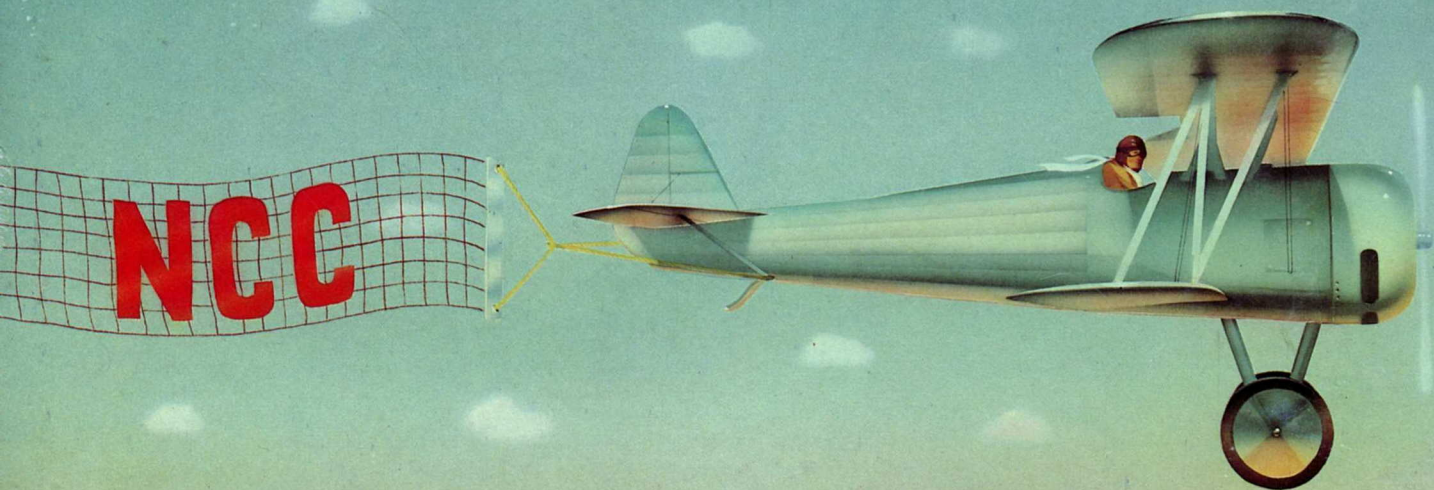


DATA MATION 80

MAY/4.00 U.S.A.



ALSO:
SMALLTALK
DIARY OF A
MULTIVENDOR USER
A CHINESE
VIEW OF AMERICAN
TECHNOLOGY

PALULIAN

Fastest Data On Two Reels

The winners—Model 9800 (625 ips) and 9810 (75 ips) Vacuum Column Tape Transports. They're the fastest—and most dependable—in their class.

Speed isn't their only advantage—they handle beautifully. Data densities of 200/54 (9.4) 525/54 (9.4) 700/54 (9.4) and 800/54 (9.4) are available. They're also available in 1/2" and 5/8" formats. **NRZ-LIFE**

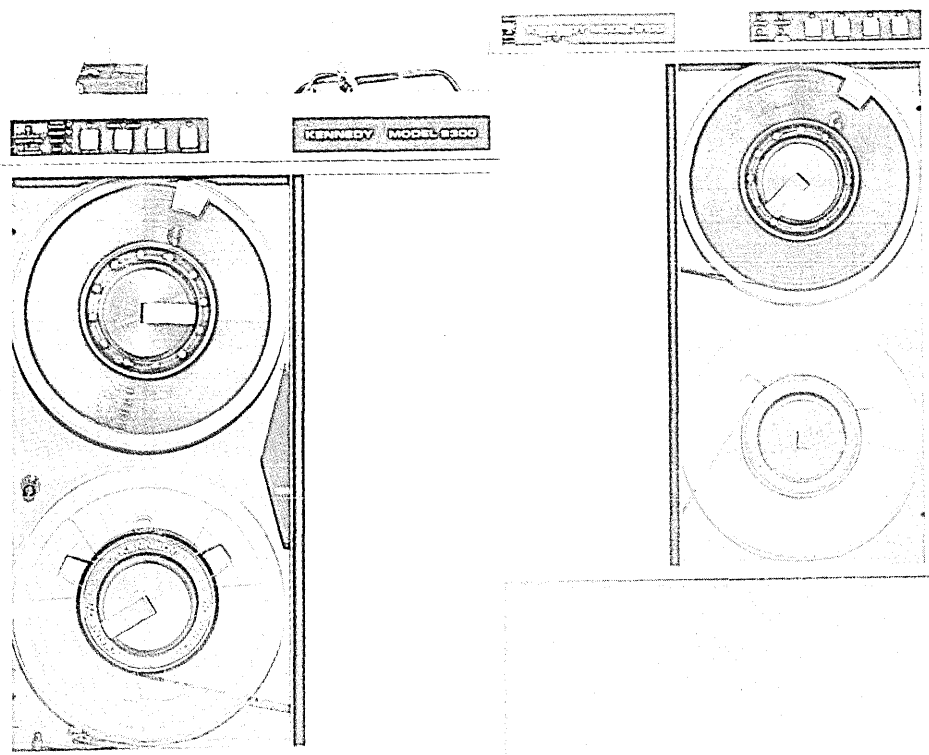
They're fully equipped with features such as capacitive tape-location detectors for improved tape life, hard-coated read-after-write heads to reduce tape wear, crystal-controlled timing, front-accessible test panel—all the features that make Kennedy tape transports the industry standard.

Just one thing—don't expect a deep-throated roar when you start up. Models 9800/9810 have the lowest noise levels in their class. Typically Kennedy—fast, reliable and quiet.

KENNEDY

Subsidiary, Magnetics Corporation

1500 Shamrock Ave., Menlo Park, CA 94025
(415) 357-8888 FAX (415) 357-8249



BONANZA!

For PDP-11* users, the most cost effective, "no-compromise," SMD disc controller

Maximize your system's cost performance factor with the full capability DC-233 Disc Drive Controller. Its unique master-slave bit slice micro-processor architecture provides total DEC software transparency with up to eight drives. Use it with the CDC 9762 80mb drive to emulate DEC's RM02/03 (67mb of formatted capacity per drive). Or—use it with the Memorex 677 Series 100/200mb drives to emulate DEC's RP05/06 (up to 176mb of formatted capacity per drive). Or—use it with eight 300mb drives for up to 2.1 billion bytes of formatted data in non-software compatible mode.

AND THERE'S MORE

- Embedded design fits all PDP-11's*
- Dual drive porting
- Optional dual unibus porting
- Automatic NPR throttling
- ECC fully implemented
- Media compatible

SEND FOR COMPLETE INFORMATION



(714) 730-6250 — TWX 910-595-1775

Cable WESPER

14321 Myford Rd., Tustin, Calif. 92680

*Trade name of Digital Equipment Corporation

CIRCLE 4 ON READER CARD

"Visit Us At NCC Anaheim
Booth #3207 - #3211"





Low-cost hard disk computers are here and field proven

11 megabytes of hard disk and 64 kilobytes of fast RAM in a Z80A computer for under \$10K. Two floppy drives, too. Naturally, it's from Cromemco.

It's a reality. In Cromemco's new Model Z-2H you get all of the above and even more. With Cromemco you get it all.

In this new Model Z-2H you get not only a large-storage Winchester hard disk drive but also two floppy disk drives. In the hard disk drive you get unprecedented storage capacity at this price—11 megabytes unformatted.

You get speed—both in the 4 MHz Z80A microprocessor and in the fast 64K RAM which has a chip access time of only 150 nanoseconds. You get speed in the computer minimum instruction execution time of 1 microsecond. You get speed in the hard disk transfer rate of 5.6 megabits/sec.

EXPANDABILITY

You get expandability, too. The high-speed RAM can be expanded to 512 kilobytes if you wish.

And the computer has a full 12-slot card cage you can use for additional RAM and interface cards.

BROADEST SOFTWARE SUPPORT

With the Z-2H you also get the broadest software support in the

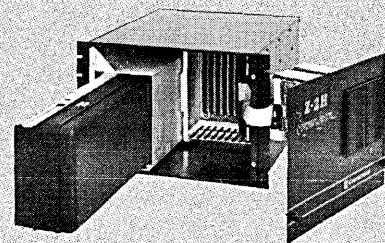
microcomputer field. Software Cromemco is known for. Software like this:

- Extended BASIC
- FORTRAN IV
- RATFOR (RATional FORtran)
- COBOL
- Z80 Macro Assembler
- Word Processing System
- Data Base Management

with more coming all the time.

SMALL, RUGGED, RELIABLE

With all its features the new Z-2H, including its hard disk drive, is still housed in just one compact cabinet.



Hard disk drive at lower left can be interchanged just by sliding out and disconnecting plug. Seven free card slots are available. Z-2H includes printer interface card.

Included in that cabinet, too, is Cromemco ruggedness and reliability. Cromemco is time-proved. Our equipment is a survey winner for reliability. Of course, there's Cromemco's all-metal cabinet. Rugged, solid. And, there's the heavy-duty power supply (30A @ 8V, 15A @ +18 V, and 15A @ -18V) for circuitry you'll sooner or later want to plug into those free card slots.

SEE IT NOW

Last summer we told you this new Z-2H would be a smash. And it is. So see it at your dealer's now. Have him put you in touch with a user—there are lots of them because Cromemco has been delivering for months. See for yourself how pleased our users are.

PRESENT CROMEMCO USERS

We've kept you in mind, too. Ask about the new Model HDD Disk Drive which can combine with your present Cromemco computer to give you up to 22 megabytes of disk storage.



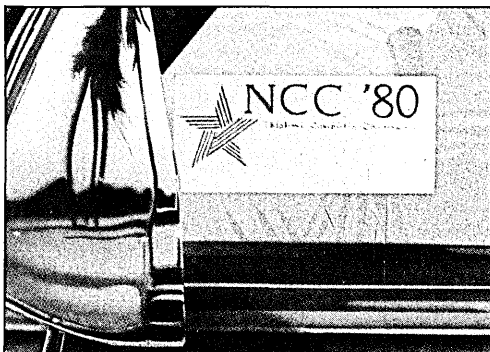
Cromemco
i n c o r p o r a t e d

280 BERNARDO AVE., MOUNTAIN VIEW, CA 94040 • (415) 964-7400

Tomorrow's computers today

CIRCLE 5 ON READER CARD

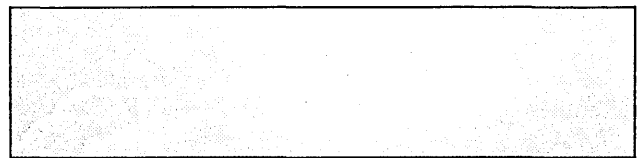
DATA⁸⁰MATION[®]



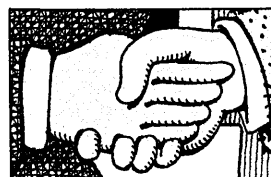
122



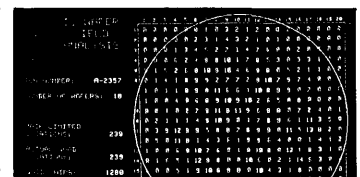
234



144



195



250

FEATURES

49 FOCUS

Bruce Gilchrist speaks to Merrill Cherlin on computers and the economy.

122 NATIONAL COMPUTER CONFERENCE

This year's conference: Anaheim, May 19-22. Review of details, p. 124; computer star game, p. 125; SHARE's 25th anniversary, p. 126; product preview, p. 131.

144 PRESENTING ROSETTA SMALLTALK

Scott K. Warren and Dennis Abbe
This friendly, high-level microcomputer language is user-extensible.

165 THE NOMAD APPROACH

Daniel D. McCracken
A DBMS with a flexible inquiry language.

177 DIARY OF A MULTIVENDOR PURCHASER

Ronald S. Lemos
Long struggle of a user whose nonfunctioning system was supplied by two vendors.

184 TAKING MANAGEMENT'S MEASURE

Jack Ewers
A technique that permits a manager to see how his shop compares with others.

195 NARROWING THE GAP

Dave Mollen
Improving communications between end users and dp professionals.

200 EFFECTIVE IN-HOUSE TIME- SHARING

Dan Walkovitz
Take a lesson from time-sharing companies.

209 OPTIMIZING DECISION SUPPORT SYSTEMS

G. R. Wagner
Making the most of the system that can extend an executive's intellectual resources.

219 THE RIGHT BOOKS

Robert Hard
Take time from inhaling technical manuals to learn to be a literary cognoscente.

227 PREDICTING RESULTS WITH STATISTICS

Richard T. Dué
Statistical techniques can help determine the success or failure of a system.

234 GLIMPSES OF AMERICA

Fei Xiaotong
An eminent Chinese sociologist says the high level of technology accounts for great changes in the U.S. in the past 35 years.

Cover by Dickran Palulian. © 1980.

NEWS IN PERSPECTIVE

62 **MERGERS**
Stordahl in the making?

64 **COMMUNICATIONS**
Key word at AT&T is "BUS."
Telemail, OnTyme-II take off.

68 **APPLICATIONS**
Keeping up with the *Times*.
Kiewit does it again.

78 **MEETINGS**
Recession is a reality.

85 **MINICOMPUTERS**
Risky suit for DG.

90 **TECHNOLOGY**
Six megabytes on every desk?

93 **SOFTWARE**
Software slump in sight?
American Software Dream.
PASCAL confusion explained.

98 **STRATEGIES**
1403s at bargain prices.
Toss out pen and pencil.

104 **COMPANIES**
ICL hopes DAP will zap U.S.
New firm, big hopes.

112 **BENCHMARKS**

DEPARTMENTS

8 **LOOKING BACK**
21 **LOOK AHEAD**
26 **CALENDAR**
35 **LETTERS**
45 **EDITOR'S READOUT**
244 **PEOPLE**
250 **HARDWARE**
260 **SOFTWARE & SERVICES**
269 **SOURCE DATA**
278 **MARKETPLACE**
286 **ADVERTISERS' INDEX**
293 **READERS' FORUM**

WHAT'S THE SECRET?



These computer data entry terminals *don't have* floppy discs or a fancy CRT screen, but major banks, corporations, computer service bureaus and businesses all over the nation are selecting them *instead* of the terminals with big expensive options. And it's not just because of price.

Mail this coupon and discover the secret of Datacorder I & II.

Tell me more about Datacorder.

IESI

408 N. E. 72nd Street, Seattle, Washington 98115.
Phone 206/525-6800 or Toll Free: 800-426-7740

Name _____
 Title _____
 Company _____
 Address _____
 City _____ State _____ Zip _____
 Phone _____

CIRCLE 6 ON READER CARD

DATAMATION.

Editor John L. Kirkley
Senior Editor Tom McCusker
Articles Editor Wendy Reid Crisp
International Editor Linda F. Runyan
European Editor Ralph Emmett
Products Editor Bill Musgrave
Copy Editor Florence Lazar
Surveys Editor Louise C. Shaw
Assistant Editor Sarah Ralph
Editorial Assistants Deborah Sojka, Don Rosenthal
News Editor Becky Barna
Bureau Managers
San Francisco Edward K. Yasaki
Los Angeles Edith D. Myers
Boston Vin McLellan
Correspondents
London Fred Lamond, Malcolm Peltu
Paris Andrew Lloyd
Sydney, Australia Norman Kemp
Telecommunications Editor Ronald Frank
Editorial Advisor Robert L. Patrick
Technical Advisor Lowell Amdahl
Contributing Editors Ralph G. Berglund, Howard Bromberg, Philip H. Dorn, John M. Eger, David Hebditch, Angeline Pantages, Russell Pipe, Carl Reynolds, F. G. Withington.

EDITORIAL OFFICES

Headquarters: 666 Fifth Ave., New York, NY 10019. Phone (212) 489-2588. **New England:** 161 High St., Boston, MA 02110, (617) 482-4606. **Eastern:** 1531 Inlet Ct., Reston, VA 22090, (703) 435-3206. **Southwestern:** 11500 Stemmons North, Suite 152, Dallas, TX 75299, (214) 247-5221. **Western:** 1801 S. La Cienega Blvd., Los Angeles, CA 90035, (213) 559-5111; 2680 Bayshore Frontage Rd., Suite 401, Mountain View, CA 94043, (415) 965-8222. **International:** 6605 Burlington Pl., Springfield, VA 22152, (703) 569-3383. **Foreign:** 20 Leamington Road, Southend-on-Sea, Essex, SS1 2SN, England; phone: Southend (0702) 611648. **New York, N.Y. TELEX 640-229.**

Art Director Kenneth Surabian
Production Manager Robert Gaydos
Art/Production Coordinator Susan M. Rasco
CIRCULATION
 666 Fifth Avenue, New York, NY 10019
Circulation Manager Suzanne A. Ryan
Director of Marketing Deborah Dwelley
Publisher James M. Morris

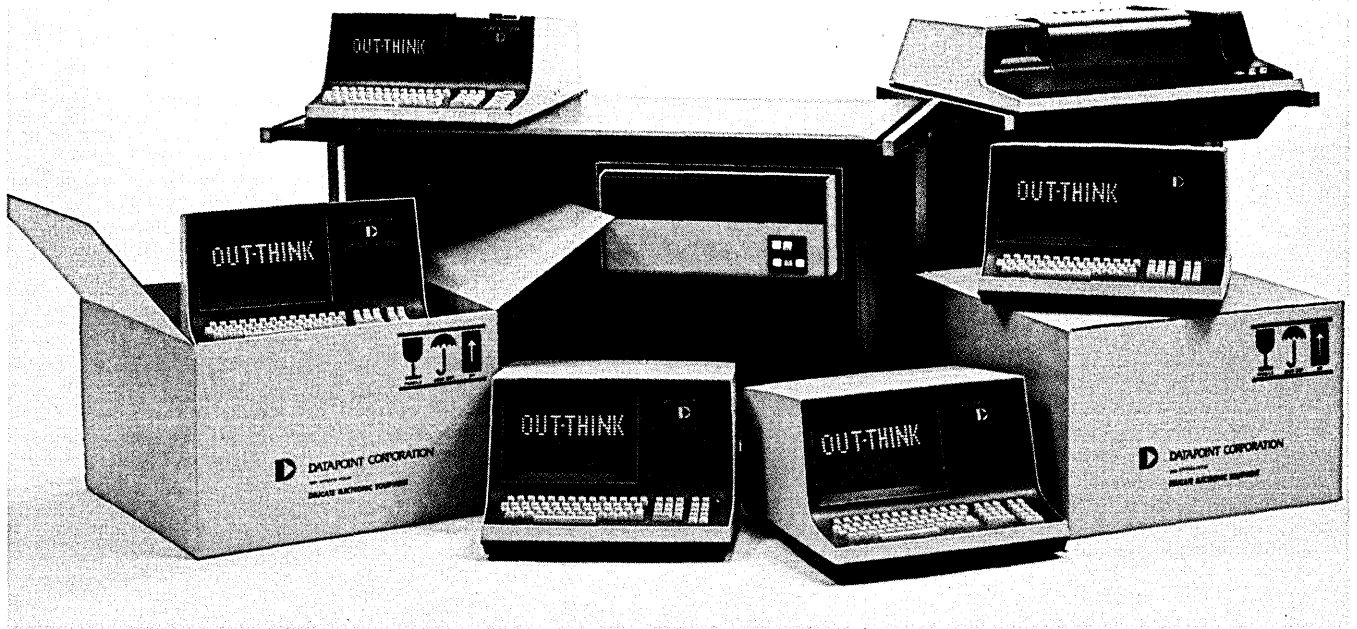
Technical Publishing

IBB a company of The Dun & Bradstreet Corporation

BPA Circulation audited by Business Publications Audit

ABP Member American Business Press, Inc.

DATAMATION (USPS 508-290) Magazine is issued monthly on or about the first day of every month, with the exception of Nov., which is semimonthly. Published by Technical Publishing, a company of the Dun and Bradstreet Corporation, 1301 South Grove Ave., Barrington, IL 60010; James B. Tafel, Chairman; John K. Abely, President. Executive, advertising, and editorial offices, 666 Fifth Ave., New York, NY 10019. Published at East Greenville, Pa. **DATAMATION** is circulated without charge by name and title to certain qualified individuals in the United States and Canada who are employed by companies involved with automatic information handling equipment. Available to others by subscription at the rate of \$36 (U.S. and Possessions), \$45 (Canadian). Reduced rate for qualified U.S. students: \$18. Foreign subscriptions: £38. Additional charge for airmail: £70. Japan, Australia and New Zealand: £42 (air-shipped). Sole agent for all subscriptions outside the U.S.A. and Canada is J. B. Tratsart, Ltd. 154 A Greenford Road, Harrow, Middlesex HA13QT, England, (01)422-8295 or 422-2456. No subscription agency is authorized by us to solicit or take orders for subscriptions. Controlled circulation postage paid at Bethlehem, PA 18016. Copyright 1980 by Technical Publishing Company, a Division of Dun-Donnelley Publishing Corporation. All rights reserved. * "Datamation" registered trademark of Technical Publishing Company. Microfilm copies of **DATAMATION** may be obtained from University Microfilms, A Xerox Company, 300 No. Zeeb Road, Ann Arbor, Michigan 48106. Printed by Brown Printing Co., Inc. **POSTMASTER:** Form 3579 to be sent to Technical Publishing Company Circulation Office: 666 Fifth Avenue, New York, NY 10019. ISSN: 0011-6963. Single copy: \$4.00 in U.S.A.



Out of the box, up and running fast.

That's reason #1 to buy Datashare, the multi-user system built for business.

Bring up interactive applications in weeks, not months, with Datashare. Here are 10 more reasons you'll benefit from choosing the transaction processing system users depend on in 15,000 installations worldwide.

2. Simple Programming. An easy-to-use language helps you put custom applications on-line quickly. Datashare's comprehensive utilities, efficient file structure, and complete documentation all combine to produce rapid results.

3. Ready-to-Run Applications. If you don't want to write your own, select from a wide variety written by Datashare users and software houses, all listed in our Applications Software Catalog—yours free for the asking.

4. Transaction Processing Power. Datashare handles big jobs easily because it was designed from the ground up specifically for interactive business applications. A choice of compatible processors lets you match system capacity exactly to the job. The compiler is fast. The language is fast. And operators are fast in getting the job done.

5. Proven Performance. Datashare's reputation for reliable performance is known worldwide. It's been helping organi-

zations do business since 1972 and has grown in capability every year.

6. Pick Your Disk, Pick Your Printer. Choose from a small diskette-based system up to a large 180 MB system. Select from 7 printers—80 CPS to 900 LPM. Share one on the system, and add others at individual displays.

7. Batch and Inquiry Communications. Datashare communicates with other Datapoint systems and with your central mainframe. You can transmit batches concurrently with operator activity during the day. Or in unattended mode at night. And since Datashare also supports 3270 inquiry to your mainframe, you can access both local files and the central database from any display.

8. Grow and Expand. As you grow, so will Datashare. With our ARC™ system architecture, you can add on displays, increase processing power, expand peripherals, and extend your database virtually without limit. And whenever you're ready, you can add word processing, electronic message service, and data and voice communications management to the same system. With Datapoint, anything goes.

9. Low-Cost Lease or Purchase. You can put Datashare to work for only \$54,550 complete or \$261 per station per month on

a 3-year lease, including maintenance. That buys a 6600 processor with 20 MB of disk storage, 8 workstations, and one 240/340 LPM printer.

10. Prompt Delivery. Lead times are now averaging 4 to 6 weeks.

11. Nationwide Service and Systems Support. Our systems engineers and service professionals grew up with this system. If there's a problem, they know how to fix it quickly. And we back them up round the clock.

Need more facts? We'll get them to you fast. Let us itemize more of Datashare's advantages to you in person. Call (512) 699-7151 for the name and number of your nearest Datapoint representative. Or write to Datapoint Corporation, Marketing Communications DM-KO5, 9725 Datapoint Drive, San Antonio, TX 78284.

D
DATAPOINT

CIRCLE 7 ON READER CARD

From the graphics leader.

"Management is greatly improved use of graphics."

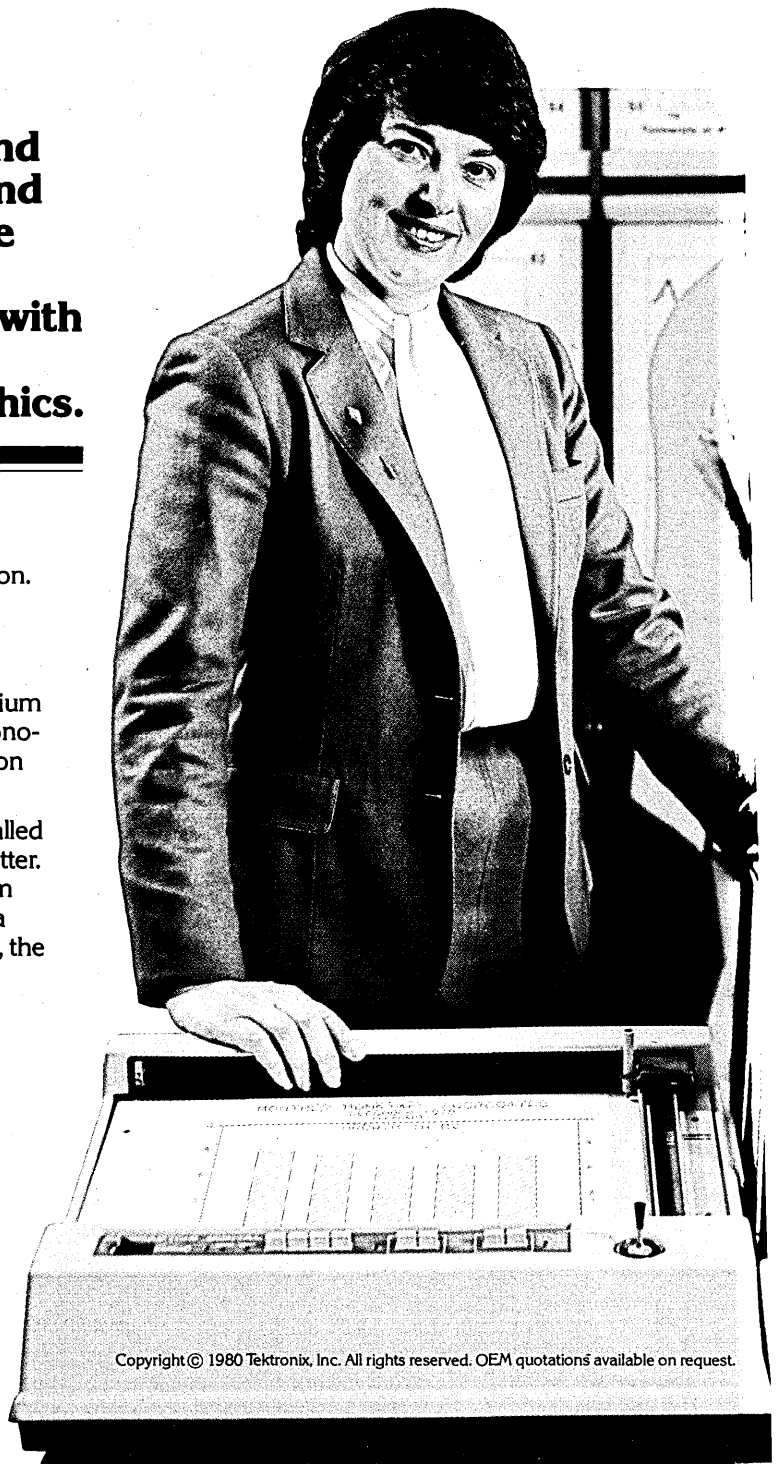
Mellon Bank has long been respected for its analyses and presentation of financial and economic conditions. Reports, once composed with ordinary columnar printouts, are now being improved with multi-color, instantly meaningful graphs ... thanks to Tektronix Graphics.

Deborah Rejniak
Assistant Economist
Mellon Bank
Pittsburgh, Pennsylvania

Business indicators such as money supply, interest rates and GNP are perfect subjects for graphic presentation. Mellon Bank is now able to visually interpret this data as well as expand its coverage of important issues.

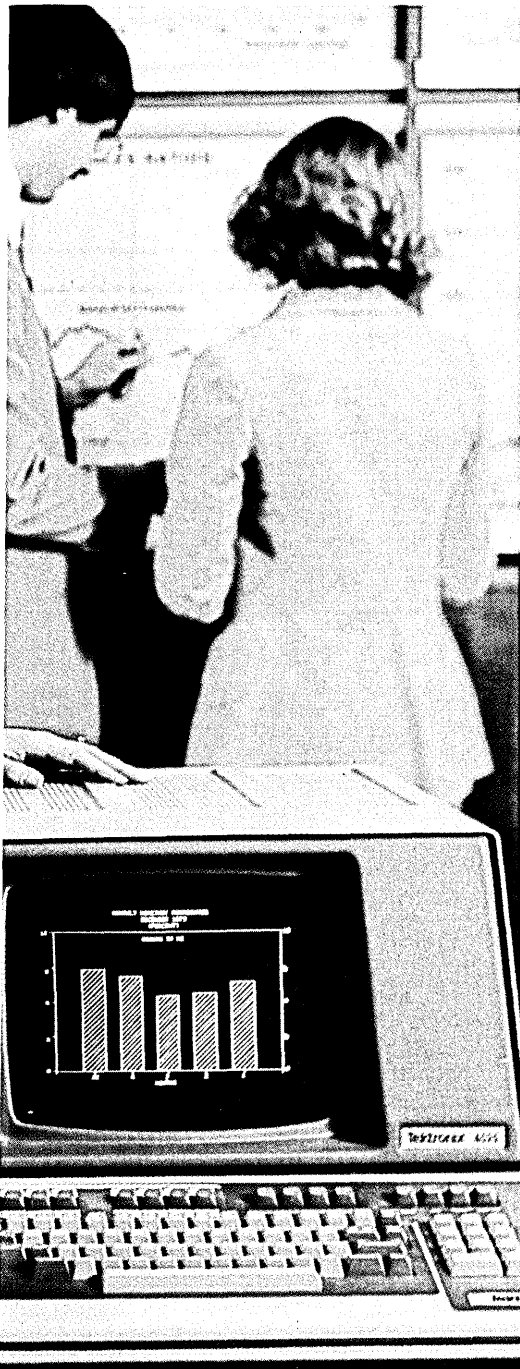
"We discovered a whole new medium of communication," says assistant economist Deborah Rejniak, "with the addition of automated graphics."

A year and a half ago, Mellon installed a Tektronix 4662 Interactive Digital Plotter. Tied to an interactive graphics program and to economic data bases through a major computer services organization, the 4662 draws precise plots of from one to eight colors, on paper or mylar, to highlight reports and information for management meetings.



Copyright © 1980 Tektronix, Inc. All rights reserved. OEM quotations available on request.

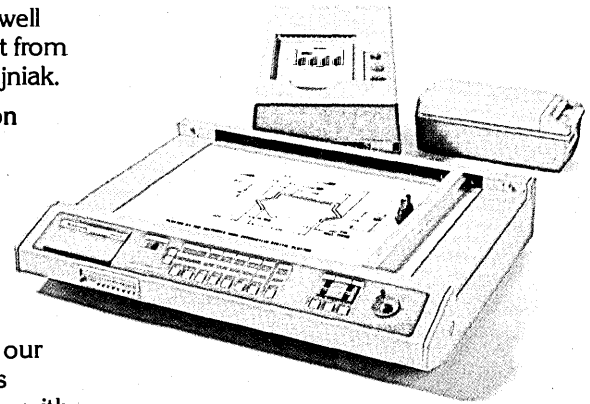
information with our expanded



"The plots are extremely well received and generate interest from all areas of the bank," says Rejniak.

As an input device, Mellon recently added the Tektronix 4025, an easy-to-use graphics and alphanumeric terminal with exceptional editing, forms ruling and buffering capabilities. "There's no question that it has increased our turnaround," says Rejniak. "It's very efficient for experimenting with variables and seeing the effects before committing a graph to the plotter."

As the world's computer graphics leader, Tektronix can assemble a complete graphics package, including easy but versatile software that's suitable for your financial analysis. No one else comes close to our broad line of graphics capabilities, including fast field service and a worldwide reputation for product reliability. For more detailed information, call your local Tektronix sales office or our automatic answering service at 1-800-547-1512 (in Oregon, 644-9051 collect).

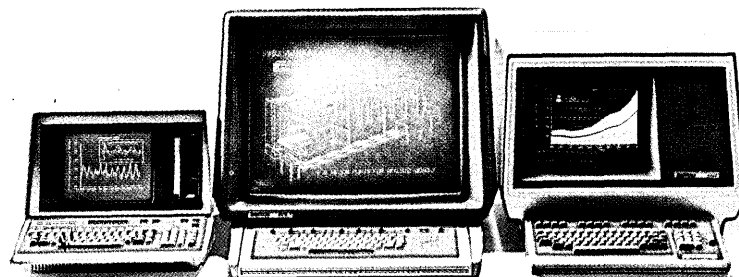


In addition to its small plotters, Tektronix also offers quiet, compact, reliable hard copy units that produce sharp, binder-size copies of on-screen graphic displays at the push of a button.

Tektronix, Inc.
Information Display Division
P.O. Box 1700
Beaverton, OR 97075
Tektronix International, Inc.
European Marketing Centre
Post Box 827
1180 AV Amstelveen
The Netherlands

Tektronix
COMMITTED TO EXCELLENCE

CIRCLE 8 ON READER CARD



promacs® lets you show everyone just how productive a programmer can be!

PROMACS will change the way you've thought software development had to be. For the better. Much better. By enhancing programmer creativity. Increasing productivity. Reducing testing costs and maintenance costs. Trimming software development time by as much as 75%. And by improving the software staff's image among management and users.

EARN YOUR BADGE IN PROGRAMMER PRODUCTIVITY



Programmer productivity and more. From PROMACS — the new free-form, high-level programming language that's similar to COBOL, but easier to use to create COBOL programs, from the simplest to the most complex. And it does it by the innovative use of powerful macros that generate a structured COBOL program which you complete and execute. Allowing you to create in a few statements what COBOL requires pages and pages of coding to accomplish.

