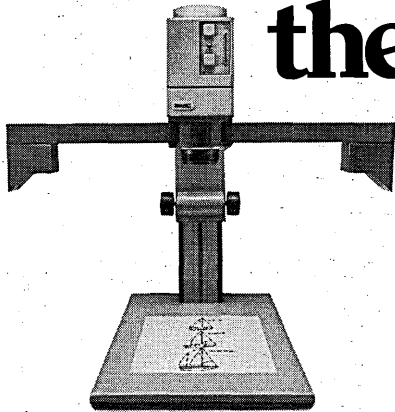
There was big news, too, from Nixdorf's Richmond, Va., software development outfit, Nixdorf Computer Software Co.: a Unix-compatible timesharing system for IBM mainframes running under IBM's DOX/VS(E) and Nixdorf's own 8890 running EDOS/VS and EDOS/VSE operating systems.

**84****NBI INC.**

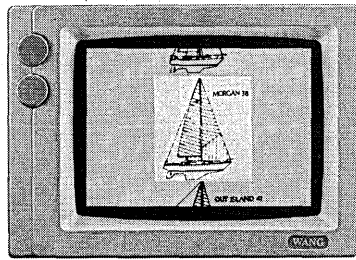
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Boulder, CO 80301  
(303) 444-5710

NBI Inc. had a tough year in 1983, a big difference from its performance in 1982. Rev-

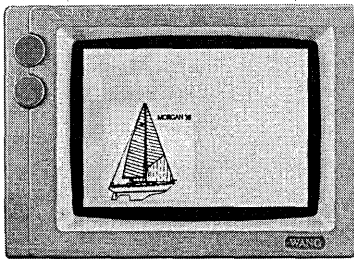
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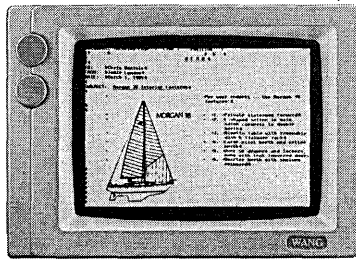
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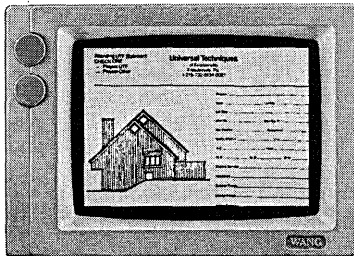
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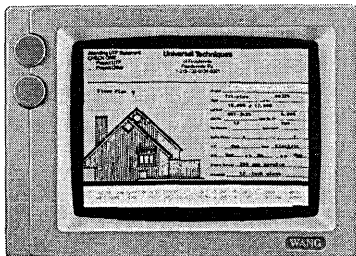
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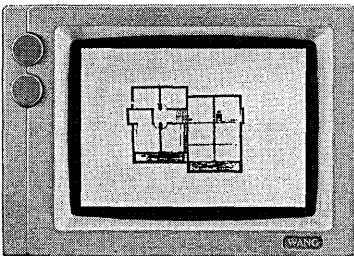
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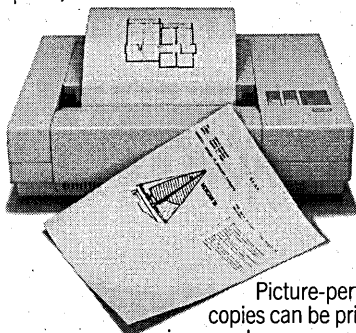
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venues were up almost \$20 million to \$140.8 million, but income was down almost \$10 million to \$3.5 million.

The company suffered a third quarter loss of \$3.5 million. It attributed the loss to being caught between product cycles as customers delayed orders in anticipation of new NBI systems. Fourth quarter performance began to recover as the demand for its products increased.

During the year, NBI hired 497 new employees bringing its work force to 1,846. It also completed construction on and occupied its new 250,000-square-foot headquarters in Boulder, Colo.

As part of its expansion program, the company opened four new domestic branch offices for a total of 33 and added 15 new dealer locations for a total of 76. NBI also took control of its key international markets by purchasing distribution rights and operations for its products in Canada, West Germany, and the United Kingdom, and built direct sales organizations in those countries as well.

During the year, this vendor added several new products to its OASys line of office automation equipment. Additions included the 4000 series of ergonomic workstations, the OASys laser printer, and the OASys 64 clustered product and 3270 communications capability.

The company also introduced System One, which includes the integrated workstation and integrated systems server. NBI also came out with a local area network that ties the OASys and System product lines together.

## **85** **PLANNING RESEARCH CORP.**

1500 Planning Research Drive  
McLean, VA 22102  
(703) 556-1000

Uncle Sam is a big favorite with Planning Research Corp., which pulled in most of its 1983 dp revenues by doing business with the Feds. Some glitches in that business, however, caused PRC's overall dp revenue to drop slightly to \$136 million last year from \$138 million in 1982.

In the dp domain, software/services jumped 26% to \$131 million. Meanwhile, the company's turnkey systems trade was off by more than 50%, down to \$4.8 million. This diversified services company's total revenues also inched downward to \$318 million last year from \$321 million in 1982.

Data processing remains the company's biggest revenue earner. During FY '83, the PRC Government Information Systems (GIS) operation hauled in 34% (\$108.2 million) of the company's revenues. Approximately 19% came from PRC Systems Services, which posted earnings of \$50.4 million—down 6% from 1982. PRC Computer Systems, which sells computer-based multiple listing and other services to the real estate brokerage industry, accounted for 16%

of the company's overall earnings in FY '83.

On the acquisition front, PRC broadened its dp base last year by acquiring Sterling Systems Inc., an \$18 million computer systems and software company also headquartered in McLean, Va. Officially melded into the GIS group last June, the Sterling Systems subsidiary was a welcome addition to the PRC family. Even more welcome was the \$10 million contract the new sub won to provide software services for the Navy's new inventory control systems.

Also last June, PRC formed an R&D limited partnership with E.F. Hutton called Hutton/PRC Technology Partners Ltd. The 30-year-old company hopes to raise up to \$25 million through this venture to fund high-tech research and development projects.

An in-house venture was also launched last year between the firm's GIS and engineering groups. These two PRC units have teamed up to form a new organization that will market the company's computer-based systems and services internationally. PRC's initial plunge into the international software market failed several years ago.

This time around, PRC is optimistic about profits on the foreign front—optimism that seems to be fueled by the company's accelerating domestic dp drive.

## **86** **LEAR SIEGLER INC.** 2850 Ocean Park Blvd. Santa Monica, CA 90406 (213) 452-6000

Data processing revenues inched up \$2 million for Lear Siegler Inc. in 1983 to \$130 million, according to DATAMATION estimates, despite the fact the company reported record sales of computer terminals.

While shipments from the Data Products Division of LSI, one of the largest independent manufacturers of dumb terminals for non-IBM markets, were at a record level, dollar volume was down because of lower unit prices. In fact, profits almost disappeared due to the industry's rampant price-cutting.

Two new terminals and a printer were introduced in 1983. The terminals are ergonomically designed with detachable keyboards and the monitor has a swivel and tilt mechanism. The multifunctional printer has graphics capability, including full color.

Total corporate revenues were \$1.5 billion in 1983, up from \$1.4 billion in 1982. As the year progressed, business began strengthening for the diversified corporation as reflected in the third-quarter results, which were about even with the previous year. In the fourth quarter, earnings of \$23.8 million represented a 14% improvement over 1982.

Research and development revenues were \$30.9 million in 1983 as compared with \$28.5 million in 1982. According to the company, R&D expenditures are at record levels, and new product development and support of existing products are up companywide.

## **87** **BRADFORD NATIONAL CORP.**

67 Broad St.  
New York, NY 10004  
(212) 530-2400

For better or for worse, 1983 was certainly an active year for Bradford National. The most important events were those concerning the proxy fight waged in the spring by dissident shareholders for control of the company's board of directors. That fight began when William Siegel, ceo of Siegel Oil Co. and a big holder of Bradford stock, formed a group claiming that Bradford was not taking advantage of opportunities in the financial services industry. Bradford sued, then said it would seek a buyer if Siegel's group would back off. Ultimately, however, Siegel's group held sway. Siegel was named the new chairman of the board and two new directors were named, giving Siegel control of the board, which then named Alan C. Winters to replace Roy B. Simpson as president and ceo.

Through it all, Bradford's business continued to suffer. True, corporate revenues climbed 7% to \$144.4 million and dp revenues rose 10% to \$127.4 million, but the \$400,000 net income for 1982 turned into an \$8.1 million loss. Employment rose 3% to 3,100, and R&D expenses rose 125% to \$4.5 million.

The company continues to focus on providing proprietary services to financial institutions, brokerage firms, and governments. During 1983, its unprofitable Bradford Broker Settlement Inc. subsidiary was sold, which accounted for \$7.4 million of its total loss on the year. The company also sold its 19% interest in Eagles National Corp. at a loss. Without those two transactions, Bradford would have had a \$3.3 million pretax profit on the year.

## **88** **NATIONAL DATA CORP.**

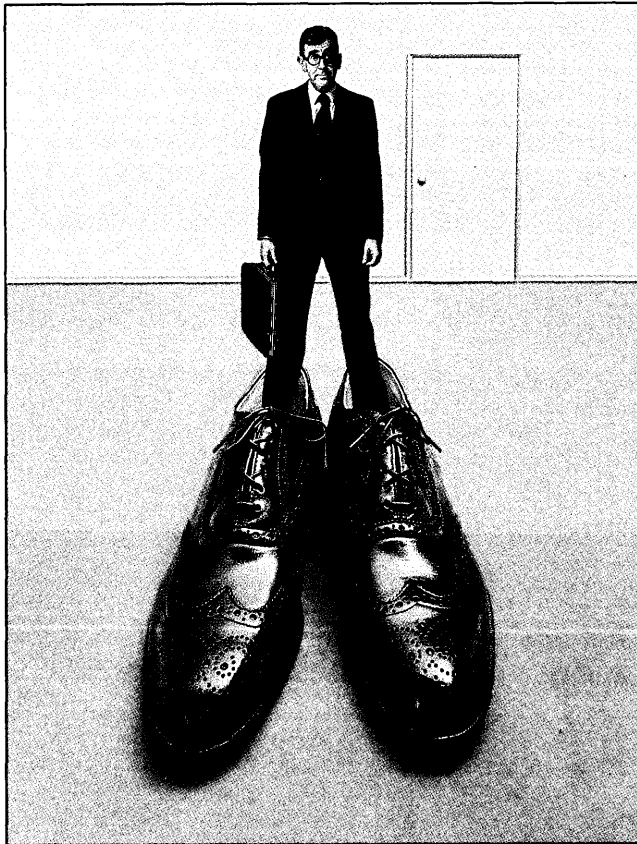
One National Data Plaza  
Atlanta, GA 30329  
(404) 329-8500

National Data Corp.'s dp revenue was up only \$5 million to \$126 million in 1983. While the first and second quarters were ahead of 1982, third and fourth quarter performance fell below last year's level.

Atlantic Richfield, one of NDC's largest accounts for credit card processing equipment, discontinued its credit card and its account, but according to NDC, this had only a "limited impact on overall performance."

Another significant development occurred in July when NDC agreed to acquire Libra Group Inc. of Rockville, Md., for about 270,000 shares of NDC. Libra is a software development and consulting firm whose primary business is in health care-related

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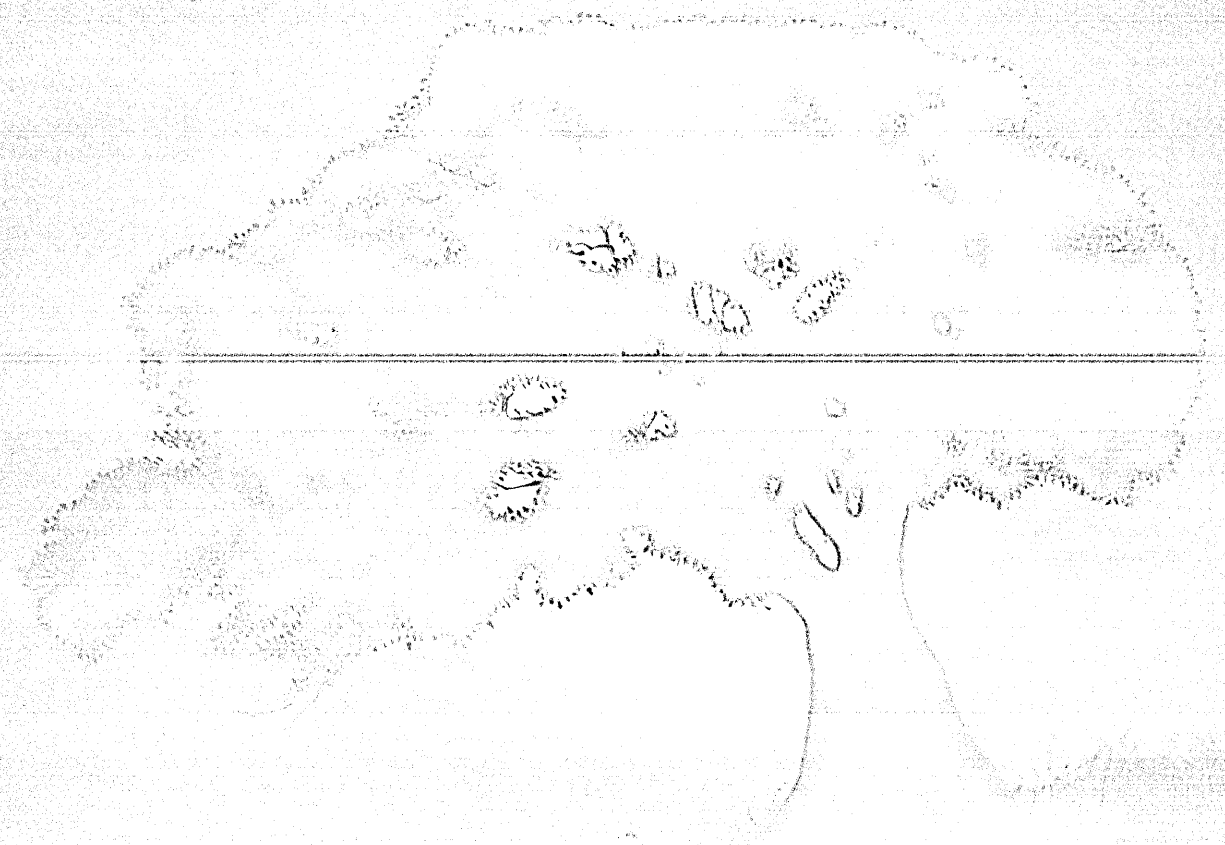
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government contracts. NDC says this acquisition, if approved, would improve its capacity in the health care market, where it has introduced an on-line eligibility system for health care services.

During the year, NDC introduced the Network for Electronic Transaction Services (NETS) for financial services, which offers banks an integrated package of traditional services and provides them with the opportunity to expand their fee revenue base in corporate, business, and consumer markets.

NDC, appointed by IBM as a value-added distributor for that company's equipment, will introduce treasury bank and pharmacy management systems for the IBM PC.

During the past year, the company made changes in its Rapidata Division by re-directing marketing efforts to concentrate on vertical markets. It also restructured its network services group.

In international markets, Europe continues to be a profit center for the company, and with recent commitments by customers in Japan to install its systems, the company is making inroads in establishing itself in the Far East.

## 89 RECOGNITION EQUIPMENT

2701 East Grauwylar Rd.  
Irving, TX 75061  
(214) 579-6000

Last year this supplier of high-speed document and currency processing, data entry and information management systems (using optical and magnetic ink character recognition) cut its R&D budget by \$1.1 million and increased its marketing spending by \$900,000. If salesmen are having more fun than engineers at REI these days, at least the red ink that swept the company in 1982 turned a reassuring black in '83.

Revenues were up only about 4% to \$117 million, from 1982's \$112.4 million. The real news on the financial sheets was a profit of \$9.6 million, a major change from the \$14.2 million loss that 1982 produced.

Reason for the big change? In March of '82, a hot new management team was grafted onto REI's already winning technology base, and last year the hybrid began to bear fruit. Costs were cut throughout the organization. New president William Moore was quick to shed assets and products that didn't fit his tightly focused view of the company's business. Quality control improvements meant each sale cost less to fulfill.

Marketing people were added: the sales and marketing staff is, at 250 people, six times as big as it was when Moore arrived. The service organization was recognized as the sales tool that years of massaging REI's near-custom solutions to customer problems have made it.

One star of the edited product line in '83 was the Tartan Terminal system. The initial piece of an IRS order for the system added

\$2.2 million to REI's '83 numbers, and, if all contract options are exercised—never a sure thing—it could be worth \$14 million. REI also continued to work on its anticounterfeiting labels for consumer goods, signing a \$2.8 million contract to develop a new generation of its successful Signa system.

## 90 MICOM SYSTEMS INC.

20151 Nordhoff St.  
Chatsworth, CA 91311  
(213) 998-8844

Micom continued on its steady, steep growth path in 1983. The company racked up \$113.7 million in revenues, a 46% jump over 1982. Net income was also up significantly, a gain of 48% to \$18.3 million from \$12.4 million. Employment jumped 70% to 1,560 from 915, and R&D expenditures nearly doubled, to \$10.3 million from \$5.5 million. In the five years since 1978, revenues have shot up 5,400% and net income has rocketed 14,800%. Not a bad way to celebrate the company's 10th birthday.

All phases of Micom's businesses scored well in 1983. The remote communications products sector, which includes items such as concentrators, protocol converters, modems, and multiplexors, recorded \$53.8 million in revenue, just under half the corporate total. Local area network products, including data PBXs, the Insta series of line drivers and local datasets, and local cabling, racked up \$33 million through the year.

The LAN segment grew substantially during the year relative to the rest of the company, accounting for 26% of corporate revenues in the first quarter and 31% in the fourth quarter. Part of the growth was due to Micom's acquisition early in the second quarter of Kertec, a Cambridge, Mass., local network cabling concern. The company operates as a subsidiary of Micom and brought in some \$1.6 million during 1983, DATAMATION estimates. Micom sources say the new subsidiary will be renamed Insta-cable but will continue to operate independently.

The success in the LAN segment of Micom's business represents the realization of the company's strategy of penetrating the low end of the local area network market as that niche expands. Yet the success does not come at the expense of either the remote data communications products that were responsible for Micom's initial success in the past decade or the Black Box Catalog, a subsidiary mail order retailer of data communications equipment. The Black Box Catalog, which was acquired in 1982, had revenues of \$20.4 million in 1983.

Micom introduced several new products in 1983. Prominent among them is the Micro7400, a protocol converter that provides an IBM gateway for a dozen async terminals or PCs; it fully supports BSC and SNA and lets terminals switch among a pair of IBM hosts or minis.

Micom also introduced its Micro860 concentrator switch, which can connect up to eight Micro800/2 data concentrators. Other products introduced during the year include an X.25 packet assembler/disassembler and a 9.6Kbps pocket dataset.

## 91 COMPAQ COMPUTER CORP.

12330 Perry Rd.  
Houston, TX 77070  
(713) 370-7040

Without a doubt, Compaq represents the Cinderella success story of 1983. The company announced its first product, the Compaq Portable Computer, in late 1982, with shipments slated to begin in January 1983. The product caught the imagination of dp users throughout the country, since it was the first portable computer to offer complete compatibility with the IBM Personal Computer. As a result, in its first year as a revenue-generating company, Compaq pulled in \$111.2 million in revenues, resulting in \$4.7 million in net income. The payroll grew equally, from 96 employees in December 1982 to 614 at the end of 1983. Not bad for beginners.

But Compaq's story, unlike Cinderella's, may not turn out as euphoric as it began. Early in 1983, IBM introduced the XT version of its PC, which included a hard disk drive. Compaq was not able to add a hard disk to its line until the late fall, when the Compaq Plus debuted. But in February 1984, IBM struck back with its own portable computer, aimed directly at Compaq. It, however, cannot accommodate a hard disk drive.