PROMACS...from MACS, the people who've been delivering software excellence for over 10 years (in products such as DATAMACS, the world's best-selling automatic test data generator.



management and computer services, inc.
great valley corporate center valley forge, pa 19482 215-648-0730

CIRCLE 9 ON READER CARD

macs
great valley corporate center, valley forge, pa. 19482

I WANT TO BE A SOFTWARE HERO!

- Tell me more about PROMACS and the free 30-day trial offer.
- Send more information...and a SOFTWARE HERO badge.
- Would you believe I see no need for improved software productivity, but would like a SOFTWARE HERO badge.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____ CPU/Op.Sys. _____

DM580

Twenty Years Ago/Ten Years Ago

LOOKING BACK

MAY/JUNE 1960

Brian Pollard, Burroughs Corp., gave a detailed comparison of the U.S. and United Kingdom computer industries. Although the computer business was still young, several patterns were already distinguishable.

Computers were originally developed in both countries for scientific applications. Traditionally in Great Britain, however, computers were considered a sideline for engineers. Unlike the U.S. market, as of January 1959, no British insurance firms had installed computers. And while the aircraft industry was a heavy consumer here, in Great Britain installation of computers was slower in that industry and started picking up when general business activity slowed down. Commercial applications in the U.S. were creating increased interest and excitement, but were greeted with the usual United Kingdom conservatism. Due to this conservatism and the view of computers as a sideline, the amount of financial investment in manufacturing and developing computers in Britain was far less than here. British government monies were not contributed freely, and the British National Research Development Corp. lent its money at the current lending rate, assuming a profit.

There was a shortage of skilled engineers in Britain, and proportionally, a smaller number of college graduates than in the U.S. Because of these smaller numbers, highly trained engineers in England were used sparingly in developing computer systems. In summarizing, Pollard stated, "The monthly output of the smallest of the American Big Three manufacturers is probably greater than the yearly output of the largest British manufacturer."

ICL was formed in 1968 in an attempt to consolidate the British mainframe industry, and it ranks today as the seventh

largest worldwide mainframe manufacturer. Through the '70s Britain had a number of the finest computer people in the world—most of whom left the U.K. due to the shortage of funding. While the U.S. benefited from this brain-drain, the U.K.'s dp industry suffered tremendously. Most of its remaining computer people moved to universities to work on "one of a kind" machines. A prime example of Britain's recent advances in computer technology can be seen in the British Post Office's Prestel viewdata system. The viewdata idea is a simple one, consisting of connecting modified television sets via telephone to computer data bases. Prestel is presently available on the U.K. public market, and international demonstrations are in the works.

MAY 1970

In March, the FCC announced it was accepting applications for domestic satellite system operation plans. A few days after that release, Datran and MCI disclosed they were "seriously considering" such plans in the near future. One option open for Datran was using "a satellite system offering a full complement of voice, data, and video services," which would place Datran in direct competition with AT&T. This prompted some questions by the commission concerning AT&T and its competitors. One such question was "whether AT&T's expansion into the satellite field, at this initial stage, might pose a substantial constraining factor for such potential entrants (Datran, MCI, etc.)." Both the FCC and the White House Report on Domestic Satellites expressed this uncertainty where AT&T was involved. Since it was the dominant domestic carrier, others could not begin to approach the problems and possibilities of domestic satellite applications from an equal competitive position.

—Deborah Sojka

NEC Trimliners. A generation ahead.

300-600 LPM band printers that set new standards.

At NEC, we've been working on band printer technology for more than seven years. While others were contemplating the possibilities of this practical, low-cost method, NEC was constructing its first units, getting the bugs out, improving the designs. Bringing state-of-the-art electronics to band printer controls. Adding serviceability. Reliability. Durability.

Today, NEC offers two band printers with speeds of 300 and 600 lines per minute. Available now, they are also reliable—now. They incorporate a technology which is now. The band technology. Low-cost, very reliable, extremely flexible.

A new enhanced-print feature allows the user to change speeds under either software or hardware controls to pro-

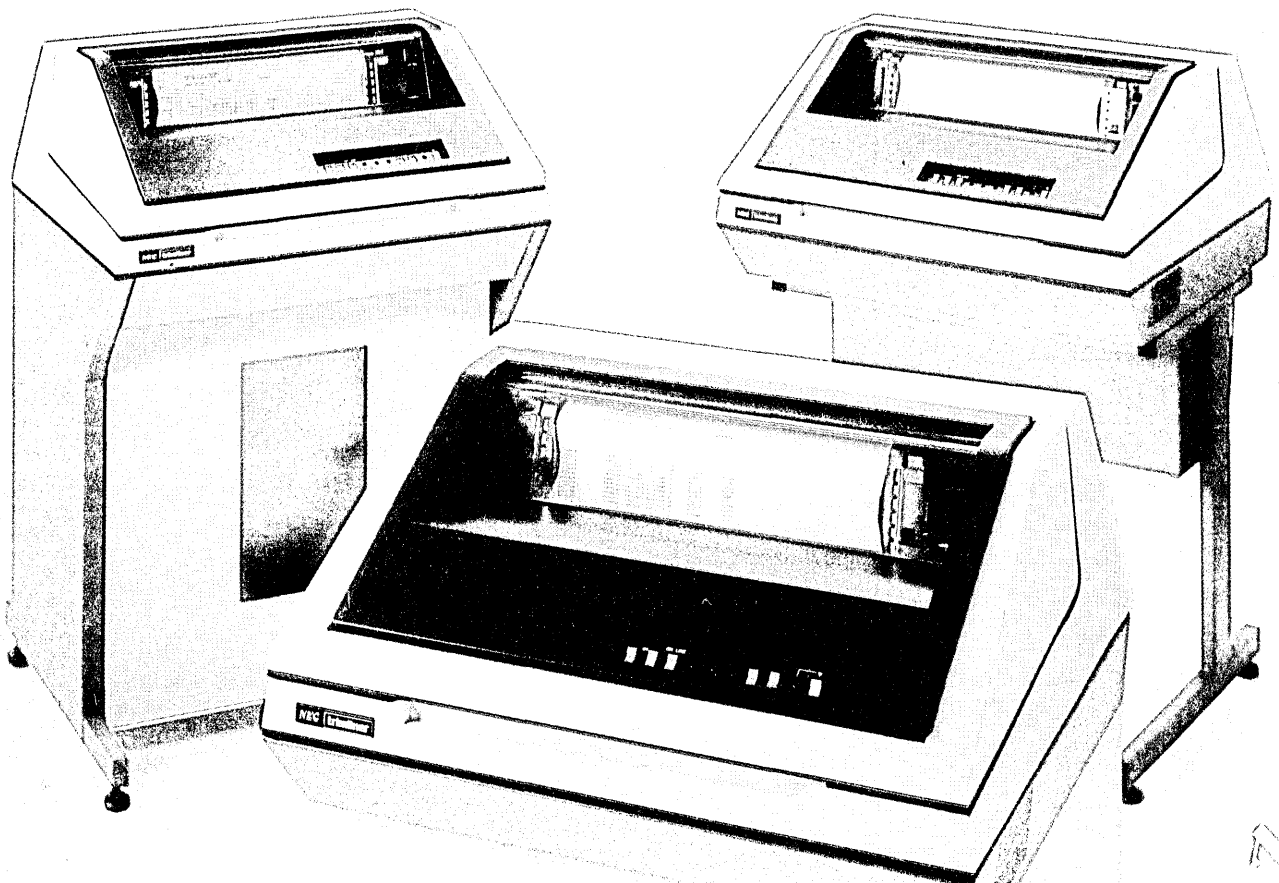
duce higher quality printed output. The feature reduces the 300 LPM speed to 170 LPM, and the 600 LPM rate to 350 LPM.

NEC's Trimliner printers have *never* experienced any band breakage. They have uptimes 50% higher than the competition. Trimliners average less than 30 minutes to repair. They're quiet, modular, ultra-cool and available in desktop, pedestal-mounted or two models of quiet cabinetry.

The technology of the 80s in a printer for the 80s from NEC—a company that was preparing for this decade and its band printing needs while others were just thinking about it.

NEC's Trimliner band printers. A generation ahead.

***NEC. Going after
the perfect printer.***



CIRCLE 10 ON READER CARD

NEC Information Systems, Inc.

Head Office: 5 Militia Drive, Lexington, MA 02173, (617) 862-3120
Eastern Office: 36 Washington Street, Wellesley, MA 02181, (617) 431-1140
Central Office: 3400 South Dixie Drive, Dayton, OH 45439, (513) 294-6254
West Coast Office: 8939 S. Sepulveda Blvd., Los Angeles, CA 90045 (213) 670-7346
Southern Office: 2945 Flowers Road South, Atlanta, GA 30341, (404) 458-7014



A Lasting Relationship.

Intel and Information Resource Management, your family of solutions.

A lasting relationship is exactly what you'll find in Intel's new family of Information Resource Management products. Combining the very best of proven products with Intel's newest innovations in both hardware and software, it's a family which brings an integrated data dictionary, powerful data base management, coordinated data communications, distributed data base facilities, and incredibly efficient data base hardware.

Integrated Data Dictionary: IDD.

Heading up the family is Intel's Integrated Data Dictionary, IDD. An indispensable tool for effective data administration, IDD helps you streamline and control your environment.

IDD is an applications design aid, a documentation vehicle, a way to enforce standards and procedures, a master reference for determining the impact of changes to your data.

Data Base Management: SYSTEM 2000®/80.

Blending the finest enhancements from previous releases with a multitude of advanced facilities, SYSTEM 2000®/80 DBMS is a family member which you, your designers, programmers, data administrators, and end users will all appreciate. Each feature is designed to increase productivity and make your environment as flexible as possible.

Multiple languages. For designers and programmers, there's PLEX, Intel's Programming Language Extension to COBOL, PL/1, FORTRAN and Assembler. And for end users Intel provides QUEST, an easy-to-use (but powerful) English-like language.

Multiple data structures. SYSTEM 2000/80 DBMS indexing and direct access keys provide fast access to relational, hierarchical, and network data structures.

Multiple operating systems and mainframes. SYSTEM 2000/80 DBMS runs on IBM, CDC, Univac, and IBM-compatible mainframes. And Intel was first with a DBMS for IBM's new 4300 series.

Data Communications: DC.

Supporting your need for high volume, on-line production processing are Intel's communications extensions to the leading TP monitors, including CICS.

Distributed Data Base: DDB.

Intel's newest addition is Multiple Systems Coupling, MSC. Providing communications between two or more IBM processors, including the new 4300 series, our MSC software lets you execute applications and transactions in one CPU while accessing data managed by SYSTEM 2000/80 DBMS in another.

Data Base Hardware: DBH.

Bringing synergism between hardware and software technologies into our Information Resource Management product family is the FAST-3805 Data Base Assist Processor. With the FAST-3805 Data Base Assist Processor, SYSTEM 2000/80 DBMS transaction throughput capacity can be improved by as much as 100 percent and with a 50 percent or better reduction in response time.

The Family and You.

Our relationship with you brings unsurpassed customer support and service. Live classroom training. Video-assisted, multimedia education. Easy-to-understand documentation. And hot-line support, to name a few.

Clip this coupon or call 512/258-5171 for an introduction to our family.

intel delivers solutions.

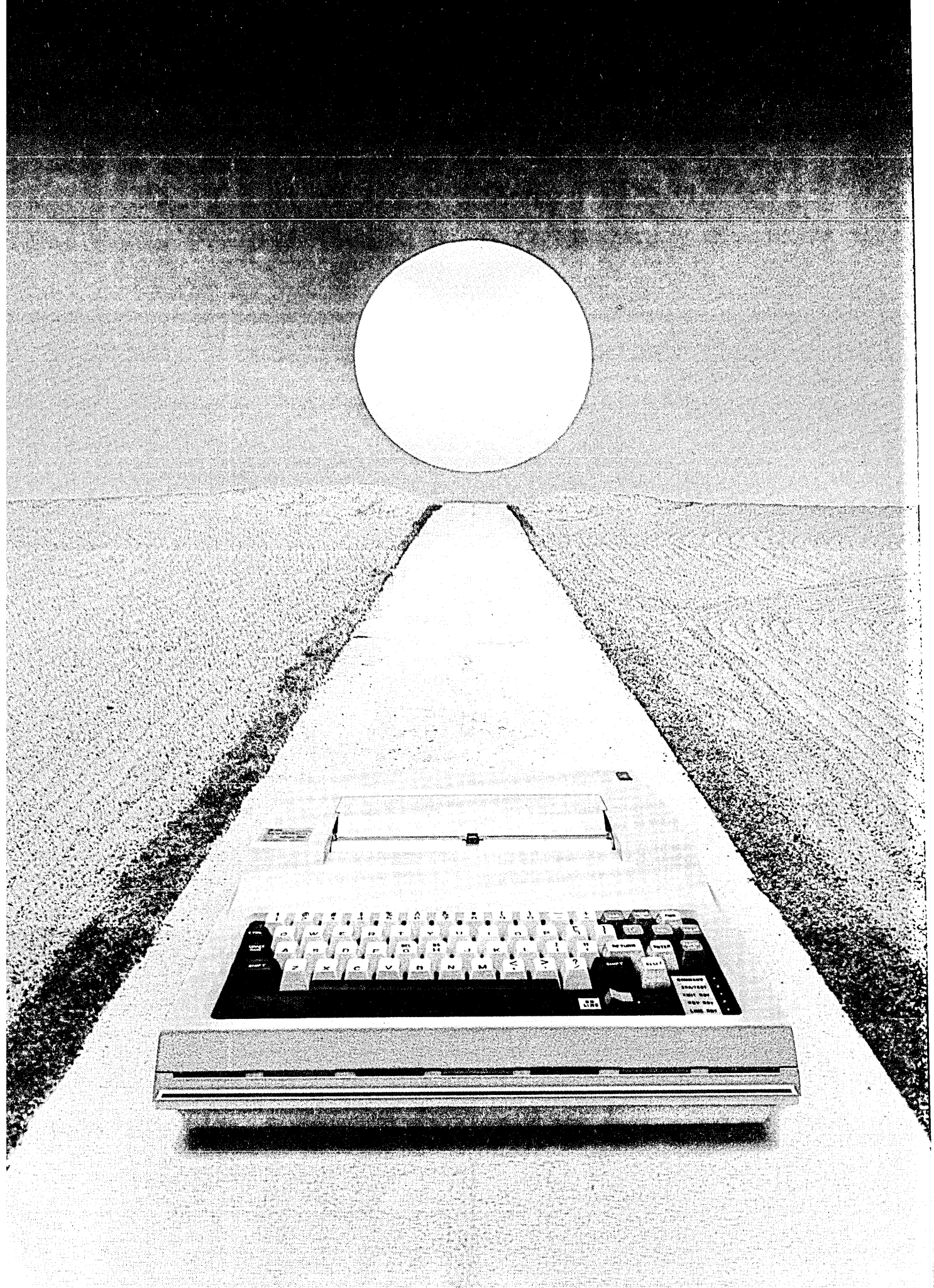
Europe: Intel Semiconductor (Nederland) B.V., Commercial Systems Division, Oranjestraat 1, 3441 Ax Woerden, The Netherlands, 31/3480-11264, Telex 47970 CSD NL.

Please introduce me to Intel's new family of Information Resource Management products.

Name _____
Company _____
Mailing address _____
_____ State _____ Zip _____

Return to Intel Commercial Systems Division,
P.O. Box 9968, Austin, Texas 78766

CIRCLE 11 ON READER CARD



The Sign of the 80's.

Greater yield has arrived with TI's new *Silent 700** 780 Series Electronic Data Terminal Family.

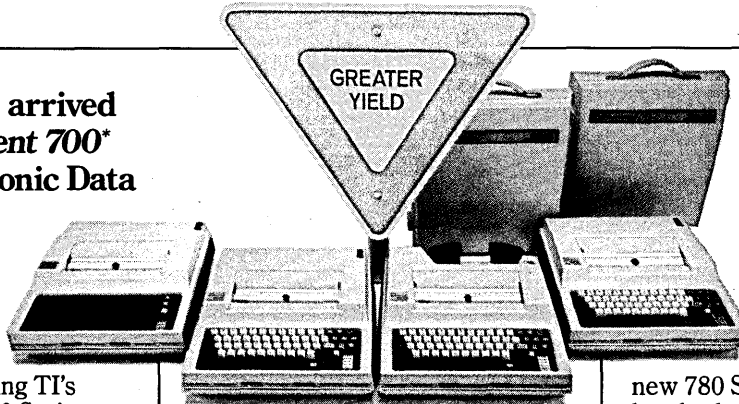
Clear the road for the most innovative thermal printing data terminals available on the market today. Introducing TI's new state-of-the-art 780 Series of 120 characters-per-second data terminals.

Every model in the four-member family features TI's innovative dual-matrix thermal print-head providing virtually silent 120-cps optimized bi-directional printing, that cuts down on print cycle time and yields four times the printing speed of conventional thermal printing data terminals.

Industries with high output printing demands will find the Model 781 Receive-Only Printer a reliable business partner. The 781 RO features an operator control keypad for referencing the terminal's operating status, a 1000-character receive buffer and 110 to 9600 bits-per-second communications speed.

Commercial applications can get top-quality performance from the desktop Model 783 Keyboard Send-Receive Data Terminal with features like a full ASCII keyboard, self-test diagnostics and programmable answerback memory.

The lightweight 17-pound Model 785 Portable Data Terminal



is an ideal traveling companion for remote data access and entry applications. With a built-in 1200-bps acoustic coupler, the 785 can transmit and receive data from anywhere using a standard telephone and electrical outlet.

The Model 787 Portable Communications Data Terminal is designed to improve your communications capabilities. The 787's 1200-bps direct-connect internal modem allows users to plug directly into a standard data jack. With its memory dialing feature, the 787 can dial a stored number and provide audible feedback of the phone line's status. The 787 can also disconnect the phone line with a simple hang-up command, so you can optimize on-line communications and minimize communications costs.

Available user-oriented 780 Series options like international keyboards and protected answerback memory add even more versatility to your business communications.

TI is dedicated to producing quality, innovative products like our

new 780 Series Family. And TI's hundreds of thousands of data terminals shipped worldwide are backed by the technology and reliability that comes from over 30 years of experience in the electronics industry.

Supporting TI's data terminals is the technical expertise of our worldwide organization of factory-trained sales and service representatives, and TI-CARE†, our nationwide automated service dispatching and field service management information system. That's why TI was appointed the official computer and calculator company of the 1980 Olympic Winter Games.

The 80's can be yours today. For more information on the 780 Series Family, contact the TI sales office nearest you, or write Texas Instruments Incorporated, P.O. Box 1444, M/S 7784, Houston, Texas 77001, or phone (713) 937-2016.



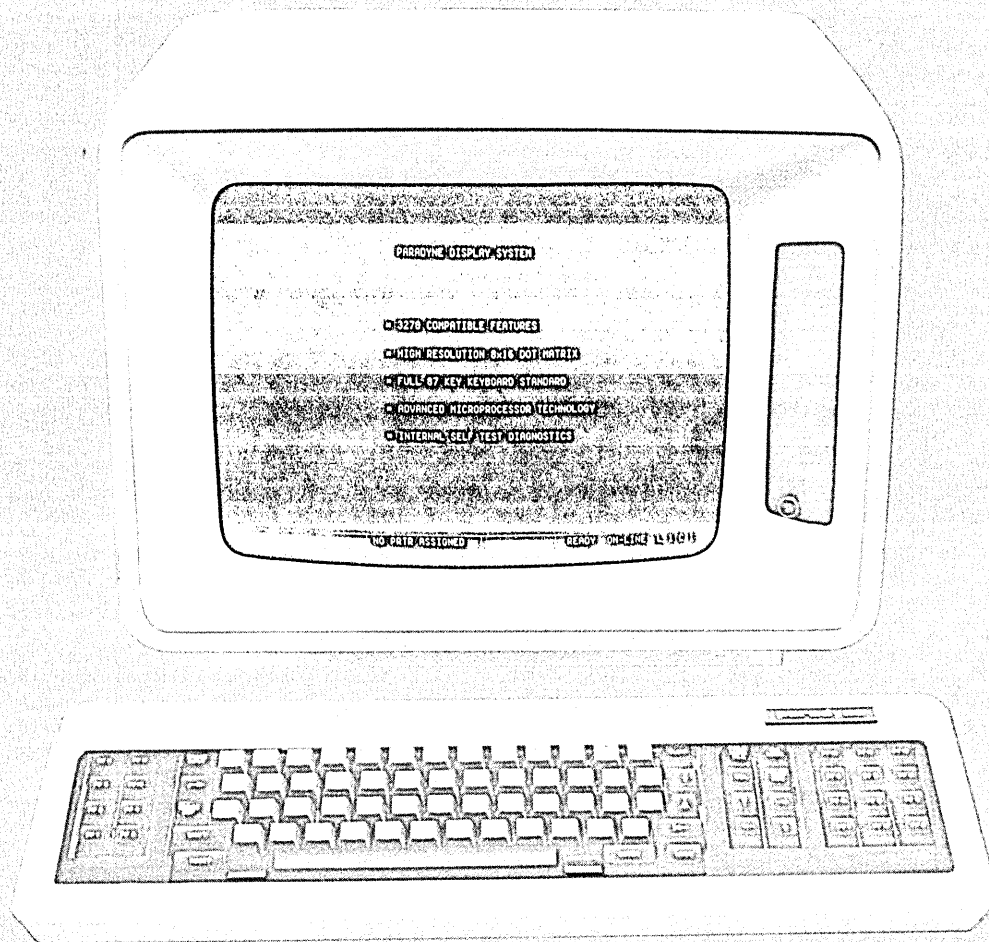
*Trademark of Texas Instruments †Service Mark of Texas Instruments Copyright ©1980, Texas Instruments Incorporated

TEXAS INSTRUMENTS

We put computing within everyone's reach.

CIRCLE 12 ON READER CARD

The PDS 270



Announcing Our Latest Addition to Coordinated Network Architecture

Simple solutions to complex problems. The PDS 270 Paradyne Display System has joined our PIXNET/PIXNET and RESPONSE family of products.

The PDS 270 is a microprocessor based system utilizing high speed "loop" technology - the most advanced technology available today for interconnecting data terminals. The PDS 270 is designed with diagnostic capability (creep or maintenance). In addition to the features listed above on the PDS 270 screen, an integral response time monitor is provided. The PDS 270 represents a significant step in the continued growth and evolution of the Paradyne product line.

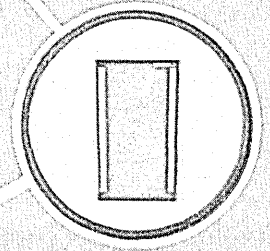
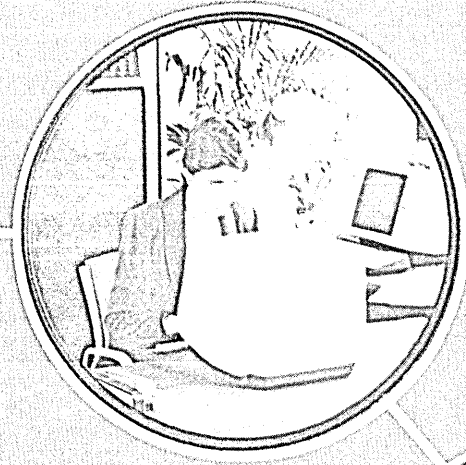
PIXNET is the most innovative approach to data communication networking. PIXNET expands data communications networks in a modular fashion. All devices within the network appear to the host processor as locally attached, resulting in reduced processor over-

head and increased efficiency. Installation of the network is simplified. Host polling, error detection and correction is eliminated, and throughput and response time are significantly improved.

PIXNET'S SDLC communications protocol between control units improves data transmission efficiency. PIXNET'S unique data compression routines result in higher performance throughout the network. Intelligence in our PIXNET Control Units is responsible for all network traffic, providing the terminal operator turn-of-the-file application access, multiple CPU access, alternate routing and line concentration, all independent of the host processor.

PIXNET'S Remote Control Unit (RCU) provides the communications interface between Paradyne or IBM peripherals located at sites thousands of miles away from the host processor. Devices supported include Paradyne card readers, line printers, magnetic tapes, diskettes, CRT keyboards, character printers systems

from Paradyne



consoles and RESPONSE. All these devices appear to the host processor as locally attached IBM devices.

RESPONSE is Paradyne's distributed processing system designed to satisfy the requirement to process information at the remote site. It uses the PIXNET communications systems to provide interactive and bulk file transfers with the host processor.

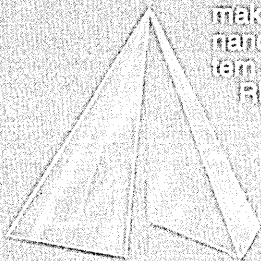
Therefore, complex IBM teleprocessing software is eliminated, making installation and maintenance of the communications system simple.

RESPONSE utilizes a powerful

IBM 370 type architecture which includes ANSI 74 COBOL and an operating system with transaction processing capabilities which are all familiar to the IBM user. Access to the system can be obtained from any location, therefore support groups are not required at remote sites. All this makes the transition to distributed processing practical.

If you'd like to learn more about how Paradyne will offer solutions to your networking problems, call or write:

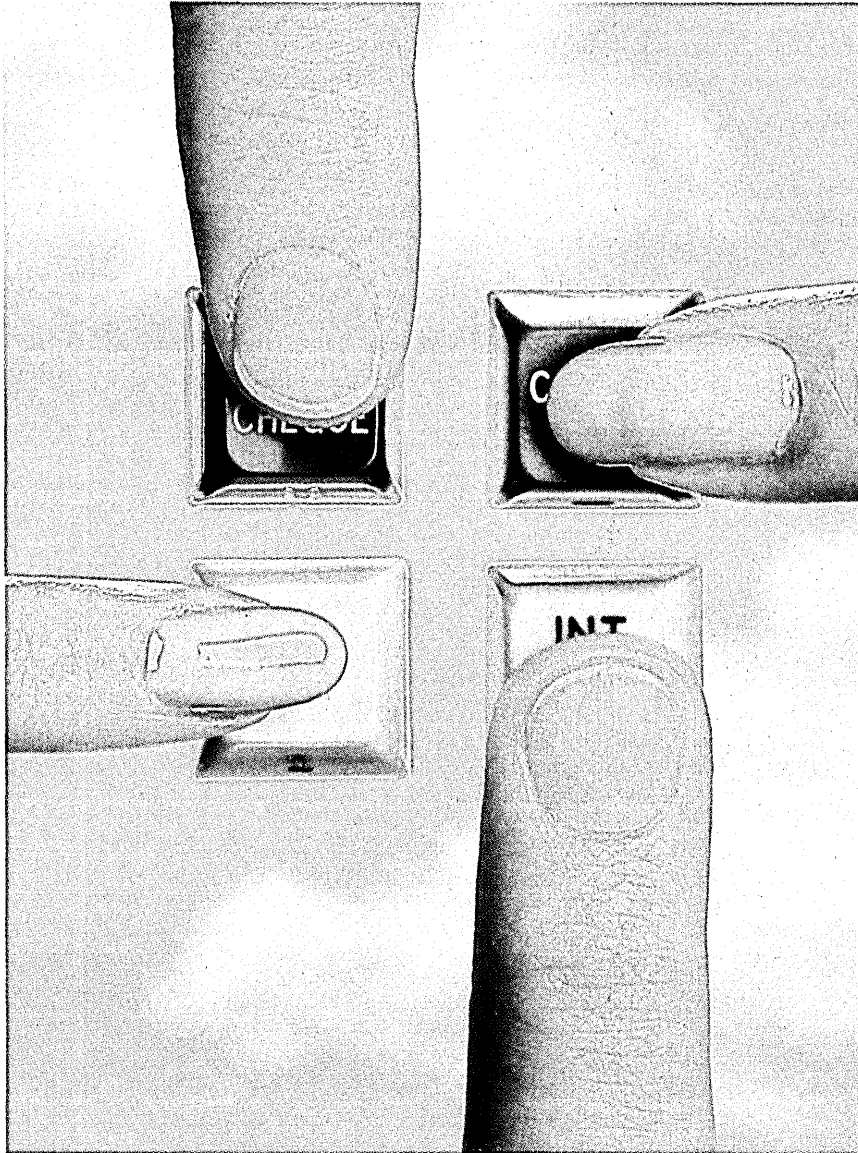
Paradyne, Box 1377, Largo, FL 33541 813-536-7771
Paradyne Canada Ltd. 416-490-0433



paradyne

CIRCLE 13 ON READER CARD

DISTRIBUTED POWER.



Honeywell's new DPS 8/20 puts more remote processing power at users' fingertips.

The whole point of a distributed processing system is to have the right data in the right place at the right time. Right?

Well, that's what the Honeywell DPS 8/20 is all about. The smallest of the DPS 8 family of large-scale distributed processing systems, it's a cost-effective way to bring big processing power to more and more locations. It's another option between the large central computer and the minicomputer in

a network. And it's another plus for Honeywell.

With its powerful GCOS operating system, it's a free-standing processor that can be used as a remote host to a series of Level 6 systems. Or use it to provide peak-load back up to a larger DPS 8 or Level 66 mainframe computer.

It's compact, energy efficient, versatile, compatible, and available now.

You'll give it extra points for software flexibility. You can take advantage of the new GCOS 8 operating system, Data Management-IV (DM-IV) Transaction Processor, COBOL-74, and Integrated Data Store/II (I-D-S/II) Data Manager.

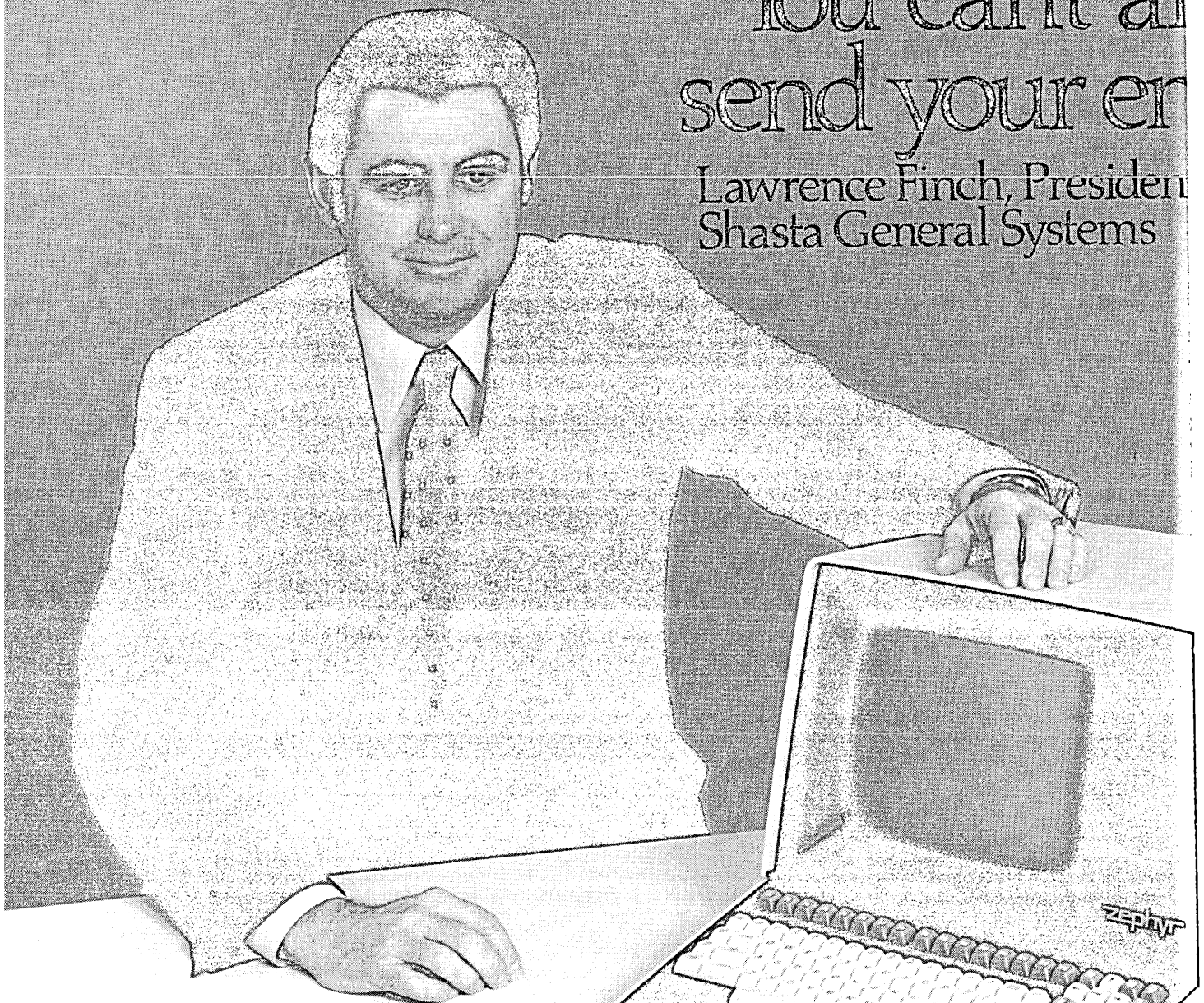
For more information, write Honeywell, 200 Smith Street (MS 487), Waltham, Massachusetts 02154.

Or better yet, see the DPS 8/20 making its debut at NCC. Check out its data base and transaction processing capabilities. Hands on.

Honeywell

"You can't afford
to send your employees

Lawrence Finch, President
Shasta General Systems

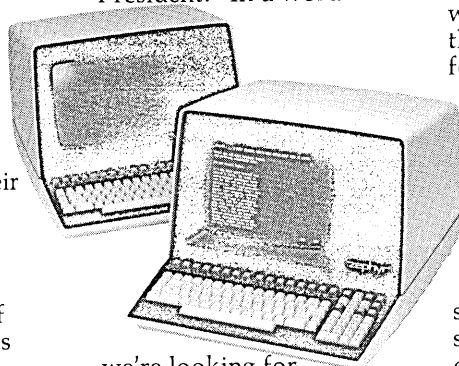


When you're selling over 75 small business systems a month like Shasta General Systems, you've got to have terminals that are as reliable, if not more reliable, than the system itself.

That's why Shasta chose to integrate Zentec CRT's into their Diablo 3200 small business and word processing systems.

As the largest independent distributor of small business systems in the United States, Shasta is a real stickler for quality. "We're incorporating Zentec Zephyrs

and ZMS-40s into our system for one main reason," commented Lawrence Finch, Shasta President. "In a word . . .



we're looking for quality. The CRT is the direct interface with our customers. In their eyes,

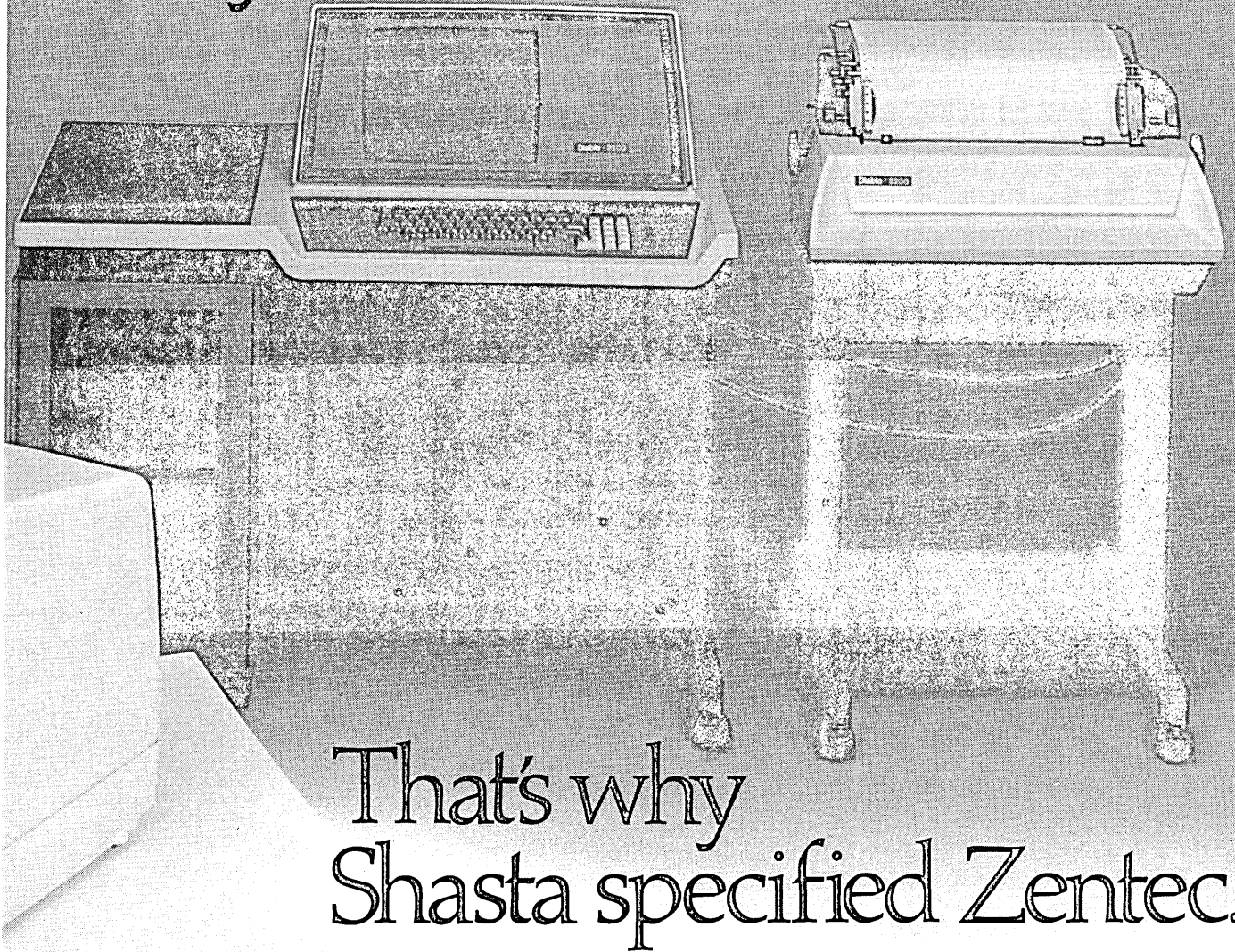
if the terminal fails, we fail. And at \$20K plus per system, we really can't afford that. We chose Zentec for that extra measure of reliability."

Getting the most from your host.

Shasta is now integrating Zentec's new Zephyrs and ZMS-40s into their Diablo 3200 small business system to satisfy a wide range of data processing and word processing applications. The system, expandable up

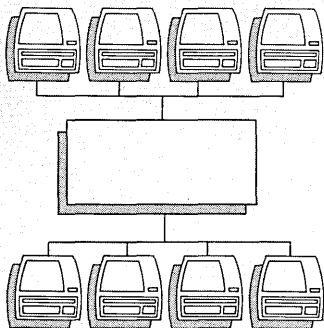
to 8 CRT's, utilizes the Zentec Zephyr to perform all data entry and data processing functions. Capitalizing on the Zephyr's intelligent features such as full cursor addressability, full editing and protected forms modes, the Diablo 3200 system offers users improved system throughput. The ZMS-40s, incorporating custom keyboards and firmware are designed

ford to have a defective tube tire system down the tubes."



That's why Shasta specified Zentec.

to Shasta's
specifications,



handling all word pro-
cessing functions. Word
processing programs can
now be downloaded to
the terminal from the

CPU and executed in
firmware, relieving the
CPU of valuable pro-
cessing time. Together,
they make powerful
additions to an already
powerful system.

Like Shasta, more and
more people are turning
to Zentec for intelligent
solutions to their data
and word processing
problems.

Why?

Simply this. Every
Zentec terminal is
designed, manufactured
and stress-tested to give
you the best MTBF rate
in the business. The
Zephyr's a perfect exam-
ple. It's the first low-cost

smart terminal designed
around Zentec's proven
intelligent terminal
technology. Incorporat-
ing custom LSI circuitry,
the Zephyr offers you a
powerful, full function
terminal at a very com-
petitive price. Equally
important, Zephyr qual-
ity offers you less dead-
on-arrivals. Fewer pre-
mature failures. And
more reliability . . . from
power-up to payout.

**Don't let a defective
CRT come between you
and your CPU.**

You really can't afford
to become a victim of
terminal trauma. Take a

close look at the new
Zentec Zephyr. Or any
one of the growing ZMS
Family of intelligent
terminals. Like Shasta,
they could be the most
intelligent solutions to
your data or word pro-
cessing problems. For
more information, just
write: Zentec Corpora-
tion, 2400 Walsh Avenue,
Santa Clara, CA 95050.
Or call (408) 727-7662.

. . . the last word in
intelligent terminals

INTRODUCING VARIABLE RESOURCE ARCHITECTURE

Announcing the IBM 3600 32-Bit Multiprocessor System with Variable Resource Architecture (VRA). Based on major advances in hardware and software technology, VRA permits multiple level performance of applications programs.

The unprecedented flexibility of VRA is a function of a pool of variable resources controlled by a single self-regulating operating system.

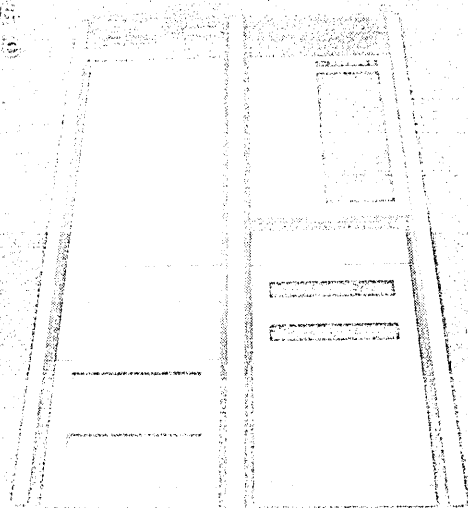
The interesting property of a IBM 3600 is its workload can be varied directly by incrementally adding or deleting hardware modules. Differences in configuration are handled by user software.

Key features of the IBM 3600 are:

- From 1 to 8 full-scale 32-Bit CPUs, controlled and coordinated by one operating system.
- From 256KB to 2 megabytes of main memory.
- From 1 to 230 interactive users, plus batch.
- Full-scale architecture, remote operations.
- Multi-user privacy, security and data protection.
- ANS COBOL 74, ANS FORTRAN 77, PASCAL, Extended BASIC.

The IBM 3600 is an entirely new system. It's the result of four years of intensive development. And it's backed by proven experience with the IBM 3600/4600/5600 series, representing over 2500 installations in the United States, Canada and Europe.

For more information, just contact the IBM office nearest you. Better yet, see us at NOC, Booth 2346.



LOOK AHEAD

ANOTHER
NEW PCM?

When Nixdorf Computer schedules a press conference in Boston and invites the European press to attend -- at the company's expense, you can bet there's something big in the works. Our sources tell us that at the mid-May meeting Nixdorf will announce its entry into the IBM plug-compatible market -- and not alone either, but in conjunction with a major software house.

HEAR AMDAHL
HAS DBMS

Amdahl is whispered to have a data base management system, an independent OS, available for first quarter '81 announcement.

NEW TIGER IN
EXXON'S TANK?

Are portions of the Memorex empire up for sale? That's what Wall Street sources are asking about the communications operations. Among those reported as potential buyers were Exxon Enterprises and Northern Telecom. Exxon is known to have an interest in a communications company that could link its varied office automation segments into compatible systems. The interest in Memorex reportedly would allow Exxon to use the 1270 and 1380 front-ends as controllers that could handle the now-incompatible word processors, electronic typewriters, fax devices, and other products in the arsenal of the Exxon tiger. Despite these reports, a Memorex spokesman denied there's anything in the wind, issuing a flat "no" when asked about the talks of a potential sale.

IBM TO REENTER
SERVICES BIZ

We hear IBM is scheduled to return to the service bureau business this summer, offering remote processing to first-time users from the System/38s now being checked out at IBM's Business Computer Centers. The BCC shop will become increasingly commercial, conventionally retail. On the shelves, third quarter, may be IBM's upgrade replacement for the 5120, apparently more of an interim product than many believed. Sources say IBM has already stockpiled two upgrades: a Japanese-manufactured 5105, offering utilities in BASIC, reportedly priced around \$4,500; and a multiterminal version, the 5130, handling four terminals, multitask programming, with hard disk and matrix printer -- and priced somewhere between \$20,000 and \$40,000.

JUSTICE COAXES
GENE AMDAHL

The Justice Department is trying to convince an unwilling Gene Amdahl to be a rebuttal witness in the IBM trust trial, testifying about executive skeletons in IBM's corporate closets.

LOOK AHEAD

DUAL AT DEC

DEC's efforts to develop a dual 11/70 to challenge Tandem has been shelved because of technical problems. DEC now counts on a dual VAX system to protective its lucrative Bell market. Word has it that DEC's holding two low-end VAX systems ready to counter Data General's new 32-bit "Eagle."

BIG PUSH IN FIBER OPTICS

Fiber optics haven't been used much in production line computer systems, but the recent joint announcement by Honeywell, Dupont and ITT makes that an imminent probability. The three big companies have pooled resources to allow them each to independently offer a new low-cost fiber optic data link, optimized for local system connection. A typical two-meter strand will sell for \$50, assembled and terminated to specs, carrying data rates of up to 30 megabits per second, with a hybrid 9-channel connector that accepts either fiber or wire.

THE LONE RANGER

Gideon Gartner of the Gartner Group is a lonely voice still predicting a second quarter announcement of the H Series from IBM -- the H/4, a packaged MP version of the H uniprocessor.

C.A.T. HAS NINE LIVES

A desktop computer for very small businesses that also teaches accounting procedures in a step-by-step fashion is about to be announced by Cado Systems Corp. of Torrance, Calif. Called the Cado C.A.T. (for computer-aided tutor), the animal is aimed at the four million U.S. small businesses and professions with sales of under \$2 million. The C.A.T. combines instructions on the computer crt with instructions in a printed handbook to provide self-pacing learning to newcomers to computers, with quizzes as they go. The system, which also can be used as a multitasking word processor, is priced at \$13,990 with a 150 cps matrix printer and nine bundled software packages, including a report writer called Just Ask II. To market the system, Cado hopes to line up about 1,000 dealers who would be supported by the company's 110 distributors.

WATCH FOR BOOM IN BACK-UP

If the feature new product technology at NCC last year was the 8-inch Winchester disk drive, its counterpart at this year's show could be back-up devices for fixed disks. At least 14 of them are expected to be announced at the NCC, or just before it, says Raymond C. Freeman, Jr. His new study of back-up devices lists specs on 22 quarter-inch tape drives for this application, 14 of them yet to be announced. And 10 of the latter
(continued on page 61)



Think what your programmers could do if your users did their own reports.

Answer/DB, the latest Implementation System from Informatics, is the new on-line software tool for report generation. It lets non-DP people develop their own report requests at a terminal — in an English like language — with as few as four simple statements.

That means much faster report turnaround, wider smiles from non-DP people in your organization, and greatly increased programmer productivity.

Answer/DB has made old-fashioned batch reporting systems obsolete because it's designed to handle the problems you'll be facing in the data base and data communications world. Answer/DB operates with your standard OS/DOS files and IMS data bases. And it offers completely interactive, on-line query entry with syntax checking and editing capabilities for creating error-free report requests.

For more information on Answer/DB and other information retrieval systems, just complete the coupon. Or, call us at (213) 887-9121.

Informatics Inc., 21050 Vanowen Street, Canoga Park, CA 91304
 Tim Corey, Product Manager
 (213) 887-9121 Telex: 69-8473

- Send me complete details on Answer/DB.
- Send me complete details on:
 - Other Informatics report writers
 - Inquiry systems
 - Have a salesman call me.

informatics inc 

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone (____) _____

Computer _____ Operating System: DOS/VS OS/VS

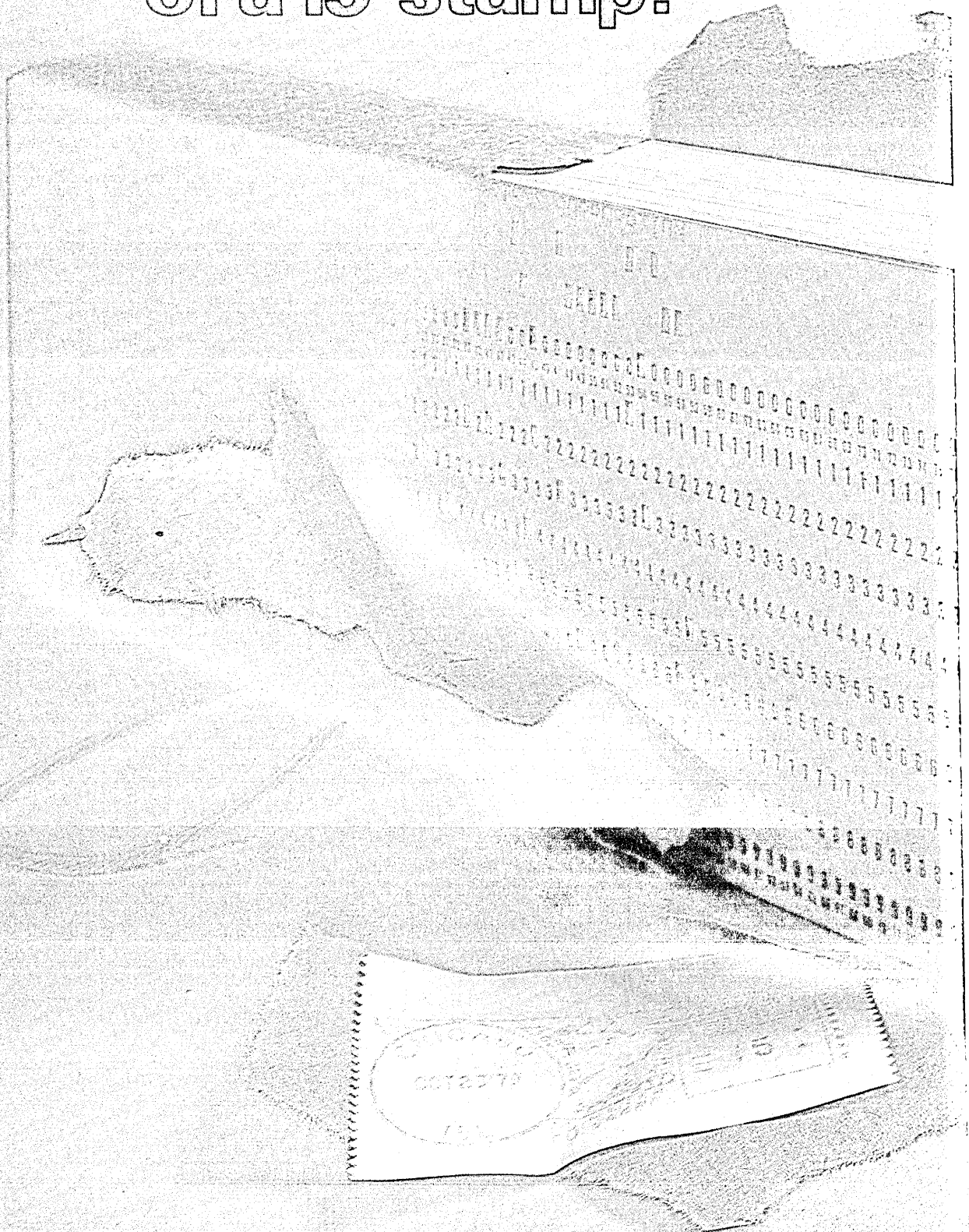
TP Monitor: IMS/DC CICS/VS TSO AD-D-5180

Introducing Answer/DB™ by Informatics®

CIRCLE 17 ON READER CARD

The Information Management Company.

Is your \$15,000
data entry system
working at the speed
of a 15¢ stamp?



If you don't have a quick, efficient way to communicate with your mainframe, it's tough to get your money's worth from a high-speed volume Data Entry system.

Our KEYBATCH® data entry systems have concurrent communications built in.

Without concurrent communications, you'd have to stop every operator every time you interact with the mainframe. Every time you send. Every time you re-send. Every time you receive. If you interrupt 15 operators for just half an hour each day, that's like wasting one operator's total production.

With concurrent communications, our systems can handle sending, receiving, report processing—even programming—without slowing or stopping data entry operators for a moment.

With concurrent communications, you can even distribute part of your workload during peak hours—to remote locations or outside services. And keep your full-time work force as small as your full-time needs.

Need systems for source data entry?

Northern Telecom combines distributed data entry with remote file management in one economical

system. So you have on-the-spot control of input data, plus quick access to frequently used information.

It's easy to add capacity.

Our data entry systems are modular. So the hardware that fits your needs now, won't limit you later. We're cost-effective with just one data station. Or eight. Or sixteen.

We can meet all your remote processing needs. So we can often meet them for less.

Right now, Northern Telecom can deliver systems for Remote Job Entry, DDP and On-Line, as well as Data Entry. So we could cut your hardware costs.

And we're sure to save you headaches. Because, when you work with Northern Telecom, one phone call brings you factory-trained service for every part of your remote processing operation.

But the best reason to talk to us today, is tomorrow.

Northern Telecom is combining data processing expertise with telecommunications expertise—in a mix no other company can match.

Today, it means better access to all the processing power you're paying for. Tomorrow, it means a smoother transition to the single system that will meet all your processing and telecommunications needs.

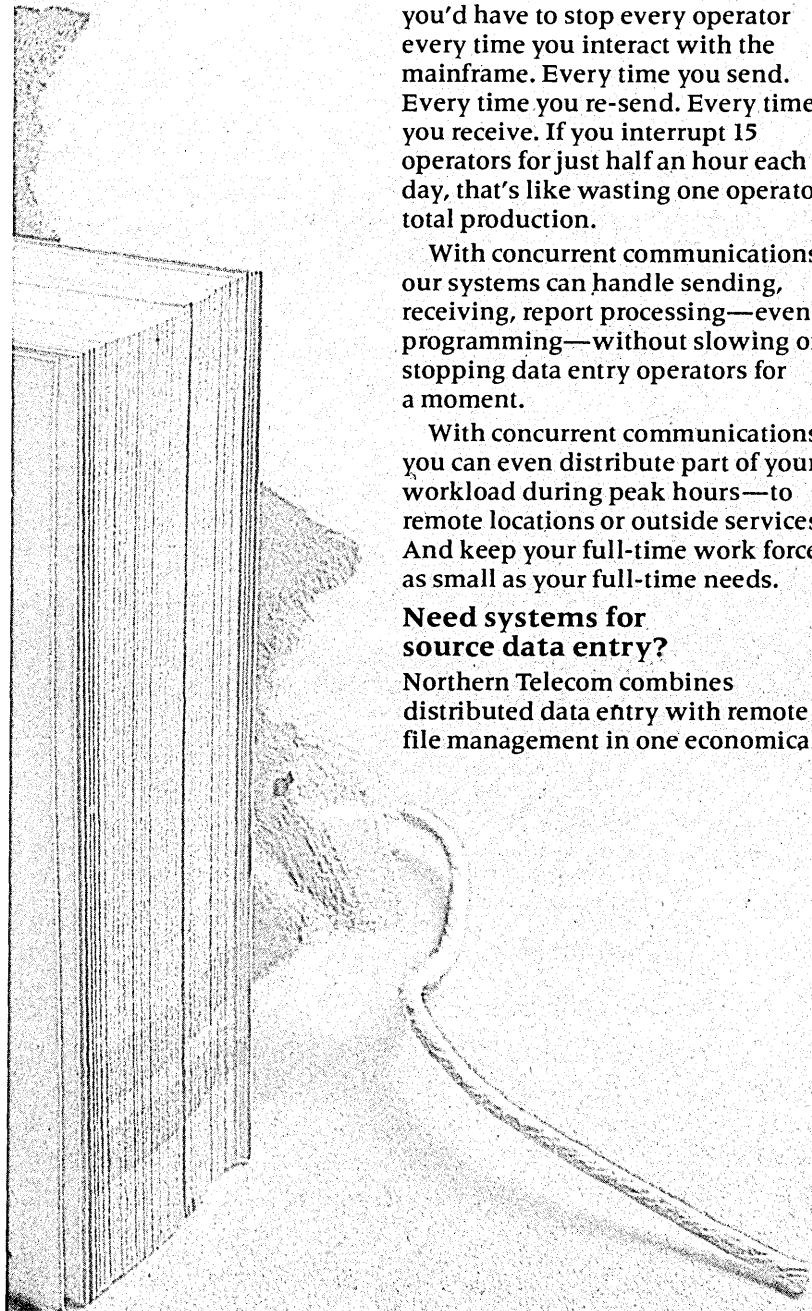
Talk to Northern Telecom Systems Corporation. Where computers and communications meet.

For the office nearest you, call our Marketing Services Department at 1-800-328-6760. In Minnesota, call (612) 932-8202. Or write Northern Telecom Systems Corporation, Box 1222, Minneapolis, MN 55440.



**Northern Telecom
Systems Corporation**

CIRCLE 18 ON READER CARD



CALENDAR

MAY

Fifth Micro Expo '80, May 6-8, Paris.

The largest microcomputer and personal computing conference in Europe, featuring themes relating to personal computing, new products, industrial applications. Contact Robert Maraziti, Sybex, Inc., 2344 Sixth St., Berkeley, CA 94710, (415) 848-8233.

NCC, May 19-22, Anaheim, Calif.

Will cover the broad areas of management, applications, science and technology, and social implications. Contact AFIPS, 1815 North Lynn St., Arlington, VA 22209, (703) 243-4100.

CECON, May 20-22, Cleveland.

The exhibits will display new products related to instruments, components, and systems. Contact Cleveland Electronics Conference, Inc., 2728 Euclid Ave., 5th Floor, Cleveland, OH 44115, (216) 241-5515.

JUNE

Automated Business Systems Exhibition, June 3-6, Mexico City.

The exhibition will be sponsored by the U.S. Department of Commerce. Contact Annette V. Napper, Industry Participation Division, Room 6015, Office of Export Promotion, U.S. Department of Commerce, Washington, DC 20230, (202) 377-2952.

Workshop for International Marketing Decision-Makers, June 16-17, Washington, D.C.

Exporting products in the '80s is the theme. Meeting is cosponsored by DATAMATION and the U.S. Department of Commerce. Contact Graydon Associates, P.O. Box 566, Red Bank, NJ 07701, (201) 741-2690.

National Computer Graphics Association Conference, June 16-19, Washington, D.C.

Will include tutorials in particular computer graphic fields, conferences focusing on new developments in computer graphics, and vendor exhibitions. Contact National Computer Graphics Association, Inc., 1129-20th St., NW, Suite 512, Washington, DC 20036, (202) 466-5895.

DATA COMM, June 17-19, Geneva, Switzerland.

DATA COMM is an international forum where developments in microprocessors, mini/microcomputers and associated services can be seen, together with new equipment for data communications and distributed processing. Contact Industrial and Scientific Conference Management, Inc., 222 West Adams St., Chicago, IL 60606, (312) 263-4866.

Computerfest '80, June 20-22, Columbus, Ohio.

Fifth annual gathering of the Midwest Affiliation of Computer Clubs (MACC), focusing on small business and personal requirements and uses. Contact James Crowley, 4008 Rickenbacker Ave., Columbus, OH 43213.

World Computing Services Industry Congress II, June 23-25, San Francisco.

Geared toward the serious discussion of responsibilities as custodians of the international information resources. Contact ADAPSO, 1925 Lynn St., Arlington, VA 22209, (703) 522-5055.

Syntopicon VIII, June 23-26, Minneapolis.

The International Word Processing Association conference will feature one day of conference and three days of exhibits. Contact IWP, Maryland Rd., Willow Grove, PA 19090, (215) 657-3220.

JULY

Harvard Computer Graphics Week 1980, July 28-August 1, Cambridge, Mass.

Five-day conference features business graphics and computer mapping in commercial, educational, and governmental areas. Contact Kathy Devaney, Center for Management Research, 850 Boylston St., Chestnut Hill, MA 02167, (617) 738-5020.

SEPTEMBER

MIMI '80, September 9-10, Montreal, Quebec, Canada

13th International symposium and exhibition on mini and microcomputer applications. Contact Prof. M.H. Hamza, Department of Electrical Engineering, the University of Calgary, Calgary, Alberta, Canada T2N 1N4.

Integrated Systems Expo '80, September 9-11, Washington, D.C.

The National Micrographics Association will feature the development and promotion of the effective uses of micrographics, including interfaces with other information-processing technologies. Contact John Bidwell, NMA, 8719 Colesville Rd., Silver Spring, MD 20910, (301) 587-8202.

Internecon/Semiconductor International Expo, September 11-13, Singapore.

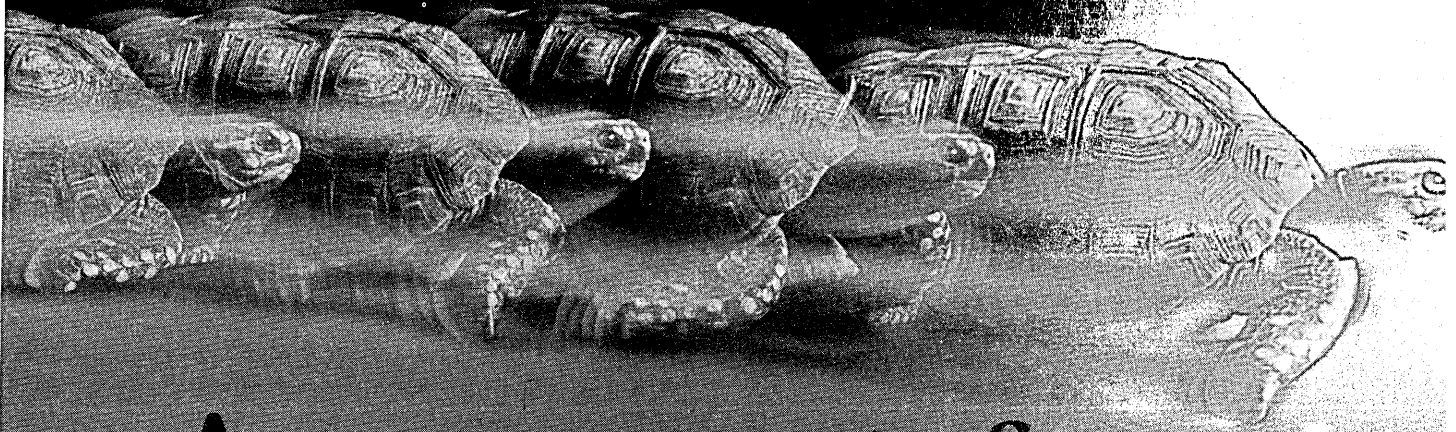
Keyed to the specific needs of engineering, manufacturing, and support personnel of Southeast Asia. Contact Industrial and Scientific Conference Management, Inc., 222 W. Adams St., Chicago, IL 60606, (312) 263-4866.

Wescon '80, September 16-18, Anaheim, Calif.

This convention is the largest high technology assembly in the U.S. Contact Robert Myers, Communications Counsel, Wescon, 999 N. Sepulveda Blvd., El Segundo, CA 90245, (213) 772-2965.

SIGOB '80, September 17-26, and Convention Informatique, September 15-19, Paris, France.

These back-to-back exhibitions and conferences cover personal computing to office equipment, and constitute the largest French international show. Contact Pierre Wagner, International Trade Shows in France, 1350 Sixth Ave., New York, NY 10019, (212) 582-4960.



A new concept of speed.

Traditional thinking about connecting one computer to another has been limited by the technological barriers to data transmission. For example, channel-to-channel interface is possible only if central processors are of like manufacture and are located close enough to each other. If they are not, the usual option is local data communications, with a transmission "speed limit" of about 56,000 bits per second.

Large mainframes, like IBM 370's, UNIVAC and CDC systems, process data at over a million instructions per second. The tortoise pace of existing data transmission technology has created traffic jams and bottlenecks which prevent these systems from being used to their fullest potential.

Network Systems' HYPERchannel™ has broken through these barriers and initiated a new era in computer-to-computer communications. HYPERchannel allows almost any computer to talk to any other computer—regardless of manufacture. At distances up to a mile in a local mode.

And at speeds up to 50,000,000 bits a second.

Proven in over 60 major installations, HYPERchannel is a means of interconnecting mainframes and mini's and extending data channels. HYPERchannel is not only providing innovative solutions to data transmission problems, but is rapidly changing the way computer centers are designed.

If you have at least two large IBM 370's or their equivalent, write us. Or call our marketing services department (612) 425-2202. We want to help you get your computer room up to speed.

CIRCLE 19 ON READER CARD



**Network Systems
Corporation**

7600 Boone Avenue North, Minneapolis, Minnesota 55428. TWX 910-576-1153.
Sales offices: Atlanta, Boston, Chicago, Detroit, Huntsville, Los Angeles,
New York, Philadelphia, San Francisco & Washington, D.C.

See us at NCC, Booth #4000, West Hall.

Drop by booth 4335-45.

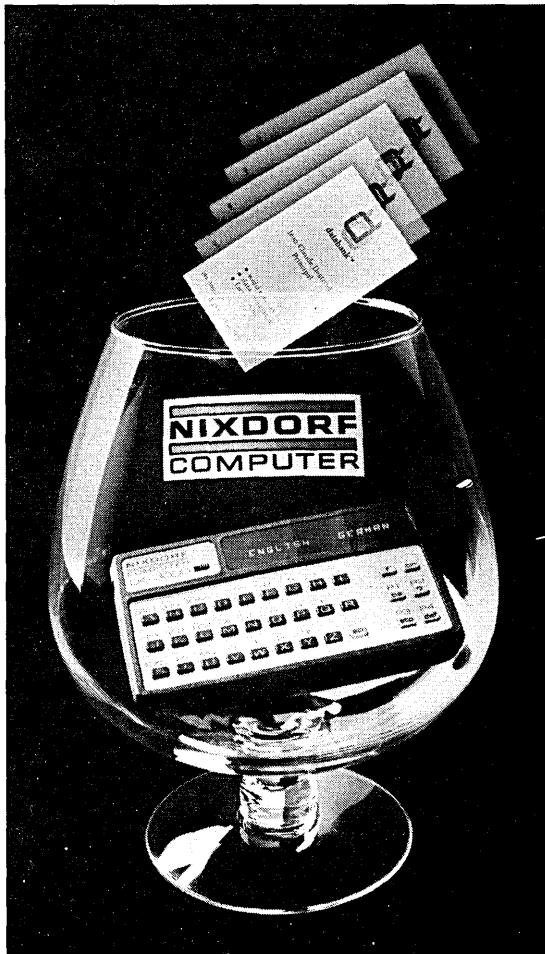
Visit the Nixdorf Computer Corporation booth at the NCC show and see our complete line of:
Word Processing Systems
General Business Systems
Distributed Data Processing Systems.

Drop in your business card.

While you're at our booth, drop a business card into the Nixdorf Brandy Snifter and you'll be eligible to

Win an LK3000 Personal Computer.

Complete with the module of your choice:
Language Translator, Calculator or
Electronic Notepad.
See you at the show.



CIRCLE 20 ON READER CARD

CALENDAR

IPAD National Symposium, September 17-19, Denver.

NASA and an Industry Technical Advisory Board (ITAB) to report on progress of the joint industry/government computer-aided design project called IPAD (Integrated Programs for Aerospace-Vehicle Design). Contact IPAD Project Office, Mail Stop 246, NASA Langley Research Center, Hampton, VA 23665, (804) 821-2888.

Federal Computer Conference, September 22-24, Washington.

Cosponsored by DATAMATION. Will address the management of change in the 1980s for federal dp users. Contact Ms. Lynn Green, P.O. Box 368, Wayland, MA 01778, (617) 358-5181.

12th Annual Conference of the Society for Management Information Systems, September 22-25, Philadelphia.

The conference theme will be "MIS Management in the Emerging Information Age" and will examine the challenges facing the MIS Executive. Emphasis will be on the impact of converging technologies on the role of the MIS executive in the 1980s. Contact M. Rippey, the Society for Management Systems Information, 111 East Wacker Dr., Chicago, IL 60601, (312) 644-6610.

Comcon Fall '80, September 22-26, Washington, D.C.

Theme will be Distributed Processing and Networking. Contact Executive Secretary, P.O. Box 639, Silver Spring, MD 20901, (301) 439-7007.

10th International Symposium on Fault-Tolerant Computing, October 1-3, Kyoto, Japan.