Virtually all of Compaq's revenues came from sales of the portable computer (the Plus line was not shipped in 1983). DATAMATION estimates that the company did generate some \$10 million in sales of spare parts and in maintenance services.

Compaq's success in an area where many startups have been tried and few have succeeded stems primarily from its nearly absolute plug compatibility with the IBM PC as much as from its portability. Other vendors, such as Corona Data Systems and Columbia Data Products, introduced their products later and were not able to provide the same level of compatibility as Compaq did. Nonetheless, these and other companies—including IBM—have targeted Compaq in their quest for growth in the portable market, and Compaq will find it difficult to maintain the same growth in 1984 as it experienced in 1983.

## 92 CANADA SYSTEMS GROUP

2599 Speakman Dr.  
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CIRCLE 58 ON READER CARD



offices in North America. Its 1983 revenues were \$109.5 million (U.S. dollars), a 10% increase over the \$99.8 million recorded in 1982. Net income in 1983 was \$800,000, erasing a \$5.4 million loss in 1982.

Late in the year, the company was reorganized into groups. The Processing and Professional Services group is responsible for the production aspects of processing centers, network services, I/O services, and professional services. The Financial Services group includes the Banking and Insurance division and the Commercial Marketing division, while the Industry Services group includes other industries.

The company introduced several new services during the year. The Corporate Income Tax software for IBM PCs allows tax preparers to process and print tax returns in-house. The Datapharm Rx pharmacy micro system is a turnkey product based on the IBM PC that performs prescription filling, patient profile recording, and third-party billing functions as well as basic accounting for pharmacists. For large systems, CSG introduced the ISF Infocenter support facility to aid end-user computing by providing menu-based inquiry and report writing, graphics, and other business functions.

CSG introduced several on-line databases during the year, including STEPS (simplified text extraction procedures) for on-line access to some 550,000 businesses in Canada through Dun & Bradstreet's Dun's Market Identifier file, and the Canadian Federal Corporations and Directors database, which includes financial and personnel data from 135,000 Canadian companies.

## 93

### COMMERCE CLEARING HOUSE INC.

4025 West Peterson Ave.  
Chicago, IL 60646  
(315) 583-8500

Commerce Clearing House didn't have a good year in 1983. Revenues were up only 8.1% to \$378.8 million from the \$350.1 million reached in 1982. Net income was affected by CCH's decision to restructure its dp business group, which was reaching for sales in the turnkey business. This restructuring caused a \$15 million write-off, which brought net earnings down 21% to \$24.9 million. CCH had started this business to capitalize on its easy entree into the accounting and law professions, which have long been users of CCH's accounting and legal professional publications.

CCH's dp operations generated revenues of \$109.2 million in calendar 1983, barely up from the \$104.5 million registered in 1982. The bulk of these sales come from tax return processing. The Multi-Tax division offers on-line tax compliance processing and planning services to professional tax return preparers like accountants and lawyers. Most of these revenues are produced during

the first quarter of the year, when the tax rush is on. CCH has yet to find a way of expanding its dp business, and time is running out as competition in the industry becomes more and more intense.

## 94

### CULLINET SOFTWARE

400 Blue Hill Dr.  
Westwood, MA 02090  
(617) 329-7700

Last year Cullinane Database Systems changed its name to Cullinet Software. What it didn't change was its winning way: revenues vaulted over the century mark to \$108 million, almost 70% over 1982's already healthy numbers. Net income rose to \$15.3 million, up almost 48% from \$8 million the year before.

Aside from its new name, Cullinet's three big announcements last year were IDMS/R, the Information Database, and the Cullinet Personal Computer System. IDMS/R takes what has been Cullinet's flagship database management system, IDMS, and adds the relational capability that dp fashion now decrees. IDMS/R can operate as either a network or a relational database system. The Information Database communicates data from IDMS databases to microcomputer users. The Personal Computer System is a management and decision support package for the IBM PC.

These systems are scheduled for volume shipment this year, but gossip has suggested that problems exist at beta sites for IDMS/R. Cullinet has vigorously denied these reports, and Wall Street analysts have apparently discounted the rumors. For example, Paine Webber has forecast continued 50% revenue growth rates for the next few years.

Still, IDMS/R is not really a new product; it is the enhancement of a veteran winner, IDMS, first introduced by Cullinane in 1973, but based on an even earlier system acquired from B.F. Goodrich. Even so, it is generally agreed that IDMS is better than IBM's DL/1 and IMS database systems, and that Cullinet's associated products also have the edge.

Among Cullinet's acquisitions during '83 was Computer Pictures Corp., specialists in management graphics. The convertibility of this software to microcomputers seems to have been a major factor in Cullinet's decision to buy the company.

## 95

### SCHLUMBERGER LTD.

277 Park Ave.  
New York, NY 10172  
(212) 350-9400

Oil industry services giant Schlumberger spent some \$300 million over the past three years buying up several companies in the CAD/CAM business, and last year didn't have

much to show for it. DATAMATION estimates dp revenues increased a mere 7% to \$108 million in 1983. While \$5.8 billion Schlumberger does not disclose the earnings on the \$2 billion worth of individual operations unrelated to oilfields, observers say the return on investment to date does not look like a gusher.

Schlumberger subsidiaries Applicon, Benson, and Manufacturing Data Systems Inc. have been consolidated into a Computer Aided Systems group along with a number of test equipment manufacturers. The company reports that economic activity spurred in the second half, with orders up 36%, yet the enormous success of newer CAD/CAM players like Daisy Systems and Prime Computers is having an effect on Applicon in the \$2.1 billion market.

To stay on top, Applicon introduced the Bravo! system, based on the 32-bit superminicomputer from DEC. It is an integrated system of application and systems software. All the software bells and whistles, like menu-driven instructions, prompts, and help commands throughout, are included.

Schlumberger spent \$339 million last year on R&D and not all of it went to new oilwell thermometers. The company brags about its work on artificial intelligence, and given the resources Applicon has behind it, the little companies in the CAD/CAM market may have to contend with a real breakthrough product someday.

## 96

### DOCUTEL/OLIVETTI CORP.

106 Decker Court, Las Colinas  
Irving, TX 75062  
(214) 258-8610

Two years ago the outlook for Docutel was bright. It had merged with the U.S. operations of a European office products powerhouse, Olivetti, and had the cash to expand its automated teller machine (ATM) business and simultaneously have access to the hot office products market with Olivetti personal computers, typewriters, and other state-of-the-art products. Business magazines hailed the merger.

So much for their optimism. In 1983 the new Docutel/Olivetti oozed red ink out of every corporate pore. Combined revenues of the Docutel ATMs, its knitwear business, and the Olivetti office equipment line were \$221.8 million, up significantly from the \$147 million of 1982. Profits were nonexistent—the company posted an \$18.3 million loss, with most of it occurring in the fourth quarter and related to its dp operations. DATAMATION estimates revenues were up 6% to \$150 million.

Docutel's first line of personal computers was discontinued and replaced with a line of IBM PC-compatible units in desktop and portable models. Faced with a horde of Japanese electronic typewriters that could more easily be connected to pcs as printers,

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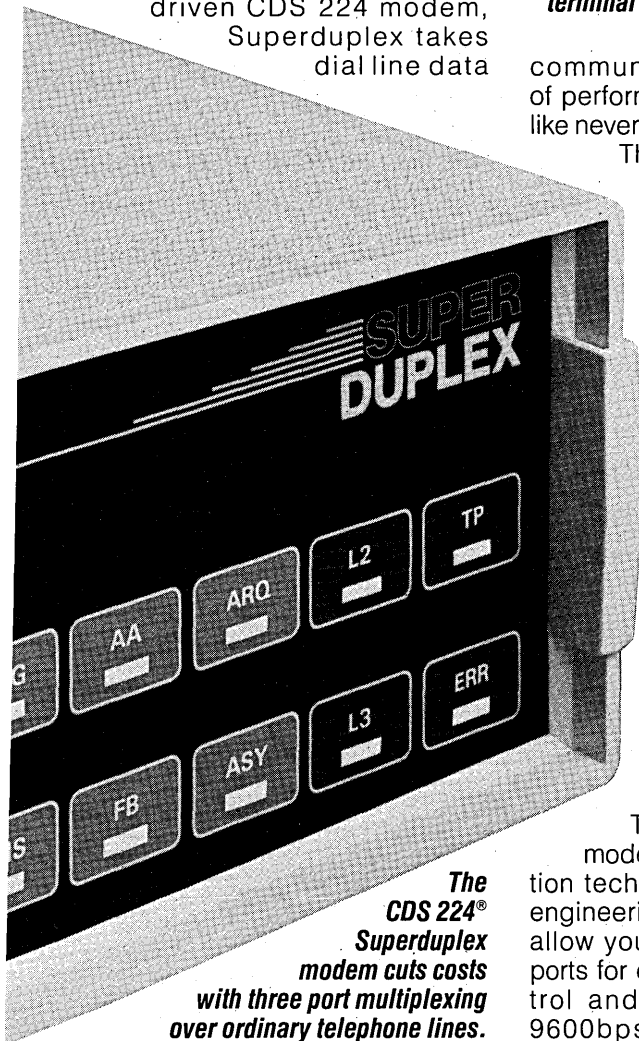
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the Olivetti Praxis line had to be discounted to attract buyers, and \$10 million in inventory was written off.

Now the horizon is also not clear. Docutel's basic business, its new ATMs, faces an uncertain future as market saturation approaches—most banks already have cash machines. Docutel may not be able to make inroads into new locations, such as supermarkets, when faced with renewed competition from archrival Diebold and new products from IBM and NCR.

**97**

## DECISION DATA COMPUTER CORP.

100 Witmer Rd.  
Horsham, PA 19044-2282  
(215) 674-3300

Peripherals for IBM equipment are central to the success of Decision Data. Last year it shipped about 85% more of its printers and 50% more of its crt workstations than in the year before. The increased size of the company's installed base meant service revenues also rose dramatically. The company also managed to reduce general and administrative expenses to 9% of revenues, from 12% in 1981. Revenues leapt by 40% to \$103.8 mil-

lion, from 1982's \$74.3 million. Despite an unfavorable tax situation, profits kept pace, rising 41% to hit \$5.4 million from 1982's \$3.8 million.

Riding the good news, the company went to the financial markets in March and sold 2.3 million shares of common stock, raising about \$19 million. Management used the new cash to reduce long-term debt to about \$600,000, and to purchase warrants for several million shares held by Data Recording Instruments Ltd. (DRI still owns about 4% of Decision Data's stock, down from about 14%.)

The company forecasts revenues and earnings that "will continue to surpass the 20% annual growth rate" of the industry. To help make its predictions into truths, management signed an offshore manufacturing deal with Tatung Electronics of Taiwan, where it will move the fabrication of some subsystems for its crt workstations.

Also part of Decision Data's growth strategy is a new subsidiary, International Computerized Telemarketing Inc., a software-driven telephone marketing system. The company hopes the new enterprise will reduce Decision Data's total dependence on IBM plug-compatibility for its business.

Other new products shipped in '83 were a 12-inch crt workstation, a letter-quality printer, and a cluster controller.

**98**

## PRINTRONIX INC.

17500 Cartwright Road  
Irvine, CA 92714  
(714) 549-7700

The general malaise in the minicomputer market definitely had an impact on impact printer maker Printronix. During 1983, sales of its best-selling model, the P300, were flat, reflecting the overall trend in the minicomputer market.

At the high end of that market, however, there was good news. The faster super-mini printers inherited from Data Printer Corp. made a valuable contribution to sales growth in 1983. In fact, the company's dp revenue jumped 31% to \$101.3 million, beating the 1982 growth gain of 28%. Earnings were also up 24% to \$6.8 million, double the increase for 1982.

The 10-year-old printer manufacturer clearly made a smart move in buying Data Printer, the Malden, Mass., maker of high-speed band and chain-train printers. Printronix wasted no time in showing off its expanded product line. In May, the same month as the takeover, Printronix turned up at the NCC touting the Model 2000, a 2,000 lpm printer developed by Data Printer.

The Data Printer acquisition filled in a gap in Printronix's product line. Until then, the company had offered its oem customers 150 to 600 lpm printers targeted mainly at the mini. Data Printer's 600 lpm to 2,000 lpm models shifted Printronix into the super-mini and mainframe markets.

Static sales in the mini realm made this move all the more necessary. Printronix had already anticipated this in 1982, when it launched its MVP printer for the small business system and office automation markets. Sales of the MVP last year were lower than expected, however. Retrenching, Printronix moved the MVP into the microcomputer arena last year, tailoring it for micro applications. Also last year, the company came out with the Intelligent Graphics Processor for the MVP printer. Other new products included the "extra quiet" P6000XQ printer and the 4000 series matrix line printer for graphics applications such as CAD/CAM.

**99**

## FLOATING POINT SYSTEMS

3601 S.W. Murray Blvd.  
Beaverton, OR 97005  
(503) 641-3151

Floating Point Systems continued to grow modestly in 1983, with revenues increasing 12.6% to \$100.2 million. Net income rose at a slightly steeper rate, a 14% increase to \$13.1 million. The company makes a wide range of floating point and array processors, and brought out several new models during the year.

Primary among the new product in-





NASA's Project Galileo Probe, which will explore the planet Jupiter later this decade, must arrive at a precise angle if it is to carry out its measurements of the chemical composition and physical state of the Jovian atmosphere. The Hughes Aircraft Company-built probe will arrive at 107,000 miles per hour, fast enough to travel between Los Angeles and Las Vegas in nine seconds. If the probe hits at too shallow an angle, it will skip off into space; too steep, it will be reduced to ashes. Even at the proper angle, the probe will encounter extremes never before faced by spacecraft. In less than two minutes, much of the forward heat shield will be eroded by temperatures of thousands of degrees. With atmospheric entry forces reaching 360 times the gravitational pull of Earth, the 742-pound probe will take on a weight equal to an empty DC-10 jetliner. Project Galileo is set for launch from the space shuttle in May 1986 and to arrive in August 1988.

The improved Phoenix missile virtually thinks for itself, thanks to advanced digital electronics. The radar-guided missile, carried by the U.S. Navy's F-14 Tomcat fighter, is the primary long-range air-to-air weapon for fleet defense. The new AIM-54C model contains 55 types of hybrid circuits—a combination of integrated circuit chips with discrete devices. They pack five or six times more computer instructions into the missile and allow it to process information hundreds of times faster. In addition, digital processing will accommodate modifications easily. As new missions are defined to meet new threats, new program memory cards can be plugged without rebuilding hardware. The missile is in low-rate production at Hughes.

Computers are helping to design and build satellites, thereby saving time, effort, and costs. One use of computer-aided design/computer-aided manufacturing at Hughes has been in developing a technique to bend titanium tubes used in propulsion systems. Design information in one computer was transferred to another and turned into three-dimensional graphics to verify that there were no physical interferences in the routing. The technique has substantially cut design and drafting efforts. Future plans include adding a computer-controlled tube bender that will directly accept computer instructions.

A laser that won't cause blindness or other eye injuries will be used in a rangefinder now under development by Hughes for the U.S. Army. The lightweight device, designated the AN/PVS-6 Mini Eyesafe Laser Infrared Observation Set (MELIOS), resembles a binocular case. Its neodymium yttrium aluminum garnet laser beam is sent through a chamber, or cell, filled with high-pressure methane gas. There the 1.06-micron frequency is transformed into a frequency of 1.54 microns. The new signal is safe because it never reaches the retina, but instead is absorbed in the vitreous humor, the white area of the eye between the retina and the lens. MELIOS is being developed under a competitive contract from the U.S. Army Night Vision and Electro-Optics Laboratory.

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roductions was the FPS 5000 series. Aimed directly at the signal and image processing markets that have dominated the company's user base since 1975, the series consists of six basic product groups that range in performance from 8 to 62 million floating point operations per second. The top-of-the-line 62 MFLOP model costs less than \$100,000. The series uses multiple arithmetic VLSI coprocessor chips directed by a single cpu, permitting modular configurations.

Within the signal and image processing markets, Floating Point's customer base has changed significantly over the past year. Revenues from seismic imaging technology dropped 55%, while sales of medical imaging technology grew 41%. That gain may be short-lived, since General Electric, a big medical systems customer, recently announced it was dropping Floating Point as its primary supplier.

For the simulation market, sales of the FPS-164 scientific computer doubled in volume for the second year in a row. In 1983, that unit accounted for \$19.2 million in sales, compared to \$9.5 million in 1982. Sales into the simulation market grew 64% during the year, when other products were taken into account. The FPS-164 was enhanced during the year with expanded memory capacity and a new FORTRAN compiler. Customer acceptance of the enhancements raised the average selling price per unit from \$300,000 to \$375,000.

## 100 MEAD CORP.

9333 Springboro Pike  
Miamisburg, OH 45401  
(513) 865-6800

When Mead Corp. is mentioned, paper products usually come to mind, but Mead Data Central (MDC) is beginning to change this. Mead Corp. ventured into the electronic publishing business in 1970 by investing in a computerized information services division. Off to a slow start, MDC has overcome years of setbacks to become one of the DATAMATION 100, as total revenues increased to \$94.5 million from \$66.2 million in 1982.

Internal conflicts, including managerial turnover, inadequate financial backing, and questions of confidence in MDC's new product created a disturbing background to the introduction of on-line data services a decade ago. Also, Mead's computerized legal research service, LEXIS, received disheartening reviews at its debut in 1973. LEXIS has arrived before its time—lawyers were unwilling to be pioneers in the computer field. Later, when LEXIS appeared in law schools, students there found it a valuable service; once established in law firms, these former students brought with them a regard for LEXIS, and revenues began to increase. But the story doesn't end here.

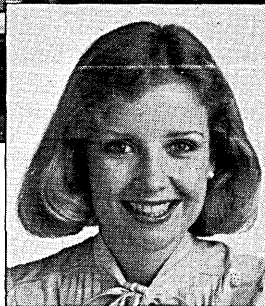
Mead Data and its parent company continued to battle over finances. Allocation of corporate development funds to its divisions was a concern. Then, in 1977, when LEXIS began to show a profit, this money was not funneled back to MDC but was invested in unsuccessful Mead Corp. projects.

Finally, in 1980, there was a new addition to the MDC family—NEXIS. A general information on-line database service, NEXIS had a more promising forecast than did LEXIS at its inception. Though expensive to use—\$50 a month plus \$20 an hour for connect time, a telecommunications charge ranging from \$8 to \$12 an hour, and search charges of up to \$18 during peak hours—NEXIS is still expected to show a profit this year.

Because of its abundance of information, MDC is surpassing the competition both in revenues and size (it has the largest on-line full-text database). Though net income and R&D expenditures were not disclosed by Mead, the future seems promising for this computer-assisted research company. An electronic clipping service (ECLIPSE) is now available for LEXIS and NEXIS users who need to be informed of current trends or get timely information on a specific subject. In an effort to broaden its market, MDC's database will be offered on IBM hardware.

A paper company's shaky venture into the legal information service field has produced one of the largest electronic information retrieval services available today. \*

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our computer to  
our word  
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**CIRCLE 81 ON READER CARD**

# PEOPLE

## ADDICTED TO GRAPHICS

This isn't exactly what she had planned.

"Nothing that's happening to me now is anything I would have imagined myself doing or anything I would have laid out for myself when I was 35," confesses Ellen Knapp, first female president of the National Computer Graphics Association (NCGA). "Nor did it concern me. Each month or year has been more exciting or interesting than the one before."

Undoubtedly. But the price is a killer schedule. Between being president of NCGA, a principal in the management information systems division at Booz Allen & Hamilton outside Washington, D.C., and full-time single mother of children aged 13 and 10, it's no surprise Knapp collapses some nights when she walks in the door at home. It's also no shock that other nights she's on the phone until midnight.

Knapp's computer graphics addiction started in high school. While the rest of her friends were behaving like normal high schoolers during the summer, she cared enough to go to college. Among the courses for advanced mathematics students that she took was one in computer science. After eight hours a day on six consecutive Saturdays, she was hooked.

"It wasn't exactly the same thing my friends were doing," Knapp says. "I guess they might have thought it was a little weird. But I didn't think so. I've always been interested in all things that have to do with mathematics, and this was the only way to get involved in computer sciences."

After that it was on to college, where she wanted to major in computer science. No such luck. The subject was not within the academic universe at the time. She eventually wound up in the geography



ELLEN KNAPP: "It wasn't exactly the same thing my friends were doing. I guess they might have thought it was a little weird."

department at the University of South Carolina. She graduated as a computer cartographer, then pursued image processing and computer graphics as a graduate student.

It was a match made in academic heaven. Knapp didn't want to know from anything less than A's. That's all she got as an undergraduate and a graduate. When they gave out the diplomas, she was first in line each time.

From there it was on to Computer Sciences Corp. (CSC) in 1977. Knapp started as an associate member of the technical staff, then quickly rose to manager of the system sciences division's human computer interaction engineering department. She kept on eye 15 professionals, specializing in everything from interactive computer graphics to pattern recognition and parallel processing.

That's also where she began her second round of extracurricular activities. Despite her heavy academic load in high school, she'd found time to be president of

the Spanish club and the mathematics honor society. But that was kid stuff. At CSC, she got down to business. She hasn't stopped since.

"I rarely sit down and think about the fact I'm doing more than any human being could possibly do," Knapp says with a laugh that fills the room. "If I did, I couldn't possibly do it. So I don't think about it. I just go ahead and do it."

Doing it includes being a member of the Association for Computing Machinery (ACM), the ACM Special Interest Groups on Graphics (SIGGRAPH) and Computer-Human Interfaces, and the Institute of Electrical and Electronics Engineers (IEEE) Computing Society. She's also published numerous professional papers. And she would do herself a large favor by getting an agent to keep track of the offers to speak.

This is in addition to being president of NCGA, which could be a full-time job if Knapp would let it. She won't, at least not completely.

"The things that are happening to me aren't directed," Knapp says. "I didn't go and decide I wanted to be president of NCGA. But when the opportunity came, I took it. NCGA has had government and academic presidents before. As a person deeply involved in the industry and very accomplished at public speaking, I thought I could bring a unique perspective to the organization."

As the computer graphics industry explodes, so does NCGA. At least 40,000 people are expected at this month's convention in Los Angeles. That's just a slight increase from the 1,700 who attended in 1980. The industry may generate as much as \$6 billion in revenues by 1986. As chief spokesperson, Knapp will spread the word in Saudi Arabia, Berlin, and Paris this year.

"The mission of the association is to increase U.S. productivity through the use of computer graphics," Knapp says. "We can make a start by establishing vendor-user forums, fostering computer graphics standards, and communicating the benefits to state and federal governments."

"Visibility for the association itself

## PEOPLE

is not nearly as important to me nor as high a priority as the visibility for computer graphics in the U.S. We're not out to have NCGA become a household word. That wouldn't prove anything. We're out to have computer graphics a household word."

While they're talking computer graphics, they just may mention Ellen Knapp. She is, after all, the first woman president of a computer trade association. The computer industry isn't necessarily known as a male chauvinist society. There are a lot of female users out there, but not many of them have risen to the top. Where Knapp's led, will others follow?

"The significance of being president is that for the most part, being a woman isn't an issue," Knapp says. "This is a very open industry. It seems perfectly natural that the computer graphics industry would elect a woman president."

Let's hear it for the natural order of things. That modus operandi indicates that nothing but the best lies ahead for Knapp. Rest assured she'll do her damndest to make that happen. But she can't begin to tell you what it will be.

"I often look back to when I was 25 or 30 and say I can't believe I'm here," Knapp admits. "It sometimes amazes me that I've done this. But when I think that way, I just think about the president of Apple [Steve Jobs] who's younger than I am and making millions more than I am."

"I haven't thought about what I'm going to do five years from now, when I'm 40. Even if I told you what I want to do then, it probably would bear no relation to anything. Maybe I should sit down and talk to myself about what's going to happen then. But I don't. I'm perfectly comfortable with events as they're evolving now, because they're evolving at a rate that maintains the level of challenge I think is important to me. My assumption is that it will continue."

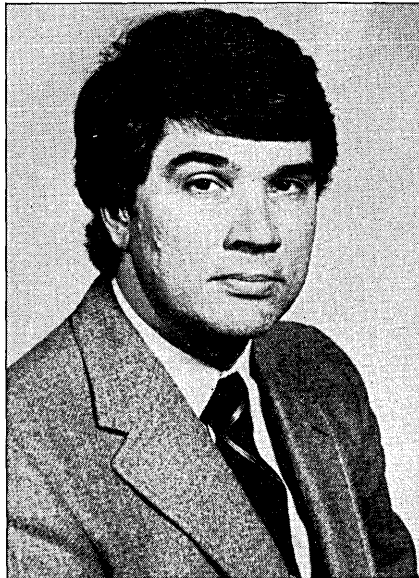
Stopping it isn't in the plan.

—Willie Schatz

# MAKING MACHINES TALK

Life after divestiture has been traumatic for many Bell System employees. Ron Cornell, 36, although he hasn't suffered a great deal, is one of these.

In February, Cornell joined Digital Sound Corp. in Santa Barbara, Calif., as vice president of engineering. But he knew he was going to leave Bell even before he was approached by James McGill, presi-



RON CORNELL: "I foresee a vocal reading of electronic mail."

dent and ceo of Digital Sound. "I was in the process of becoming an entrepreneur within the Bell structure, but I was still in a bureaucracy," he recalls.

Cornell joined Bell Labs at Indian Head, Ill., in applied research in 1973, shortly after receiving his PhD in electrical engineering from Cornell University. "I had studied computer systems and I joined Bell to get into low-bit-rate voice research."

His last post at Bell was head of the cellular systems design department with project management responsibility for the Autoplex System 10 mobile radio system aimed at serving areas of up to 25,000 subscribers. He was named to this position in 1983. Earlier, from 1980 to 1983, Cornell headed up software development for the Autoplex 100 cellular mobile radio system. He compares the two systems by saying the 10 would serve a city like Santa Barbara while the 100 would serve a city like New York.

"It was my first large-scale software management experience," he says of the 100 project, "and it was fun." He was assigned responsibility to make it a finished product and "we delivered the product three months early." Cornell says he felt "a sense of ownership with it [the product] that was more than just the job." With divestiture, product marketing went to the operating companies and manufacturing went to Western Electric. "I spent a good part of my last year with AT&T traveling all over the country to sell the product."

He recalls taking it to a trade show. "Western Electric wanted to advertise the image of the company rather than the product, so I contacted a New York marketing firm and developed product literature which was displayed side-by-side with Western

Electric's brochures. Bell is a big place with not too many rules. I learned to take action and then defend it."

The Bell bureaucracy was still too much for him, however, and early this year Cornell was in the process of trying to start his own company to build enhancements for both Bell and Northern Telecom's PBXs and other small switches. "I had a base of talented people who wanted to work with me and I had talked to venture capital people in Chicago. I was down to building a business plan when I discovered I was missing a solid business background."

It was at that time he was approached by McGill of Digital Sound. "He'd read an article I had written on management methodology and he liked it. He told me all about his company." It took six weeks of negotiating before Cornell committed himself. "I'd always loved Santa Barbara and its speech research community," he says. He also like the idea of being in an entrepreneurial world with a familiar technology.

Digital Sound is seven years old and has sold its DSC 200 Audio data conversion system to end users, many of them speech research laboratories. "I talked to people I knew who knew the product and found they were impressed with it," said Cornell.

Earlier this year the company received additional capital for introduction of its latest offering, the DSC 2000 Voice-Server, a voice processing subsystem that reduces voice messages to standard micro-computer data rates by means of a proprietary compression technology. It is basically an oem product. "This is low-bit-rate voice technology," says Cornell, "just what I'd been working with."

He likes the looks of the future too. "The product is designed so that we can add things like speech recognition, speaker recognition, and text to voice. It can combine electronic mail and voice mail and I foresee a vocal reading of electronic mail."

The company has geared up from 12 to 65 people for the new product line and is still growing. "I think it's fun and it's going to be lucrative," said Cornell, who will bring his cellular systems experience to the product's marketing. He sees local Bell operating companies as potential customers.

It was a Bell operating company—he declines to identify which one—that gave him the notion of starting his own company. "They approached me. They were worried about where they were going to get things and were trying to lure people out of Bell Labs."

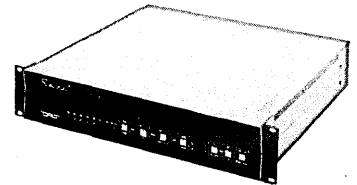
Cornell is not a total stranger to entrepreneurship. While a graduate student at Cornell, he operated an audio electronics design firm from his garage. "I netted \$13,000 in my last year of operation. I had to take a cut to go to Bell Labs."

—Edith Myers

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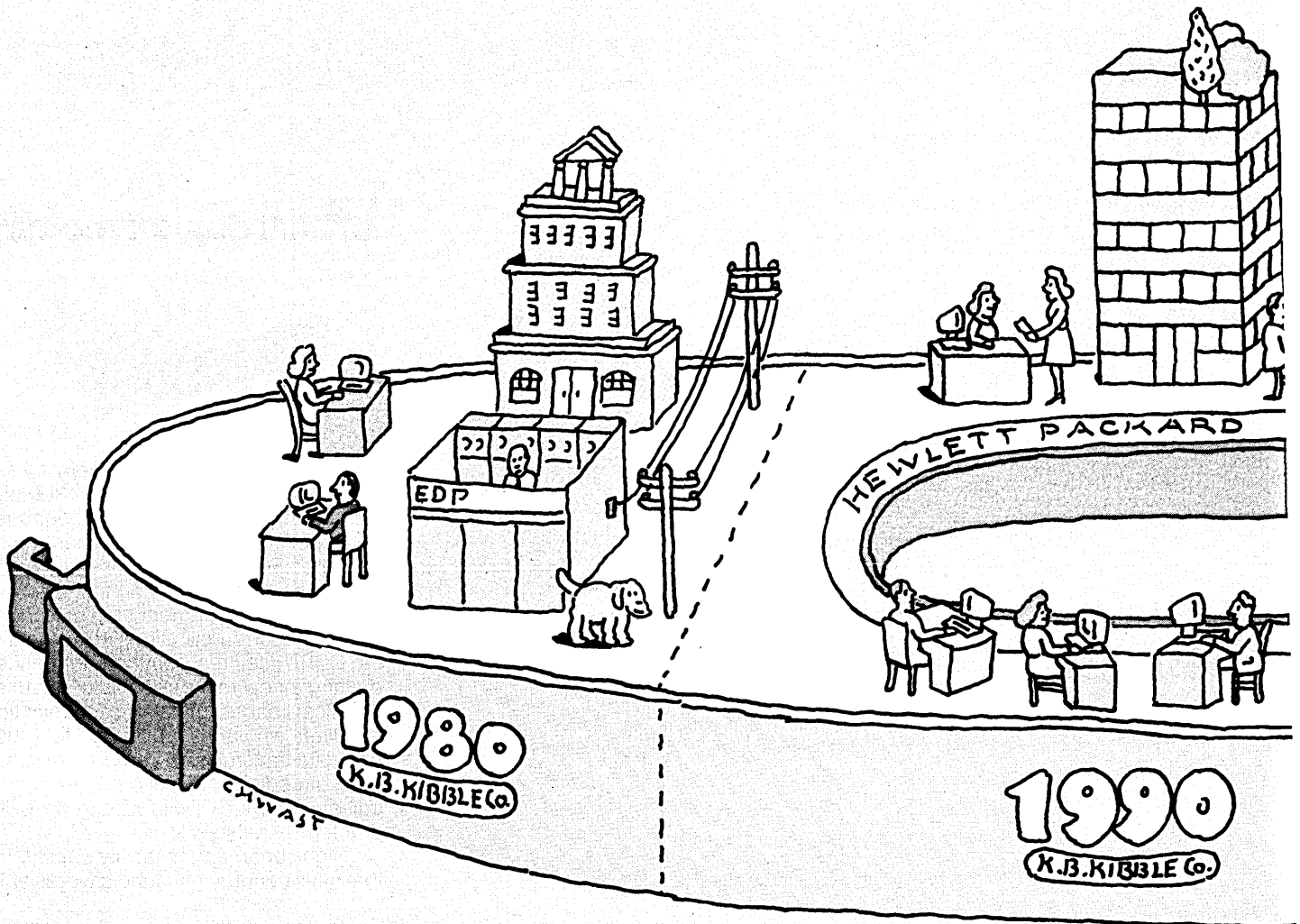
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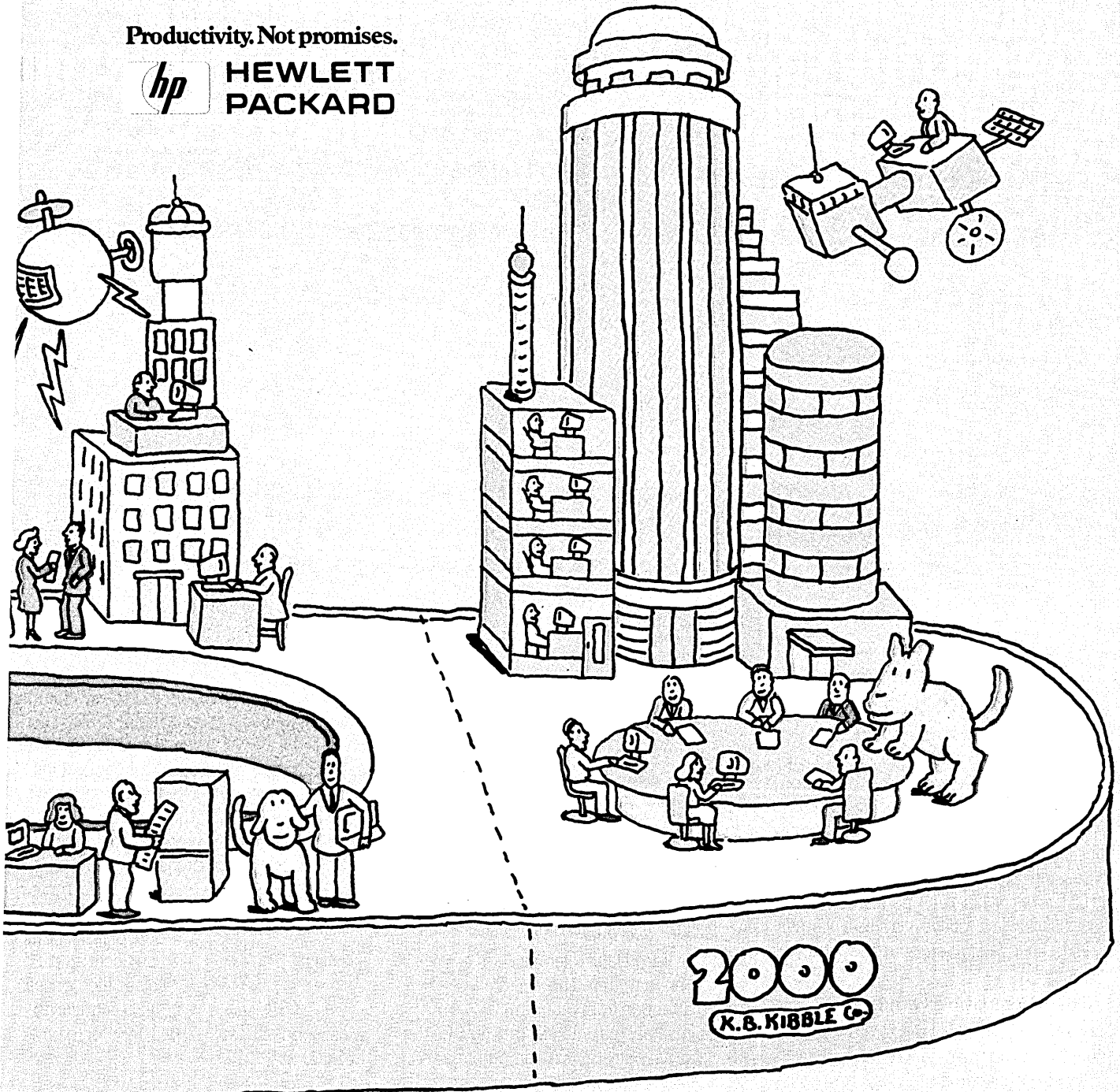
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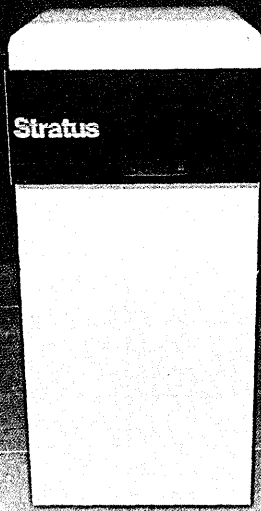
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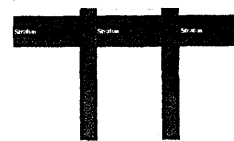
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# HARDWARE

## OFF-LINE

Among the more traditional rites of spring are baseball, the Academy Awards, and better weather (at least for people who do not live in the Sun Belt). Events in the computer industry over the last few months could add another rite to spring. It seemed that a week couldn't go by without a major company making an announcement, or, in the case of AT&T, several announcements in the same day. And not unlike the movies, many of the new product introductions bordered on the dramatic. Certainly the most overwhelming, in terms of numbers, was AT&T, which introduced its entry into the general purpose computing field.

Ma Bell made the announcement at its new headquarters in New York City, but just so the audience wouldn't forget what line of work the communications giant used to do, and is still heavily involved in, the event was teleconferenced to several cities throughout the United States. A few weeks later, AT&T brought out its System/75 midrange digital PBX amid similar fanfare.

Between the two announcements, Digital Equipment Corp. held a press conference to announce what had already been rumored -- the high-end VAX-11/785. DEC's conference should win an award for length, since the speeches lasted several hours. One of the speakers was Will Zachmann of International Data Corp., who discussed what he thought superminis should be; coincidentally, his mythical device pretty much aped the 11/785 specs. Of interest were the remarks by DEC's president, Ken Olsen. When asked if he was concerned about the threat to the VAX's market share by some of the AT&T's new product entries, he said no. He added that AT&T had always been one

of DEC's best customers, and that he hoped to continue the relationship. But Olsen must have had Ma Bell on his mind in some way. During his speech he said that "in our hearts, we believe Unix is the best [operating system]." At the end of his remarks, Olsen said that what he really meant to say was that the company's own VMS operating system was the best in DEC's heart, and that "we're sold on VMS...it makes VAX more powerful." The Unix operating system almost got a unique, unsolicited endorsement from a most unlikely endorser. Incidentally, one industry estimate is that one in five VAX units is operating under Unix.

There is a lot of talk about the office of the future -- what it will look like and how it will increase productivity. One thing is sure: computers, especially microcomputers, will play an increasingly important role in the office. Steelcase Inc. commissioned Lou Harris and Associates Inc. to conduct a study on the attitudes of office workers, corporate office planners, and professional office designers toward the offices of today and tomorrow. The study revealed that 94% of the executives interviewed say their companies have already invested in more computers and peripheral equipment. The remaining 6% feel that this will be true of their firms in the next decade. In fact, the suitability for dp equipment was the most common answer to the question, "Which criteria do you feel will gain the most importance for developing office plans in the next 10 years?" Ironically, a spokesman for Steelcase says that many executives actually prefer wood desks and office furniture as homes for their impersonal plastic and metal personal computers.

## MAPPING WORKSTATION

The GWS IV is a workstation designed for mapping applications. The system features an on-board microprocessing system that increases workstation throughput speed, according to the vendor.

The workstation's graphics processing system includes three microprocessors and a math coprocessor, which offload many time- and resource-consuming functions from the cpu. The local processing system also performs pan, zoom, symbol dragging, real-time map distortion correction, cursor tracking, grid generation, and selective erase functions at the workstation.

Because the graphics processing system frees the cpu from much of its computational load, more workstations can be attached to a single cpu without affecting display speed.