The symposium concentrates on Fault-Tolerant Computing, and covers the basic theory and practice. Official language is English. Contact Secretariat of FTCS-10, Department of Applied Mathematics & Physics, Faculty of Engineering, Kyoto Univ., Kyoto, 606, Japan.

Eighth World Computer Congress, October 6-9, Tokyo, and October 14-17, Melbourne.

Speakers will discuss subjects ranging from computer architecture to computers in everyday life. Contact Joseph Mendez, c/o AFIPS, 1815 North Lynn St., Suite 800, Arlington, VA (609) 764-0100.



CARTOON BY W.R. BROWN

A lot of companies turned to Nixdorf for



Even the competition.

When we introduced the computer world's first "help" function, a lot of the competition stood up and took notice. Even IBM.

With this unique key, an operator can quickly call up "next step" instructions for performing various operations. As a result, operator efficiency and productivity can be dramatically enhanced with a single keystroke.

Recognizing a good thing, many of our competitors wasted little time in developing similar "help" keys of their own.

But we're not worried. Because the fact remains that Nixdorf data entry/distributed data processing systems are still the most flexible, easiest-to-operate, most cost-efficient in the world. And we can prove it.

If your data entry/distributed data processing system needs "help," turn to the company that originated it. Call this toll free number, (800) 225-1979, and ask for a local demonstration at any of our 120 locations throughout the United States. Nixdorf Computer Corporation, 168 Middlesex Turnpike, Burlington, Massachusetts 01803.

NIXDORF
COMPUTER

CIRCLE 21 ON READER CARD

INTRODUCING THE OFFICE OF TOMORROW WITH EVERYTHING YOU NEED TODAY.

Prime's Office Automation System has more to offer than any other system available today.

It has word processing, data processing, electronic mail, correspondence management, scheduling, automatic proofreading, language translation, networking capabilities—virtually everything you need—all integrated into a single incredibly efficient system.

This means that administrative people can quickly become more efficient because of all the advanced capabilities at their fingertips. And managers and professionals can become more productive because communications will be faster and information will be easier to get.

But total integration is just part of the story. So if you'll stay with us for a few paragraphs, we promise you some very productive reading about a very productive office system.

We'll begin with the word.

Word Processing.

This is the basis of all automated offices. The main things to look for are ease of learning, ease of use, and the ability to work with documents of any size.

As you may have guessed, Prime's Word Processing system embodies all these features and quite a few more, including a screen editor that displays text as it's entered. Menus that lead the user through the system. Labelled function keys that eliminate the need for heavy user memorization. And system storage capability of over 2 billion characters. Which translates into roughly a million pages of information.

Our Word Processing also has management and administrative workstations that provide fast, consistent response time. Powerful text creation and editing facilities. User created

boilerplate library. Comprehensive filing and retrieval capabilities. List processing. And letter-quality output from a printer with interchangeable character fonts.

In a word, our Word Processing is productive.

Management Communications and Support.

This part of our Office Automation System is a natural extension of our Word Processing function. Like Word Processing, it's simple to learn and easy to use. And it has all the features you need to enhance productivity.

Electronic Mail, for instance, has intray processing, note and memo creating capabilities, receipt acknowledgment, and the ability to annotate received messages and to forward documents and notes to an office down the hall, across the city, or around the world.

Correspondence Management cuts paperwork and simplifies filing with its powerful storage and retrieval capabilities.

An Electronic Intray receives and stores notes, documents, and appointment requests.

A Tickler File will remind you that on a given day, a certain task has to be performed.

Calendar Management allows you to maintain a confidential two month personal calendar.

And Scheduling, which is based on the personal calendar, lets you request a meeting, get confirmation of a specific date and time from all attendees, then actually schedule the meeting.

As you can see, our Management Communications and Support lets you spend less time on routine jobs, and allows you to function better as a manager.

Advanced Text Management.

This tremendously helpful function employs a 60,000 word electronic dictionary. The contents are user-defined, so medical, legal, or industry terminology can easily be added. Spelling is automatically compared with the dictionary for accuracy, and hyphenation is done automatically.

It will also support multi-lingual dictionaries for creating foreign language documents or translating one language to another.

In other words, *C'est si bon.*

Hardworking workstations.

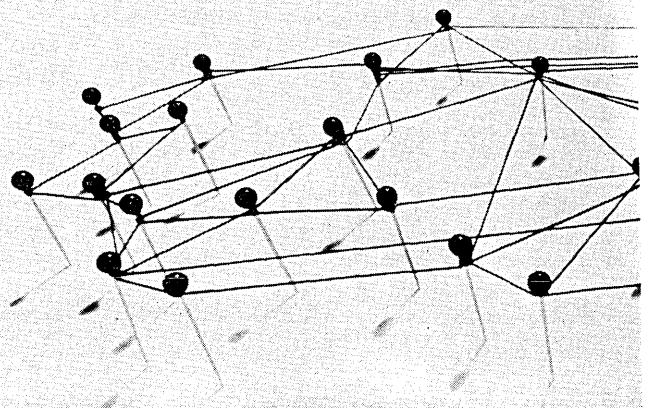
Prime's Office Automation System is supported by two workstations; one administrative and one management. They both can access all capabilities of the system, but each is tailored to the specific needs of its users. Together, they make a highly productive information management tool.

The System operates on a multifunctional Prime 50 Series computer system. All Prime computers share the same operating system, the same file system, and the same communications products. So no matter what size computer you start with, you can move all the way up to a powerful 750 without piling up bills for recompiling programs or modifying software. In fact, your office system can easily and economically grow to support over sixty users.

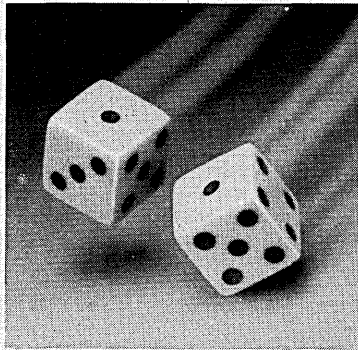
In short, Prime's Office Automation System can deliver what you need. So if you're ready for this kind of office, we're ready to deliver the System. If you'd like to know more, write Prime Computer, Advertising Department, 3 Newton Executive Park, Newton, Massachusetts 02162.

PRIME
Computer

**Introducing
electronic mail
without risk.**



Telemail:



You're ready to move in on electronic mail—but you don't want to gamble?

Meet TelemailSM electronic mail.

Our nationwide message service that you hook into using your data terminals, it is adaptable to your own requirements.

It's fed into and through the world's first and most advanced public packet network for data communications—GTE Telenet—just a local phone call away from hundreds of North American cities.

It's a true state-of-the-art, computer-based system. As new technology comes along, we'll integrate it. So you needn't worry about obsolescence.

And, as your usage grows, we'll help you convert to your own in-house system.

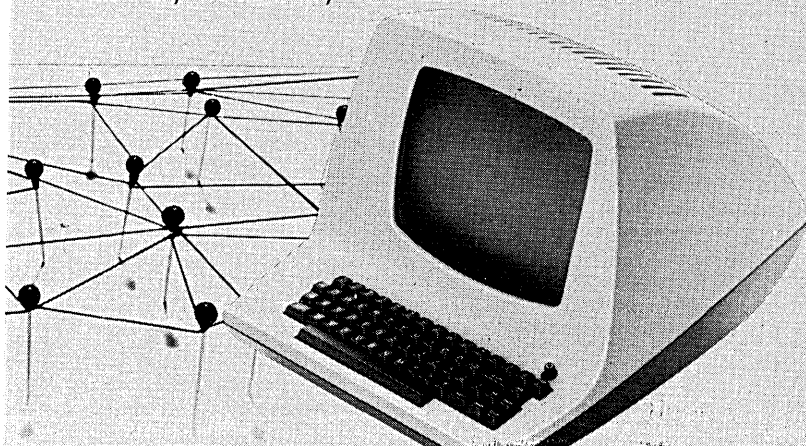
At GTE Telenet, we give you full support for this major approach to the office of the future. Tailoring the service to your needs. Training. Terminals if you need them. User assistance 24 hours a day.

No capital outlay.

And if you don't think it's right for you, give us 30 days' notice and...

We'll call the whole thing off.

Details are as near as your phone. Call 703-827-9565. Or write Marketing Communications Department, GTE Telenet, 8330 Old Courthouse Road, Vienna, VA 22180.



GTE Telenet Electronic Mail

A part of **GTE**

CIRCLE 23 ON READER CARD

STILL WAITING FOR REPORTS?

If you're still waiting, you haven't tried EASYTRIEVE, the software system that supplies information in the simplest manner and in the least possible time to users of IBM and Siemens hardware.

By use of a free-form language there are no coding forms, and no need to be a programming specialist to obtain the information you want.

In a matter of moments, a program can be written in English and run to provide exactly the report information you require. EASYTRIEVE does the formatting, the figuring, the selection of just the data you need. Automatically. Quickly.

Anyone who needs information can learn to use EASYTRIEVE. From a non-DP oriented secretary to a plant manager to the executive VP of a division. Yet, EASYTRIEVE is powerful enough to do: systems housekeeping, computer graphics, create test data, job accounting and even budget forecasting.

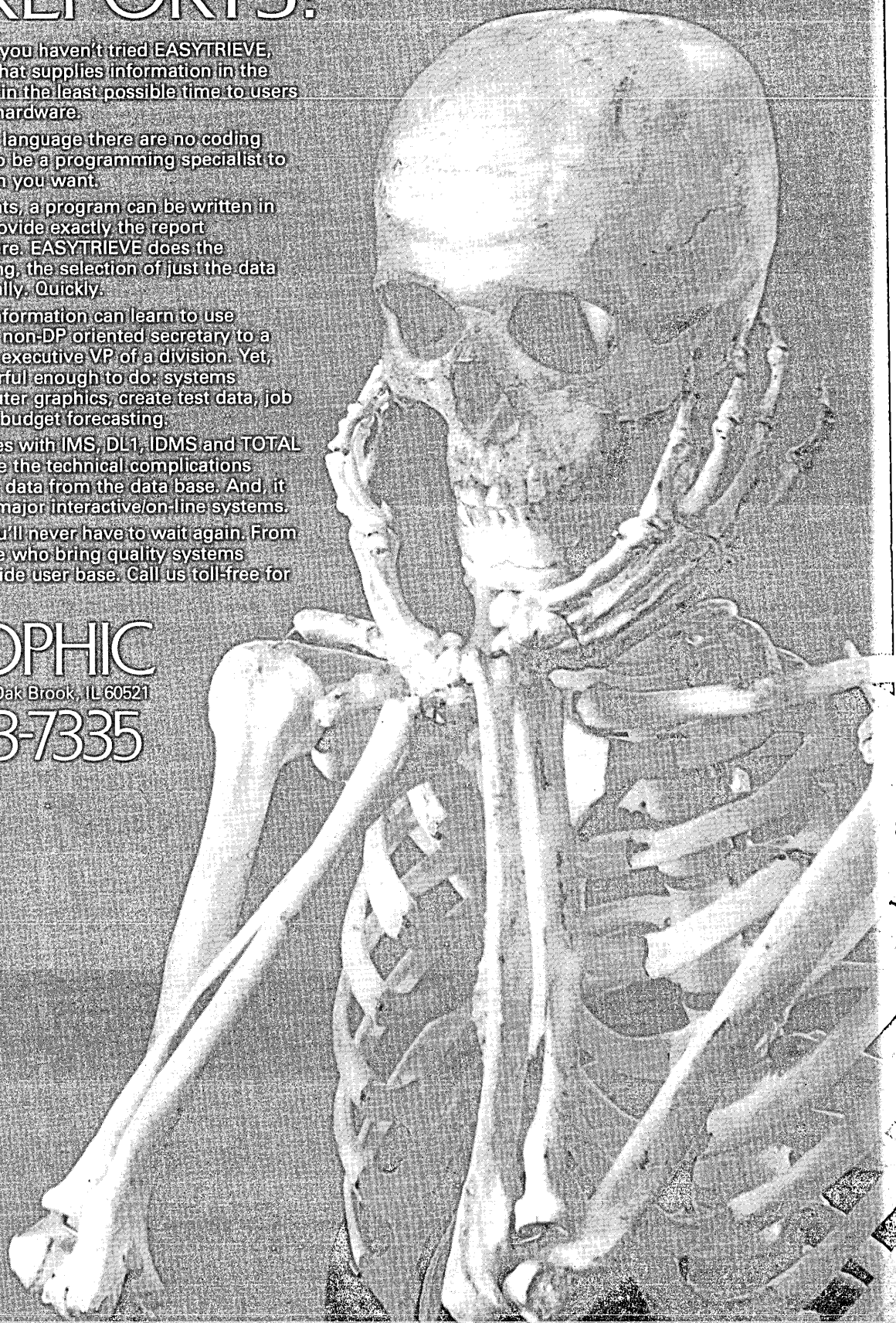
EASYTRIEVE interfaces with IMS, DL1, IDMS and TOTAL to dramatically reduce the technical complications involved in accessing data from the data base. And, it can be used with all major interactive/on-line systems.

With EASYTRIEVE you'll never have to wait again. From Pansophic, the people who bring quality systems software to a worldwide user base. Call us toll-free for more information.

PANSOPHIC

709 Enterprise Drive • Oak Brook, IL 60521

800-323-7335



CIRCLE 24 ON READER CARD

LETTERS

PERFORMANCE MEASUREMENT

The purpose of professional meetings such as the Computer Performance Evaluation Users Group (CPEUG) is to provide a forum for the free dissemination of knowledge and experience. I am, therefore, deeply perturbed that your magazine elected to sensationalize my recent presentation to that group which has subsequently caused me considerable personal embarrassment among my peers and my NASA clients.

"Measure by Dp Measure" (Feb., p. 79) is a collection of misquotes and erroneous conclusions apparently drawn to imply some degree of poor planning of the Shuttle Inventory Management System. This implication is clearly not supported by my paper, National Bureau of Standards Publication 500-52 (1979), which was conveniently not referenced by your article.

NANCY LENNON
Manager
Systems Support and Analysis Section
Computer Science Corp.
Kennedy Space Center, Florida

This story was based on personal interviews and coverage of Ms. Lennon's speech, "Performance Analysis of a Saturated System."—Ed.

USER VIEWS

Re: "Developing User Views" (Feb., p. 141), the problem is partially due to ignoring the learning process which occurs while a data base is being designed. There are two views which must be distinguished:

The data model: a description of the data requirements of the applications which are candidate users of the data base. These models are then integrated into the integrated data base model (see El-Masri and Wiederhold in SIGMOD '79 Proceedings for a formal methodology). During this process much is learned about the data structure which represents the information required to operate the enterprise.

Out of the integrated data base model a number of submodels are then extracted, which will represent the operational view of the implemented applications.

These two views, the original data model and the final data base submodel, often differ considerably due to the learning process which has occurred. If this flexibility is recognized by the data base designers, then some of the problems alluded to in Dr. Holland's article will be minimized. An article outlining this process has appeared (Wiederhold and El-Masri, in the *Entity-Relationship Approach* (Peter Chen, editor), UCLA and North Holland) using modeling tools from my Database Design textbook (McGraw-Hill, 1977).

We are all aware that one of the advantages of moving to automation is in the preparatory analysis that is undertaken in the conversion process. This advantage should be recognized in the development of user views.

GIO WIEDERHOLD
Assistant Professor
Department of Computer Science
Stanford University
Stanford, California

APPLICATION CHECKLIST

Re: "A Checklist for System Design" (Jan., p. 147), we are involved in an evaluation of ddp at The Hartford. The article touched many of the issues we are currently wrestling with as we attempt to unravel the ddp puzzle.

THOMAS B. STRETT
Data Processing Systems Support Dept.
The Hartford
Hartford, Connecticut

It is good to see articles on the human factors of computer systems. Too often, interactive systems are designed with the operator as an afterthought.

My laboratory is interested in man-computer interface problems. We are currently sponsoring work in the development of man-computer dialogue design tools. In the near future, we are considering establishing a man-computer-interaction laboratory devoted to the investigation of this interesting coupling of man to machine. It is

our opinion that the most challenging work of the future does not lie in the development of new technology, but in discovering how man can best utilize this new technology.

DONALD L. MONK
Crew Systems Effectiveness Branch
Human Engineering Div.
Department of Air Force
Wright-Patterson AFB, Ohio

VM AND VIGOR

Re: "VM: A Basic Ingredient in Emergency Planning" (Dec., p. 167), poor Mr. Murphy. He has obviously spent a considerable amount of time and money to get his contingency plan to the point where it will work, which is certainly an effort worth applauding. But, Murphy is in big trouble if he ever has to execute his plan in a disaster situation, especially if he has to use the data center where his test was run.

Murphy's contention is that once the technical problems are overcome, everything else should fall into place. The two problems Murphy pays lip service to are significantly more difficult to solve. These two problems are finding a place to run and, once an alternate site is found, getting enough capability to at least process critical applications in a timely manner, and Murphy hasn't even considered the question of backing up on-line systems, which in most medium- to large-scale operations fall into the critical category.

The problem of finding an alternate site where some sort of reciprocal agreement can be made is not in and of itself a difficult task. Other than this type of agreement not really being binding, the real problems, once a site is found, can be stated in terms of hardware resources and time. What portion of the configuration can the manager of the alternate site afford to give away and for how long? Realistically, the alternate site manager could not afford to give away anything. If he could, then he's probably spending more money on hardware than really needs to be spent.

The performance problem can easily be clarified by using Murphy's test

LETTERS

experience. I have no doubt that Murphy was able to take his MVS system and IMS application from his IBM 370/158 with 3MB of storage and process it under VM at the alternate site on the IBM 370/148 with 2MB of storage, but in a real disaster situation with the overhead required by VM and its inherent performance problems, I find it hard to conceive of IPLing the alternate site owner's operating system in addition to Murphy's, let alone getting any meaningful work done.

I believe the true test of a reciprocal agreement and its chances of being an effective solution in an emergency can be measured very simply. In Murphy's case, all he has to do is ask himself how much of his computer he could spare if the situation were reversed.

HUGH CHEKEMIAN, JR.
Sun Information Services Co.
Philadelphia, Pennsylvania

Mr. Murphy responds: The problems, which exist whether or not VM is considered, are:

1. Selection of an alternate site.
2. Finding the capability to process critical applications.
3. An alternate site does not "give away" resources.

VM does, however, greatly increase one's options in dealing with the above problems.

As to performance, let me ask Mr. Chekemian how much performance degradation he is willing to suffer if he has no data processing facility? I am in bigger trouble not having even the test site to go to.

Mr. Chekemian asks how much of my computer can be spared if the situation were reversed? For the right price, he can have it all. Reading between the lines, it appears Mr. Chekemian is associated with a firm that provides emergency backup service. Let me assuage his fear that I am an advocate of alternative solutions to this type of endeavor. As a matter of fact, his firm stands to take the best possible advantage of the use of VM in this context as it provides the following:

1. Removes a potential client's fear of having to compete with another user who happens to have a catastrophic situation simultaneously.
2. Allows the least difficult manner in which to duplicate a user's environment.
3. Allows the easiest test program to be set up.

As to my being poor, that is easily corrected: send money.

GRAVE ERRORS

Re: Forum (Feb., p. 195), Lance Hoffman suggests that the computer industry can expect a Three Mile Island-type accident in

the 1980s to mobilize public opinion against computing abuses. A gross data abuse has already occurred, in the fall of 1979, when an incorrect data tape almost started World War III. Where was the public concern? Where was Mr. Hoffman?

PAUL BARACOS
Winnipeg, Manitoba
Canada

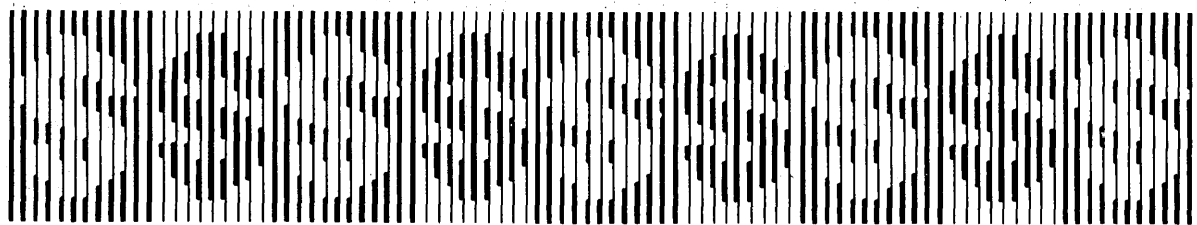
PLACEMENT ETHICS

Re: "That Old Bugaboo Turnover" (Oct., p. 97), as vice president of Recruiting Services Inc., and with 10 years in technical and executive recruiting, I would like to make a comment on so-called "boycotting of placement firms" and "self regulation." It is an unwritten law among ethical recruiting and placement firms not to recruit from existing clients. Of course, there are those placement firms that disregard unwritten laws. The companies that utilize recruiting and placement firms should check on their reputations before dealing with them.

JOSEPH N. GANIM
Vice President/Recruiting Services Inc.
Cincinnati, Ohio

R.A. McLaughlin gives some interesting solutions (and nonsolutions) to the problem of high turnover in the data processing industry. I would like to offer another solu-

Eliminate the Hidden Costs of Systems Development



With Central Software from PRC International

Central Software, a systems development tool for IBM 370 users, puts a handle on the obvious and not-so-obvious costs of developing on-line and batch applications software.

How? Central Software eliminates the need for many routine and time-consuming functions in the systems development process. These routine and inefficient functions are often the root of delays and cost overruns. Central Software promotes effi-

ciency, security, and reliability... and puts you in control.

Here's what Central Software can do for you:

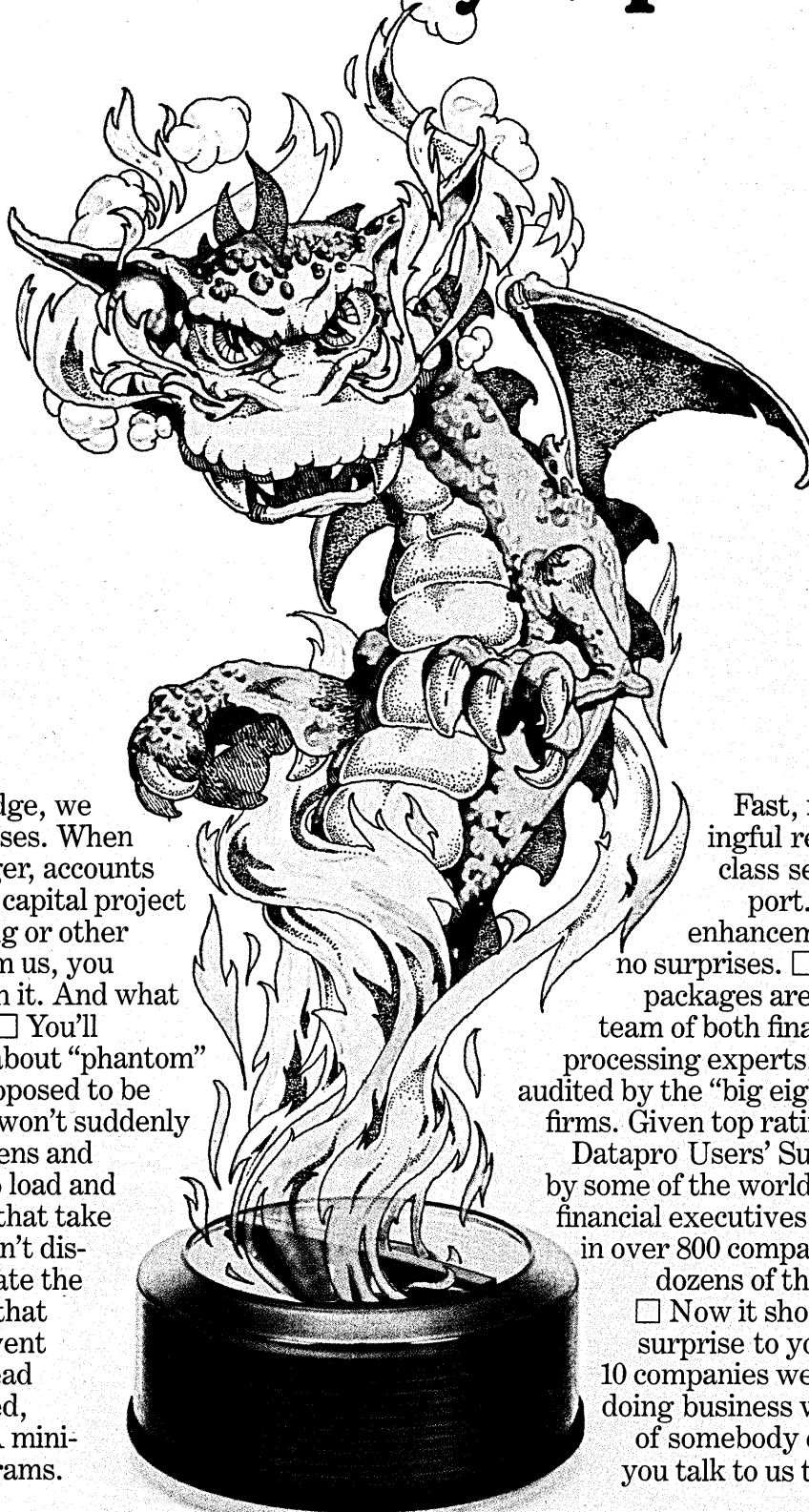
- save up to 40% on human resources
- reduces development time & costs up to 50%
- enhances programmer productivity
- eliminates hours of debugging time
- reduces training time



prc

Planning Research Corporation
Program Products Group
1764 Old Meadow Lane
McLean, Virginia 22102
Telephone: (703) 893-8909
Telex: 899 105 PRC INT MCLN

You can buy financial software that's full of nasty surprises...



At McCormack & Dodge, we don't believe in surprises. When you get a general ledger, accounts payable, fixed assets, capital project accounting, purchasing or other software package from us, you know exactly what's in it. And what isn't. Right up front. You'll never have to worry about "phantom" programs that are supposed to be there but aren't. You won't suddenly find yourself with dozens and dozens of programs to load and unload. Or programs that take all day to run. You won't discover you can't generate the reports you need. Or that there's no way to prevent obsolescence. Instead you'll get a streamlined, easy-to-use system. A minimum number of programs.

Fast, flexible, meaningful reporting. First class service and support. Our continual enhancement plan. And no surprises. Our software packages are designed by a team of both financial *and* data processing experts. They've been audited by the "big eight" accounting firms. Given top ratings in the 1978 Datapro Users' Survey. Selected by some of the world's most critical financial executives. And installed in over 800 companies, including dozens of the Fortune 500. Now it should come as no surprise to you that 7 out of 10 companies we talk to end up doing business with us instead of somebody else. Shouldn't you talk to us too?

or you can talk to McCormack & Dodge.

Talk to us.  **MCCORMACK & DODGE CORPORATION**

560 Hillside Avenue, Needham Heights, MA 02194, (617) 449-4012
Atlanta (404) 997-2797, Chicago (312) 893-8788, Dallas (214) 369-7014, Los Angeles (213) 645-6382, Washington, D.C. (703) 734-0710
Toronto (416) 445-2971 • United Kingdom/Netherlands, R.T.Z. Computer Services, London • Italy, General Systems, S.p.A., Milano, Torino
Australia/New Zealand, Adaps Software, Ltd., Melbourne, Sydney

CIRCLE 26 ON READER CARD

LETTERS

tion which is available to any data processing firm—cooperative education.

Co-op is a program now in existence in over 400 higher education institutions throughout the United States, as well as many others in Canada and abroad. The basic premise of these programs is to provide college students the opportunity to work off-campus in their major field, often earning college credits and a salary at the same time, while still in college.

The advantages of such a program to employers, especially those with high turnover rates, are many. Co-op provides well-qualified, highly motivated personnel at low cost and may reduce training costs of potential employees. It releases high salaried employees from lower level professional tasks, and assists the employer in obtaining temporary help at peak workload periods. Perhaps most importantly, co-op gives the employer the opportunity to review potential full-time employees without commitment and provides the vehicle for successful recruitment and retention of trained, qualified personnel.

Should companies be interested in becoming involved in a cooperative educa-

tion program, they need look only as far as their local community colleges, colleges, or universities. Chances are good that a co-op program will be in existence, and highly qualified students available. In addition, the Cooperative Education Association, 247 Alumni Center, Indiana State University, Terre Haute, IN 47809, would be glad to assist any employer in locating schools in their area with cooperative education programs.

LINDA C. NELSON, Director
Cooperative Education Program
Skagit Valley College
Mount Vernon, Washington

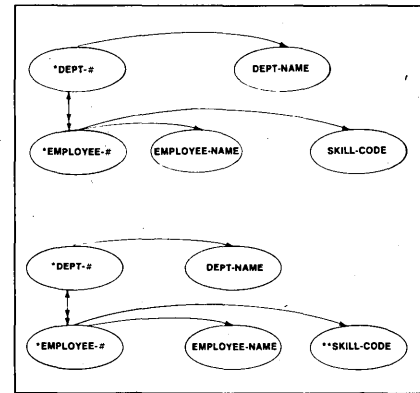
CORRECTIONS

Heights Information Technology Service, Inc. has completed 20 projects in the U.S., not 90 as we reported in an earlier issue, and the company has over 120 panel members signed up.

“Basic Books Briefs” (Feb., p. 178) were written by E. A. Keith of the Hughes Corp. Mr. Keith has been teaching BASIC pro-

gramming for 11 years. We regret his byline was omitted from the reviews.

Re: “DBMS: Developing User Views” (Feb., p. 141), the article refers to bubble charts which use ellipses in drawing user views, yet rectangles were depicted. Also, placement of arrows in some cases were incorrect, and the three-dimensional effect, although more interesting, unfortunately gives the impression of too many relationships. The correct charts should have appeared thus:

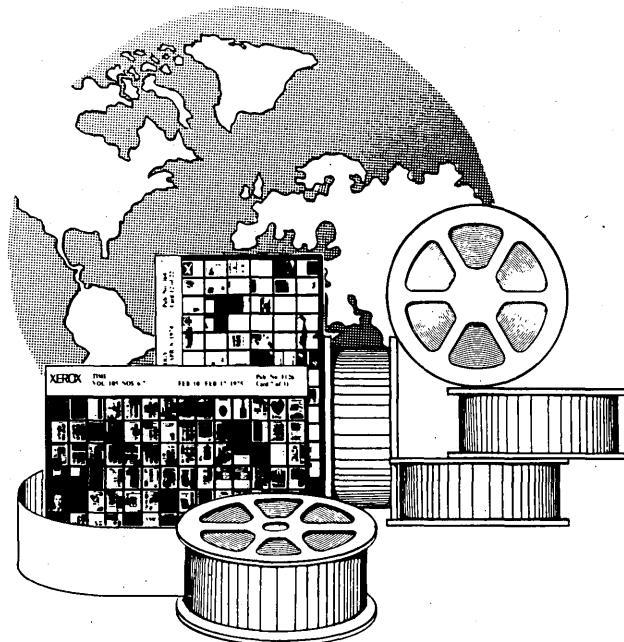


Due to a printer's error the headings for the April salary survey chart on p. 113 were omitted. The headings are listed below.

Cumulative Averages		to \$5,000		to \$12,000		to \$25,000	
Salaries	Usual Range	Salaries	Usual Range	Salaries	Usual range	Salaries	Usual range

This Publication is Available in MICROFORM

FOR INFORMATION
WRITE:
Dept. F.A.



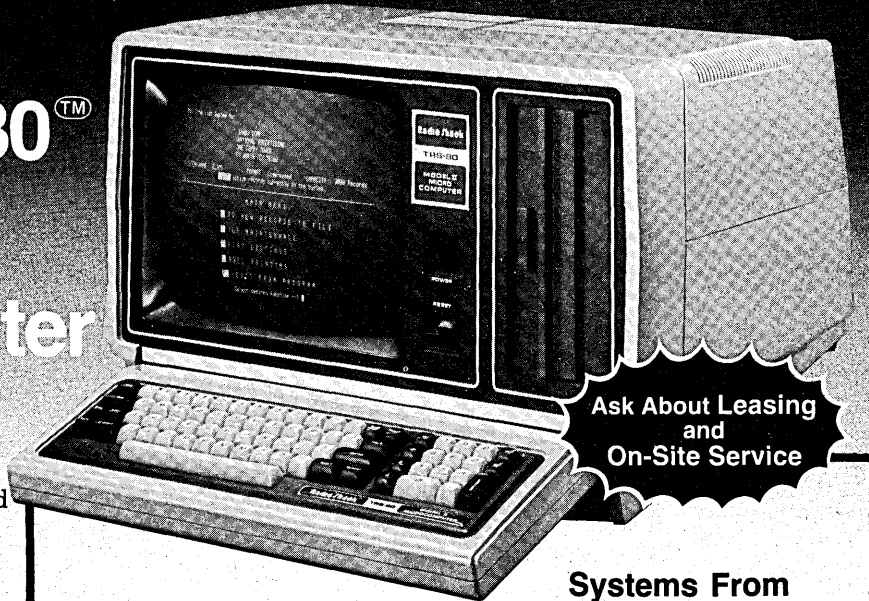
University Microfilms International

300 North Zeeb Road
Ann Arbor, Mich. 48106
U.S.A.

18 Bedford Row
London, WC1R 4EJ
England

Radio Shack Delivers Computers – Not Promises!

New! TRS-80™ Model II Microcomputer



You probably have a DP job that could be handled far better without a mainframe. Perhaps teams of small computer sales "experts" have already paraded through your office leaving you with few facts, hazy prices and delivery guesses. Now Radio Shack can give you a TRS-80 Model II in a few weeks (not months) from date of order at unbelievably low catalog prices! Many other comparable small computers cost more than two Model IIs!

No "Software Softshoe"! We're not doing the old routine of choking you with software costs after you bought the computer either. Want proof? Small business Inventory Control and Accounts Receivable cost just \$199.95* each!

We want your business! There are over 7400 locations that can sell you the Model II plus 52 computer centers and 100 stores that have expanded computer departments. We now have 111 company-owned repair centers in case you ever need service fast! Talk to the people at a Radio Shack outlet or Radio Shack Computer Center today.

Here's What
You Get
For Your Money!