The GWS IV includes a digitizing table large enough to accommodate up to standard E-size drawings, floating alphanumeric keyboard, programmable cursor, and two crt display screens that are available in both color and monochrome. Workstation-to-cpu communication is handled through the system's attached graphics communicator, which plugs directly into the Unibus of an unmodified DEC cpu. The GWS IV ranges in price from \$60,000 to \$80,000. SYNERCOM, Sugarland, Texas.

**FOR DATA CIRCLE 305 ON READER CARD**

## SUPERMINICOMPUTER

The VAX-11/785 computer incorporates several improvements in circuit technology and other internal features to achieve performance 50% to 70% greater than the VAX-11/780 computer in timesharing, compute-intensive, and real-time environments, according to the vendor.

The 11/785 is fully software-compatible with other VAX systems and uses the same architecture, packaging, and peripheral equipment as the 11/780. Other improvements include the implementation of advanced Schottky technology for cpu circuitry, a larger cache memory, a new float-

## HARDWARE

ing point accelerator, and a writable control store for special microprogram instructions. The cache memory uses the same two-way, set-associative architecture as the 11/780, and has 32KB of storage. The interrupt latency averages 28 microseconds. Instruction microcode for the system is stored in RAM. Console memory for the unit is 48KB.

A special packaged system has been assembled with 6MB of memory, 456MB disk drive, magnetic tape drive, four DECmate II small business systems with word processing software, and licenses for VMS, All-in-1 office menu, VAX DECmail, and DECdx/VMS communications software.

A field upgrade kit is also available to transform the 11/780 into an 11/785. The unit will support the Computer Interconnect and the HSC50 intelligent storage controller. It can be configured in the VAXcluster systems, runs under the VMS operating system, and can take advantage of layered information management products, languages, software tools, and DECnet, Ethernet, and gateway communications facilities.

It will run Digital's Ultrix-32 operating system for users who work in a Unix environment. It can also run PDP-11 software running in compatibility mode. The VAX-11/785 starts at \$195,000 with 2MB of memory, cabinetry, and the VMS operating system license. The All-in-1 packaged system costs \$323,000. The optional FP785 costs \$14,000. The VAX-11/785 upgrade kit for the VAX-11/780 costs \$95,000. DIGITAL EQUIPMENT CORP., Maynard, Mass.

**FOR DATA CIRCLE 306 ON READER CARD**

## SECURE MODEM

Data Sentry is an intelligent modem that can prevent data theft and other security breaches of personal, mini, and mainframe computer systems without requiring encryption or changes in systems programming, according to the vendor.

The product uses a sophisticated call-up, callback, and password sequence to thwart data thieves and hackers. It also offers the telecom features of conventional nonsecure intelligent modems.

A user who wants access to the protected computer provides Data Sentry with his phone number, which is then checked by the security routine against a list of authorized numbers. If the caller's number is authorized, the unit dials the caller back and requests a password. The caller is given three tries to provide the right password; without it, the unit won't return further calls from that phone number. It also creates an audit trail of user passwords and phone numbers, whether calls are successful or not.

A lower security mode, designed for traveling business people, lets users program the modem to call back any number for anyone who requests access to the office or home computer whenever the computer is unattended.

Data Sentry features 300- or 1,200-baud, full-duplex, asynchronous operations with auto dial, auto answer, auto speed, and auto parity selection. It displays call progress tone detection on the terminal, showing dialing, ringing, busy, check line, and dead line. Tone and rotary pulse dialing are auto-

matically selected. Six programmable directories are available. These range from 10 stored phone numbers of 32 characters, for speed dialing, to 16 "not allowed" phone numbers of 32 characters, which Data Sentry won't call back when in a security mode.

Terminal interface is an RS232C cable. The telephone interface is a single telephone number drop with an RJ11C connection. A battery backup protects menus and tables in memory. An optional device called Remote-On can turn a computer's power on and off from a remote terminal once security has been cleared. Data Sentry costs \$900, the Remote-On option, \$145. LOCKHEED-GEORGIA CO., Marietta, Ga.

**FOR DATA CIRCLE 304 ON READER CARD**

## INTEGRATED PC

The Integrated Personal Computer (IPC) is capable of delivering an IBM PC-compatible system with numerous terminal possibilities and multi host micro-to-mainframe communications capabilities.

The vendor says this system is fully PC-compatible in hardware and software, which is accomplished by running the unit at 4.77MHZ. According to the vendor, this is necessary for the IPC to be truly compatible. Also, the unit has an open-ended architecture, which includes five PC-compatible expansion slots to permit users to order customized versions for specialty applications. Hardware customizations can include memory expansion to 654KB, color monitor with graphics, and additional floppy disk drives.

The core product of the series is the standalone Direct IPC. It features the MS/DOS 2.0 operating system, 128KB or 256KB of internal memory, two RS232 asynchronous serial ports, one parallel printer port, a floppy disk controller, a real-time clock and calendar (with battery backup), an 8088 processor, and a socket for the 8087 coprocessor.

The unit comes in two basic configurations. One version includes 128KB of memory, two floppy disk drives, and a monochrome monitor, and costs \$3,200. The other includes a 10MB Winchester disk, 256KB of memory, a floppy disk drive, and a monochrome monitor, and sells for \$5,200. DIRECT INC., Santa Clara, Calif.

**FOR DATA CIRCLE 303 ON READER CARD**

## SWITCHING/MONITORING SYSTEM

The Intelli-MAX is a single vendor system for centralized management and control of large and small data communications networks. The system integrates network performance monitoring matrix switching and management reporting capabilities. According to the vendor, users can identify and correct network problems and analyze network performance from one crt.

## HARDWARE SPOTLIGHT

### MINICOMPUTERS

AT&T is entering the general purpose computing business with several new products. In all, the company has rolled out three computers and two networking products.

Some of the minicomputers introduced are currently in use at AT&T and many local operating companies. All AT&T's new offerings are based on the 32-bit WE32000 microprocessor and the Unix operating system.

The 3B20D is this vendor's top-of-the-line superminicomputer, and is used extensively in its telecommunications switching network. It continues operating during diagnostics, repair, maintenance, software updates, and system administration, and includes safeguards to prevent failures. The system memory capacity can be as high as 16MB. The 3B20D costs \$340,000.

The 3B20S is a high-end supermini designed to support the heavy-duty applications needs of data centers, office service organizations, developers, and manufacturing locations. It does not require installation on raised floors, and can withstand temperatures as low as 32°F and as high as

122°F for periods as long as three days. It costs \$230,000.

The 3B20A is an enhanced version of the 3B20S, with double the processing power. It can be ordered as a complete system or upgraded from a 3B20S on-site. It sells for \$120,000.

The 3B5 is a supermini designed for the office. It is offered in two versions: the 100, which serves about 30 users and sells for \$57,000, and the 200, which can accommodate up to 60 and lists for \$73,000.

The 3B2 is a desktop, multi-user supermicro. It can handle up to 18 users or be configured as a single-user system. It costs \$9,950.

The 3B Net is a high-speed network that ties 3B computers together and interfaces to the Ethernet standard. It features self-diagnostics. The pc interface connects the 2B2/300 to IBM-compatible pcs. This networking allows pcs to share computer peripherals, such as hard disks and printers.

All newly introduced products are now available for sale. AT&T INFORMATION SYSTEMS, Morristown, N.J.

**FOR DATA CIRCLE 300 ON READER CARD**

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CIRCLE 64 ON READER CARD

## HARDWARE

The unit produces color graphic display of up to seven layers of network activity—from the entire network to individual devices—and presents information on specific communications applications, such as CICS, IMS, and TSO. Color coded alarms notify users of network component failures and degrading network conditions. The unit displays network activity in minute-by-minute and five-minute color trends.

Once a failure or degrading condition has been identified, the system reconfigures the network via commands from the

terminal. The user can bypass failed lines or components, optimize network performance through load balancing, and allocate hardware resources.

The system can be tailored to the user's needs through dynamic rotational monitoring. DRM takes advantage of the matrix switching function that dynamically rotates lines to provide any combination of dedicated and rotational line monitoring. Users can monitor portions of their lines at will without having to physically move T-connectors from line to line. It can sup-

port from 16 to 512 communications lines.

Fully configured, the Intelli-MAX system, which includes the control processor, a color crt terminal, printer, scan units, and can support 16 lines, starts at \$16,400. A 256-line system is \$300,000. DATA SWITCH CORP., Norwalk, Conn.

**FOR DATA CIRCLE 305 ON READER CARD**

### WINCHESTER DISK

The DataSafe-24 is a 15MB, 5¼-inch fixed Winchester disk system for the Intel Intellec Series II, III, and MDS-800 microprocessor development systems. The hard disk has 24MB of unformatted storage along with the 15MB of formatted storage, totalling 115,200 available blocks allocated in four directories, F0, F1, F2, and F3.

The four directories, each with 28,800 blocks, permit up to four engineers to share available storage and still keep their files separate. The unit is plug-compatible with the Intellec systems and compatible with the Intellec's ISIS-II operating system. Designed to replace the Intellec dual floppy drive, the DataSafe-24 doubles the Intellec's system throughput, offering a data transfer rate of 625KBps and an average access time of 85msec.

The unit fits exactly on top of Intellec Series II and III systems, and includes a Multibus adapter card which occupies one slot in the host chassis and conforms to IEEE 796 specifications. According to the vendor, the unit's higher speed and greater capacity offer users time savings during programming and debugging. The unit costs \$1,250. WINCHESTER SYSTEMS INC., Winchester, Mass.

**FOR DATA CIRCLE 306 ON READER CARD**

### PROTOCOL CONVERTER

The Defender II/II's protocol converter allows asynchronous ASCII terminals to communicate with an IBM or equivalent host computer using SNA/SDLC or BSC protocols. It is designed for use with the Defender II, a computer security and management system which blocks access to large computers from unauthorized dial-in.

The protocol converter has full-screen mapping, allowing the data display on the asynchronous terminal to be the same as it would be with an IBM terminal. It maintains an internal image buffer, identical to each terminal attached, and operates remote full-screen applications at low baud rates. The system is menu driven, and has backup memory to protect it during power shutdowns. The protocol converter supports over 100 types of asynchronous terminals. It is installed in the Defender II/II's chassis and is available in an eight-port configuration. One Defender II/II's protocol converter costs \$5,500. DIGITAL PATHWAYS INC., Palo Alto, Calif.

**FOR DATA CIRCLE 307 ON READER CARD**

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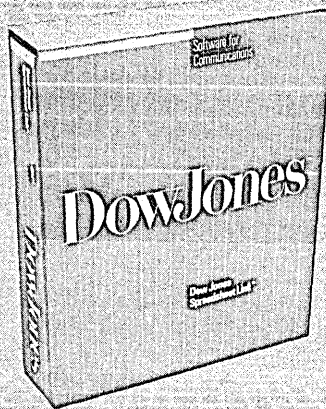
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ED	37.75	1.00	25.00	11000.00	11.50	11.50
GS	7.15	1.00	25.00	11000.00	11.50	11.50
PZL	37.75	4.00	25.00	11000.00	11.50	11.50
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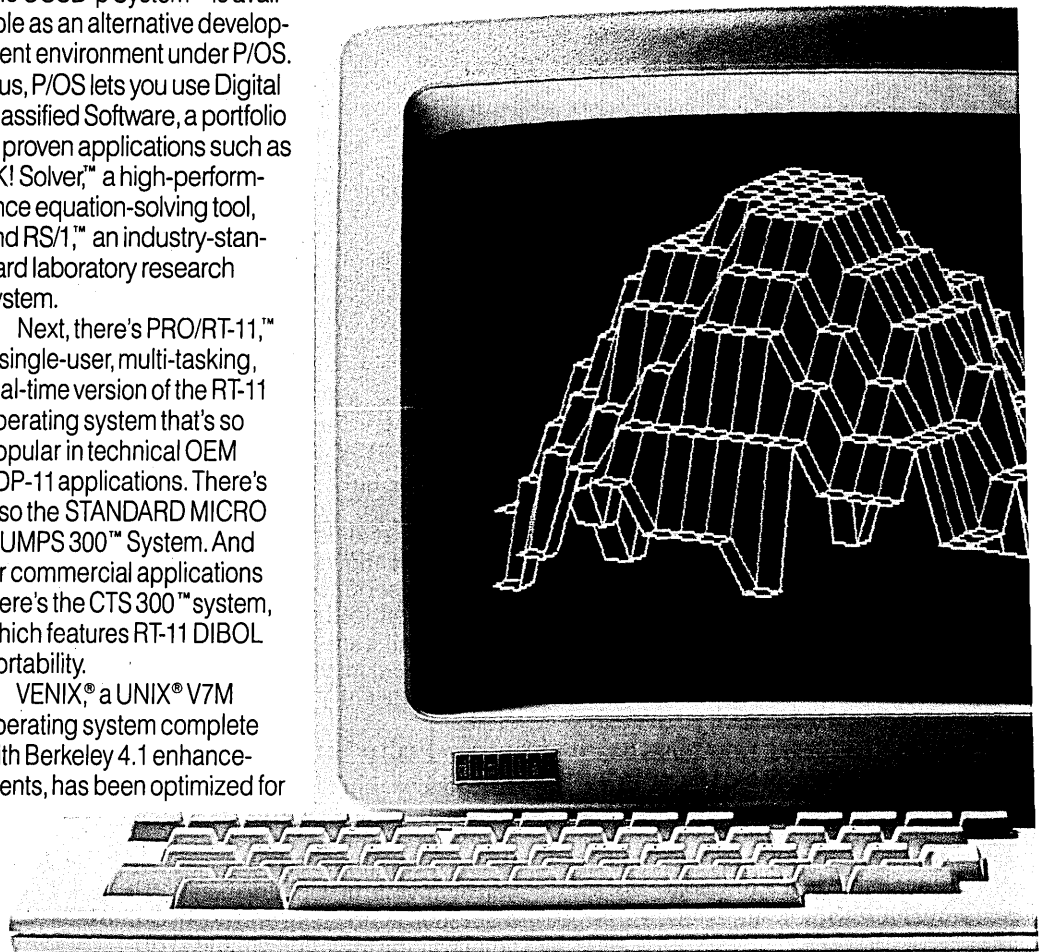
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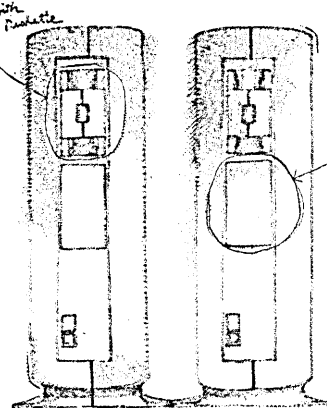
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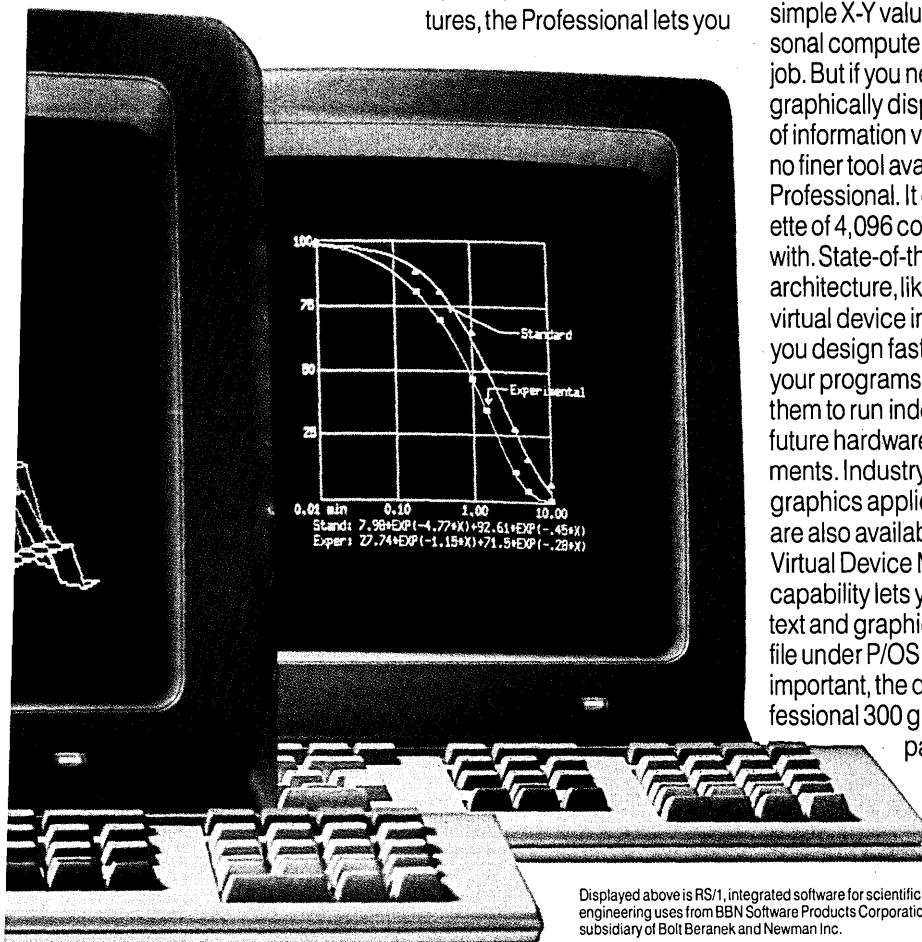
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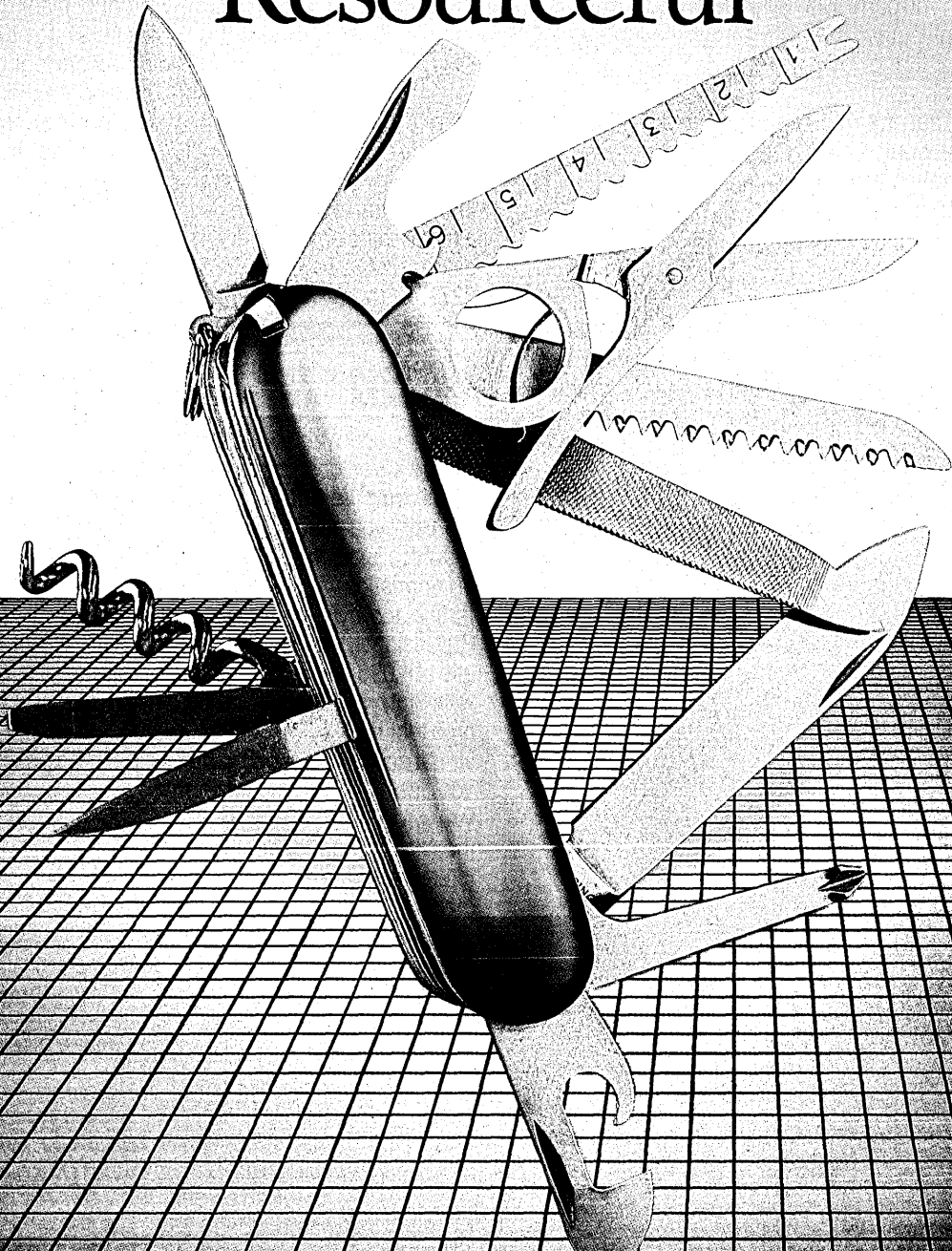
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# SOFTWARE AND SERVICES

## UPDATES

The practice of casual copying of microcomputer programs is certainly the most widely noted form of software piracy, but it is not the only form, nor is it the most worrisome to some observers. Consider the malicious theft of software for profit. The U.S. Copyright Office reported hundreds of cases of copyright infringement last year, a substantial increase over 1982. Examples of the more widely publicized suits involved IBM, Hitachi, Apple, and Tandy. The upshot of all that litigation is that Big Blue, along with other large companies, will no longer tolerate the relaxed practices to which the software business has been accustomed. Further, these companies are beginning to view software as an asset, and one that is worth protecting through prosecution, according to Data Securities International. Beyond the risk of software theft for profit, industry leaders also recognize the need to protect their software assets from the risks attending ordinary business transactions in software development and distribution. Loss of software due to negligent handling, accidental disclosure of trade secrets, physical destruction, and copying are but a few concerns. Joe Noerr, president of DSI, recently told the New York Bar Association's computer protection subcommittee, "In our business dealings we are finding more and more examples of firms that have been badly burned by not adequately protecting their software investments. A company that purchases software must recognize that it faces enormous liability for protecting any proprietary information entrusted to it." He went on to point out that under the much publicized IBM-Hitachi settlement, IBM has the right to inspect any

new Hitachi product exported before 1988. Not surprisingly, one solution he recommends is a software escrow house, not unlike DSI, to hold proprietary software materials. He says clients use this service to support their corporate proprietary rights programs and to ensure that key materials will be available in the event of a business disaster. The main purpose of a proprietary rights program is to provide an audit trail for controlling proprietary materials.

Another way to combat the problem of illegal or unauthorized copying of computer programs is provided by Software Security Systems Inc. This company sells a software "key" that it says will prevent unauthorized program copying by "uniquely communicating directly with the program it has specifically been designed to protect." It is aimed at the minicomputer market and costs anywhere from \$200 to \$500 a unit. Many companies are involved in this field, and while the software vendors may be willing to spend this much money on a security device or service, it remains to be seen how much of the cost users will be willing to shoulder in light of the competitive nature, low margins, and sharp price points that abound in this industry.

Kaypro Corp. has announced it is changing its bundled software to include MicroPro's WordStar and companion programs by the San Rafael, Calif., software house. Kaypro says it made the move to reflect the "widespread demand from our customers." The deal provides a much needed shot in the arm to MicroPro, which has faced layoffs and other cutbacks in the past year, since Kaypro's line of portable computers is among the industry's top sellers.

## ACCOUNTING SOFTWARE

This accounting software package also comes with a free customer training seminar developed by Arthur Young, the accounting firm. The program will combine hands-on training with a lecture.

Users will be trained to use the Dow Jones Software Accounting series. It has three core modules—general ledger, accounts payable, and accounts receivable—within the seven-part series.

The software is designed for the IBM PC XT. According to the vendor, this software can handle the accounting needs of multibranch, division, or client companies. The menu-driven programs require a minimum number of keystrokes and feature a word processing style editor, numeric entry options, operator prompting, and extensive error checking.

The series has an automatic audit trail that ensures the user can always track summary account balances back to the originating transaction. The "pencil posting" capability allows the user to create preliminary journal entries and financial statements. The central program in the series is the Dow Jones General Ledger. It has a flexible chart of accounts that permits the user to specify, without any practical restriction, the type of chart desired.

Both the accounts payable and accounts receivable programs have select-and-sort capability for account monitoring and analysis. With this feature, the user can request all vendors or customers within any of 37 different categories, like zip code, due date, or amount owed. The user can also request a subgroup within the category. Both modules have a "closest match" capability that helps the user locate desired accounts by displaying the account closest to the one input by the user.

All modules in the series are integrated. Information developed in the accounts receivable or accounts payable modules is automatically recorded in the appropriate general ledger journals when the invoices or checks are printed.

## SOFTWARE & SERVICES

The three core programs cost \$1,000 each. Additional modules, including inventory, management analysis, sales order entry, and purchase order entry, will be introduced in early 1985. DOW JONES INFORMATION SERVICES, Princeton, N.J.

**FOR DATA CIRCLE 326 ON READER CARD**

### PRODUCTIVITY SOFTWARE

Framework is a software package that allows users to create, analyze, and manipulate words, ideas, concepts, data, and numbers much in the same way that today's spreadsheet programs handle numbers alone, the vendor says. The software unifies six functions, including high-level language and outline, into one program.

Included as integral parts of the Framework program are a full-featured word processor, spreadsheet, business graphics, data management, forms processing, and an outline generator. According to the vendor, Framework's outline provides an overview that helps simplify complex analysis or reports.

The software also offers a tight coupling with the vendor's own information management system, dBASE II, as well as the capability to use other spreadsheets and ASCII files. Through its DOS access facility, PC/DOS software may be run in Framework.

Initially, this product will be available for the IBM PC and PC compatibles. It requires 256KB of RAM and supports graphs and text simultaneously on the IBM monochrome display.

The vendor says this product is built

around frames, which appear similar to windows found in current software, adding that frames in this program organize information.

Ideas and concepts can be captured in Framework's outline mode. A single-line subheading can be expanded to include text, spreadsheet, graphs, or any combination of numbers, graphs, or text, according to the vendor. Framework costs \$700. ASHTON-TATE, Culver City, Calif.

**FOR DATA CIRCLE 327 ON READER CARD**

### INTEGRATED LOANS SYSTEM

This integrated loans processing system is an on-line, real-time software package for large-scale IBM and compatible mainframe computers.

The system integrates and automates the handling of all types of lending activities, including consumer, mortgage, and commercial loans, at large commercial banks and thrift institutions.

According to the vendor, this is a large and comprehensive loan processing system, and is a product of advancing technologies and deregulation in the banking industry, which has changed the way loans are handled.

The vendor says this software package allows lending institutions to stay abreast of the complexities of the lending business and allows enough flexibility to keep up with the ever-changing loans marketplace.

The system features 46 hierarchical databases and 54 sequential databases, has

66 on-line reports, 243 batch reports, 698 maps, and 2,374 librarian members (647,000 total records). The Integrated Loans System costs \$500,000. HOGAN SYSTEMS, Dallas, Texas.

**FOR DATA CIRCLE 328 ON READER CARD**

### COMMUNICATIONS ADAPTER

The SNA-3270 and BSC-3270 software and communications adapters allow a variety of personal computers to communicate with IBM hosts in SNA and BSC networking environments.

The software is developed according to a building block structure. It provides flexibility for using a variety of personal computers, networks, and types of terminal emulation desired by users in micro-to-mainframe communications. The software is written in C language, and designed with a multitasking and modular architecture.

With the multitasking design of the product, a variety of functions can be performed during communication sessions that make use of the personal computer. The software maintains an SNA connection with the host while running a local application. During host transmission sessions, users log on once to execute a local application with a few keystrokes.

It also includes a wide range of printer functions. The products support host-initiated printing in both 3270 data stream and SNA character stream modes. The latter SNA implementation provides users with programmable margins and horizontal and vertical tab spots for additional control over printing parameters.

The system allows users to capture and transmit data to and from disk in addition to screen and printer support. It also supports ASCII and EBCDIC transmissions, translating between the interchange codes as required. In addition, it prevents a loss of data should the host connection become faulty.

The communications adapter is a multifunction, dual-channel circuit card that provides access to a wide variety of networks without removing the board. It operates in connection with the vendor's software. The Pathway Design/SNA and BSC products cost \$600 each, the communication adapter costs \$300, and the adapter cable is \$50. PATHWAY DESIGN INC., Wellesley, Mass.

**FOR DATA CIRCLE 329 ON READER CARD**

### ENGLISH ENVIRONMENT

The Intellect micro-to-mainframe link will allow users to be able to request information from their mainframe in English, download it to their IBM Personal Computer, and merge the data into an application package for further manipulation and display. The software also allows users of PC and PC compatibles to access, retrieve, and display information resident on their IBM

## SOFTWARE SPOTLIGHT

### FINANCIAL MANAGEMENT SYSTEMS PACKAGE

Comprehensive Financial Operations (CFO) is an integrated, interactive mainframe-type financial software package for distributed data processing systems.

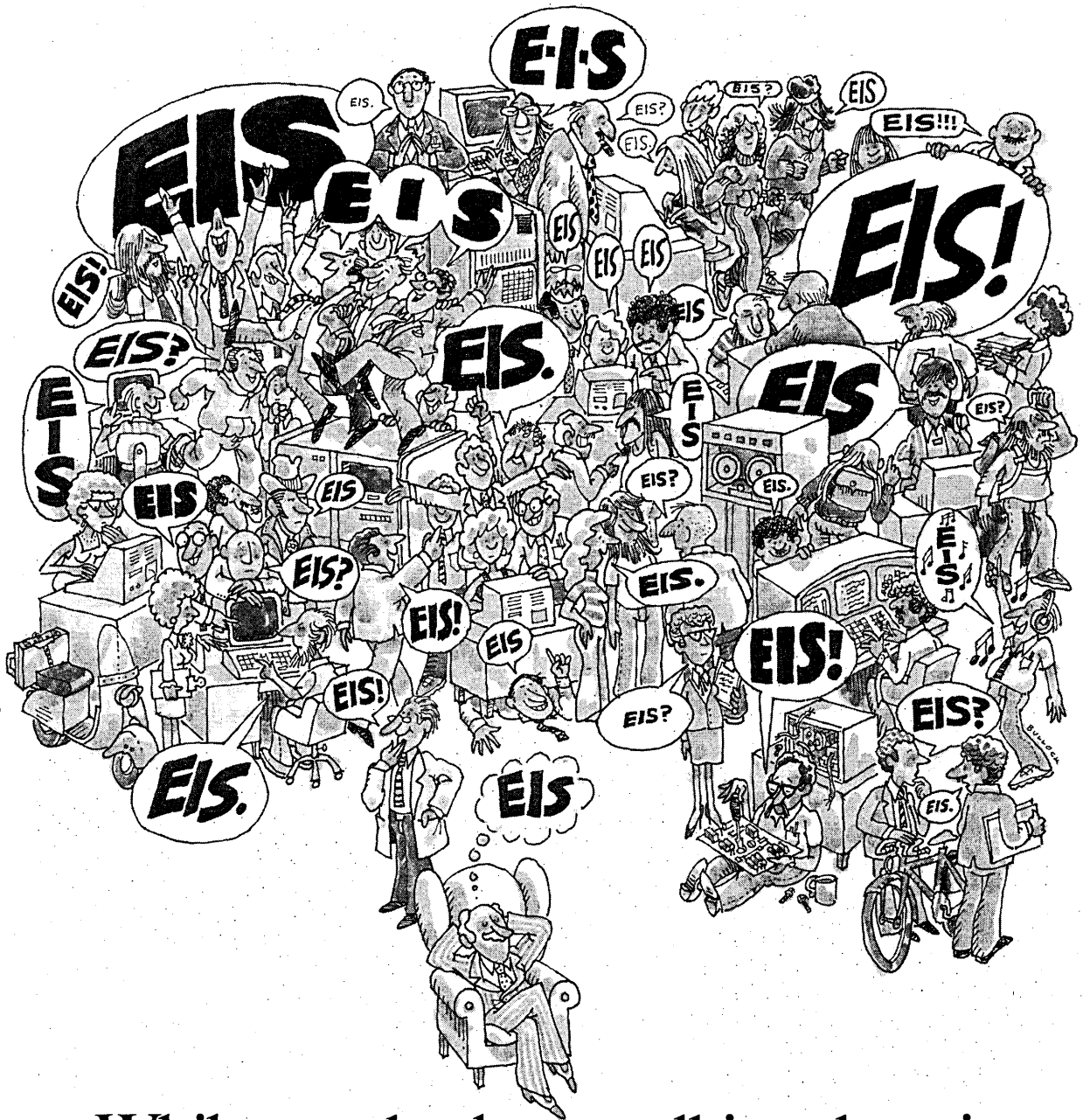
The package operates on Data General's 32-bit Eclipse MV/Family of information systems and includes five software modules: General Ledger and Financial Control, Accounts Payable, Purchase Order, Materials Management, and Accounts Receivable and Credit Management. It provides real-time control over finances in an organization and supports distributed accounting responsibilities in multiple, remote locations for large organizations. Users can move from one software function to another with just a few keystrokes.

The software package also provides what the vendor calls "personalizers," tools that facilitate user tailoring of features to meet precise business needs. There are six personalizers integrated with all CFO modules, which enable users to create, maintain, and enhance standard financial applications. A "screenbuilder" lets users custom design any screen in the system. A

"reportbuilder" lets users custom design any report in the system as well as deliver a complete set of comprehensive reports designed to satisfy common information requirements. The "inquirer" provides real-time, interactive display of system information. The "validator" allows the user to personalize the definition of valid data entering the system and then identifies errors for correction as either software or hardware errors. The "documentor" provides the ability to personalize product text and to ensure essential documentation stays in real-time synchronization with the personalized systems. A "table manager" allows users to view and update any table or database used by CFO.

Comprehensive Financial Operations software is priced in separate modules: General Ledger and Financial Control, \$48,000; Accounts Payable, \$34,000; Purchase Order, \$38,500; Accounts Receivable and Credit Management, \$48,000; and Materials Management, \$32,500. Multiple product and site discounts are available. DATA GENERAL CORP., Westboro, Mass.

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## SOFTWARE & SERVICES

mainframe in conversational English with no special training or knowledge of computer language.

In addition, the software acts as a front-end supervisor to many database, statistical analysis, graphics, and spreadsheet packages currently available for the IBM and compatible personal computers.

According to the vendor, this product combines the artificial intelligence techniques of natural language understanding with the integration of commonly used software systems, adding that this product is in

an evolutionary path of bringing natural language technology to micro users.

This product has an expandable data dictionary, graphics capabilities, terminal emulation to an IBM host running VM/CMS or TSO via asynchronous or coax connection, visible support of multitasking via windows, access to mainframe data stored under all Intellect-supported DBMSS, and security of mainframe data.

The micro-to-mainframe link requires Intellect running under VM/CMS or TSO for mainframe query, the mainframe-

to-micro software option, and an asynchronous RS232 connection or a coax connection to a 3274 controller. The IBM PC or PC compatible must have at least 256KB of RAM and concurrent CP/M-86 or PC/DOS. The host link costs \$17,500 including the mainframe communications module and software packages to link ten personal computers to the mainframe. Additional PC packages cost \$250 per copy. ARTIFICIAL INTELLIGENCE CORP., Waltham, Mass.

**FOR DATA CIRCLE 330 ON READER CARD**

### THIRD-PARTY SERVICE

Honeywell Information Systems has entered the third-party service market with a program called TotalCare. It will be operated by its Customer Services Division. The program offers custom-tailored service programs to third-party customers.

Service will be offered in such areas as telecommunications, peripherals, and microcomputer-based equipment. A staff of more than 3,700 service professionals at 250 locations in the U.S. will support the program. The domestic service program includes a toll-free telephone number to the vendor's national response center; remote support services; an automated nationwide logistics network to provide delivery of spare parts; a customer-assisted maintenance program, which allows customers to participate in the maintenance process; and customer education programs.

Customers may select a range of services including dispatch, mail-in, and full on-site traditional service. According to the vendor, if a customer service engineer is required, that engineer will be available anywhere from two hours after the call to the next day depending on the equipment and the customer's service requirements. HONEYWELL INC. Waltham, Mass.

**FOR DATA CIRCLE 331 ON READER CARD**

### PERSONAL PLANNER

Personal Planner is an address book package that lets users compile and print names, addresses, and telephone numbers. It also offers letter writing, mail list management, envelope and label addressing, appointment scheduling, and expense record maintenance. The letter writer feature will merge correspondence with the address book database. The program will also create a text file for merging the database with other word processors. With the software comes an address book to store hardcopies of the file, index tabs, and standard Recordplate forms that are tractor-fed.

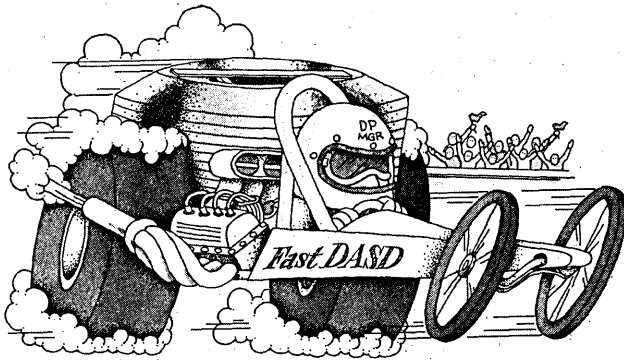
The software is compatible with computers using CP/M, PC/DOS, or MS/DOS operating systems. Personal Planner costs \$100 and is supplied with documentation, index tabs, and 100 Recordplate forms. NATIONAL MICROWARE, Irvine, Calif.