Systems From
\$3450*

Hardware

- 32K (64K RAM optional)
- Built-in 8" dual density floppy disk (500K)
- Add up to 3 more floppies
- Z-80A microprocessor at 4 MHz
- Separate keyboard processor
- Filtered power supply
- 2 RS-232C I/O ports
- 1 Centronics parallel port
- Power-up diagnostics
- 12" high-resolution CRT
- 24 lines of 80 or 40 characters per line—program selectable
- DMA & vectored interrupts for faster throughput

Language

- Level III 17K BASIC interpreter plus 8.5K DOS

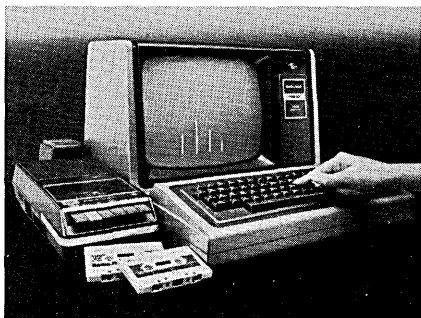
- Supports advanced string handling, arrays, edits, renumbering, Hex & Octal conversion + error trapping
- Other languages available soon
- Communication software included

Optional Software

- Inventory Control
- General Ledger
- Mailing List
- Accounts Receivable
- More on the way!

Optional Accessories

- Disk Expansion Unit
- Acoustic Modem
- System desk
- Family of printers



Over 150,000 Sold!

*Retail prices may vary at individual stores and dealers

Don't Forget TRS-80 Model I

It's now available off-the-shelf at Radio Shack outlets everywhere at prices starting at just \$499 for the 4K LI. \$849 will buy you the surprisingly powerful 16K LII TRS-80. Expansion Interface, disk drives and printers available for fast delivery. It's perfect for your own personal computer! Details at Radio Shack!

Write for a Free Full-Color TRS-80 Catalog

Mall To: Radio Shack Dept. CMA-480
1300 One Tandy Center, Ft. Worth, TX 76102

Yes! Send me your new 1980 TRS-80 Catalog
 I'd like more facts—have a representative call me

Name _____

Title _____

Company _____ Phone _____

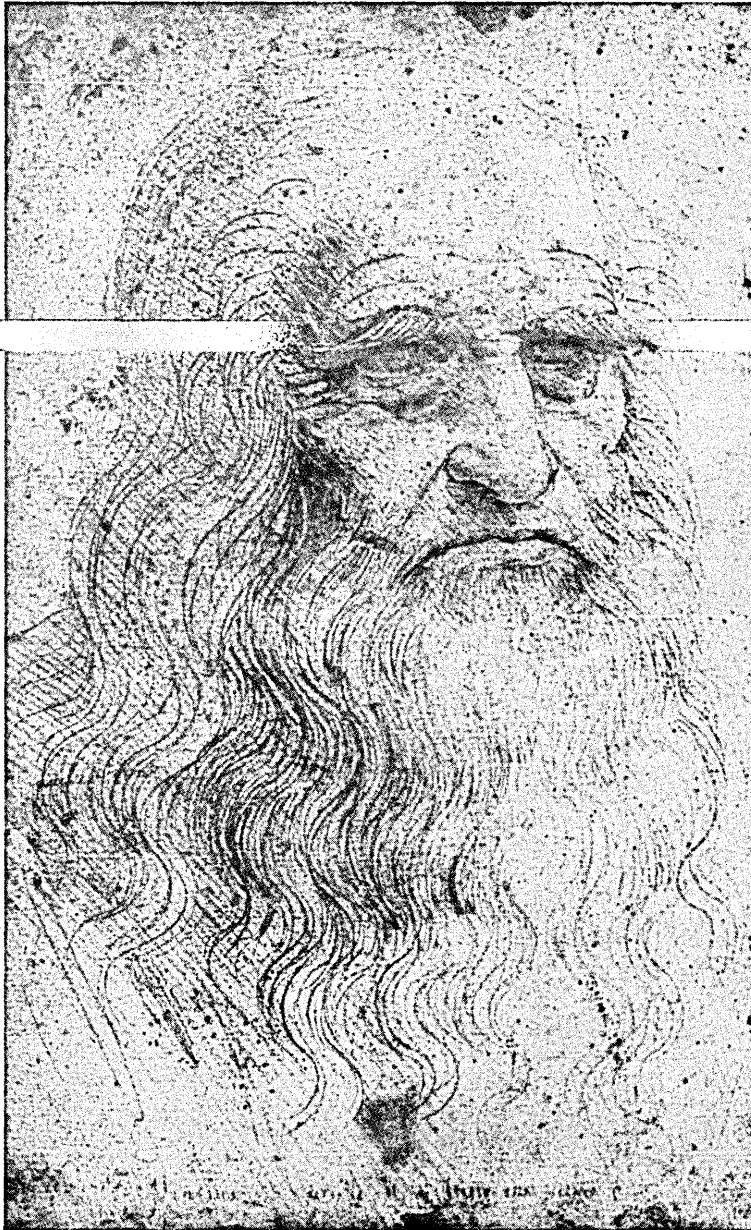
Street _____

City _____ State _____ Zip _____

Radio Shack®
The biggest name in little computers™

CIRCLE 28 ON READER CARD

"The Tragic Pursuit of Perfection"



**think
what
this
person
could
have
done
with**

an imaginative inventor
an inquisitive scientist
an accomplished artist and
sculptor
a renowned military and
civil engineer

a person considered to be
history's most versatile
genius

Leonardo DaVinci . . .
devoted to the pursuit of
better understanding
through creative
applications of technology

Demand 90
available to DECsystem 10
and DECsystem 20
communities for information
contact: the Olamic
Systems Corporation, the
Software Services Division,
503 N. Euclid Avenue,
Bay City, MI 48706
(517) 686-7725

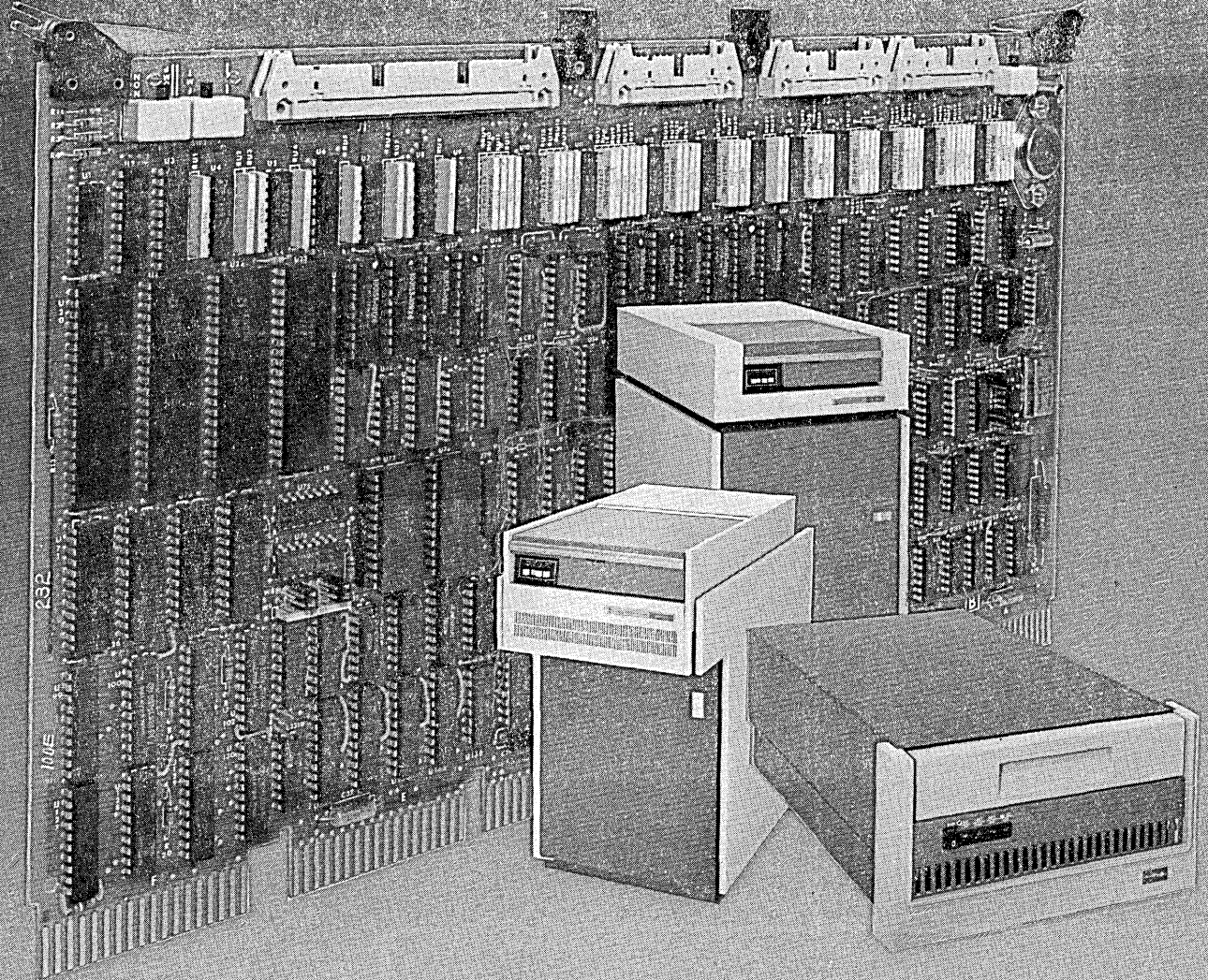
DEMAND

90

VIDEO TRANSACTION MANAGEMENT SYSTEM

CIRCLE 279 ON READER CARD

NEW SMD CONTROLLER for Plessey's family of disc subsystems for the PDP-11*



PLESSEY'S PM-DC1100 disc controller provides a reliable interface between your PDP-11 and a wide range of drives with industry standard, SMD-type interfaces, including the latest Winchester minimodule devices. The low-cost PM-DC1100 is designed for realistic expansion of your present RP02/RP03* series subsystem data base to more than 538/2000 Mbytes of hard disc storage. For PDP-11 users without an RP series subsystem, the PM-DC1100 is available with selected drives, cables and DEC*-compatible software as a complete subsystem. Model numbers and formatted capacities are:

PM-DSA11/32	27 Mbyte	(1 removable, 1 fixed disc)
PM-FS11/33	25 Mbyte	(1 fixed, Winchester)
PM-DSA11/80	67 Mbyte	(1 disc pack)
PM-DSA11/300	256 Mbyte	(1 disc pack)

The PM-DC1100 controller is completely transparent to your operating systems and diagnostics that support the RP series controllers. It's also pin-to-pin, signal, and power compatible with DEC backplanes. Just plug the SINGLE hex board into your PDP-11 computer, and cable directly to one or two drives. With a multidrive interface chassis and minor software patches, the controller can support up to eight drives.

*Registered trademark of Digital Equipment Corp.

The microprocessor based controller features a high transfer rate of 1.2us/word, transparent ECC, multiword DMA transfer, and many other benefits you expect from the leading producer of DEC-compatible peripherals.

Plessey's reputation for quality, service, delivery, reasonable prices, and worldwide support, has made us the largest independent supplier of DEC-compatible equipment. Our product line includes add-in/add-on, core, and semiconductor memories; cartridge, disc pack, floppy, mag tape controllers and subsystems; mini/microcomputer systems; DEC-compatible software; and a wide variety of backplanes, expansion chassis and other accessories. All Plessey products include applicable hardware and software documentation, plus warranty with maintenance/installation options.

Contact your nearest regional sales office for more information on the PM-DC1100 controller, subsystems, or any Plessey product.



**Plessey
Peripheral
Systems**

17466 Daimler Avenue
Irvine, CA 92714
(714) 540-9945
TWX 910 595 1796

A REPUTATION TAKES TIME TO ACQUIRE

Waltham MA (617) 890-2654 • Dallas TX (214) 387-0229 • Minneapolis MN (612) 881-0190 • Santa Ana CA (714) 972-8966

CIRCLE 29 ON READER CARD

Now: A Disk Subsystem that will help

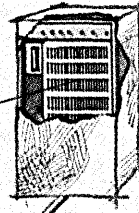
If you suspect your CPU isn't delivering all the throughput it promises, here's the solution: STC's 8000 Series Disk Subsystem. It's a family of disk drives and controllers that goes beyond mere compatibility to provide innovative hardware features and architectural enhancements. Coupled with STC's uncompromising support, the 8000 Series will enable your IBM or compatible system to process more information, faster. And, at significantly lower cost of ownership.

More paths for your data. More ways to store it.

The 8000 Series is absolutely software compatible with IBM's 3350, but that's where the similarities end. You have a choice of string switch, dual port, or both — on the same subsystem. You get contiguous addressing, 64-volume support and 8-string addressing for configuration flexibility and increased availability. And you get a choice of the proven STC 8350 with 317.5 Mbytes per spindle and the double-density STC 8650 with 635 Mbytes per spindle. In short, it's the most powerful disk subsystem ever offered for mainframe computers.

Fitting the solution to your problem.

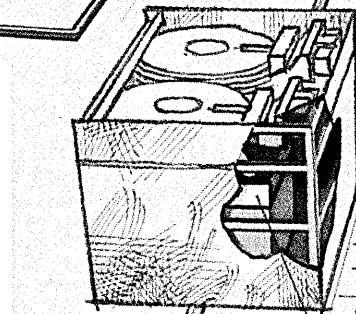
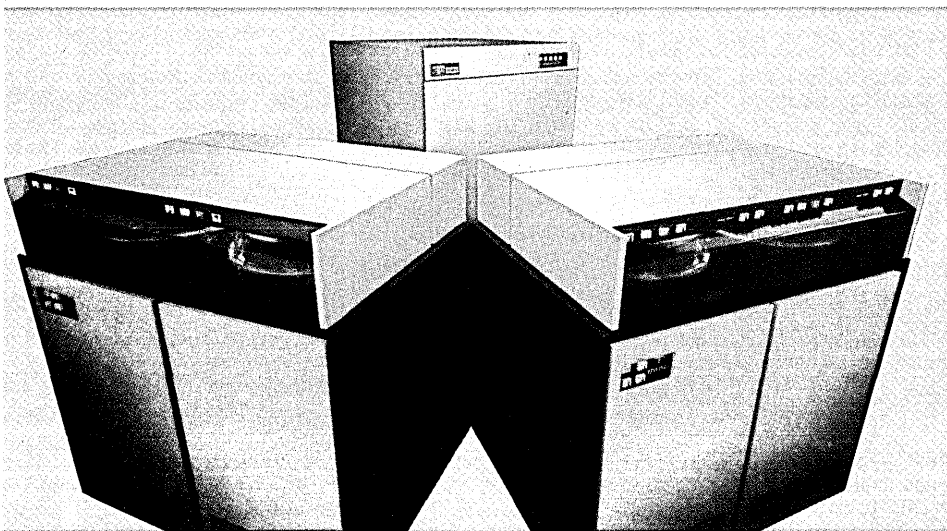
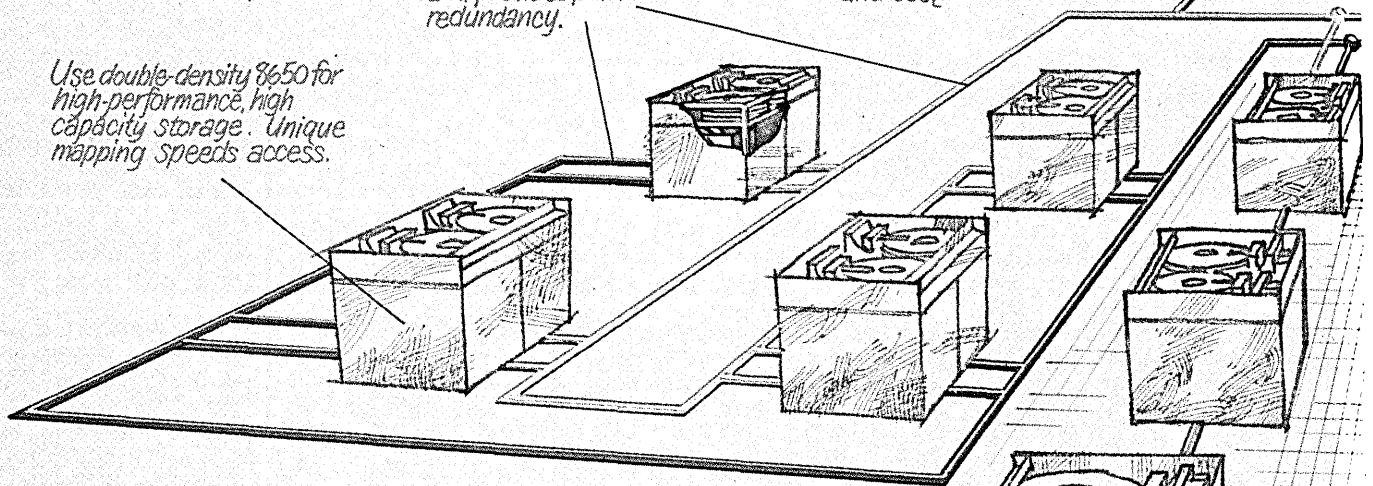
Hardware that extends well beyond mere compatibility is the foundation that permits skilled STC Systems Engineers to craft a solution tailored to your particular operation. Using powerful performance analysis and tuning software, they can virtually split open every pack in your shop to seek out performance bottlenecks and show how to eliminate them. They'll even simulate your new subsystem configuration to document both the performance benefits and the cost — before you spend a nickel.



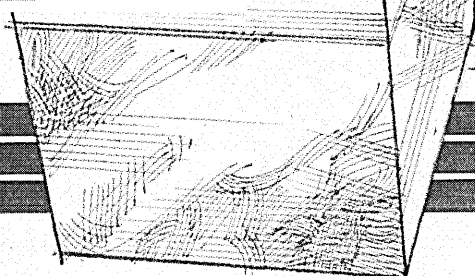
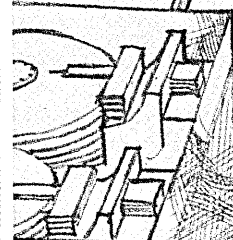
Dual port option improves accessibility and provides path redundancy.

Powerful diagnostics cut service time and cost.

Use double-density 8650 for high-performance, high capacity storage. Unique mapping speeds access.



Fully redundant electronics for enhanced reliability.



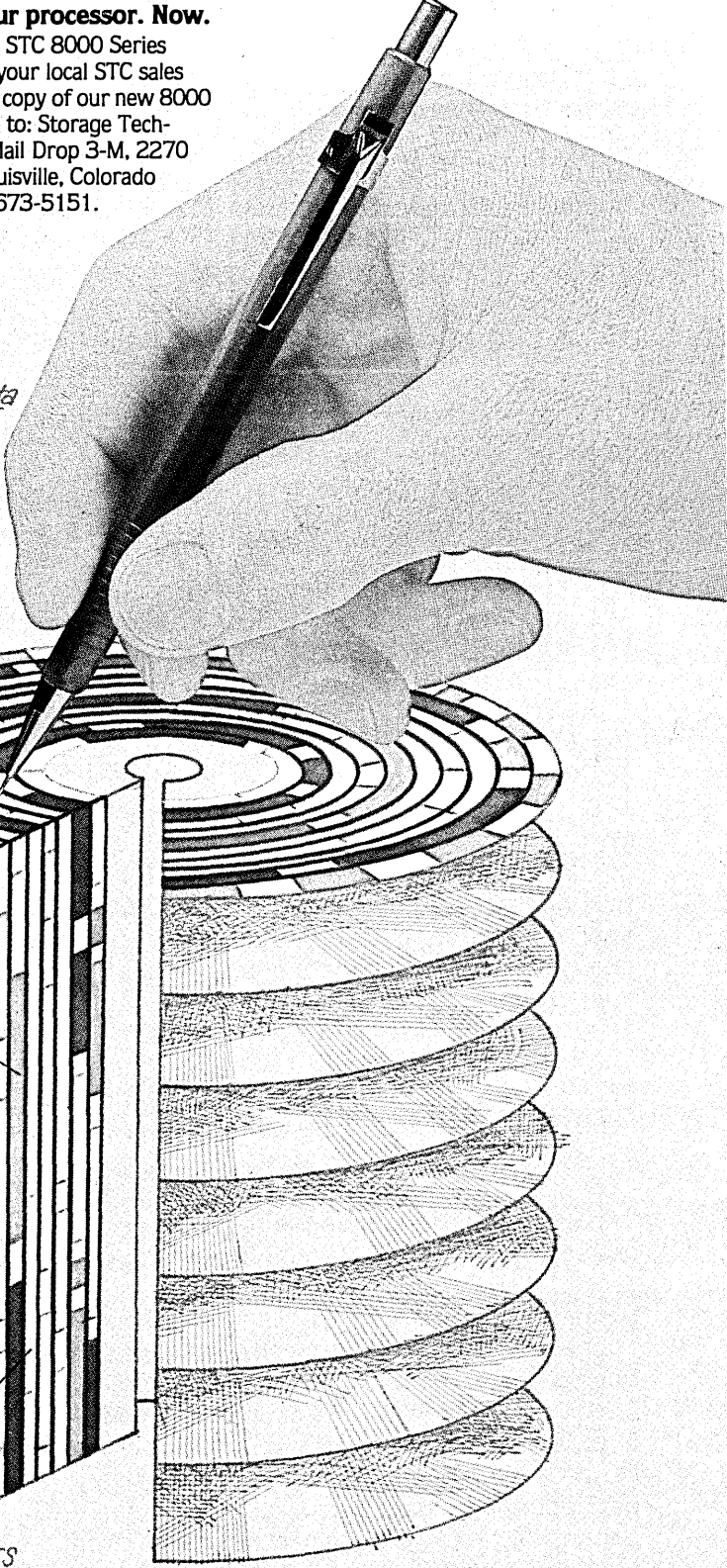
your computer fulfill its potential.

Superior support for peak availability.

Once your 8000 Series Subsystem is up and running, our top-rated Field Engineers will keep it that way. Among their maintenance tools are powerful software programs that highlight performance trends, enabling our FE's to solve problems before they happen. Other programs pinpoint malfunctions quickly to facilitate speedy on-site service. Our uncompromising field support is your assurance that your 8000 Series Subsystem will deliver all the performance we've promised, every day of its service life.

Get more from your processor. Now.

For more details on STC 8000 Series Disk Subsystems, call your local STC sales office. To receive your copy of our new 8000 Series brochure, write to: Storage Technology Corporation, Mail Drop 3-M, 2270 South 88th Street, Louisville, Colorado 80027. Phone (303) 673-5151.



8-string addressing reduces string contention.

STC provides utility programs to help manage data efficiently.

8350's on short strings for catalogs, TSO, sorts - all high activity data sets.

Performance tuning software places data across volumes, strings and channels for maximum performance. Can simulate performance before you install.

STC Systems Engineers analyze performance to reveal inefficiencies and bottlenecks.

STC
**STORAGE
TECHNOLOGY
CORPORATION**

Fulfilling the promise of technology.

CIRCLE 30 ON READER CARD

SCIENCE/SCOPE

Pilots will experience the sights, sounds, and feel of flying in combat in a new Hughes simulator. The system will help train pilots of the U.S. Navy and Marine Corps F/A-18 Hornet strike fighter. It includes two 40-foot domes, each surrounding a simulated cockpit. Projected onto the domes will be computer-generated pictures of sky and earth, maneuvering aircraft, missiles, and gunfire. The images will move in response to the pilots' actions as they "fly" the trainer. An instructor at a separate console can pose tactical problems, monitor the mission, and evaluate performances.

Remotely piloted vehicles using a new video processing technique could relay TV pictures with less chance of being detected or jammed by an enemy. The method, developed by Hughes for the U.S. Army, first separates potential targets from background clutter. Background areas are then converted into a white-on-gray outline picture that's updated every second. A window containing the prime target is allowed a fuller range of tones and is updated at a rate of 7-1/2 frames per second. Other targets receive lower resolution or are converted to symbols, and are updated every second. Though standard TV is sharper because it uses twice the line resolution and is transmitted at 30 frames per second, this compression technique transmits all vital data with one-thousandth the bandwidth.

Improvements to the U.S. Navy's Phoenix missile will enable the radar-guided weapon to meet anticipated airborne threats through the 1990s. The current model, the AIM-54A, now carried on the F-14 Tomcat fighter, is the service's primary long-range air-to-air weapon. The new AIM-54C incorporates a digital guidance unit that will be more flexible and reliable than the analog unit it replaces. Other changes include an inertial reference system to improve range and accuracy, a solid-state transmitter-receiver with increased capability over the existing klystron tube, and a target-detecting device developed by the Naval Weapons Center. Hughes is building 15 engineering development models of the improved Phoenix for captive flight tests and actual firings.

Hughes Research Laboratories needs scientists for a whole spectrum of long-term sophisticated experiments. Advanced research programs include three-dimensional microelectronics, digital picture processing, space optics, solid-state devices, fiber optics, integrated optics, integrated circuit design, and electro-optical materials. Send resume to Professional Staffing, Dept. SE, Hughes Research Laboratories, 3011 Malibu Canyon Road, Malibu, CA 90265. Equal opportunity M/F/HC.

Finding wasted energy is one of many ways that a hand-held infrared viewer helps its users save money. The device, a Hughes Probeye® viewer, senses heat to create a red-on-black image for display through an eyepiece. It let workers at a large airport pinpoint underground steam leaks within a 10-foot circle, thereby avoiding costly exploratory excavations that would have disrupted airport operations. Paper manufacturers use the viewer to monitor paper sheets for moisture differences that can cause defects. The scanner picks up temperature changes caused by varying moisture conditions. Inquiries about the energy and safety uses of the Probeye viewer should be directed to (714) 438-9191, Ext. 223.

Creating a new world with electronics

HUGHES

HUGHES AIRCRAFT COMPANY
CULVER CITY, CALIFORNIA 90230

EDITOR'S READOUT

CURING THE MEETINGS BLUES

A short time ago we attended a computer conference in Miami Beach. From this experience we learned two great truths:

1. We are in no hurry to return to Miami Beach.
2. There are far too many computer conferences.

The first great truth—like all major revelations—must be experienced to be understood. One hour in Miami Beach should do it.

The second comes on gradually over time, sometimes years. The symptoms manifest themselves individually and institutionally. The first is characterized by a vague sense of exhaustion, an inability to remember which city you are in, chronic *déjà vu* immediately upon entering the exhibit floor, and indigestion. The institutional symptoms include skyrocketing corporate show budgets, exhibit booths that are never returned to storage, and a stretching of marketing and sales resources to the breaking point.

Not that we are against shows. They perform a vital function in our industry; they are our 20th century version of the marketplace and bazaar all rolled into one, and the many levels of interaction that take place cannot be duplicated in any other fashion.

And, of course, they make plenty of money for the show organizers. So, as each new wave of technology crests on the horizon, a gaggle of entrepreneurs comes body surfing along with it, and before long . . . lo! a new show is born.

As every marketing manager knows, shows are extraordinarily costly. The cost of the booth is minimal compared to the money spent for salaries, travel, and entertainment. Even more critical is the time lost by salesman pulling booth duty when they could be making rifle shot sales



calls at the offices of their major accounts. But the marketing manager also knows that his competition will be at the show . . . does he dare not show his company's flag?

The problem is compounded by a limited show season—spring and fall are the prime times. And there are only a limited number of cities to consider—the very best of shows will languish if held in some festering secondary town far removed from the major centers of user population.

The marketing manager is between the proverbial rock and a hard place. He has a finite budget and finite sales resources; yet domestic and international show calendars indicate that he could participate in two exhibits a month and still have shows left over. Every year at budget time he must perform a delicate balancing act and hope he's right.

For a moment let's imagine a more idyllic situation. Suppose there were only four major shows a year. The NCC would certainly be one. Interface would be the major data communications show, and Office Automation would target this growing area. The other major show would be highly oriented to both the classic end user: the dp professional, the director of MIS, the manager of corporate information resources, and, for want of a better term, the end, end user—the unit manager who is now heavily involved in dp but is not a dp professional. This show would bring them together and would focus on the cooperative development of the corporation's information re-

source. Info would be folded in here along with several other shows.

Five or six regional shows would cater to specialized needs and accommodate highly focused programs (for example, a federal adp show in Washington, a software and data base conference, and a text and word processing applications show).

While we're fantasizing, let's revamp the programs. At the major shows, all papers would have to be carefully refereed; the sloppily constructed, last minute programs where the same faces and same speeches show up year after year would be taboo.

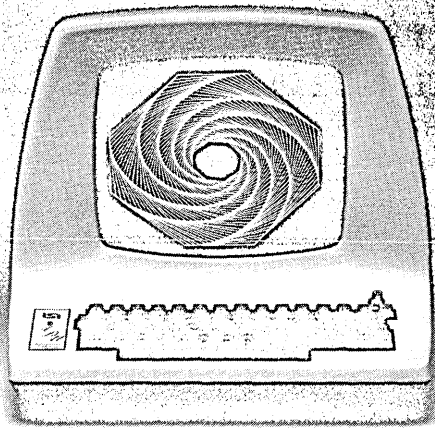
At the regionals, there would be sessions devoted to unabashed vendor presentations, where purveyors of similar services or products would use a prespecified format to pitch their wares so the users could make an apple and apple comparison between the various offerings.

There's much more that could be done, but you get the drift. It is possible? Can it ever happen? Probably not. But while we're fantasizing, let's imagine the major vendors and the organizers of the major shows forming a powerful show governing board to decide such arrangements.

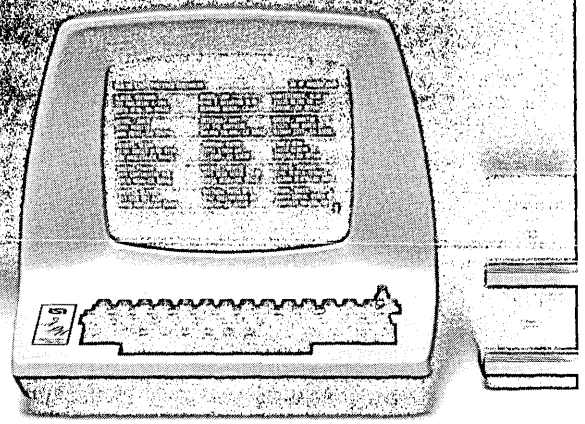
All of us travel-weary industry wanderers would breathe a sigh of relief and beleaguered marketing managers could bring their budgets in line with these difficult, inflation-riddled times.

And one more thing. We might never have to go to Miami Beach again. *

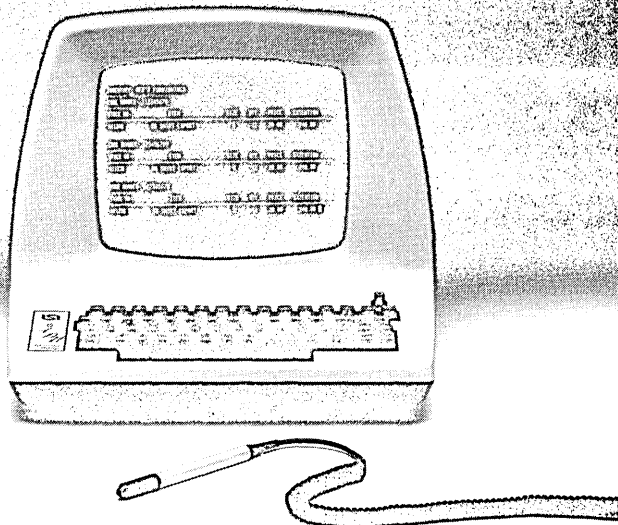
SOPHISTICATED GRAPHICS TERMINAL



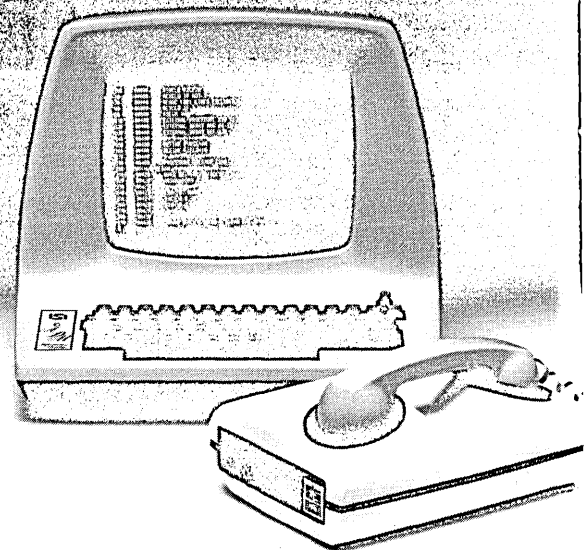
SMALL BUSINESS SYSTEM



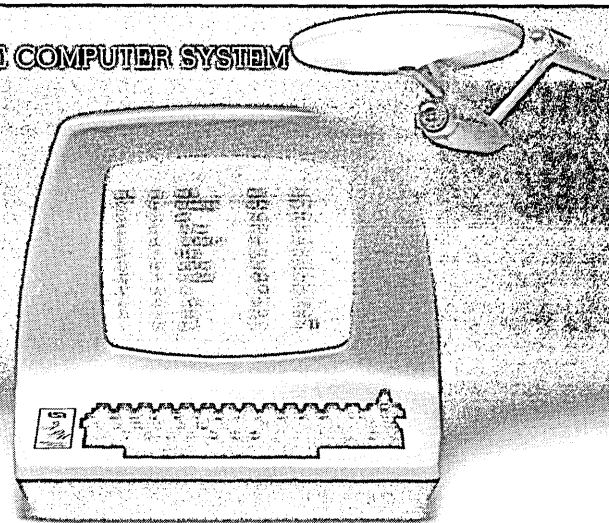
INVENTORY CONTROL



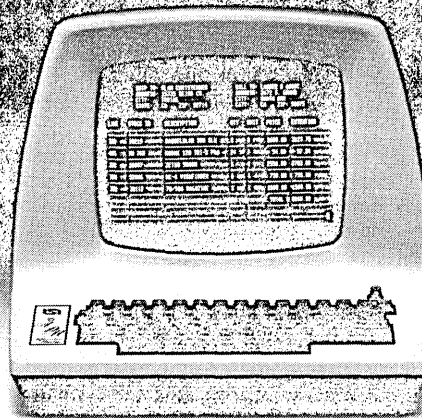
PORTABLE I/O DEVICE



HOME COMPUTER SYSTEM



VERSATILE DATA TERMINAL



What could anyone possibly do with 85,000 Dumb Terminals?