**FOR DATA CIRCLE 332 ON READER CARD**

—Robert J. Crutchfield

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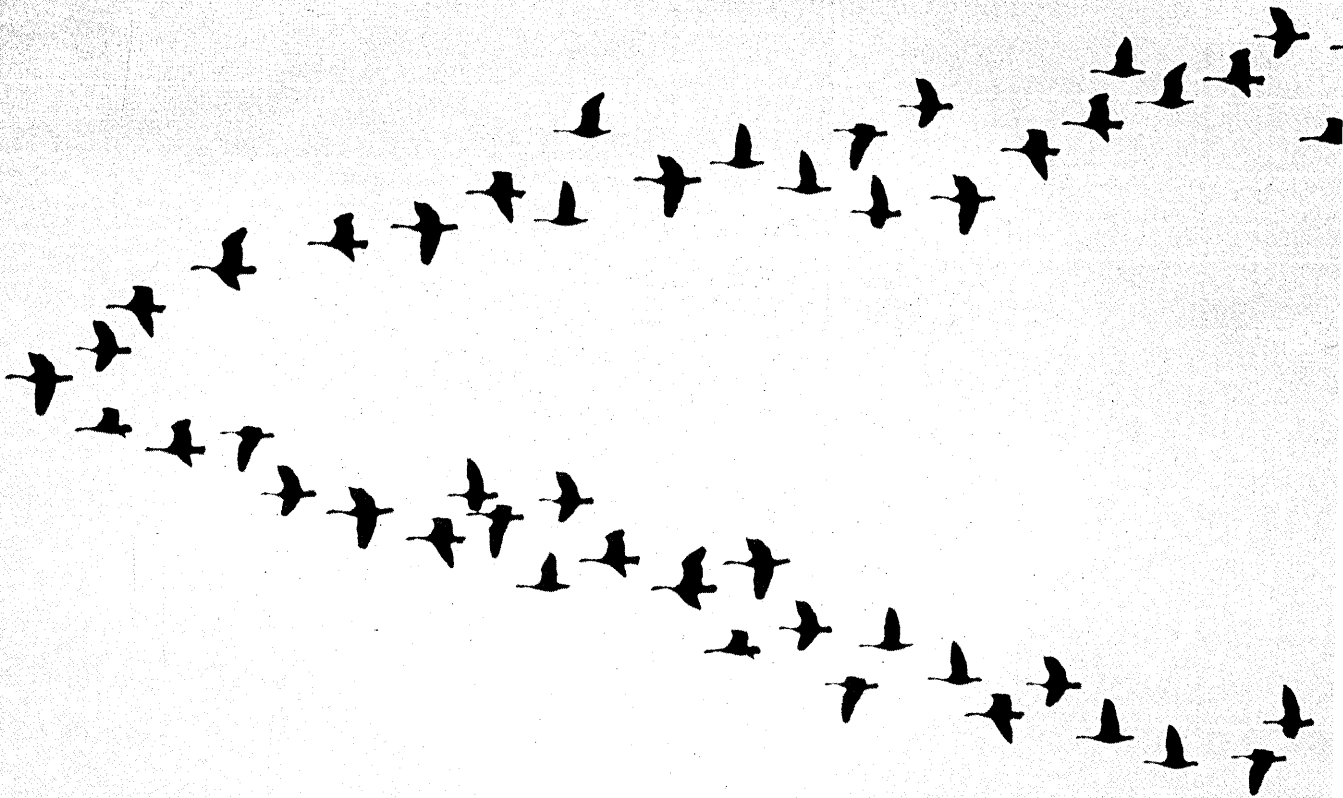


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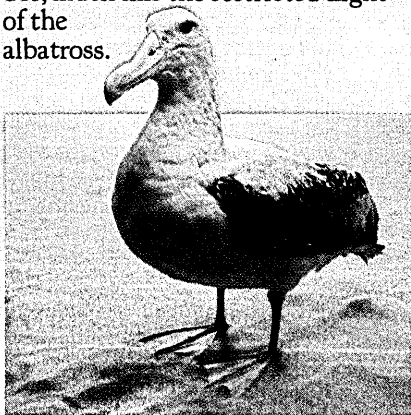
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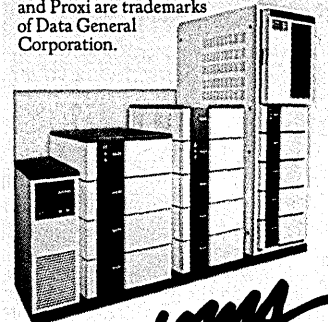
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# SOURCE DATA

## BOOKS

### **THE NAKED COMPUTER** by Jack B. Rochester and John Gantz

According to its publisher, *The Naked Computer* is "A Layperson's Almanac of Computer Lore, Wizardry, Personalities, Memorabilia, World Records, Mindblowers, and Tomfoolery." Trudging through the blizzard of press releases collected by *Computerworld* (for which Rochester once worked), tunneling through the avalanche of hardware data collected by International Data Corporation (for which Gantz once worked), the authors launch a barrage of "Gee whiz, what will the cute critters do next?" snowballs.

Did you know that the U.S. Surgeon General denounced video games as hazardous to the nation's youth? That the average commute in Silicon Valley is 22 miles (so much for the global village)? That computers are better than people at diagnosing potential suicides? That Pope John XXIII conferred a papal decoration on Tom Watson Jr. and his brother Arthur after IBM indexed the works of St. Thomas Aquinas? That IBM hit \$1 billion in annual sales in 1957, and by 1983 had \$1 billion in sales every two weeks? That government civil defense documents suggest keeping your credit cards with you during atomic attack because they will be critical in restoring the nation's financial health?

Besides 10,000 other tidbits that will amaze your friends, this volume contains such little-known trivia as the lyrics to an IBM spirit song ("So let us sing men—Sing men/Once or twice, then sing again/For the Ever Onward IBM!"), an annotated list of movies that star or costar robots, a log of computer encounters with the arts, and a list of the 24 "biggest tangible computer-related losses" in descending order of con-

stant dollars (nice touch). This last list variously mixes crime (Equity Funding, OPM), business write-offs (Xerox, RCA, Singer, Memorex), business disasters (Intel, Viatron, Saxon), and political reverses (Social Security, Vietnam, Iran).

Rochester and Gantz's knowledge of computing is wide but not deep. They peer into a disco ball instead of a crystal ball. They do have a journalist's respect for objectivity, however; in a list of the 15 most influential artificial intelligence researchers, they include Joseph Weizenbaum, who is famous on at least two counts. In the 1960s, partly as a joke on both medical and computer science colleagues at Stanford, he wrote a program called Eliza that parodies and superficially simulates the responses of a nondirective psychotherapist to a patient. Weizenbaum was horrified to find that some medical researchers viewed this program as an advancement in therapeutic technique—some patients confided their inner worries to it—and some computer science researchers regarded it as a contribution to artificial intelligence.

In 1976, Weizenbaum wrote a book, *Computer Power and Human Reason* (W. H. Freeman and Co., New York), in which he essentially said that computer professionals, including intelligence researchers, have the intellectual and ethical sensibilities of teenage boys. This hypothesis drew blood: Pamela McCorduck, in *Machines Who Think* (W. H. Freeman and Co., 1979), quoted an anonymous "old friend of Weizenbaum" as saying, "I have the impression that if Joe could do science, he wouldn't be doing this"—surely the cruelest insult that one MIT professor could sling at another. With old friends like that, who needs new enemies?

Nevertheless, Weizenbaum's hypothesis makes sense. After all, Alan Turing and Kurt Gödel were hardly more than teenage boys when they proved, respective-

ly, that anything that can be computed can be computed by machine, and that some things cannot be computed; nor were Steve Jobs and Steve Wozniak much older when they made their gold mine with Apple, or Bill Gates when he founded Microsoft, or, indeed, Raymond Kurzweil when he built and marketed a machine to read printed books to the blind. Computers at home and in the mall have done more for teenage boys than any invention since the slingshot.

But what, you ask, does the Teenage Boy Hypothesis have to do with *The Naked Computer*? Well . . . how can I put this without being snide? Did you love the Ripley's Believe-It-or-Not Museum? *The Guinness Book of World Records*? The Baseball Hall of Fame? Did you ever buy a how-to book to overcome crippling shyness at parties? Are control structures and data structures more enticing to you than centerfolds? Does an android bare discharge in electric fields?

If so, you will enjoy this book. I certainly did. I haven't had so much fun since we negatively charged the principal's hat in eighth grade so that it stuck to his toupee. William Morrow and Co., Inc., New York, N.Y. (1983, 334 pp., \$15.95).

—Nicholas Zvegintzov

### **HIGH OUTPUT MANAGEMENT** by Andrew S. Grove

Everyone's shelves are full of books on management. The volumes range from exhortative, evangelical pamphlets to weighty tomes burdened with scholarly references. Somewhere in the middle are the numerous *How I took this small company and made \$10 million* pseudobiographical writings. The Grove treatise falls into this honored middle group, the foremost example of which is Alfred P. Sloan Jr.'s *My Years with General Motors* (Doubleday, New York, 1964).

Nobody doubts the success of An-

## SOURCE DATA

drew Grove and Intel, the company he helped found. A Hungarian refugee of the class of 1956, Grove obtained a degree in chemical engineering three years after his arrival here, and a PhD from Berkeley only three years after that. Along the way, he thoroughly mastered the English language and made the fascinating leaps from scientific innovator to entrepreneur to corporate manager. This is a far piece to travel in little over a quarter of a century.

Grove espouses a number of management ideas well known to students of that black art. He talks about leverage, hybrid corporate structures, and how to run a meeting. He even tackles the messy subject of dealing with subordinates who have the nasty habit of quitting at the worst possible times. His performance evaluation and review discussion is a model of its kind.

Having said all these things, one still feels compelled to sit back and wonder if this is really the way Intel is run. There is something bloodless about the way Grove approaches employee problems. He talks almost in engineering terms, as if a respectable Intel manager applies a little force at the right point and the employees move. It all sounds like an equation: apply the proper pressure at the appropriate time, and the world can be changed.

Obviously, people are not entirely predictable or rational. What is a prime motivator for one fails totally with a colleague of seemingly similar background. The engineer is challenged by new and complex state-of-the-art tasks. The salesman runs on pure fear with a healthy dose of financial incentive. A majority of employees at any large corporation goes to work simply to get out of the house. These employees love the social relations of the workplace, therefore logical incentives don't always work.

Cookbook formulas—rules to be applied in situation A against problem B when dealing with employees C, D, and E—do not seem terribly appropriate in most large corporations. What has apparently worked well at Intel, a high-technology corporation with an explosive growth history, probably won't be transplantable to a stolidly middle-aged insurance company or a major government bureaucracy.

Therein lies the flaw in this book as well as in most of the other management texts. Corporations have cultures. Each is different. What works well at Intel might collapse completely at Xerox, IBM, or Texas Instruments. Indeed, one corporation's management by objectives (MOB) or another's matrix management style will fall apart when the culture in which it was nurtured is no longer present. Imposition of these techniques from the outside simply doesn't work. (The recent move at Texas Instruments away from its historic matrix approach strongly suggests that a style for the '60s and '70s may not work in the

'80s even at the company in which it was originated.)

Where does this leave Grove and Intel? Will what has seemingly worked in the past decade continue to be the right style for the next 10 or 20 years? Or is the management style of the present Intel leadership so personal to Grove and Robert Noyce that it will leave with them when they depart? Consider the retirements of William Hewlett and David Packard from HP and the difficulties John Young, a nonfounder, had converting a highly personalized company to professional management.

*High Output Management* is a pleasant enough little book and an easy read. Nobody will find any suggestions too complex or confusing. But neither this book nor in all likelihood any management volume ever written will solve all the problems at all companies for all time.

In the real world, what works for one manager in one company is a style, a way of approaching problems, a highly personalized and almost impossible to transfer way of structuring thoughts and ideas. It is perhaps characteristic of the engineering mentality that there is a continuing search for formulas to ease the most complex individual and social interactions. But these really do not exist. Social engineering is a discipline still to be invented, B.F. Skinner notwithstanding.

The bottom line on this and similar books is fairly clear. Read them and try to get a sense of Intel's corporate culture. But do not assume any Grove prescription will work for any corporations' ills. And whatever you do, do not try to mechanically apply Dr. Grove's cures to your symptoms. They won't work and will, if anything, make matters worse. Each organization must develop its own solutions within its own cultural framework. Random House, New York (1983, 224 pp., \$16.95).

—Philip H. Dorn

## REPORTS & REFERENCES

### PRODUCTIVITY AIDS

A directory of software products and tools to help improve the productivity of the systems development function is available from Applied Computer Research. The *Winter 1984 Guide to Software Productivity Aids* covers 742 software products in 22 classifications that are keyed to the system development life cycle as well as the information center environment. Products are listed under such categories as application development systems, precompilers, cross-reference analyzers, data dictionaries, database management systems, debugging aids, and JCL processors. Also included are two in-depth tutorial chapters on increasing productivity in traditional system development and through use of the information center concept. The publishers claim the guide

will be a primary benefit to top dp and systems managers, to managers of information centers, and to software vendors. The *Guide to Software Productivity Aids* is published semiannually on a subscription basis for \$95 per year. For more information, contact Applied Computer Research, P.O. Box 9280, Phoenix, AZ 85068-9280, (602) 995-5929.

### CLOSE TO THE EDGE

The International Information Management Congress is distributing a new book entitled *The Executive's Guide to Information Technology: How to Increase Your Competitive Edge*. The book takes a look at how today's technology can help managers do their jobs better and increase their companies' competitive positions. Also included are ways to manage the huge investments in capital and manpower training associated with new information systems. The guide defines six areas of change managers should begin watching now, including the integration of communications and computing, and new competition from Japan and Europe. The 314-page book costs \$30 and is published by John Wiley & Sons. To order it, contact IMC, Publications Sales, P.O. Box 34404, Bethesda, MD 20817.

### I HATE COMPUTERS...

The Hayden Book Company Inc. has published *The Unofficial I Hate Computer Book*, which takes a "tongue-in-chip look at the everyday evils of home, personal, and big computers." The book features 76 anticomputer cartoons created by John Barry and illustrated by Richard Tennant. You can purchase the \$4.95 book by contacting Hayden at 10 Mulholland Dr., Hasbrouck Heights, NJ 07604, (201) 393-6306.

## PERIODICALS

### PROBING USERS

In February, Probe Research Inc. began publication of *User!*, a bimonthly report serving the end-user community. The report covers the topics of telecom, MIS/OA, wp, pcs, mainframes, and minis. *User!* will present case studies of actual user experiences with new systems and services, forecasts and product trends, user perceptions of vendors and vice versa, and regulatory and public policy matters that affect users. Subscriptions cost \$75 a year (six issues) in the U.S. and Canada and \$90 elsewhere. For more information contact Probe Research Inc., P.O. Box 590, Morristown, NJ 07960, (201) 285-1500, international telex 6853420.

### SPEAK SOFTLY

"No holds barred accuracy" is the goal of the *SPCU Letter on Word Processing and Data Management Software*. SPCU stands for the Society for the Prevention of Cruelty



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## If you still believe in me, save me.

For nearly a hundred years, the Statue of Liberty has been America's most powerful symbol of freedom and hope. Today the corrosive action of almost a century of weather and salt air has eaten away at the iron framework; etched holes in the copper exterior.

On Ellis Island, where the ancestors of nearly half of all Americans first stepped onto American soil, the Immigration Center is now a hollow ruin.

Inspiring plans have been developed to restore the Statue and to create on Ellis Island a permanent museum celebrating the ethnic diversity of this country of immigrants. But unless restoration is begun now, these two landmarks in our nation's heritage could be closed at the very time America is celebrating their hundredth anniversaries. The 230 million dollars needed to carry out the work is needed now.

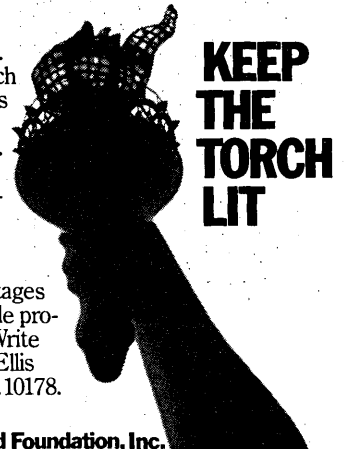
All of the money must come from private donations; the federal government is not raising the funds. This is consistent with the Statue's origins. The French people paid for its creation themselves. And America's businesses spearheaded the public contributions that were needed for its construction and for the pedestal.

The torch of liberty is everyone's to cherish. Could we hold up our heads as Americans if we allowed the time to come when she can no longer hold up hers?

### Opportunities for Your Company.



**OFFICIAL SPONSOR**  
You are invited to learn more about the advantages of corporate sponsorship during the nationwide promotions surrounding the restoration project. Write on your letterhead to: The Statue of Liberty-Ellis Island Foundation, Inc., 101 Park Ave, N.Y., N.Y. 10178.



## SOURCE DATA

to Users. They claim their newsletter will leave readers with "no doubt about the best and the most annoying characteristics of any program [we] review." In addition to these reviews, the *SPCU Letter* will provide tips on using specific programs, general advice on the creation and handling of information with a computer, news about product updates or revisions, and digests of reviews and articles on wp from major computer magazines. The SPCU is devoted exclusively to educating professionals who use IBM and compatible pcs in the selection

and use of software. The society began publication of the newsletter in January, and charges \$36 for 12 monthly issues plus a special report after each Comdex, an annual "Software Oscars Issue," and a "Worst Dressed Software Issue." Subscribers automatically become members of the SPCU and are invited to write for specific information on any word processor they are using or thinking about buying. For more information contact Dr. Charles Spezzano at 6716B East Cedar Ave., Denver, CO 80224, (303) 388-2380.

## WORLDVIEW '84

The World Future Society is gathering distinguished scientists, scholars, educators, researchers, policymakers, and others from around the world to analyze today's trends, make forecasts, and explore the opportunities and challenges of tomorrow. The conference will be held June 10-14 at the Washington Hilton Hotel in Washington, D.C. Rather than focusing on a single topic, Worldview '84 will strive to present a multifaceted, interdisciplinary look at "the myriad forces that are shaping and changing society." Session topics will cover robotics, biogenetics, habitats, values, health, and even art of the future. If you wish to attend all sessions, the welcome reception, and receive a copy of all the papers presented at the conference, the fee is \$225. Attendance at the session only is priced at \$190. For more information, contact Ellen Dudley, media relations director, World Future Society, 4916 St. Elmo Ave., Bethesda, MD 20814-5089, (301) 656-8274.

## SEMINARS

### OFFICE INFO SYSTEMS

The first Office Information Systems Conference (OIS) will be presented in conjunction with the Eighth Annual Computerized Office Equipment Expo, June 19-21, in Rosemont, Ill. The keynote address, "Challenge of Years Ahead, Management Issues and Information Systems," will be given by John J. Connell, executive director of Office Technology Research. The seminar program offers resource material in management issues, systems planning, administration and organization, professional development, technological studies, and program implementation. The OIS conference will also include professional advancement courses and participation workshops designed "to provide fresh ideas and step-by-step guidance in the latest techniques, procedures, and equipment that serve to efficiently gather, interpret, store, and disseminate the vast amount of data that business requires on a daily basis." The seminars will be held at the O'Hare Exposition Center. For more information, contact Janet Schafer, Show Manager, Cahners Exposition Group, Cahners Plaza, 1350 E. Touhy Ave., P.O. Box 5060, Des Plaines, IL 60018, (312) 299-9311.

### TRAIN THE TRAINER

Advanced Systems Inc., is offering a three-day seminar entitled "The Effective Implementation and Administration of In-House Training" that will be held in seven U.S. cities and one Canadian city in 1984. The course is designed for the human resource and dp training staffs, to help them develop training skills that can be put to immediate use in the business environment. The course costs \$685, which includes all work-

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shop materials and luncheons. The seminars will be held at the following locations: Atlanta, June 11-13; Toronto, July 16-18; San Francisco, Aug. 13-15; Minneapolis, Sept. 26-28; Boston, Oct. 22-24; Washington, D.C., Nov. 19-21; and Tampa, Dec. 17-19. For more information, contact the Seminar Coordinator, Advanced Systems Inc., 2340 S. Arlington Heights Rd., Arlington Heights, IL 60005, or call (800) 323-0337. In Illinois or Canada, call collect (312) 981-4260.

## VENDOR LITERATURE

### ELECTRONIC DISK

Dilog PC Products is offering a four-page, four-color brochure describing its Electronic Disk, which replaces a conventional floppy disk in IBC PC and XT computers. DILOG PC PRODUCTS, Garden Grove, Calif.

**FOR DATA CIRCLE 350 ON READER CARD**

### MICOM SHORT FORM

Micom Systems Inc. has just issued its 14-page illustrated "Short Form Catalog and Price List," covering its entire range of data communications equipment. Descriptions of the company's line of local networking equipment, voice/data multiplexors, data concentrators, data PABXs, modems, multiplexors, miniature local datasets, and its newly introduced protocol converter, as well as U.S. prices and volume discounts. MICOM SYSTEMS INC. Chatsworth, Calif.

**FOR DATA CIRCLE 351 ON READER CARD**

### PROJECT MANAGEMENT

A 38-page brochure is being offered by AGS Management Systems that describes the fundamental principles of project management and illustrates the project management framework. The brochure includes two matrices showing the levels for distribution of 16 essential project management reports, as well as the computer format and layout of these reports. AGS MANAGEMENT SYSTEMS, Philadelphia, Pa.

**FOR DATA CIRCLE 352 ON READER CARD**

### MORE ON MODEMS

IBM is offering a 20-page brochure on its new 3868 rack-mounted modems and the 3866 multimodem enclosure. The design of the 3868 modem incorporates a primary speed of 2,400 to 9,600 bits per second and a backup speed of 1,200 to 4,800 bits per second over nonswitched (leased) telephone lines. IBM CORP., White Plains, N.Y.

**FOR DATA CIRCLE 352 ON READER CARD**

### READY AND ABLE

Able Computer has published its new communications systems brochure and data sheets. The four-color brochure is first in a series of five. It focuses on data communications, and presents an overview of the

market and trends within the industry. Also featured in the 12-page brochure is Able's Attach system. ABLE COMPUTER, Irvine, Calif.

**FOR DATA CIRCLE 355 ON READER CARD**

### GOODIES GALORE

Irv Brechner's Micro Goodies catalog is available at no charge. The catalog features whimsical and useful items, as well as edibles such as a 5/4-inch chocolate disk. The catalog also has a series of T-shirts available ("I've Been D-Based II" among oth-

ers) and personalized adventure books for kids. MICRO GOODIES, Princeton, N.J.

**FOR DATA CIRCLE 357 ON READER CARD**

### TABLE TALK

Bretford Manufacturing Inc. is presenting its 32-page, four-color catalog covering its line of computer furniture, crt and typewriter tables, office machine stands, library furniture, mobile equipment tables, and video furniture. BRETTFORD MANUFACTURING, Schiller Park, Ill.

**FOR DATA CIRCLE 354 ON READER CARD**

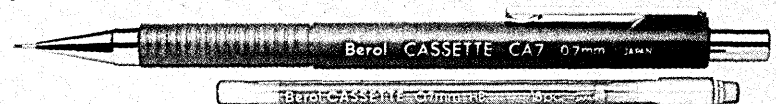
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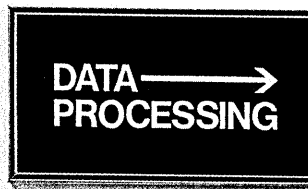
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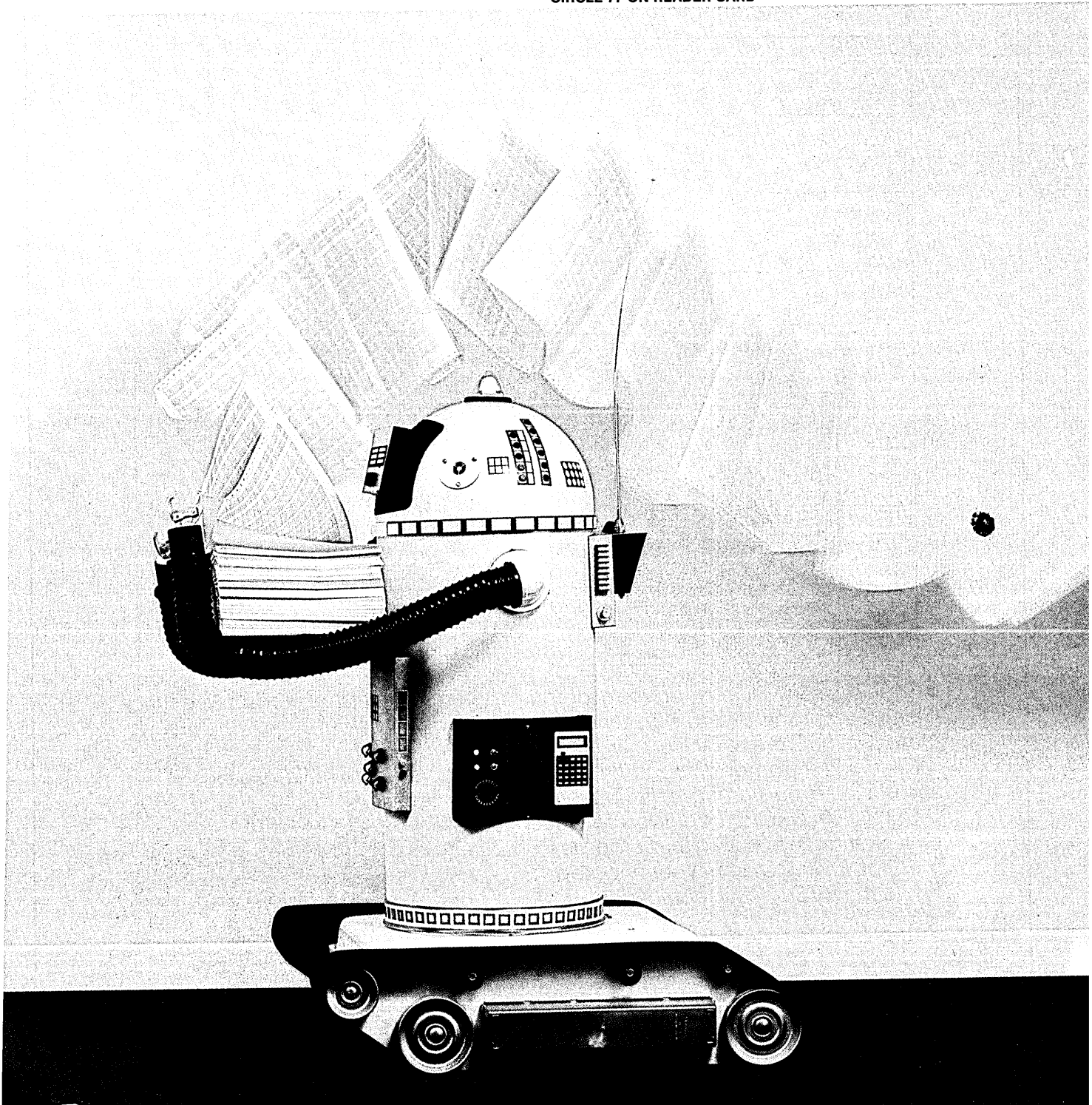


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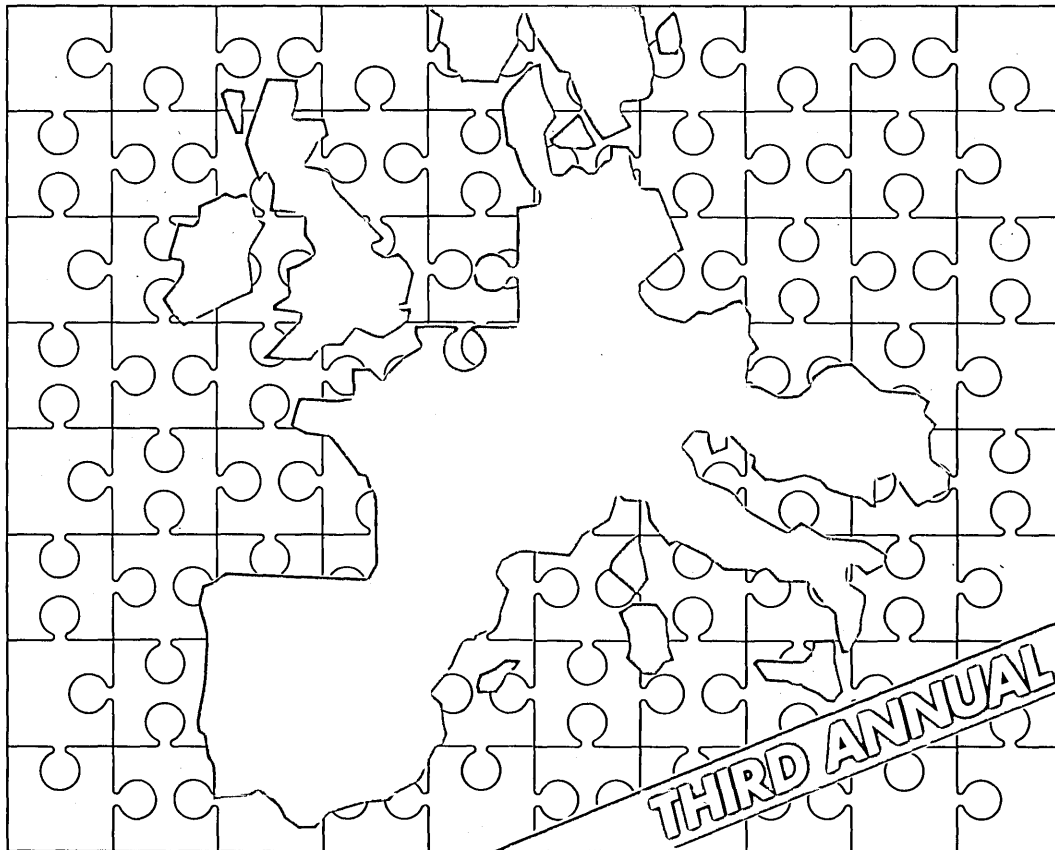


# COMDEX

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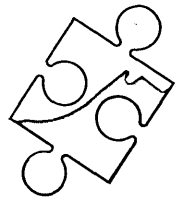
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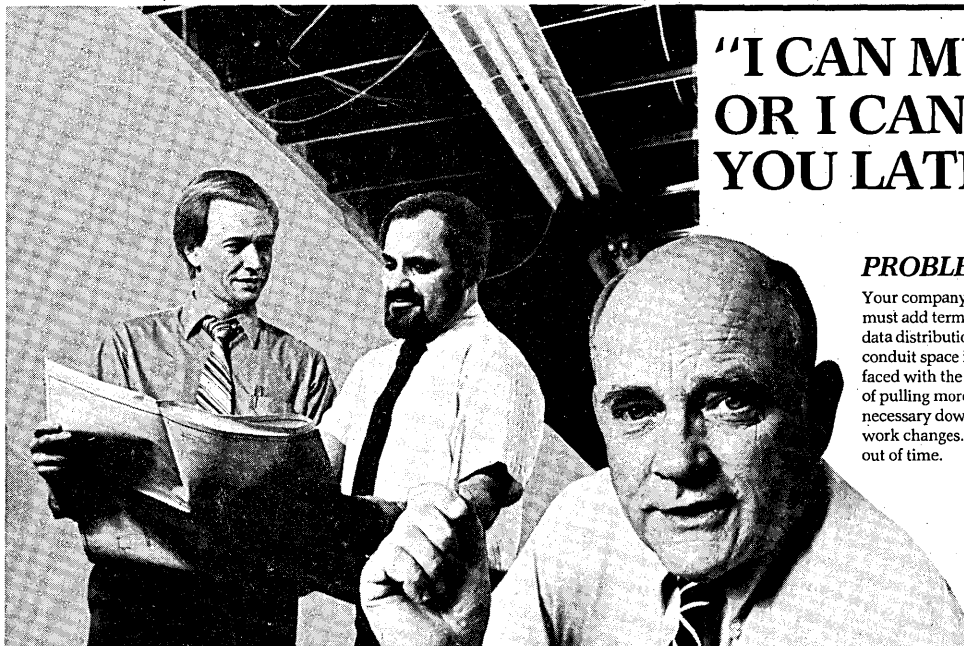
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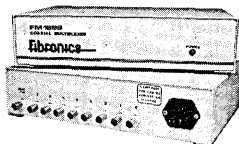
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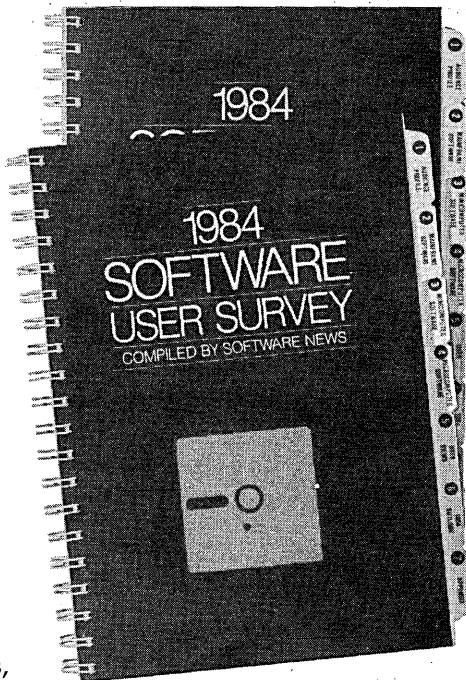
# Second Annual Software User Survey Forecasts Prosperity and Problems for Major Vendors

**Be prepared for some eye-openers in 1984's software market...order your personal copy of the Software User Survey today**

The results are now in from the second annual Software User Survey conducted by Software News. Over 2000 major national accounts participated.

Virtually every sector of the U.S. economy was polled...banks, insurance firms, manufacturers, distributors, medical and legal groups, educational institutions, systems houses, process industries, etc. The respondents identified the software packages they are now using and what they plan to buy in 1984. The mainframes, minis and microcomputers currently in use and those planned for purchase in 1984 are also identified.

The 200-page report of the survey results ranks the leading software vendors by their relative market shares. The expected increases in 1984 software expenditures are analyzed separately for mainframes, minis and micros. Twenty-seven specific categories of applications and systems software were studied to identify the fastest growing segments. Examine the Table of Contents for more details.



## Partial Table of Contents

1. 1983 competitive market shares of independent software vendors (analyzed by application/function)
  - a. Mainframe software vendors
  - b. Minicomputer software vendors
  - c. Microcomputer software vendors
2. Software vendors' projected 1984 market shares (analyzed by application/function)
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4. Comparison of 1984 software expenditures versus 1983
  - a. Mainframe software expenditures
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  - c. Microcomputer software expenditures
5. Current and expected usage of personal computers as links to corporate mainframe databases.
6. Analysis of marketing channels used by micro software producers in selling into the corporate environment.
7. How users rank the various selection criteria when choosing a software vendor.
8. An assessment of lagging programmer productivity and what users cite as the most viable solutions for easing the backlog of applications awaiting development.

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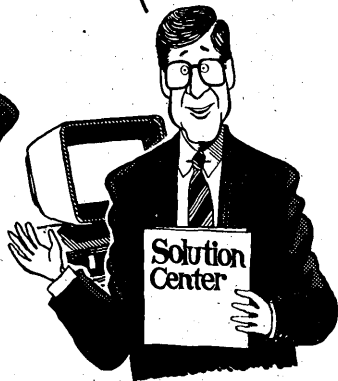
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WAS UP TO HERE  
IN WORK."

"AND ROUTINE  
END-USER REQUESTS  
WERE JUST ADDING  
TO MY BACKLOG-  
UNTIL I HEARD ABOUT  
THE SOLUTION  
CENTER."

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OF USER-FRIENDLY  
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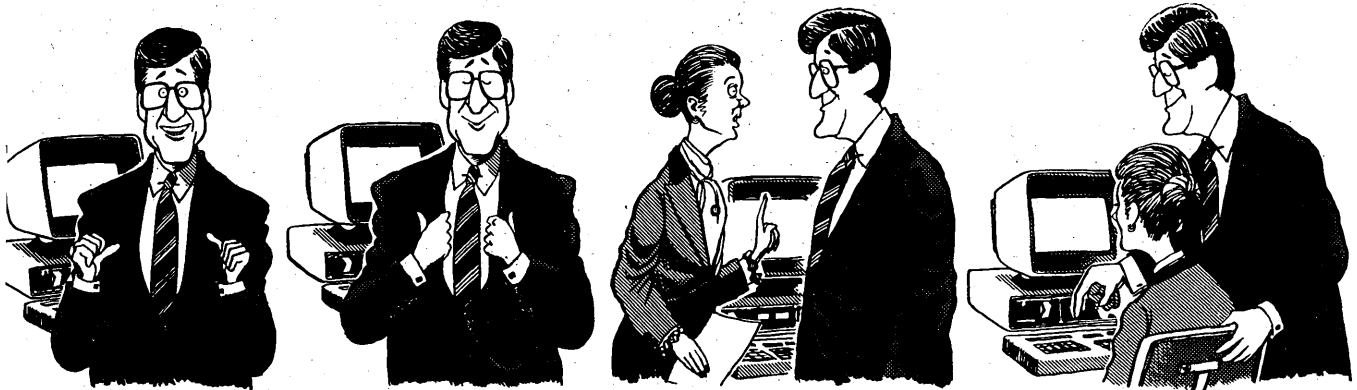
# user satisfaction switch."

"AND ME  
A LOT HAPPIER  
TOO."

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AND..."

"BILL, I NEED  
AN ANALYSIS OF  
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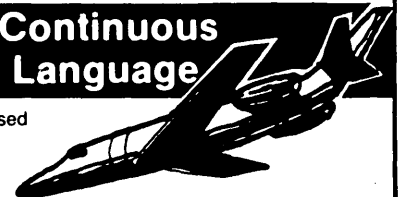
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CIRCLE 511 ON READER CARD

# ON THE JOB

## HAPPY HUNTING

There are plenty of books around these days to help you find the career or job of your dreams. Some are geared to specific areas, such as *Careers in Computers and Data Processing*, by Herman McDaniel; some to specific industries, like *Help Wanted: The First Guide to High-Tech Jobs*, by Sue Hoover; and some have a broader scope, such as *Dream Jobs: A Guide to Tomorrow's Top Careers*, by Robert W. Bly and Gary Blake.

The first book, *Careers in Computers and Data Processing*, is designed for

people who don't know what kind of jobs are available in the dp and computer industries, or what they encompass. It is particularly useful for high school and college students who are interested in entering the computer industry.

The book is also a valuable point of reference for those considering leaving their present jobs to enter the dp field. It provides detailed descriptions of the jobs available as well as what backgrounds are required to land those positions. The kind of equipment a person would need to do a particular job is also included in these de-

scriptions, as well as how to use it.

The book even lists which jobs are suitable for the handicapped. For instance, under the job listing "Printer operator," the author states that "because the printer operator works from written instructions and the job requires a minimum of verbal communication, persons who are deaf and/or mute can perform competently as printer operators." In spite of its good points, the book lacks guidance concerning the best geographic locations for these jobs, and what kinds of salaries they command.

The second book, *Help Wanted:*

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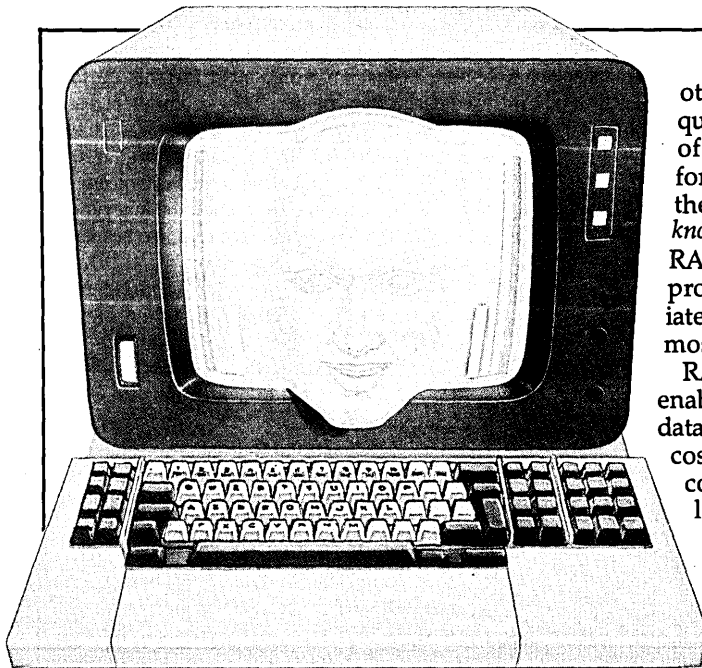
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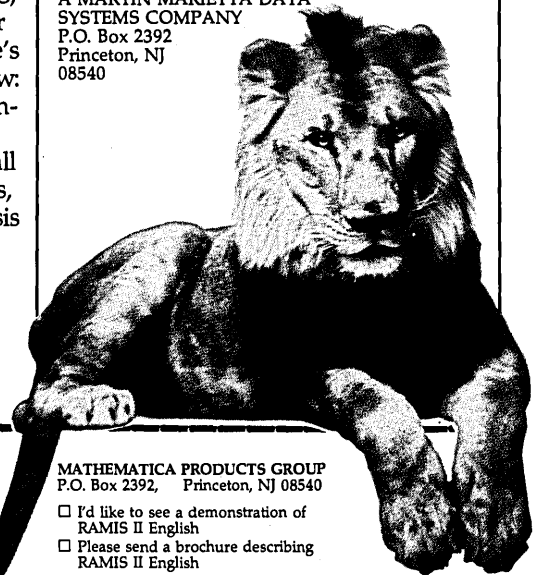
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CIRCLE 87 ON READER CARD

## ON THE JOB

*The First Guide to High-Tech Jobs*, by Sue Hoover, takes a hard-line approach in its discussion of what jobs the future will hold. In her opening chapter, Hoover notes that the move from an industrial to a technological age is really no different than the move from agriculture to industry at the turn of the century. She also claims that technology is creating new industries as well as re-vamping old ones, and that people will have to convert and be retrained to survive the transition.