That's how many ADM-3A's there are out in the field working right now. And more being shipped each day. Now just what accounts for such remarkable popularity?

Sure, it's the definitive dumb terminal, adaptable enough to fit a host of applications. It has a 12-inch diagonal screen. Full or half duplex operation at 11 selectable data rates. 1920 easy-to-read characters in 24 rows of 80 letters. 59 entry keys. An RS232C interface extension port. And direct cursor addressing.

But we wondered if all 85,000 Dumb Terminals were being used for just everyday data entry. So we checked around.

And found that people are using Dumb Terminals for things even we never thought of.

THE ADM-3A GOES INTO BUSINESS.

More and more OEM's are putting the Dumb Terminal into small business systems. They assemble a package that usually contains a disk, memory, a printer, and a video display terminal — the adaptable ADM-3A.

So the chances are that when you buy a small business system from someone, it'll contain, you guessed it, the amazing Dumb Terminal.

IT TAKES STOCK OF THE SITUATION.

Many businesses are using the Dumb Terminal, along with a light pen (Universal Product Code Decoder), to keep track of their inventory. The decoder is interfaced to the Dumb Terminal, and when a piece of merchandise imprinted with a Universal Product Code passes under it, the item is entered into a computer for tallying.

Simultaneously, the item is also displayed on the ADM-3A's screen — so it's instantly available for quick double-checking.

PROGRAMMERS LIKE IT, TOO.

Surprisingly enough, many computer programmers use the ADM-3A as an effective, portable I/O device. They can take it into a back room or, along with an acoustic coupler, to their homes if they wish, and compile programs nearly anywhere.

By using telephone lines, they can have direct access to a computer. Or, with the addition of an inexpensive cassette, the programmer can store the program on tape and enter it into the mainframe at a later date — with no loss of data.

THE DUMB TERMINAL PUTS ON A NEW FACE.

Some of our more ambitious customers have transformed their ADM-3A's into sophisticated graphics terminals. Simply by installing another PCB, they've enabled their terminals to perform complex plotting, graphics, and even draw charts.

And the Dumb Terminal is so adaptable that these industrious people had no trouble with installation — the graphics PCB required not the slightest cutting or soldering. It simply slipped right in and started working, all in a matter of minutes.

YOU CAN EVEN TAKE IT HOME TO MEET THE FAMILY.

We discovered that many computer buffs are using the Dumb Terminal as an inexpensive way to upgrade their systems. After all, the equipment found on most microcomputers leaves a lot to be desired. Such as the tiny five or six-inch screen, for instance.

By upgrading to the ADM-3A, they get a full 12-inch screen that's easy on the eyes. Not to mention

DUMB TERMINAL SMART BUY



LEAR SIEGLER, INC.
DATA PRODUCTS DIVISION

Dumb Terminal® terminal is a registered trademark of Lear Siegler, Data Products Division.

CIRCLE 34 ON READER CARD

a lot of capabilities they wanted, but just didn't get on their systems.

All for only \$895.

THE DUMB TERMINAL. THE HALLMARK OF VERSATILITY.

When you get right down to it, the Dumb Terminal's applications are pretty amazing.

It can be interfaced with a staggering variety of RS232 devices. Such as cassettes, disks, floppy disk drives, printers, paper tapes, and readers, to mention just a few.

In fact, the ADM-3A is compatible with just about any RS232 device you can name. Even other video terminals, if you wish.

And people call this a "dumb" terminal?

WHAT WILL THEY THINK OF NEXT?

Who knows? But it seems that as long as there are Dumb Terminals, people will find new, unsuspected uses for them.

Of course, the ADM-3A will continue to be the same dependable data entry terminal that's made it an industry legend.

With good, reliable features and a minimum of frills. Nothing could change that. The fact is, we think that's probably the main reason that so many people have come up with so many uses for the ADM-3A.

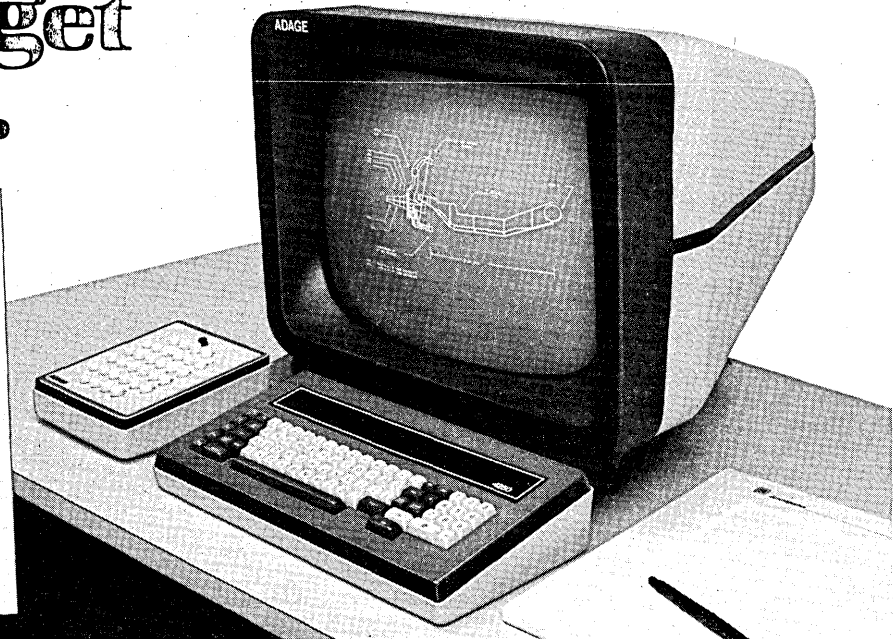
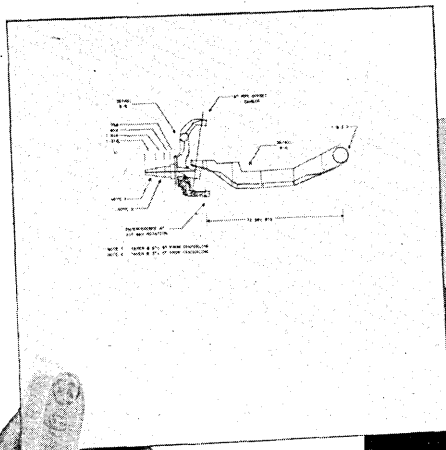
Who said you can't teach a Dumb Terminal new tricks?

Lear Siegler, Inc./Data Products Division, 714 N. Brookhurst Street, Anaheim, CA 92803. (800) 854-3805. In California (714) 774-1010. TWX: 910-591-1157. Telex: 65-5444. Regional Sales Offices: San Francisco (408) 263-0506. Los Angeles (213) 454-9941. Chicago (312) 279-5250. Houston (713) 780-2585. Philadelphia (215) 968-0112. New York (212) 594-6762. Boston (617) 423-1510. Washington, D.C. (301) 459-1826. England (4867) 80666.

CAD/CAM GRAPHICS

The IBM System 360/370

user can get a grip on.



The Adage 4250 is a plug-compatible improvement on the costlier IBM 3250 Display. With superior graphics, local hard copy output — and a host of advanced, user-oriented features — the Adage 4250 is, quite simply, the best interactive display system available for use with large mainframes.

Basic 4250 System advantages include:

- More terminals per I/O channel, giving you a better ROI.
- Faster full duplex transfer rate, for lower channel loading.
- Larger refresh buffers, so you can locally store and display larger portions of your data base.
- Data tablet input, which is more convenient, less tiring than light pen.

For demanding CAD/CAM applications, these special Adage 4250 features give you an even better grip on the toughest graphic problems.

Local hard copy — at the touch of a button. In seconds the 4250 interface captures and processes full, or partial, CRT images for plotter output from 8½" to 72" wide. No CPU interaction required.

Local zoom — allows operator to "scale up" the image for better readability. Again — no burden on your CPU.

Enhanced keyboard — which can include a numeric keypad for easier entry.

Microwave adapter — enables high-speed (1.544 Mbps) trans-

mission between remote terminals and CPU via telephone, microwave or fiber optic links.

Full 3D graphics — available with Adage 4370 System. Provides an extra dimension in interactive graphics for special applications on large mainframes.

To learn more about the Adage advantage, call or write the leader in interactive graphics.



U.S.
One Fortune Drive
Billerica, MA 01821
(617) 667-7070

Europe
Adage GmbH, Marktstrasse 9
3308 Koenigslutter am Elm
West Germany
05353/1089, Telex 095528



THE WEAKEST GO TO THE WALL

Bruce Gilchrist philosophizes on the effects of computers on the economy and society.

by Merrill Cherlin

To find Bruce Gilchrist, you must search out a rather anonymous-looking doorway on West 115th St. between Broadway and Riverside Drive in Manhattan. Columbia University, spilling over the restraining walls of its campus a few blocks away, has invaded the seedy surrounding streets. Its computer center is housed in a distinctly non-ivied pile of brick, and here, on the fifth floor, nestled among books, manuals, and undernourished houseplants, Dr. Gilchrist philosophizes.

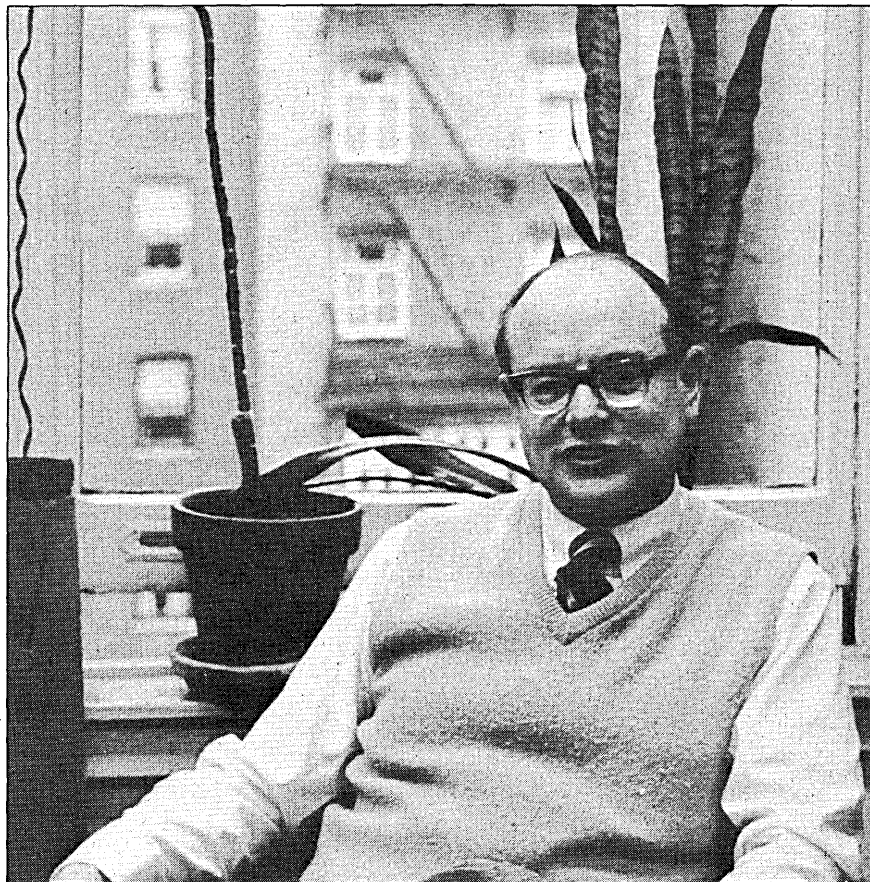
Asked to comment on the long-term effects of computerization on the workplace, the erudite director of Columbia's computer center and former president of AFIPS is definitely not at a loss for words.

"There's one point I'd like to make first," he says. "It's important to realize that computers cannot be considered independently of the economy and society in which we live. It's too simplistic to think otherwise.

"The growth of the economy depends on new products, new services. These imply change—and our economy has continually changed over the last 200 years. The computer is a major cause of change, but not the unique and sole cause. There is no way, therefore, that one can isolate the question: shall we or shall we not use computers? It's like asking: should we run New York City without electricity? It doesn't make sense to ask the question or spend time on the answer. Where there is concern is when change comes so fast in an area that it has an above average effect on people."

Three of those areas in which computerization has caused massive job loss are newspaper composing rooms, supermarket checkout counters (due to electronic scanners), and the telephone company (replacing operators). Gilchrist has studied these particular cases and has written extensively on his findings. His conclusions are that while the job losses could not and should not have been prevented, the lack of support systems and retraining for those fired is pretty shameful.

He says, "Historically, the free enterprise response has been, 'You got in the wrong job—too bad. The weakest go to the wall.' Over the last 40 years the United States has had a number of programs to ameliorate the effects of change, with labor agreements, private charities, and so forth.



These have played a role in facilitating change in the work force. But the difficulty comes when these mechanisms don't work for people. Take the example of newspaper typesetters; suddenly they were obsolete. There, unemployment affected a skilled group led to expect stability. They had earned high wages, but suddenly found themselves back in the labor market at an advanced age. They couldn't find jobs at anything like the level at which they had been. When you earned \$20,000 a year and now can only earn \$10,000, it's a shock to the family unit.

"Our help sources tend to be for people at a much lower economic level. There's no sympathy for an executive who loses a \$100,000 job and who can only find a \$50,000 job. There's more concern for someone who has to go from earning \$20,000 to \$10,000. But CETA programs and so on don't affect these people. We need more government programs for retraining people like this."

According to Gilchrist, supermarket checkers and telephone operators will probably not lose their jobs due to technological improvements in their work; those two jobs have such high staff turnover that employers can simply wait until attrition solves the problem. "Though it's not as easily noticed, the removal of jobs at the bottom end of the spectrum is of concern. It's unlikely that people will get pink slips because their store has installed scanners, for instance; it's just that not as many weekend high school students will be hired. But this has a cumulative effect, and it makes it increasingly hard for the unskilled to find jobs. The yet-to-be-employed have no ombudsman to stand up for them."

This is the group, Gilchrist says, on which computer-related job loss will have the greatest impact—on the young, yet-to-be-employed, unskilled worker. If thousands of jobs are taken away, more will have to be created somewhere else. As he sees it, these jobs will crop up in the service

FOCUS

industry, in areas where computers can't possibly replace people.

"That's where the growth is," he claims, "from waiters to people servicing electronic equipment. The impact of computers on employment will be somewhat less as more people enter the service industry. You can't get one waiter to serve twice the number of people, whereas in a factory, automation can cut the labor force in half."

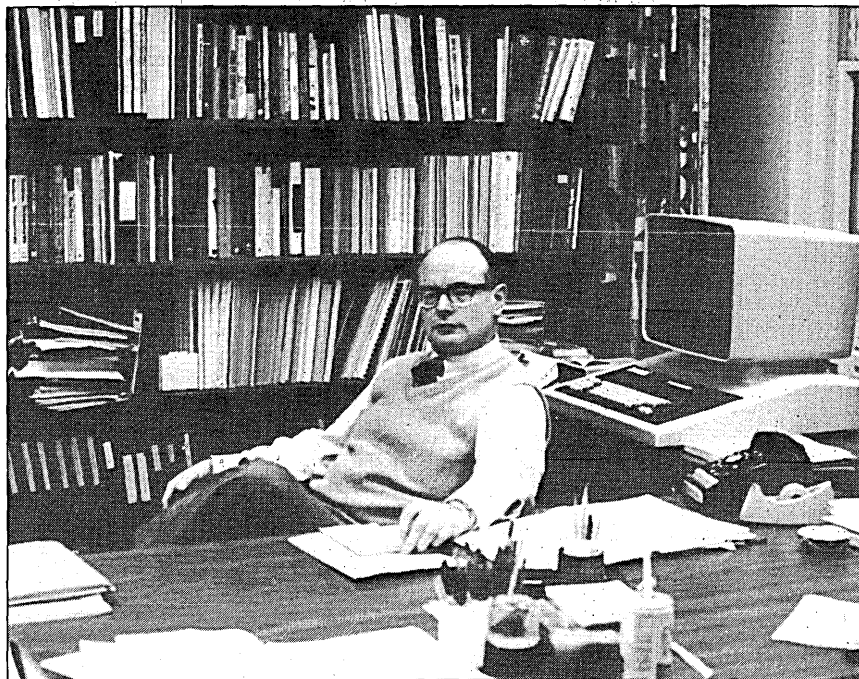
But, he continues, a massive reeducation of society would be necessary to get people to accept the low status service jobs. It means, for them, moving in a direction different from the one they'd been led to expect. "In Europe, in the Middle Ages, fathers, sons, and grandsons all carried on the same work and lived in the same place, but we don't live that way anymore.

"It's almost impossible to find a stonemason now, because the stonemason sends his kid to college. He leaves a gap. He wants to be upwardly mobile and do white collar work. But what happens when you need a stonemason? Or a plumber? You always hear people say that a good plumber is worth his weight in gold. There are a lot of jobs that could be done in the city. New York is filthy, and full of abandoned buildings. It's also full of unemployed people, but we can't seem to match up jobs with people."

Unfortunately, prestige plays a large role in peoples' resistance to do what it seen as menial labor. Gilchrist continues, "A waiter should be just as valued a member of society as a typesetter, but that's not always recognized. We have to learn to pass on some of that respect to the service functions so that young people will be encouraged to go into them. Our educational system has to discuss, from prekindergarten on, realistic expectations for future employment."

He says the women's movement remedied a similar problem—portrayal of women in children's textbooks. Now kids can learn to read in a book about a physician mother and a businessman father. He says that a similar overhauling of textbooks is needed, one where the nice, respectable father is a waiter and the mother a chambermaid, for example. He also hopes to see "reasonable changes in school guidance programs" that will steer students toward the service industry.

Generally speaking, though, Gilchrist does not think the use of computers is driving people from the work force, because computers have improved the economy and we've been more productive. He says, "The level of total employment goes up as the gross national product increases. There's no evidence that computerization over the last 20 years has lessened the total number of jobs. There are a lot more people employed now than in the 1950s, at the start of the computer age. New jobs have been created. There are some exceptions, of



course—we've had increased phone use but fewer operators are employed.

"A lot has been written about the impact in the office on white collar workers; for example, billing systems replace typists who used to get bills out by hand. But I don't feel the change will be as rapid as the prophets of doom predict. A secretary does lots of things besides type. Large typing pools will be affected, but otherwise things will change bit by bit. We're also dealing with the human inertia factor, of course.

"Overall, I'm not alarmed at the prospect of mass unemployment due to computers, but I am alarmed when pockets of employment are affected. We don't have the means of dealing with them."

Gilchrist feels cooperation may be

"Historically, the free enterprise response has been, 'You got in the wrong job—too bad. The weakest go to the wall.'"

the means of coping with this problem, at least in part. "Labor organizations will say, 'We can no longer stand for this [firing of workers because of computerization].' But it may backfire. Workers at the *London Times*, for example, wouldn't accept the newer technology, and the paper nearly went out of business. There is resistance by workers and a lack of understanding by management. It takes two to make a confrontation.

"I'd like to see a cooperative approach. In Norway, management doesn't automate without discussing it first with the workers. We can't solve problems by confrontation, just by cooperation. I think we'll see more cooperation, but for the wrong

reasons: management doesn't want labor problems or people screwing up. The right reason is because people are important.

"The secretaries here have been able to decide how much they want to use terminals for text processing. Now they're the enthusiastic ones who want more terminals. It doesn't work if management just mandates. We've got to solve all these problems before they get worse or we'll just build up resistance.

"I realize, though, that people who say that are accused of wanting palliatives, when 'we should just ban computers!' I feel computers can be helpful to mankind. But I'm biased, I earn my living that way."

Most of all, says Gilchrist, computers mean progress; we all know it, so let's not kid ourselves. "You cannot legislate against progress! Those who hung on to the horsedrawn carriage could not prevent the coming of automobiles. I don't know of any case where progress was stopped because people didn't want it. You can't really ban things.

"I can't envision a world in which we didn't use computers—they can do so much. But—if you look at the whole social cost to an area, you may see you're better off not moving as fast.

"In the U.S. we moved rapidly from operator-run elevators to self-run elevators. In other countries they've preserved the operators. They kept these people employed, and—an additional safety feature—have prevented muggings from occurring in unattended elevators. Maybe we shouldn't have gotten rid of these guys. We may want to preserve jobs and some of the more personal advantages.

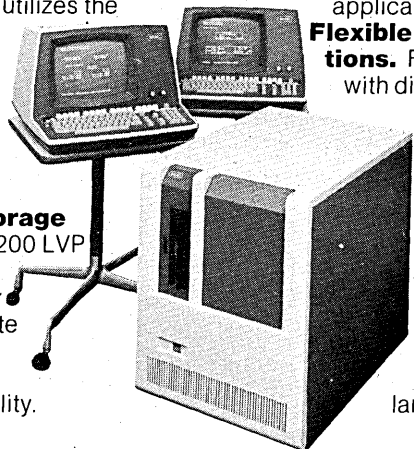
"There has to be an awareness that we can't pull people out of the system entirely. We're not replacing people with ma-

Wang's New 2200 LVP: The multi-user computer that stands alone.

In its under-\$20,000 price range, Wang's new 2200 LVP computer outclasses the competition with a unique combination of:

Powerful Performance. A true multi-terminal, multi-processing system, the 2200 LVP utilizes the same architecture and bus structure that has made the Wang 2200 one of the fastest and most popular small computers in the industry.

Advanced Disk Storage Technology. The 2200 LVP combines new fixed disk and dual-sided, double-density diskette drive technology for greater reliability, performance, and portability.



Comprehensive Data Entry/File Management. The LVP's versatile data entry terminal and I.D.E.A.S. data management software make the system ideal for clustered data entry and program development applications.

Flexible Telecommunications. For larger companies with distributed processing requirements, the 2200 LVP supports a full line of asynchronous and bi-synchronous telecommunications in a variety of industry-standard protocols.

Easy System Expansion. Modularly add terminals and

all the memory and printers you're likely to need as your business grows. And with full software compatibility, you can be sure your investment is protected.

The Wang 2200 LVP. It stands alone.

Tell me more about Wang's 2200 LVP.

Name _____
Title _____
Organization _____
Address _____
City _____ State _____ Zip _____
Phone _____

Send to: Wang Laboratories, Inc.
Lowell, MA 01851 (617) 459-5000

DP108/D50

WANG

Making the world more productive.

© 1980 Wang Laboratories, Inc., Lowell, Mass. 01851

CIRCLE 36 ON READER CARD

FOCUS

chines, but with a combination of people and machines to do a better job. It could involve fewer people or more people. A person and a machine are better than a machine alone. My own feeling is that the combination is more successful, though there are those that argue that the machine is more reliable.

"We also have to be concerned about jumping to systems that may have lots of abilities but, when they don't work right, cause major problems. We have to be careful we don't build systems we grow to depend upon but that don't have backup or failsafe capabilities. Till Three Mile Island we didn't realize how sloppy things can get. Complex systems aren't easy to maintain and keep working. Should we keep a PhD physicist in every control room, just in case

"There's no evidence that computerization over the last 20 years has lessened the total number of jobs."

today's the one day in every 12 years it all collapses?

"We have to reduce the impact of change by going slowly and letting people have time to adjust. The Victorians wore a lot of clothes to the beach. We go practically nude. But over a hundred-year span we

didn't even realize it was happening. My mother was born in the 1890s, pre-Wright Brothers. Now she happily flies the Atlantic. I'm sure it's never concerned her, this change, because it's come over a period of time."

A way of lessening one's fear of anything is through education. Gilchrist feels, "It's almost criminal to have kids leave school without some knowledge of computers. What are its functions? Are computers always right or can they make mistakes? How does an order from shop to plant work? The kids don't have to learn to program. You can talk in simple terms for those without much interest, but in more complex terms for highly motivated kids. They might use these machines in their chosen professions. Unfortunately, there's a significant lack of teachers who know enough to teach others about computers."

Should schoolchildren be allowed to use calculators when doing math problems, or will new generations that use them lose most knowledge of mathematics? Gilchrist's answer: "They have to understand some math concepts, but to not use a calculator seems ridiculous to me right now. I don't think they can use calculators without understanding the process, and it removes the mechanics that cause students the most difficulty and frustration. They make so



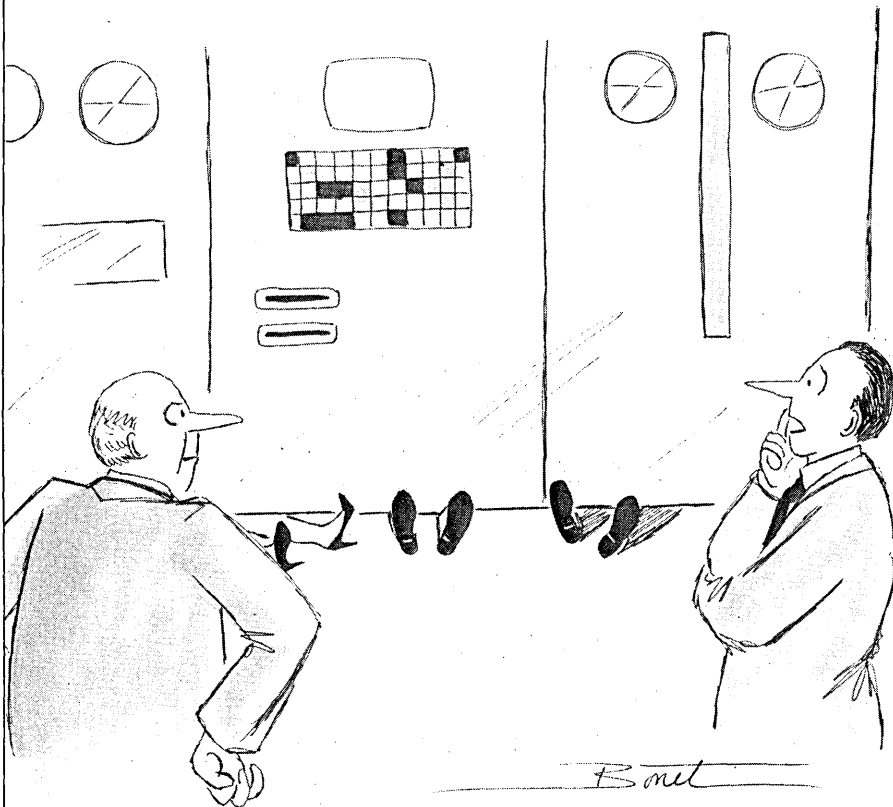
many mistakes, and are never sure the answer's right. Hey—who understands the automobile engine? Yet we're allowed to drive a car. We must know some functions of the car, that's all. They teach driver education without auto mechanics."

Bruce Gilchrist is, of course, heavily involved in education through his role at Columbia. He's responsible for central academic and administrative computing activities, for providing facilities for students and researchers, and for improving administrative systems "such as accounting, payroll, and all that sort of stuff." He teaches a course in the school of engineering and seminars in the graduate school of business. He teaches "Computers and Society"—the object of which is "to get students to think about the possible consequence of computer use."

If by now you have received the impression that Gilchrist is a person with a finely tuned social conscience, you're right. He feels that the responsibility of computer professionals is enormous and hopes to see them exercise this responsibility for the good of people, not just the industry.

He says, "The challenge is to work with users to see they get what they want. Don't be content with just talking to the wholesaler; you should make sure you see what happens at the end of the road. For example, the banks set up these easy money machines so you can withdraw money any time of the day or night. Now they find they are the sites of lots of robberies. It's the job of the computer person to go beyond designing the technology to thinking about the end usage.

"He shouldn't think he's also an expert in sociology, but he should perhaps involve sociologists and psychologists to work out the complete picture. I don't believe systems are neutral nor do I believe in this attitude, 'It's the user's responsibility.' It's like making a gun. You can shoot wildlife or you can shoot people—it's up to the



"It's one thing to replace three employees with this machine, but shouldn't you at least have fired them first?"

©DATAMATION

A Timeplex Report on Statistical Multiplexing

TRUTH NO.

3

PROGRAMMABLE TRAFFIC CONTROL IMPROVES NETWORK INTEGRITY

What Is Programmable Traffic Control?

TIMEPLEX' Programmable Traffic Control is a unique feature of the industry-leading SERIES II MICROPLEXER™ family of statistical multiplexers that prevents data loss under high traffic conditions. Each SERIES II MICROPLEXER* data channel can be individually field programmed to either dynamically control incoming traffic or be controlled by external devices such as buffered printers. The remote MICROPLEXER may be programmed to a different traffic control protocol from the host site unit.

Is It Important, And Why?

Yes! All statistical multiplexers have buffer memories that can fill to capacity under high traffic conditions. Programmable Traffic Control regulates the traffic flow to prevent overflow and to ensure that no data will be lost in a variety of network configurations.

Does The Competition Have Comparable Traffic Control?

No! The limited traffic control options for every competitive unit are fixed on either a per multiplexer or per system basis.

Free Illustrated Handbook!

Programmable Traffic Control is only one truth about statistical multiplexing. Learn the entire truth! Write or call to receive an illustrated handbook on statistical multiplexing from TIMEPLEX, the world leader in data multiplexing.

Timeplex®

Timeplex, Inc./One Communications Plaza/Rochelle Park, NJ 07662
(201) 368-1113 TWX: 710-990-5483

CIRCLE 37 ON READER CARD

*PAT. PEND.

FOCUS

user. You can't wash your hands of your product. You should design and use the product in a thoughtful manner."

Gilchrist gives several more general examples of the kind of long-term thinking he feels should be applied to computer usage, saying, "My mother lives out in the country. There used to be a bus into town every 10 to 15 minutes. With increased car ownership, the bus now only runs once an hour. My mother doesn't own a car, so for her, transportation has deteriorated.

"We built a big highway system in this country. This brought industry out to the countryside and the cities began to die.

That's not to say we shouldn't have built highways, but we should be able to predict the social consequences. After thinking about things we may decide to change them, but we should make modifications, not just rush into change. Maybe we won't be able to stop the outcome, though," he trails off musingly.

"Anyway," he continues, "we need more studies in the U.S. to focus our attention on where problems will be—especially in an office situation.

"I don't want computer people to feel they can take over the world, on the other hand. We have a very special knowl-

edge, can do detailed systems analysis, and have the tendency to think the world can be run by analyzing problems and making logical choices. But the world is not like that. Our knowledge has to be tempered by the skills of other people—for instance, a marketer knows what will sell, even if it's not logical. The user must be an active participant, but not the boss. He shouldn't tell everyone what to do.

"We should inject computer science grads with a good dose of questioning about what they're doing and make sure other people understand something of the technology. We need a coming together. Eventually, most computer people will feel they're not just technicians and others won't feel they're a race unto themselves, speaking a language no one else understands. There are positive signs . . . now an educated person is supposed to know something about computers and most places give computer scientists at least one course in social issues.

"I don't see computer-knowledgeable people becoming the elite of the business world, though they've moved up from department managers to vice presidents. Now they must appreciate the other pieces of it.

"The gap I do see widening is between the employed and the never-employed young people. But I don't think we'll have a subservient mass that goes to revolution. We'd have social protest long before that, and lots of mitigation of the impact of computers along the way!"

Gilchrist appears to never tire of good talk. He speaks of his professional and personal lives as if they are one. A native of England but now a U.S. citizen, Gilchrist has lived in the States since 1952, when he came to the Institute for Advanced Study at Princeton to work with John Von Neumann. He lives with his wife, who is a reading teacher, and three sons in Westchester County, New York, a suburban area not immune to the Gilchrist influence.

For 10 years he served on the school board, and now he's on the zoning board of appeal. There, too, he gets to ponder some of life's great questions. He's so far attended eight meetings devoted to debate on whether or not the Moonies should be allowed to set up a center in town. Currently at issue is whether a goat is a common household pet. The question is still unresolved, and we leave Bruce Gilchrist, leaning back in his desk chair, sipping a diet Pepsi, and pondering this and other cosmic unknowns. *

Ms. Cherlin, a former Datamation employee, is currently a freelance writer in Baltimore, Md. Her articles have appeared in numerous national publications; she's a regular contributor to the *Baltimore Sun* and *Baltimore Magazine*.

SOFTWARE AUTHORS

TAKE THIS OPPORTUNITY TO INVEST IN YOUR FUTURE

We are a major, multi-million dollar organization which specializes in international promotion and sale of software products across multiple CPU and peripheral equipment lines.