The book is broken down into seven

chapters: The Jobs Revolution; The New Geography of Jobs; The New Work Place; The New Work Discipline; Retooling America; Jobs Mom Didn't Tell You About; and Jobs in High Technology. The final chapter takes nine States (Arizona, California, Colorado, Florida, Massachusetts, New Mexico, North Carolina, Texas, and Utah) and discusses what those high-tech breeding grounds have to offer. It then lists major companies in those states, what types of jobs may be available, how to apply for them, and what kind of responses to

expect. Hoover has even included directions to the companies from the nearest major highways. A lot of research went into this book, and it proves to be very informative, thought provoking, and entertaining.

The final book, *Dream Jobs: A Guide to Tomorrow's Top Careers*, by Robert W. Bly and Gary Blake, pulls back even further than the first two, and discusses what the future will mean for "the nine fastest growing, most fascinating job opportunities of the '80s—computers, cable tv, advertising, public relations, telecommunications, travel, consulting, training and development, and biotechnology." The authors geared their book to "everyone from entry-level job seekers to nonspecialists to career changers."

The 20-page chapter on computers features a quick rundown on some of the jobs available in the field, along with the appropriate starting salaries. Next is a section on what it takes to get into dp. The authors claim you don't always need a computer science degree to break into the business. This chapter lists books to help beginners understand computers, has a short glossary of terms, and discusses whether you really need computer experience to enter the field or if business experience will suffice. It also mentions some of the dp world's professional societies and trade publications. Listed in addition are some of the major companies in the data processing industry along with their addresses and a brief description of the kind of business they do.

These are but three of the numerous books available on the jobs of the future. They all stress that it's not just new jobs coming on the scene that will shape the future work world; each has pointed out that present jobs are changing to conform to the age of technology.

As Sue Hoover wrote in *Help Wanted*, "High technology in the work place is the force that is creating new scientific data which when applied result in new industries producing new products and requiring workers with new skills and attitudes about their work. Further, it is the force that is creating new ways of producing old products and thus requires retrained and converted workers there as well."

One final note: all three books seemed to agree that the fields of data processing and computer technology appear to harbor little job discrimination of any sort.

*Careers in Computers and Data Processing* is published by Petrocelli Books Inc., New York, 1978, \$8.95. *Help Wanted: The First Guide to High-Tech Jobs* is published by Andrews and McMeel Inc., New York, 1983, \$7.95. *Dream Jobs: A Guide to Tomorrow's Top Careers* is published by John Wiley & Sons, New York, 1983, \$8.95.

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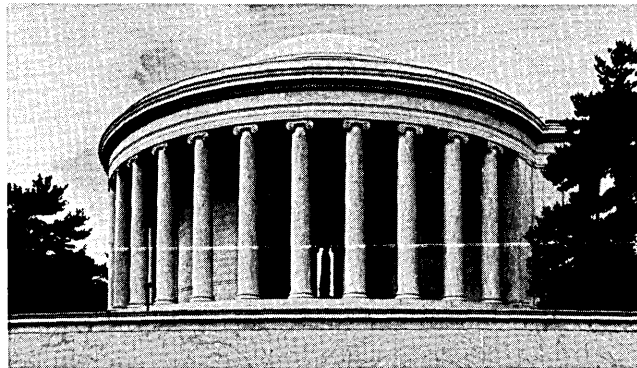
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# READERS' FORUM

## MY SKULL IS THICK

If Mrs. Slade had told her boy software analysts came in a model the shape of an hourglass, he might have gone into dp instead of PI. And let me tell you, when Ms. Simpson leaned over my desk and sniffled, "You've gotta help me, Sam," I kicked myself for throwing out that literature about night classes in COBOL. Fortunately, my aim was bad and I only succeeded in putting a foot through the bottom of an open desk drawer.

Ms. Simpson was new, but her story was as old as the lint in the cuffs of my pants.

Ms. Simpson was paid \$50K per annum by People's Insurance Company of America (otherwise known as PINA) to check out new software to make sure it would run under PINA's configuration. Trouble was, in the last week she had found herself providing tech support to a bunch of heavies from New Jersey who had muscled their way in with a package called Universal Rating Manager—and nobody had ever asked her word one about whether it was right for PINA's system. Somebody had spent 200,000 crisp Yankee dollars on an application that was written when the 370 was a gleam in IBM's eye. To run the Rating Manager at PINA (which ran MVS/XA on a 3084) Ms. Simpson and her assistants would have to install Release 20 of DOS—and a card punch.

It looked like an inside job to me, and I told her so.

"That's what I thought," she said, "but why would anyone want to spend so much money on a batch system like URM when there's plenty of decent on-line software out there?"

I didn't want to depress the kid, but I figured I knew the answer. In the old days it was sexual favors; today, the kickback would probably be cocaine, or tickets to a Michael Jackson concert. But somebody at the insurance company was getting a payoff for selecting a turkey like URM. It made sense.

As far as I could tell, PINA's corporate structure made the federal government's structure look like the flowchart of a card system. They had enough vice presidents, assistant vice presidents, and department directors to populate a small city. I was going to have a tough time figuring out who had enough power in the organization to push a project like URM over the transom.

When she was talked out I took her home and followed her in. A minute later, she picked me up and threw me down the stairs.

"My hat," I growled at her. She threw it down at me. I trudged home, put down a gallon of lighter fluid to help me sleep, and turned out the light on another day.

The first person I ran into at People's Insurance was the operations manager. After I apologized and helped him dust himself off, I hit him with a few questions about Universal Rating Manager.

The only thing he knew about URM he had heard in the

company cafeteria—in a conversation at the next table. My ears perked up like a hungry Doberman's when he's heard the front door creak open.

"Yeah," the manager told me, "two filing clerks. One said, 'Have you seen that blond guy from URM?' and the other one said 'No,' and then the first one said, 'Well, you're not missing much.'"

No help there. Working my way sideways through the management, I paid a visit to the applications manager. She had an analyst and a programmer assigned to the URM project, but they had been waiting for documentation on the system since last Christmas. The boys from URM were going to handle the installation and testing, anyway; her people wouldn't be involved until it came time to attach URM to the existing systems. As for the manager herself, she didn't even know what the letters URM stood for.

"I'd be happy to tell you all about it over dinner tonight," I winked at her.

She picked me up and threw me into the hallway outside her office.

"My hat," I growled.

She threw it after me.

It was clear low-level management either wasn't in on this caper or was being too sly for me. I decided to work my way up.

The director of data processing got my head spinning.

"...and the only other thing I can tell you is I got invited to a meeting of the dp steering committee to rubber-stamp the URM project. But they hadn't looked at any other package; I'm sure of that."

"You mean to tell me the director of dp isn't a member of the dp steering committee?" I asked, my eyebrows lifting the hat off my head.

He studied a blemish on his desk blotter. "I've been given a sort of—ahh—dispensation from attending the meetings. See, I've been too busy with the budget; they ask me to come only when they know the steering committee is going to discuss something important."

"What budget? Your fiscal year-end is nine months away."

He smoothed some pages in front of him. "Hadn't you heard? Every department has to shave 2% from its operating budget by next month." He made sure his intercom was off. "The company's in a bit of financial trouble."

I had something here. "You said 'every department.' That includes the rating department?"

This time he met my eye. "Yes. The rating department, too."

I found the office of the director of rating, and leered at his pneumatic secretary while I stated my business. The director couldn't see anyone right now, the secretary told me; she was busy shaving her budget.

"Then she won't know you're taking a long lunch break," I smiled, sitting myself down on the edge of her desk.

She picked me up and threw me into the hallway.

There was something in the way she threw me that made me

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## READERS' FORUM

think I shouldn't ask for my hat. I left it with her as a kind of memento.

I pulled out my copy of the company's organizational chart, spread it out on the floor, and followed the boxes from the director of rating up to the one marked vice president of operations. There were three boxes in between that I decided to ignore. I folded the chart up again and caught an elevator to the 37th floor.

The vice president of operations had a receptionist who outweighed me by 75 pounds and who had no patience with people who wanted to talk to the boss without an appointment. I draped an arm across the receptionist's shoulder and tried charm. When that didn't work, I offered him two box seats to the Tigers versus the Yankees.

That didn't work either, so I told him I would be happy to wait until the vp had a few free minutes. The secretary told me where to sit, and I sat there.

Late in the afternoon the vp came up for air. I collared him halfway to the men's room.

"URM," I said succinctly.

He turned and grinned. "My baby all the way."

I blocked him as he bent toward a water fountain.

"How did you come up with 200 grand in the middle of a budget crunch?"

He kept grinning. "Once I showed the prez how much money it was going to save—400 bucks in the first year alone—he wanted URM, and he wanted it now. He talked to corporate and they said, 'Go for it.'"

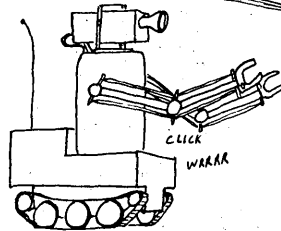
I was dealing with a lunatic here, I told myself. My right hand instinctively reached inside my jacket to fondle the handle of the cannon I keep there.

"Who estimated URM was going to save you money?"

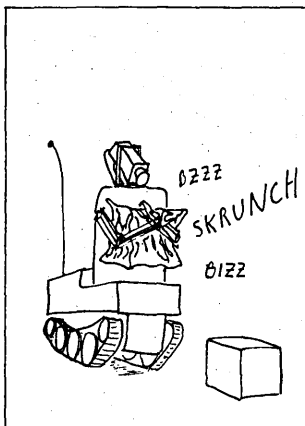
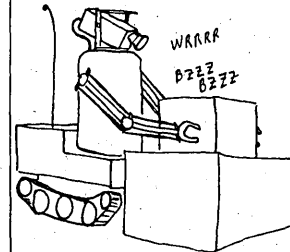
"Why, I did. I figured out it was going to allow us to do away with three full-time employees in rating, as well as reams of

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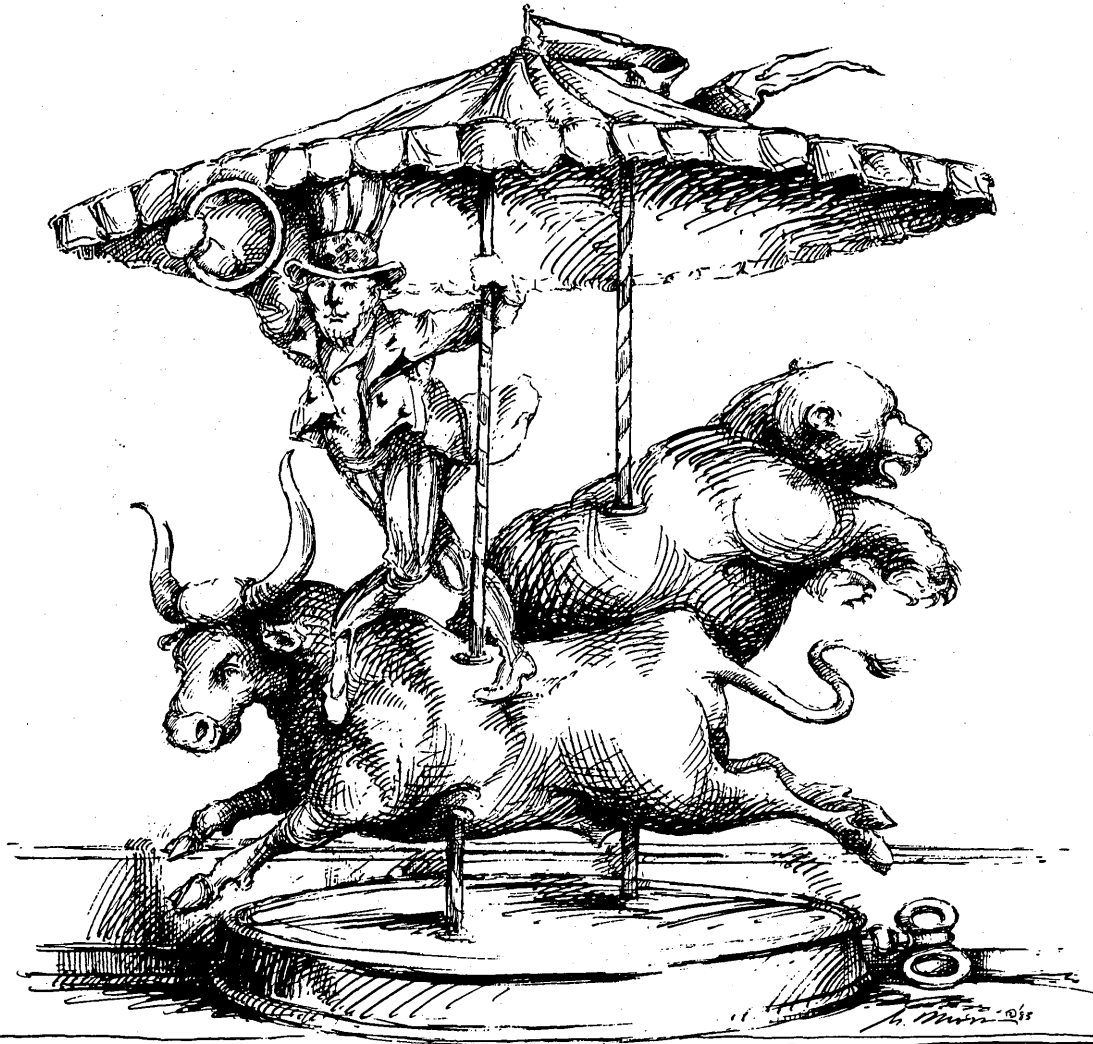
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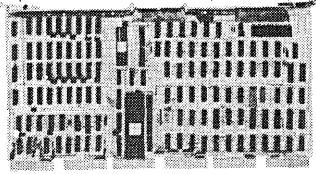
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## READERS' FORUM

paperwork. I've got the numbers back in my office, if you want to see them."

I did some quick estimating of my own. There was the initial price tag on URM itself. They'd need a system programmer to bring up and maintain DOS, another one to bring up and maintain VM (unless they got another machine to run DOS on), two applications people to figure out how to get URM to talk to their other systems, and about 1.5 million punched cards per year. It didn't take a genius to figure out all that was not going to be offset by pink-slipping three rating clerks.

This was not a simple case of an administrator who didn't have both oars in the water. This guy didn't even have a boat.

"URM is 20 years out of date," I told him, watching his hands.

He laughed a crazy little laugh. "Nonsense," he said, and whipped a glossy brochure out of an inner pocket. He found himself looking into the barrel of a .38 police special.

And I found myself drenched. Not only had my partner, one maniacal Maria Valdez, substituted a water pistol for my .38, but she had substituted the kind of water pistol that shoots backwards. I made a mental note to find a partner whose brother does not own a novelty shop, and dug for my handkerchief.

But the vp, if he noticed my discomposure at all, didn't miss a beat. He waved a five-color bar graph at me.

"Look here. They had 450 users in 1978, and 2,017 users in 1979. . . ."

"It's 1984," I reminded him, wringing water from my tie.

"... their gross revenues have tripled in the last two years. . . ."

"Those figures include the income from their paper mill in Minnesota, you know."

"... and look at these testimonials." The vp flipped pages until he found what he wanted, and held the brochure in front of me again.

"How many URM installations are running under MVS?"

He gave me a look like a cow waking up from an afternoon nap.

"That's an operating system, isn't it?"

"You got it, Einstein."

He shrugged a shrug Marie Antoinette could have been proud of. "That's a bits-and-bytes issue; the dp department will handle all that. Anyway, I made sure the director of dp was very much involved in the selection process, so I'm sure it's okay."

I rode the elevator back down to the dp department, and looked up Ms. Simpson. I told her what I had found out, and I didn't sugarcoat it for her. After her treatment of me last night, I didn't feel any urge to be nice.

She stared out the window, stunned. "So you think it wasn't a kickback scheme at all? Just pure administrative incompetence?"

"That's the way it plays."

She sighed, and pulled her purse out of her bottom drawer. Handing over five new 20s, she leaned close to me.

"What do you think I should do, Sam?"

"Update your résumé and find yourself a good body broker. Take some dance lessons from me tonight."

She threw me into the hallway.

I walked the streets for hours, watching the city settle down for a night of mayhem, and listening to the rustle of the greenbacks in my pocket. It wasn't enough for the kind of work I do, not nearly enough. But it was enough for a new hat.

—Bruce C. Kula  
Ann Arbor, Michigan

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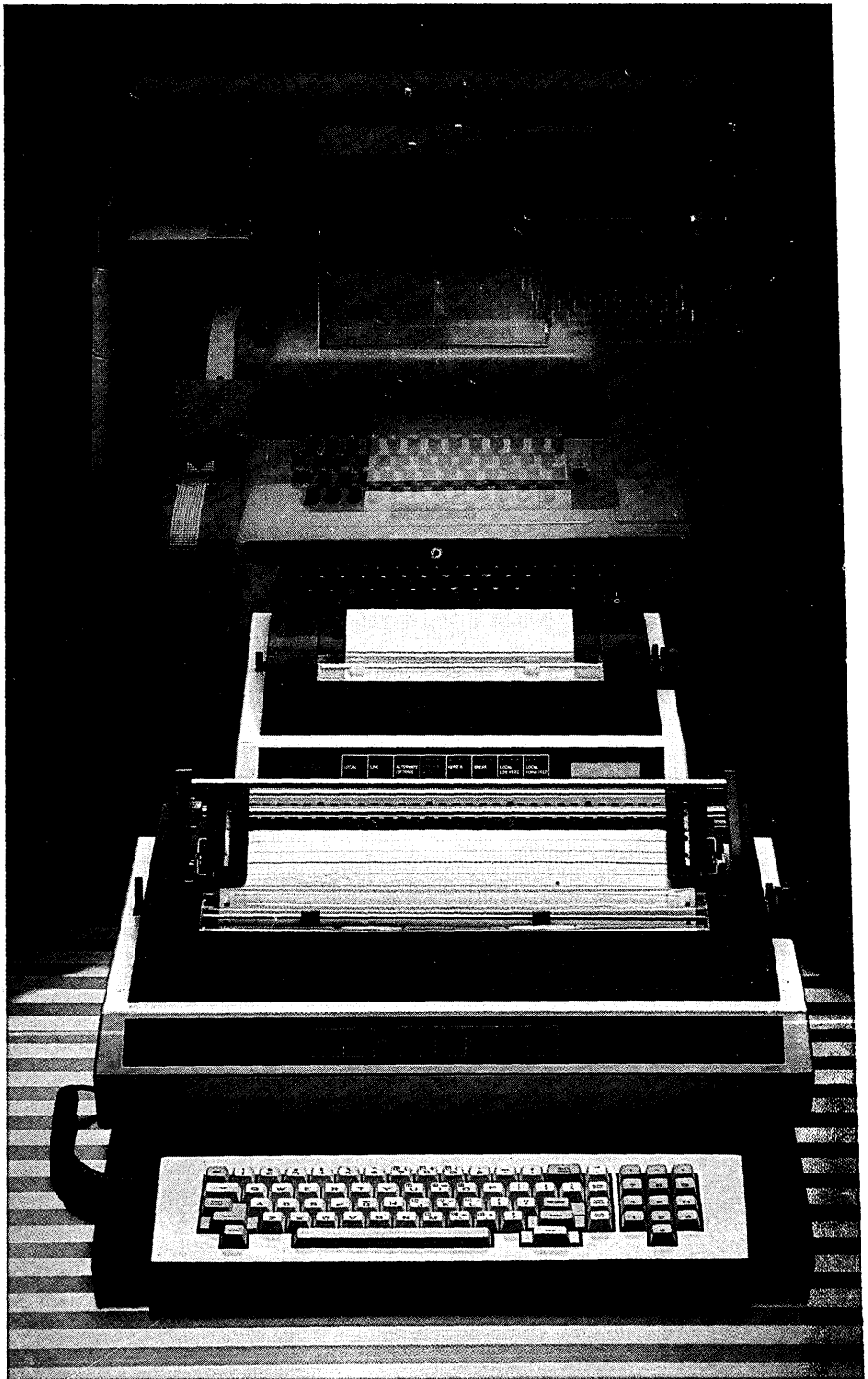
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