If you presently manufacture, or plan to introduce, innovative software solutions in the following areas:

- FINANCIAL APPLICATIONS
- MANUFACTURING APPLICATIONS
- MEDICAL ADMINISTRATIVE APPLICATIONS
- GRAPHIC DISPLAY SYSTEMS
- DATABASE MANAGEMENT SYSTEMS & LANGUAGES
- TIMESHARING MONITORS
- NETWORK COMMUNICATIONS
- OPERATING SYSTEM AND UTILITY ENHANCEMENTS OR REPLACEMENTS

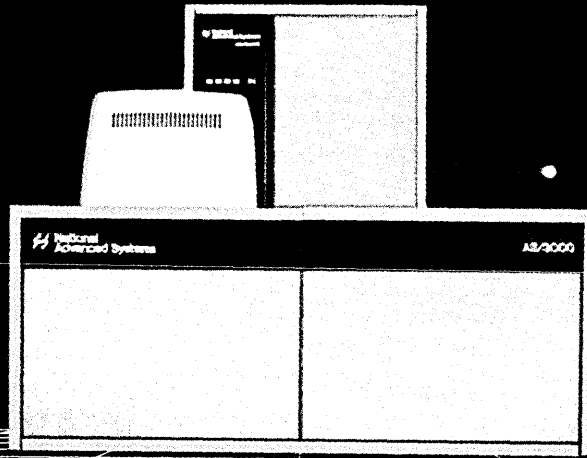
reply now to:

olamic

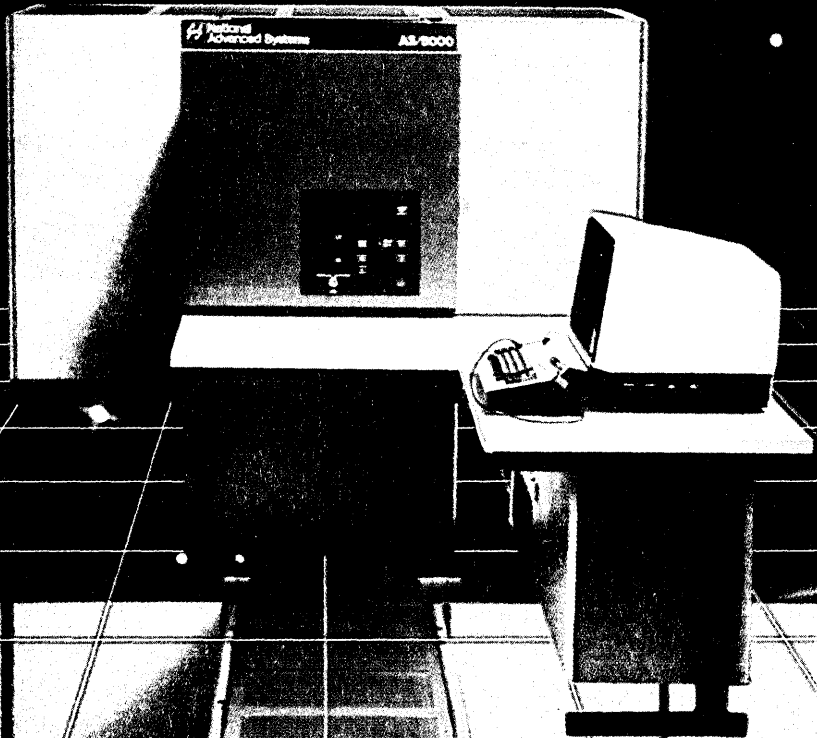
OLAMIC SYSTEMS CORP. • SOFTWARE PUBLISHING DIV.
503 N. EUCLID AVE. • BAY CITY, MI 48706
PHONE (517) 686-7725

and, discover how our unique structured marketing plan can help you realize the optimal return on your development dollars.

AS/3000



AS/5000



AS/7000



Announcing the broadest range of IBM compatible computers.

National Semiconductor, our parent company, has been a manufacturer of program-compatible computers for over five years.

In fact, National has produced more compatible computers than anyone else. Now, with the formation of National Advanced Systems, we are a formidable force in the IBM-compatible field.

With the recent announcement of new members to our proven Advanced Systems (AS) product family, we now offer the broadest range of compatible computers on the market today. Computers that use a microcode-based design to insure compatibility with current IBM products and future enhancements.

National Advanced Systems, through the AS product family, now offers the user significant advantages in terms of price, performance, reliability, and financing alternatives. We feature the finest post-installation service and support in the entire industry. We have a complete line of products and services that the user can grow with, offering long-term, unparalleled business solutions for your information processing needs.

The AS/3000 Series. **Sometimes less really is more.**

Our AS/3000 is a medium-scale, highly reliable computer series that offers a performance range equal to an IBM 4341 on the low end, and a 370/158-3 on the high end.

The AS/3000 is field-upgradable and supports all current and past popular releases of IBM operating systems. Flexible software support programs provide the AS/3000 user with the ability to tailor software support to meet specific needs.

In addition to purchase and long-term lease options, the AS/3000 may also be obtained through several highly competitive short-term leases of variable length.

The AS/5000. High technology, low cost.

Offering superior performance and reliability at a lower price, our AS/5000 is the sensible alternative to the IBM 3031.

Through the use of advanced integrated circuit technology, the number of components, pins and connections in the AS/5000 is substantially less than used by IBM. The AS/5000 is also lighter, takes up less floor space, and uses about 50% less power than its IBM counterpart.

What this means is dependability greater than anyone else can offer. With technology that is unsurpassed by anything in its class.

The AS/7000 Series. **Dependability you can count on.**

Dependability is synonymous with our AS/7000 Series, the true price/performance alternative to the middle and upper end of IBM's 303X series. Increased dependability results from the most recent manufacturing advances and the latest proven technology. That technology plus rigorous testing combine to deliver the highest degree of reliability possible.

The AS/7000 Series is composed of three field-upgradable models. The AS/7000N can be upgraded to the AS/7000, which can in turn be upgraded to the AS/7000DPC, offering significant "in-place" growth capacity and thereby protecting your investment.

And there's no waiting.

Our Advanced Systems are available now. All our deliveries are on schedule. So you can receive shipment of your computer when you want it — and need it.

If all this sounds interesting to you, write to us at National Advanced Systems. We'll be happy to give you all the information you need on our Advanced Systems.

The compatible computer line from the Compatible Computer Company.

 **National
Advanced Systems**

The Compatible Computer Company
A subsidiary of National Semiconductor.

3145 Porter Drive, Palo Alto, CA 94304, (415) 856-5000

DIGITAL INTRODUCES THE MOST AWESOME ARRAY

At Digital, network technology has just taken another giant step.

Announcing Phase III networking: a host of new capabilities that will make your computer power easier to allocate, easier to control, and easier than ever to justify to your management.

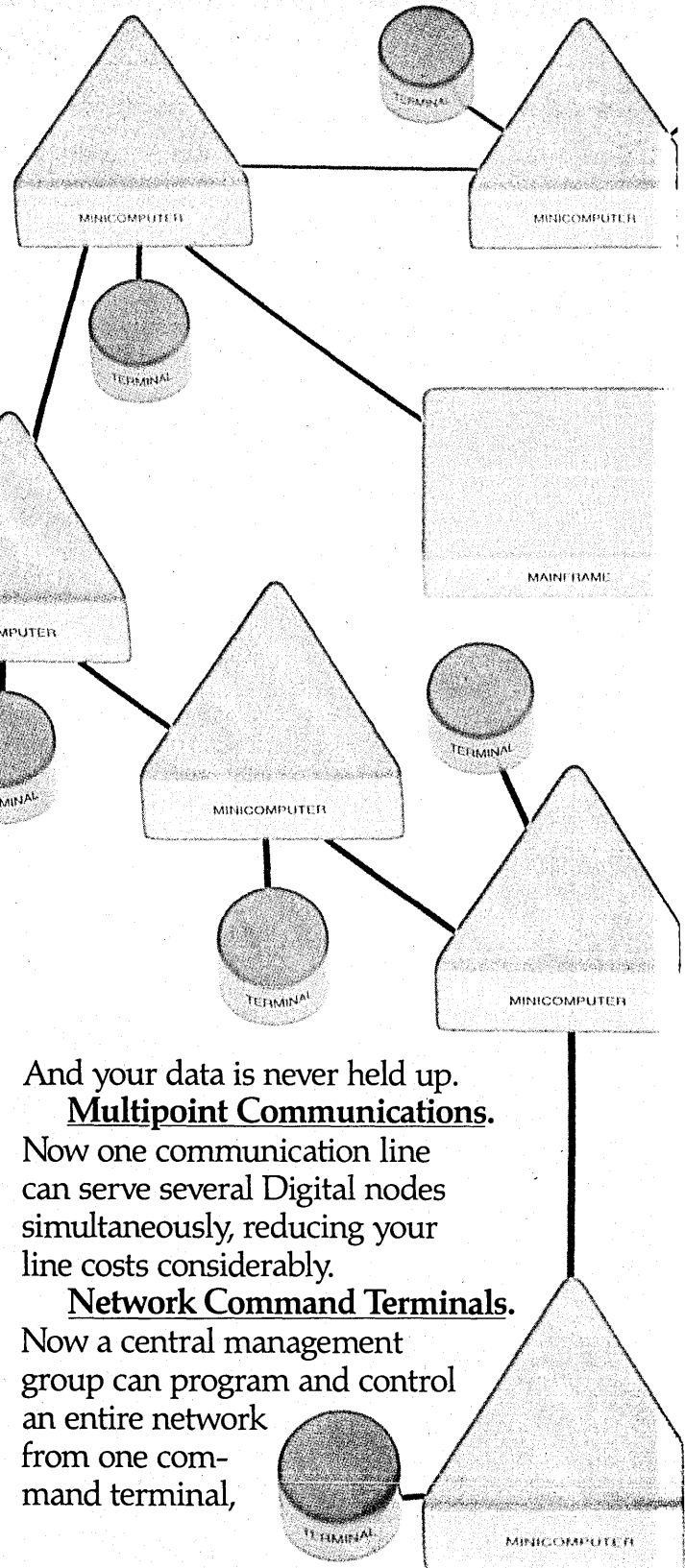
With Phase III, your options have never been greater. Or more cost-effective. As always, you can match the right Digital system to the right local job. But now, you can network those systems virtually wherever, whenever, and however you want. Even when your mix includes another manufacturer's mainframe.

And no matter how you network, you'll be doing it in the most economical way possible. Just consider these new capabilities.

SNA Protocol Emulator.

Now Digital systems can talk to and support IBM mainframes using the SNA protocol. Thus, you can protect an investment in hierarchical networks, even as you commit to more flexible distributed systems.

Adaptive Routing. Now Digital networks can automatically find the least expensive path between two nodes. Not only that, they automatically re-route information around problem areas. Your line costs are held down.



And your data is never held up.

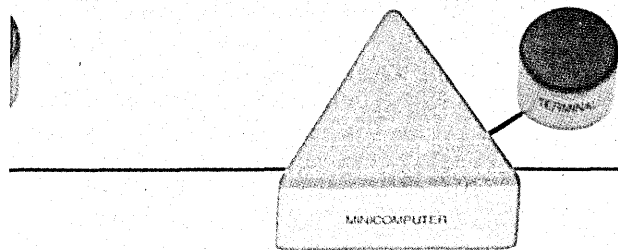
Multipoint Communications.

Now one communication line can serve several Digital nodes simultaneously, reducing your line costs considerably.

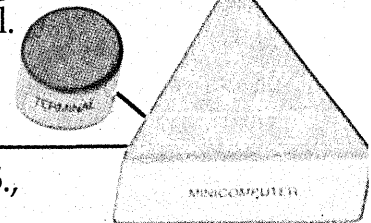
Network Command Terminals.

Now a central management group can program and control an entire network from one command terminal,

PHASE III. OF NETWORK OPTIONS EVER.



public packet switching networks using the X.25 protocol. Digital Packetnets are currently being tested

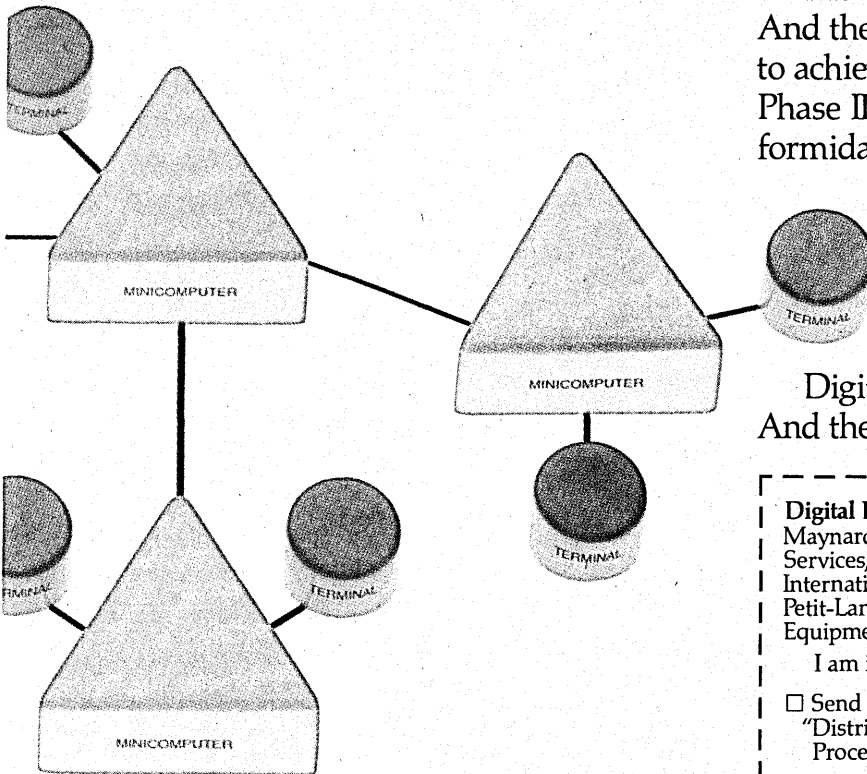


and certified in the U.S., Canada, and France.

More flexibility. More control. And the most cost-effective ways to achieve them. Add these new Phase III capabilities to the already formidable array of Digital

networking options, and you have the elements of an awesome network.

But then, that's just what you'd expect from Digital. Innovative technology. And the leadership to put it to work.



thus cutting the cost of programming individual nodes in widely dispersed locations.

Enhanced Network Management.

Now you can add on systems, change communication links, gather operating statistics, and detect problems, all without shutting down the network. Imagine the savings on downtime and expansion costs.

X.25 Packetnets. Digital is firmly committed to supporting

Digital Equipment Corporation, 146 Main Street, Maynard, Massachusetts 01754. Attn: Communication Services, NR-2/2 or Digital Equipment Corporation International, 12 av. des Morgines, 1213 Petit-Lancy, Geneva, Switzerland. In Canada, Digital Equipment of Canada, Ltd.

I am interested in Digital's Phase III. Tell me more.

- Send me the brochure, "Distributed Data Processing and Networks." Send me the handbook, "Introduction to DECnet."

Name _____

Company _____

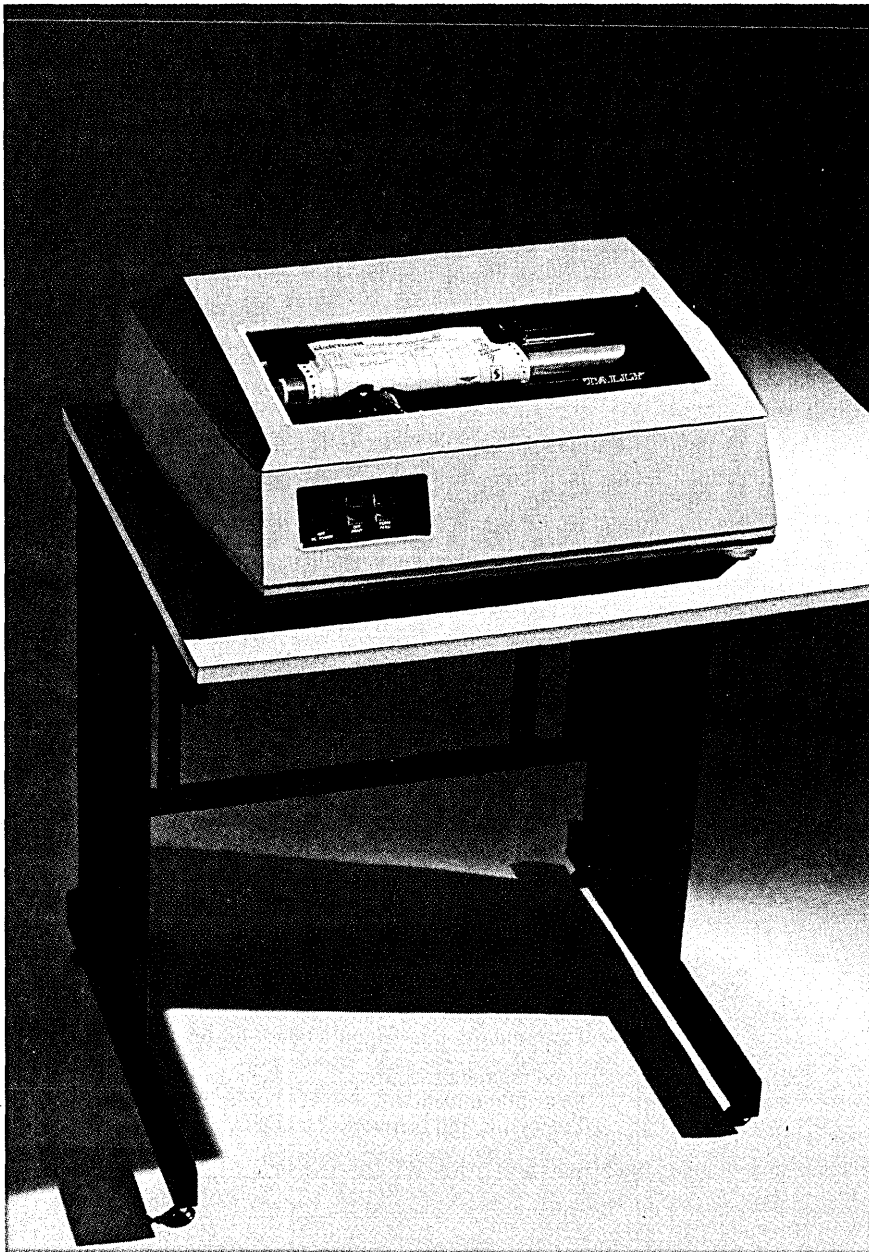
Street _____

City _____ State _____ Zip _____

digital

CIRCLE 41 ON READER CARD

A NEW SERIAL PRINTER FROM THE LEADER IN MATRIX TECHNOLOGY



Mannesmann Tally sets the pace in price with the T1705.

From the Tally tradition of quality and reliability comes another dramatic advancement in lowered cost of ownership. A combination of low purchase price, low maintenance costs and low parts usage. A "no options" fully loaded printer that combines the latest in LSI electronics with precision mechanics. You get standard features that are extra cost options on other printers.

OEM's will select it because users will prefer it!

The T1705 is the quietest impact printer on the market. It has 160 cps optimized bi-directional printing with high speed 48ips head slew for throughput speeds up to 200 lines per minute. Rugged reliability. No preventive maintenance requirements.

Standard features include a new operator changeable precision print head for long life and superb print quality. Dual tractors for positive paper positioning and control. Operator selectable 6 or 8 lpi spacing. Self test. Forms control. A convenient snap-in ribbon cartridge for clean, fast and easy ribbon changing. Double wide character printing. And a buffered serial interface.

A new serial printer. Competitively priced. 30 day delivery. Call your nearest Tally sales representative today.

See us at NCC Anaheim,
Booth #1527



**MANNESMANN
TALLY**

Mannesmann Tally
8301 South 180th Street
Kent, WA 98031. (206) 251-5524.
Telex - 320-200



CIRCLE 42 ON READER CARD

LOOK AHEAD

(continued from page 22)

ADR BOWS TO
CATV INDUSTRY

are streamers, which Freeman predicts will be the dominant back-up devices. He also has specs on six half-inch drives, three yet to be announced. One is due for introduction at NCC, along with three removable 8-inch cartridge disk drives.

TWO PI TIGHTENS
THE BELT

Applied Data Research is introducing its first turnkey business system, a \$100,000 operations management system built around the DEC 11/34, for the lusty cable tv industry.

First indications of a belt-tightening are showing up. Two Pi Corp. last month closed its advanced R&D facility in Anaheim, Calif., 500 miles from HQ in Santa Clara. The equipment has been sold to the R&D plant of Magnavox, another division of Philips, in Torrance, just south of Los Angeles. And a few people are relocating there, a few being moved to HQ. In Santa Clara, however, plant expansion from 35,000 to 55,000 square feet is planned as shipment of 370-compatible minis is stepped up. President Jared Anderson says they shipped their 100th machine last December, are now shipping three per week, and calls the contraction a consolidation of engineering staffs.

THE GERMANS
ARE HERE

Vollwood Computer Services, GmbH, the largest German third party service company, has set up office in Wayland, Mass., to seek U.S. vendor contracts for total support and service in Europe.

COMPUTERIZED
HIT LISTS?

Is there automated crime? Prof. John M. Carroll of the Univ. of Western Ontario thinks so. He tells of a counter-culture group in Los Angeles that maintains a computer-based hit list of execs of American firms doing business in Latin America and of hit lists of jewelry and valuables and the computerized rigging of odds on horse racing.

RUMORS AND
RAW RANDOM DATA

"It's a good clean operation," says Rube Kuriposky of an organization he is attempting to launch called SOAP (Society of Old Abused Programmers). Programmers over 40 with at least 15 years in programming qualify for membership. "After 15 years, a programmer either gets stage fright or punch drunk and feels frustration with management," says the Informatics employee, who feels SOAP can help. "We'll hold semi-annual meetings and we'll call them SOAP operas"....The pace of foreign takeovers and mergers in the U.S. dp industry seems to have slowed recently, even as the motivation for such deals -- lucrative market growth, expensive money -- grows. "Perhaps," says ADL's Frederic Withington, "we're seeing the calm before the storm."

NEWS IN PERSPECTIVE

MERGERS

STORDAHL IN THE MAKING?

The announcement of merger talks between Storage Tech and Amdahl has met with mixed reactions from industry observers.

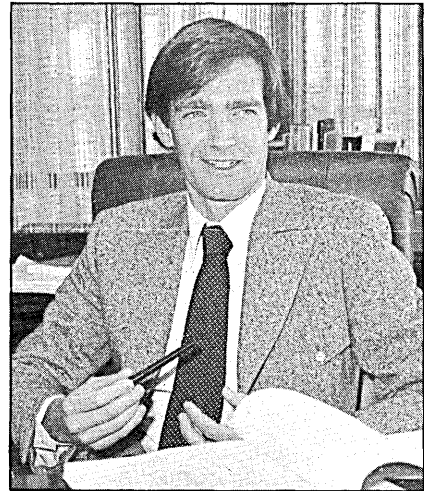
Industry pundits last month were generally bullish on news that a new systems company was in the making, this in the IBM plug-compatible marketplace. Should shareholders approve, Amdahl Corp. and Storage Technology Corp. will become one, perhaps forming Stordahl.

This follows earlier merger negotiations last year between STC and Memorex Corp. and between Memorex and Amdahl, neither of which materialized. This new letter of agreement also follows by only a few days the announcement of Amdahl's agreement to merge with Tran Telecommunications Corp. of Marina del Rey, Calif., a successful designer and manufacturer of digital communications networks.

It's possible the new combine, representing companies known for their leading-edge technologies, will chalk up revenues this year of close to \$1 billion. Tran, under the leadership of founder and chairman Ray W. Sanders, had sales of almost \$20 million last year, its 10th anniversary year. The company employs more than 500. Also celebrating its 10th anniversary last year was Storage Tech, which employs 7,500 and had revenues last year of \$480 million. The company historically spends from 6% to 8% of revenues on R&D. And Amdahl last year ended its first decade watching its sales fall by 7% from the year before, to \$300 million. The company, whose success has been based on leading-edge products, typically spends from 9% to 11% on R&D, but this figure rose to the 13% to 15% level last year as revenues fell.

STC cofounder and chairman Jesse I. Aweida, slated to become chairman of the new organization, says the proposed combine "has very strong technology. And the technology's going to put us in a good spot for the future." He notes that the products of the three companies complement each other, even the communications products being marketed by Storage Tech. "I think you're going to see communications becoming an important part of this new business."

But 1979 was a humbling year for Amdahl. Demand for its products plummeted last year as users chose to delay com-



DAVID T. MORGENTHALER II: "We have no intention of voluntarily veering from [IBM] compatibility."

mitments until they could see what IBM's new H Series machines look like. It was the same fickle marketplace that led to ITEL Corp.'s withdrawal from the PCM business. "There is an anxiety hanging over the marketplace," Amdahl chairman Eugene White told the financial community recently. The company last year found it was manufacturing faster than customers wanted deliveries, so it cut back to where shipments exceeded production.

Compounding this situation, Amdahl customers who were expected to buy chose instead to lease. Where historically 90% of shipments were purchases, this figure ran below 70% at times, where it is said to have since leveled off. Finally, Amdahl was the victim of its own charity. Because it provides a field-upgradable capability, users began buying small, ordering mainly from the lower end of the product line. Still, the company has some 350 systems installed—nothing to be ashamed of, to be sure, but far below what had been projected at the start of 1979.

Analysts in the financial community are upbeat about the proposed merger.

But analysts in the financial community are upbeat about the proposed merger, one describing the new organization as being greater than the sum of its parts. Consultant David E. Gold of Saratoga, Calif., thinks "it may be one of those marriages made in heaven." And Omri Serlin, the consultant who expressed his doubts about the PCM business in these pages last month (see p. 63), says he hasn't changed his mind about PCMs but readily admits that for the short haul, meaning the next five years or so, it looks good for Amdahl.

Analyst Ulric Weil of Morgan Stanley & Co. in New York worries about the

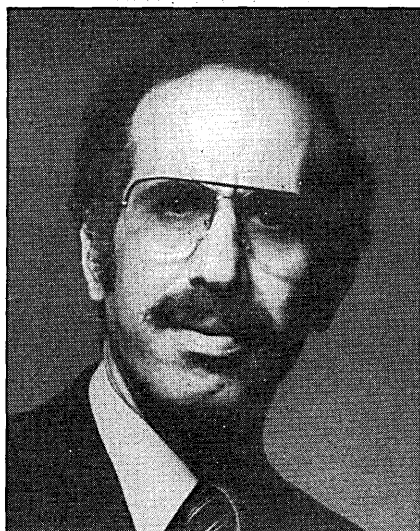
economy in the next 12 to 24 months, what with the upcoming recession and the current monetary crunch. He suggests that one must distinguish between the short and long term, less than 18 and more than 18 months, saying, "Assuming we eventually get to the long term. . . ." And he says that's meant to be a global statement, not referring only to Amdahl.

"If we get to the long term," Weil says, "then I think this could be a more formidable competitor to IBM than two separate companies. And so I would suspect from IBM's point of view this is not necessarily good news."

But for the immediate period, he is more cautious, explaining that both companies are financially weak, that STC in particular has a leveraged balance sheet, that both companies need money to finance both their research and development programs and the buildups of their lease bases. Thus there are defensive reasons for the two companies to get together at this time. Weil says that the partners, becoming a systems company, will find it easier to interest the banking community in providing funds, more so than individually.

"But that's about the best one can say for the short term." In this period, he adds, the two companies face significant problems, and it's not clear that by merging they will be able to alleviate those problems.

Consultant Dave Gold, too, thinks that in terms of access to financing the merged company will have more contacts in the community of money suppliers than either company had before by itself. He also observes "some counter-cyclicity" in the two product lines—mainframes and the business cycles they go through, and peripherals with theirs. There are times when people worry about what IBM is doing or will do and this affects Amdahl's busi-



JESSE I. AWEIDA, Storage Tech's chairman, is slated to become chairman of the new organization.

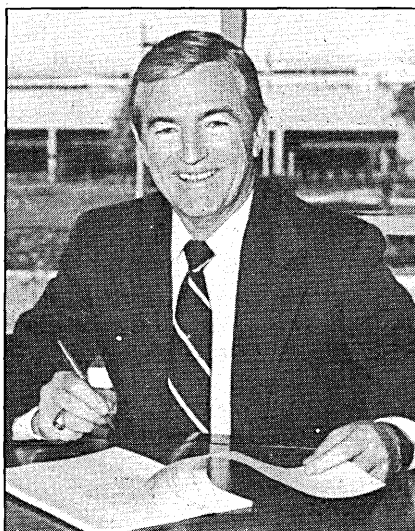
ness; at different times, people worry about peripherals. "And it's rarely the case that everyone sits around and worries about those two things at the same time." The combined companies, therefore, have a certain financial stability that stems from the diversified product line.

Indeed, Gold is concerned that the new company might be strong enough to stop tracking IBM and, instead, go off in its own direction. Not to worry, says David T. Morgenthaler II, vice president for corporate planning and architecture at Amdahl. The company has done nothing to lead its users away from 370 compatibility, he says.

"We are still 100% compatible. We have no intention of voluntarily veering from that compatibility. . . . And we're spending a lot of money to figure out how to avoid involuntary departure from that compatibility."

The articulate Morgenthaler, still only in his early 30s, speaks like someone who's been steeped in bits and bytes, fans and fan-outs. But he holds a BS in economics from Yale and an MBA from Stanford. He was a management consultant with McKinsey & Co., consulting with Amdahl for about a year before joining the firm in 1977. Asked how long Amdahl had been engaged in merger talks with STC, he said for as long as he's been associated with the company.

He talks about funny things IBM could do to make life more difficult for Amdahl, like taking parts of its operating system and placing them into microcode. He mentions IBM's announcement, almost three years ago, of MVS-SE, which introduced 14 special op codes that previously were not part of the 370 instruction set. Users were given to expect an 8% to 14% performance improvement, a 20% reduction in supervisor state. For the next year, Amdahl was forced to sit down with cus-



EUGENE R. WHITE, now Amdahl's chairman, would become deputy chairman of the new company.

tomers and prospects to explain what it meant and what role a control store plays.

Amdahl had to decide whether it wanted the capability to recognize those new op codes, or whether to give its interrupt handler the ability to recognize a reference to one and to supply the interrupt handler with a routine that takes the place of one of the 14 instructions. It chose the latter alternative, says Morgenthaler, and produced a software package called MVS-SEA that it supplies in order to maintain compatibility.

The combined companies have a certain financial stability that stems from the diversified product line.

IBM charges \$65,000 for MVS-SE on a 168. "It doesn't even start to give you that much performance," he says, "so it's a bad deal for a 168." Amdahl's replacement, which supplies perhaps 80% of the performance boost IBM provides, is available for \$250 a month. Many IBM users were critical because Amdahl did not have anything like MVS-SE, says Morgenthaler, but when the company came up with MVS-SEA, users really didn't want it either. They apparently didn't see that SE or SEA was a big deal after all.

"So that's a software strategy where we're providing software [IBM] didn't, but we're doing it to maintain compatibility," he says.

Nor will Morgenthaler acknowledge any inherent weakness in the company position stemming from the fact that its mainframes are all hardwired. "It is true that it costs more to change a totally hardwired machine than it does to change a microprogrammed machine," he admits. But, he claims, that's irrelevant, for Amdahl has always strived to build the fastest machine, to stay at the forefront of the technology. And if it were to incorporate microprogramming, the machine would be slower.

In early March, speaking to securities analysts gathered at corporate headquarters in Sunnyvale, Calif., Morgenthaler discussed this same issue. The point he makes is that microcode is important for small machines but not for large processors. He said at that time, "It's quite interesting that IBM talks about microcode. But the two key units in its 3033, which are its instruction unit and the storage control unit, are both hardwired." And only in the 3033 execution unit is microcode used.

On that occasion, he briefly traced some early history. The company shipped its first product some four and a half years ago, a mainframe 30% to 50% more powerful than IBM's at 92% of its price; it took up half the floor space, consumed half the power, etc. "And, by God, they still have

NEWS IN PERSPECTIVE

85% of the market. It's kind of amazing," he quipped.

He also discussed various semiconductor technologies and the promises each holds for the late 1980s. He described the Josephson Junction technology as "one of the exciting ones of the future," but dismissed it as being too far down the road to invest any research money in. "Main memory, which used to be the biggest constraint in designing computer systems, is going to be relatively cheap and relatively easy to use," he said. He foresees MOS memory chips packing 256K to a million bits in the mid-'80s, consuming low power, being very inexpensive, and having access times of from 50 to 100 nanoseconds.

In the same timeframe, he sees the ECL RAM chip for cache applications reaching 4K bits (compared with the current 1K bit/chip) and having a 2- to 3-nanosecond access time. "You can figure that the machine, itself, will have a cycle time on the order of 2½ to 3 times the access time of an ECL RAM that is used for its cache or control store, and that would mean we could have a machine with a cycle time of 7 to 9 nanoseconds."

For the mid-'80s, then, Morgenthaler sees a cpu performance of 30 MIPS for a uniprocessor, more than 200 megabytes/second aggregate data rates, and more than 20 megabytes/second/channel. But the data rates, he explained, are higher than required because memory constraints are expected to go away. As memory prices drop it will be possible for everyone to have more, and there will be a lot less paging.

But, he said, obviously knowing that announcement of the STC merger agreement was near, the 20MB/second channels would provide significant opportunities for some interesting peripheral devices. The merged company could, indeed, provide such devices.

—Edward K. Yasaki

COMMUNICATIONS

KEY WORD AT AT&T IS "BUS"

The vehicle that will take AT&T into the future is "BUS"—"Bell Unregulated Subsidiary."

Deep inside the AT&T executive office complex in suburban New Jersey a small group of top-level managers is laboring daily over a secret plan for the future. The project, known internally as "BUS" is headed by Charles Hugel, one of AT&T's four executive vice presidents. "BUS," stands for

"Bell Unregulated Subsidiary," and the plan the group is working on is a blueprint for an entirely new corporate structure for the Bell System.

Last month the group's work took on an extra dimension of urgency as the Federal Communications Commission approved new rules that free AT&T to compete for the first time in unregulated data processing markets. Under the new rules, which are almost certain to be tied up for months in court battles, the company will be allowed to set up a separate subsidiary to market equipment and services that aren't subject to the FCC regulations that have historically constrained AT&T.

If and when that moment comes, the company will be well prepared to finally make its headlong, unobstructed drive into data communications. For in addition to Hugel's planning group, which was working on its secret blueprint long before the FCC issued its new rules, the company has been moving on several fronts in recent months to put itself in a better position to start a new life of competition with IBM and the rest of the computer industry.

AT&T has made significant organizational changes—including a reorganization last month of its crucial business marketing operations group—to beef up its sales forces. It has started to emulate vendors in the data processing industry in the way it introduces new products, making national announcements rather than spreading the word in piecemeal fashion as it had in the past. It has started offering an alternative to the monthly rentals traditional in the telephone industry in the form of variable term leases of up to four years for data communications equipment, another new policy fashioned after standard practices in the computer industry.

Most important, it has continued pouring money and manpower into development of its Advanced Communications Service and other high-priority data projects, in spite of delays caused by massive problems with the ACS software.

"They've retrenched with ACS and there's much more optimism about it now than there has been in a long time," an AT&T source said recently. "And we've made a lot of progress in gearing up for competition in new areas."

That doesn't mean there aren't still major problems with ACS. An AT&T source recently confirmed that the latest timetable for ACS doesn't project a start for the service until 1982, and even then it will only be a "plain vanilla" version of the packet-switched data communications service, with minimal enhancements for subscribers. That delay has led to speculation that other comparable services already up and running, such as GTE-Telenet and Tymnet, will shut out ACS. But most industry analysts don't see that happening.

"I don't see the window closing for

ACS," said Winston Himsworth, a telecommunications analyst with Salomon Brothers in New York. "The time frame in which this is going to grow into a large enough business to be a material source of revenues for the Bell System is way, way out. The longer they wait with ACS, the more opportunity there will be for competitors, but with a flexible service they'll still get a big chunk of the market."

AT&T apparently is thinking in terms of flexibility for ACS. When project director Frank Vigilante was taken off ACS early this year and promoted to vice president of corporate engineering at Western Electric, the title of the ACS project leader was changed to "director of major projects." Although Vigilante's replacement, Sal Barbera, is still working primarily on ACS, he

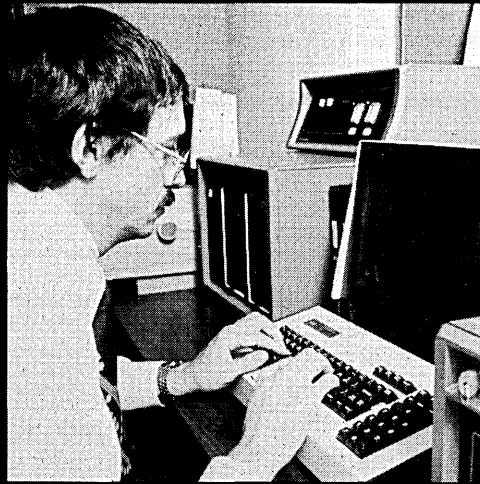
Latest timetable for ACS doesn't project a start until 1982, and then it will only be a "plain vanilla" version.

may be given additional responsibility for developing other new products and integrating them into the ACS framework, an AT&T spokesman said.

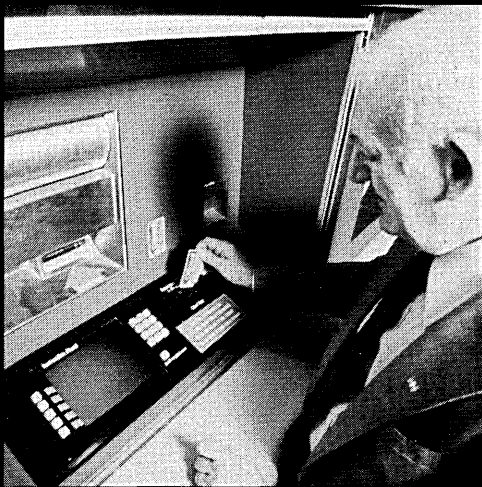
One high-priority project is development of a new voice and data switch, code-named "Antelope," which is envisioned as a new generation communications controller to be installed on customers' premises. The new controller will reportedly handle video communications in addition to voice and data and will be Bell's attempt to leapfrog over sophisticated competition in the private branch exchange (PBX) market from products like the SL-1, manufactured by Northern Telecom, which have presented a threat to Bell's Dimension PBX. However, an AT&T source said that as of the middle of April, technical plans had not even been distributed for the new product, which means the wait for Antelope will most likely be a long one.

A more immediate concern is with another data communications product, the Dataphone II network diagnostic system. After introducing the system last October with a national announcement and simultaneous nationwide tariff filings with state regulatory agencies, AT&T announced delays in the initial deliveries set for the spring to allow for more product testing.

Dataphone II products are high-speed modems with extensive diagnostics and are seen as an aggressive move against competitors who have built up their presence in a segment of the market AT&T previously neglected. A group of those competitors, the International Data Communications Manufacturers Assn., has charged AT&T with "premarketing" the Dataphone II products to undermine competition. The group is currently fighting it out with AT&T in pleadings before the FCC.

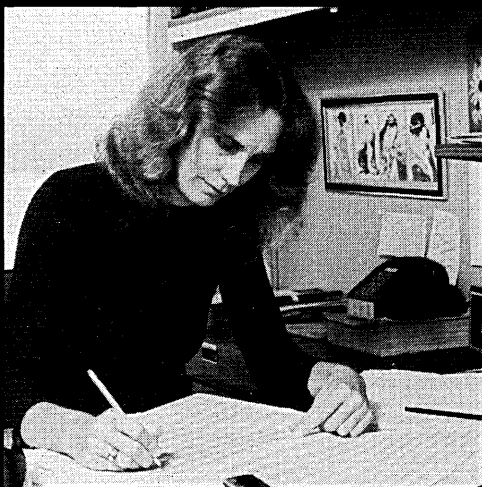


TTI: THE EXPERIENCED SYSTEMS AND SOFTWARE PROFESSIONALS



Experience — it comes from years of continuous exploration and achievement. And in the case of TTI — part of Citibank, one of the world's largest financial institutions — that achievement lies in the field of sophisticated electronic banking systems. Many companies may follow in our footsteps, but the truth is, no other company has successfully pioneered this area more thoroughly than TTI. In order to maintain this prestigious position, we recognize the fact that we must constantly move forward and strive for new innovations. We need your years of exploration and achievement — your experience. Consider the following career assignments:

- SYSTEMS PROGRAMMING
- ON-LINE APPLICATIONS PROGRAMMING
- TEST ANALYSIS
- PRODUCT DESIGN
- DIAGNOSTIC PROGRAMMING
- TECHNICAL MANAGEMENT
- SYSTEMS ENGINEERS



Selected candidates will find an outstanding environment offering total career satisfaction. For an immediate professional review, qualified individuals are invited to forward a detailed resume, complete with salary history, in confidence to: Nancy Stockinger, DM51 Professional Staffing.

TTI

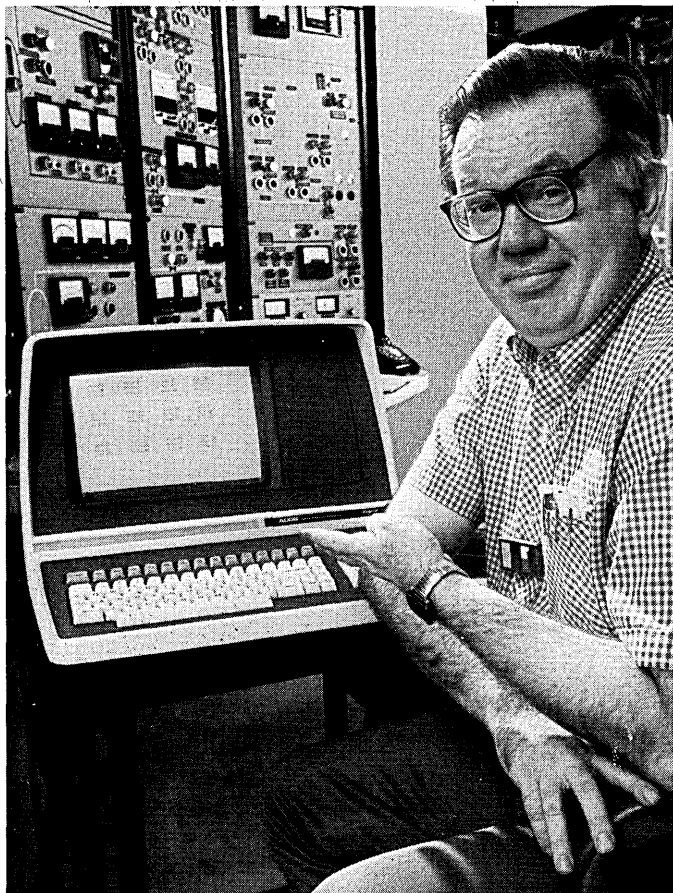
● **CITICORP**

TRANSACTION TECHNOLOGY, INC.
10880 WILSHIRE BLVD.
LOS ANGELES, CA 90024
Equal Opportunity Employer M/F

"Where the future of electronic banking is...Today"

CIRCLE 43 ON READER CARD

New way to exert more control.



Now you can get business graphics in a simple, smart display terminal.

Regent® 30, the newest terminal from ADDS, offers a full upper and lower case display and keyboard, cursor control and editing keys, and transmission capability by character, line, or page.

Our patented business graphics let you make bar charts, graphs, histograms—provide a resolution of over 11,500 graphic elements to depict financial or other data.

And with all this extra visual control, the *Regent* 30 is priced so you can control costs.

For more information and the name of your nearest distributor write: Displays Division, Applied Digital Data Systems Inc., 100 Marcus Blvd., Hauppauge, N.Y. 11787. Or call (516) 231-5400.

See us at NCC '80, Booth 1562

ADDS

SOMETHING EXTRA IN EVERYTHING WE DO

TERMINALS

CIRCLE 44 ON READER CARD

ADDS DISTRIBUTORS FROM COAST-TO-COAST

*NATIONAL

General Electric ASBD
Kierulff Electronics
Rental Electronics
TISCO

*REGIONAL

EASTERN

Computrend

MIDWEST

C.G. Distributors
Loonam Associates
Lowry & Associates
SEA Distributors

SOUTHERN

Tel-Tex Inc.

WESTERN

David Jamison Carlyle
Group III Electronics
R.V. Weatherford

LOCAL

Advanced Digital Systems
American Computers
Arch Associates
J.P. Bagoy
CMC Marketing
Compusystems
Computer Systems & Services
Data Communications & Systems
Data Management Solutions
Data Marketing Associates
Datco, Inc.
Dayton-Forester Associates
Digital Systems Marketing
Distributed Data Products
Information Technology
Manchester Equipment
Ossmann Instruments
Peripheral Products
Pro-Com Sales
R.C. Data
Supply Depot
Synchro-Sound Enterprises
Systems Marketing Consolidated
The Computer Store
Type-A-Line Business Machine Co.
Veytec, Inc.
Western Microtechnology, Inc.
Western Telecomputing
*Multiple locations—Check
your local directory.

NEWS IN PERSPECTIVE

Another indication of Bell's new aggressiveness and its willingness to play by the rules of the data processing industry is its new leasing policy for data communications equipment. Starting with its Data-speed 4540 data terminals, AT&T will offer two-year and four-year lease arrangements with customers as an alternative to monthly rentals, according to Robert Hamer, an AT&T service marketing manager. Hamer said the policy, which is patterned after

One high-priority project is development of a new voice and data switch, code-named "Antelope."

practices in the data processing industry, will probably be extended to other new products.

Meanwhile, a key segment of the department headed by Arch McGill, the vice president of business marketing who was recruited from IBM in the early 1970s to help coordinate AT&T's moves into data, was reorganized last month. Titles were changed and responsibilities shuffled among all levels of management in the marketing operations area headed by J. Roger Moody, an assistant vice president and also a former IBM executive, in an effort to provide better support for Bell account representatives, a company spokesman said.

"Before, everything was classed according to specific services and products, but now account executives will be backed up with ranges of solutions to different problems," the spokesman said.

The reorganization is the most recent manifestation of the corporate restructuring started two years ago by former AT&T chairman John deButts, who pledged to toughen up the company's marketing operations in anticipation of a new era of deregulation and competition. It is also the most dramatic recent sign that Bell is taking special pains to prepare for its move into competitive data processing markets.

The extent and exact nature of that move will remain in doubt until the confusion of litigation surrounding the FCC's recent rulings are cleared up. Under the rulings, which formally concluded Computer Inquiry II, AT&T apparently will be allowed to offer unregulated data processing services and equipment. But that decision runs squarely into the 1956 Consent Decree which, in settling a federal antitrust case against AT&T, prohibits the company from competing in unregulated markets, including the data processing market.

Judging by initial reactions of interested parties in the data processing industry, the matter will most likely get a lengthy and bitter hearing in federal courts.

"This is probably the single worst thing that has happened to the computer hardware industry in the past decade. . . . It'll go to the Supreme Court," said

A.G.W. "Jack" Biddle, president of the Computer and Communications Industry Assn. Biddle said he fears AT&T will be able to gain an unfair advantage by subsidizing low prices for competitive data processing products and services using revenues from its monopoly telephone services, where rates are protected and profits guaranteed. He said he feels the separate subsidiary for unregulated products and services isn't enough protection against such cross-subsidies.

For its part, AT&T's initial reaction was cautious approval of the rules, but the company stated reservations about the extent of separation that may be required between the new subsidiary and AT&T's research and manufacturing arms, Bell Labs and Western Electric. The creation of the BUS planning group prior to the FCC's action, however, reflects the readiness of the company to deal with the issue of setting up the subsidiary.

Until now, the planning group has been working under heavy security wraps and has consisted mostly of a close-knit collection of what one source called "the heavy thinkers." But the pace of its work is expected to step up. "At the moment," the source said, "it's still a very small group, but they're starting to bring in people from all over."

—David A. Copithorne

TELEMAIL, ONTYME-II TAKE OFF

GTE Telenet and Tymnet face head-on competition in their electronic mail offerings.

Users of public data networks that want to add electronic mail to their offices now have two such offerings to evaluate.

GTE Telenet has unveiled its Telemail offering, which will join the OnTyme service that has been available for about two years on the Tymnet network. And since Tymnet recently announced OnTyme-II, an upgrade of the earlier service with new features and prices, both networks will have new service within the next few months.

A comparison of Telemail and OnTyme-II indicates that the electronic mail services are very similar, and a user's final choice may be based more on small details rather than major advantages.

Both electronic mail offerings appear to be designed for non-dp users and they include self-help features that prompt the operator on the crt screen. Text editing capabilities are available for those who

Telemail versus OnTyme-II

	Telemail	OnTyme-II
Effective date	July 1980	June 1980
User programmable	no	yes, PASCAL
Av. cost/message	40¢ to 80¢	40¢ to 60¢
Text editing	yes	yes
Fax to fax	no	1980
ASCII to fax	no	yes
3270 support	1980	yes
Telex/TWX delivery	yes	TWX only
Mailgram delivery	yes	no
Transmission speed	110-1,200bps	110-9,600bps
International	if approved	via ITT Telex

want to change their information before sending it to another person on the system.

While both services support ASCII, Correspondence, and EBCD codes, OnTyme-II also has 3270 compatibility. Telemail is planning to add 3270 support by the end of 1980. Tymnet will include facsimile-to-facsimile mail in 1980, which Telemail has planned for the early 1980s. OnTyme-II includes the ability to convert ASCII terminal input so that a message can be delivered to any two-minute to six-minute facsimile device. Telemail has no plans for a similar offering.

Both services will have user directories of those subscribers that agree to be publicly listed.

Both of the electronic mail offerings include delivery of messages via "off-network extensions." Telemail will deliver to telex and TWX terminals and it will also send a message via Mailgram. OnTyme-II has only TWX terminal delivery and, instead of Mailgram, it will offer similar private mail delivery, according to a spokesman.

Each service will accept messages for authorized users on the system with proper password and user ID codes to prevent unauthorized access. Both intracompany and intercompany messages can operate on the mail systems but with intercompany mail, each company must preauthorize such usage. Both Telemail and OnTyme-II will have user directories of those subscribers that agree to be publicly listed.

Telemail supports terminals operating at transmission speeds from 110 to 1,200 bps while OnTyme-II accepts speeds from 110 to 9,600 bps. OnTyme-II includes a user-programmable PASCAL software feature that allows users to tailor the service to their specific needs—especially in the area of word processing. Telemail has no comparable feature but user prompting commands will be tailored to meet special needs, a Telenet spokesman said.

Both carriers said they are prepared to offer their electronic mail systems on a turnkey basis for companies that want to have electronic mail installed on in-house

computers. Although both services are primarily aimed at users within the U.S., some thought is being given to access from overseas locations. OnTyme-II can be accessed via ITT World Communications' Infotex service. Effectively this means an overseas user can send a conventional telex message using Infotex, which is then transferred to the OnTyme-II service in this country. A Tymnet spokesman said there are no other international extensions planned at this time. Telemail will be expanded into an international electronic mail offering if the necessary regulatory approvals can be obtained from both the FCC and overseas telecommunications authorities, Telenet said.

Cost comparisons for the two electronic mail services are similar, although there are differences in the rate structures. Telemail quotes average per message rates ranging from 40 cents to 80 cents; OnTyme rates range from 40 cents to 60 cents. Telemail has an hourly rate of \$13.25; OnTyme charges in the range of \$7.50 to \$10 per hour. But these numbers don't tell the whole story since Telemail has an off-peak-time rate (after business hours) of \$3 per hour, and Tymnet has high density and low density cities in which differing rates apply. Both services offer In-Wats dial rates with Telemail set at \$25 per hour and On-

Although both services are primarily aimed at users within the U.S., some thought is being given to access from overseas locations.

Tyme quoting \$19.60. Other tariff components include a per location fee for multiple destinations of a single message which is set at 5 cents, and separate charges for off-network delivery options. When all the variables are folded in, it appears that usage patterns will be the determining factor in estimating actual user costs.

Assuming that no unexpected regulatory roadblocks are encountered, the OnTyme-II offering will become effective on June 1, with Telemail scheduled to start on July 14.

—Ronald A. Frank

APPLICATIONS

KEEPING UP WITH THE TIMES

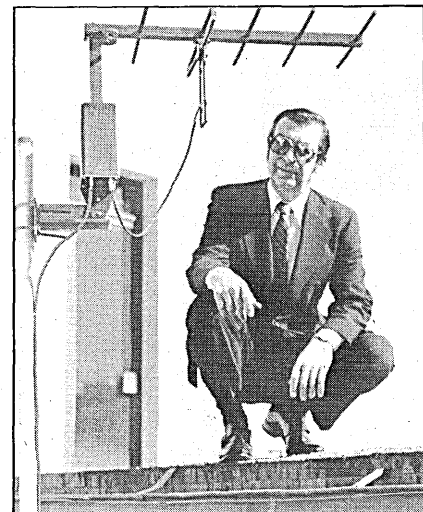
With its new radio frequency data communications system, the Los Angeles Times hopes to cut down on complaints and improve customer service.

Imagine spending \$14,000 preparing for rains that never came.

This has been a regular occurrence with the *Los Angeles Times* subscriber service, which has responsibility for the largest newspaper home delivery program in the world and one of very few that are motor carrier based.

"Your friendly newspaper boy can ring your bell or put your paper on the porch when it rains," said Gerald Ouellette, *Times* subscriber service manager. Not so for the *Times* carriers, who traverse the streets tossing papers from cars in an area that sprawls from Santa Barbara to the Mexican border and from the Pacific Ocean inland as far as Palm Springs, all between 4 a.m. and 6 a.m.

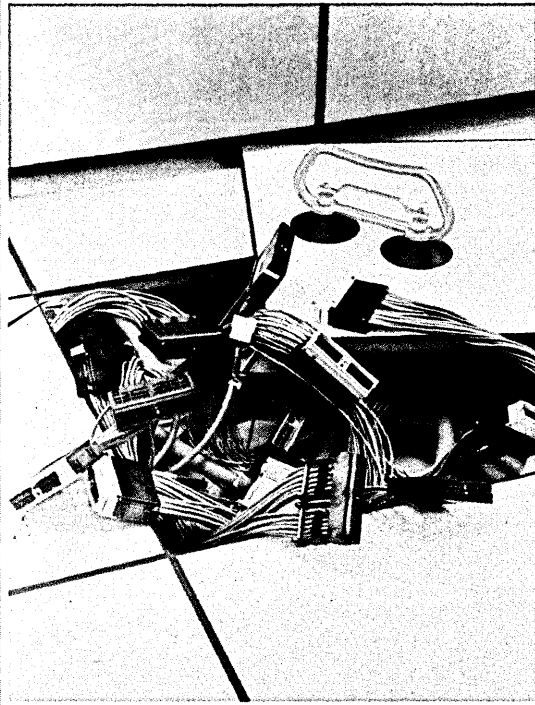
The *Times* delivers some 800,000 papers every weekday and more than that on Sundays. On rainy days papers are enclosed in protective plastic bags. Sometimes that's also done on not-so-rainy days because it's better to be safe than sorry. "Nothing irritates a subscriber more than a soggy



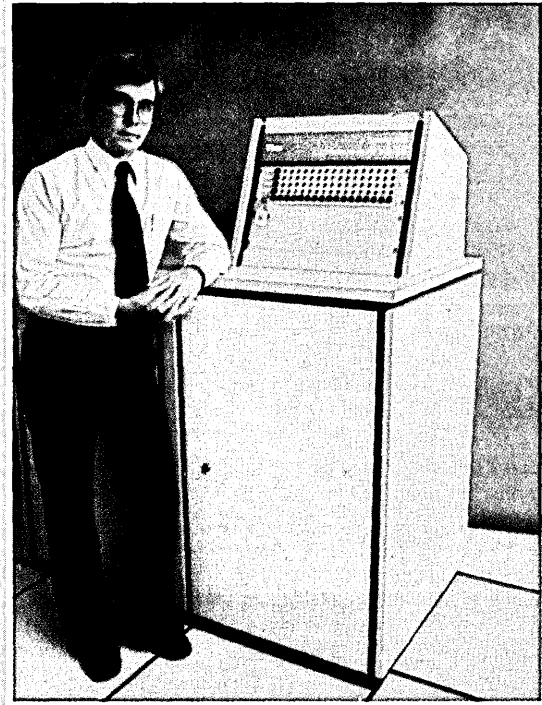
ROBERT D. HYNES: Critical to LADD's effectiveness are specially designed antenna/radio receiver units, such as this one mounted atop the Times-Mirror Building.

How do YOU avoid downtime?

This way?



Or this way?



The choice is yours. Some IBM* computer installations can lose up to \$5,000 per minute when the computer system fails. But that's only one reason why the T-Bar 3900 Series of Computer Peripheral Switches can save you money. If your system demands continuous on-line operation, call or write T-Bar today. Let us show you how other companies have used T-Bar alternatives to minimize downtime.

*or IBM compatible, such as Amdahl, ITEL and CDC.

Tbar[®] Incorporated

141 Danbury Rd.
Wilton, CT 06897
203 762-8351

Show me how T-Bar can help to minimize downtime.

Name _____

Company _____

Address _____

See Us At Booth 2709, NCC '80.

CIRCLE 49 ON READER CARD



LADD AT WORK: Messages for circulation agents originate in the subscriber service center, where service reps take problems by phone, then enter data in the center's dedicated IBM 3032.

With messages coming automatically, Ouellette explained, agents simply check their terminals periodically and carry out the instructions they receive.

Downtown, the subscriber service representatives become free to devote their efforts to more careful upgrading and maintenance of subscriber information, and soon, to handle the initial phases of subscriber accounting right at their terminals.

"We now have more than one million subscriber records in our CHDS data base," said Robert L. Hernandez, assistant manager of subscriber service. "Currently our operators do many handwriting chores, filling out a dozen or more forms which go into pouches for hand delivery to agents. As they are able to transfer these tasks to the electronic delivery capability of the LADD system, paperwork will diminish and productive work will increase. We'll realize better and faster distribution and virtually foolproof accuracy."

Hynes estimated that the LADD system, when fully implemented late this year, will carry 750,000 characters of information per day, transmitting at a data rate of 1200 baud. He said accuracy of transmissions is anticipated to be far greater than that achievable over leased lines, which historically have an error rate of 5×10^{-5} to 5×10^{-6} . The error rate is expected to be reduced by LADD to about 10^{-8} or 10^{-9} .

Albright said the reason for the lower error rate is that there is no noise intrinsic to FM as there is with switched or leased line services.

Also, he said, "the LADD system has been designed to emphasize signal level and quality, as well as transmission range. Several factors, rather than simply power, contribute to the maintenance of high quality signals at each phase of the data communications process, and ultimately at the antenna/receiver and printer."

Hynes offered an estimate of \$400,000 as his investment in the *Times*' installation of LADD, including all hardware as well as installation costs. "It is not a program the company would have entered into had not the payoff been visible right up front. A primary consideration always is that our systems pay for themselves. We see the LADD system doing this easily, and offering plenty of opportunity to expand its functions in the future as well."

Albright does not see LADD as the most economical use of his type of system. "They send 10 messages to one person. I envision its best use for people sending one message to millions."

His system is geared to one-way transmission of data to be received on paper. "Business runs on paper. It'll be a long, long time before paper goes out. Paper is useful if only as something to doodle on." He sees the use of FM and tv sidebands as "tapping an unused resource," although he admits it was tried as early as 1934 for facsimile transmission.

Albright sees as a potential user of his system "an operation that has already identified its communication problem and has done something about it; one that has a system in place and is already doing it electronically, that has its data in electronic format." He sees wire services and commodity services as good potential users. "We ran UPI at the American Newspaper Assn. show on an experimental basis." His company currently is talking to a commodity service in Fargo, N.D.

Albright feels his system could well be tied to larger, national and global communications networks to "solve the glut at the local level. It's like flying on the airlines. You're sped from coast to coast; then it takes forever to get where you're going locally."

—Edith Myers

KIEWIT DOES IT AGAIN

With its new local data network, Dartmouth hopes to have the best of both worlds—distributed and centralized processing.

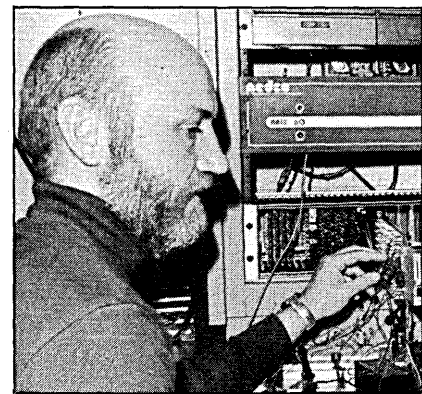
The computer has never been a stranger at Dartmouth College. From the earliest days when John Kemeny and Thomas Kurtz developed the BASIC language, data processing and the educational activities of Dartmouth have been inexorably intertwined.

Today, Kemeny as president of the school still teaches one course each semester emphasizing the importance of the computer, and Kurtz is involved in developing a new graduate curriculum in computer science.

But subtle changes are taking place at the Kiewit Computation Center on campus that will have a profound impact on the ways in which data processing is used at the Hanover, N.H., educational institution.

Kiewit made a name for itself in the 1960s when the Dartmouth Time Sharing System (DTSS) served virtually every student and course on campus and then expanded to provide time-sharing access to a network of colleges and high schools all along the East Coast and into Canada. DTSS pioneered the use of remote terminal access to a large dp center as an integral part of the educational process.

In the mid-'70s the pattern began to change as individual schools began to install their own minicomputers, thus building up in-house dp resources that made them less dependent on the wide resources available at Kiewit. This process was also evident at Dartmouth itself, where individu-



STAN DUNTZEN tests a 9,000-foot experimental link interfaced to the first Nedco processor.



ECS 4500

Beauty and Brains. In the history of the computer there has never been an intelligent terminal like the ECS 4500. It is singular both in its external design and internal architecture. Singular in its power to function as a stand-alone computer and as multiprotocol network computing terminal. Singular in its ability to interface immediately with virtually any mainframe or minicomputer. With a complete repertoire of software and high level languages. Information systems of the coming decade will emulate this architectural elegance. Only ECS 4500 makes it all available to you now.



ECS MICROSYSTEMS The Information Architects. Headquarters at 215 Devcon Drive, San Jose, California 95112.
(408) 286-4200. Sales and service offices around the world.

NEWS IN PERSPECTIVE

al departments on campus began to install processors for specialized projects. Sensing that the trend toward distributed processing went counter to the basic Kiewit centralized time-sharing concept, the dp staff at the computation center began looking for ways in which Dartmouth users could have the best of both worlds.

The solution has been to design a local data network that will link the campus via a coaxial cable system. "Essentially our network design is patterned after the Ethernet architecture developed by Xerox," explains Stan Dunten, chief systems engineer at Kiewit. While Ethernet inspired the new

network, the Kiewit staff has also drawn on the experiences of MIT with its Chaos local network. The main network processor at Dartmouth will be a machine made by New England Digital Corp. in Norwich, Vt., called the Able-60. The Nedco machines, as they are known at Kiewit, will be the main interface to the local network. "They will be the only machines that will talk directly to the network," Dunten says.

The Nedco processors will be programmed in XPL which David Pearson, senior programmer, described as a rough subset of PL/1. Since only the Nedco machines will interface to the net, the program-

ming of the contention protocol and other software needs to be done only once, and it will apply for all nodes.

It cost the college about \$8,000 to install the coaxial cable in the existing conduits running between buildings on campus. The Nedco processor that can hook up

The main net processor will be a machine made by New England Digital Corp. called the Able-60.

a group of terminals costs about \$8,000, Dunten says. At present, Dartmouth pays the phone company \$15 per month for a 300 bps line and \$35 per month for a 1200 bps line. Thus, the Nedco machine becomes cost effective for each group of 10 or more of the higher speed terminals, Dunten says. Actually that includes only the cost of the line and the modem at the remote end. If the modem and required interfacing equipment needed at the computer center is included, the local data network looks even better on paper, Dunten explains.

One of the key elements in the network will be a transceiver/amplifier circuit installed as an interface device at each point where a Nedco processor connects to the local network. The first processor and transceiver are now operating over a 9,000 foot experimental cable at the Kiewit center.

The co-ax network is configured as a star system with five major legs terminating in twisted wire at Kiewit, Dunten explains. Asked why the cable was not used also at the computer center, he said the wire pair was easier to install and at short loop distances the bandwidth is sufficient.

The current implementation schedule calls for the first network nodes to be operating in time for the fall semester this year. As more nodes are added to the local data network, the Kiewit staff knows that it will have to provide network management functions in the form of monitoring and diagnostic capabilities. According to Richard Brown, telecommunications engineer, the monitoring software will have to include the capability to test any of the Nedco machines to see whether they are operating properly. But the Kiewit staff is no stranger to maintenance, since the teleprinters and other terminals now used on campus are maintained in-house.

The Nedco processors will have a series of fault indicators so that the users will be able to notify the Kiewit maintenance staff when a fault alarm is observed. One new requirement of the local data network will be communications. Many of the Nedco processors will be installed in basements or other points where there are no phones. Dunten and his staff are investigating communications systems that could be used between such sites and the Kiewit center. Such methods as radio and transmission

TURN YOUR CICS TERMINALS INTO... SUPER DATA ENTRY STATIONS



WITH KEY/MASTER™

KEY/MASTER IS A POWERFUL DATA ENTRY SYSTEM FOR CICS. IT GIVES YOU EVERYTHING YOU NEED TO CAPTURE DATA AT ITS SOURCE - AUTOMATIC EDITING, IMMEDIATE ERROR CORRECTION, AND COMPLETE DATA SECURITY.

NEW APPLICATIONS CAN BE DESIGNED IN MINUTES, INTERACTIVELY, THERE'S NO PROGRAMMING, NO HASSLE, AND NO DELAYS.

LET KEY/MASTER MAKE YOU A SUPER HERO. CALL OR WRITE TODAY FOR MORE INFORMATION.



turnkey systems inc.
50 WASHINGTON STREET
NORWALK, CONNECTICUT 06854
(203) 853-2884

Freedom of choice.



VISUAL 100

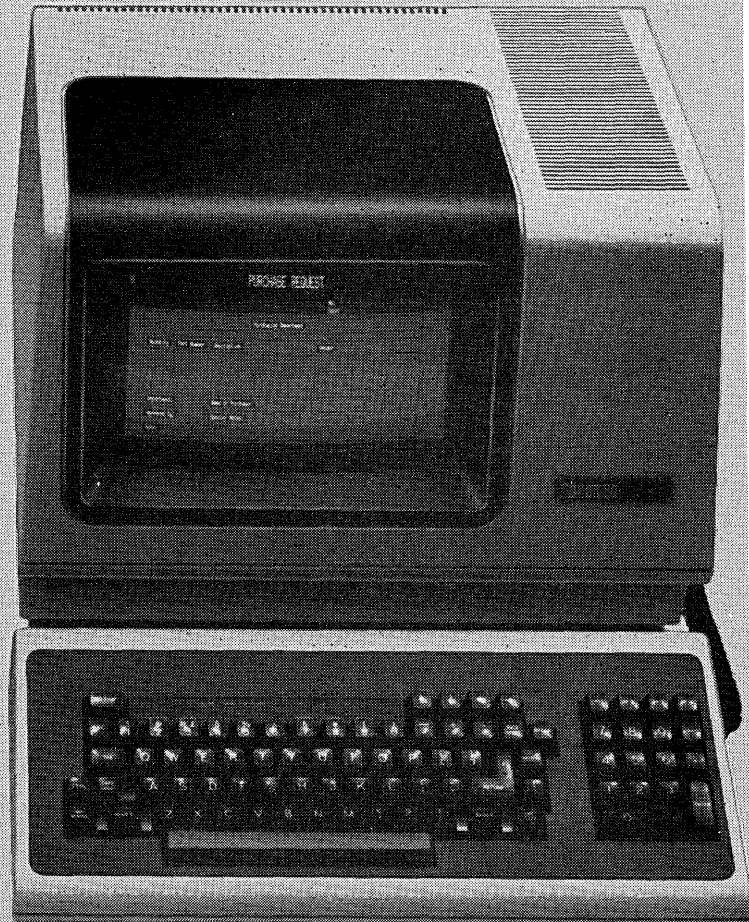
These two terminals not only look alike—they act alike. But ours is a little better.

The new VISUAL 100 is 100% compatible with the DEC VT 100, right down to the spacing of the keys and the roll of the keyboard. Neither your operator nor your software will know the difference. Except your operator will appreciate the superior human engineering features of the VISUAL 100 like the non-glare screen,

adjustable viewing angle and low slung keyboard.

Further, the Advanced Video package and current loop interface that are optional with the DEC terminal are standard with the VISUAL 100. And we've added an optional Buffered Printer Interface with independent baud rate, independent parity and printer busy via XON XOFF protocol or control line.

Although we think the VISUAL



Digital VT 100

100 is a little better than the VT 100, we priced it a little lower. Plus it's from the Company that's delivered thousands of terminals emulating DEC, Hazeltine, Lear Siegler and ADDS. Call or write us today.

VISUAL See for yourself

Visual Technology Incorporated
Railroad Avenue, Dundee Park, Andover, MA 01810
Telephone (617) 475-8056

CIRCLE 52 ON READER CARD

UP IN ARMS

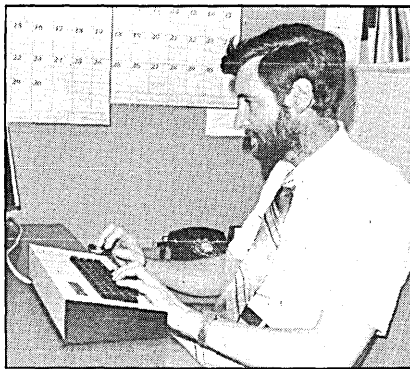
As computers and terminals and systems proliferate at Dartmouth, the man responsible for seeing that they can talk to one another is Dr. William Arms, Kiewit director. Coming to Dartmouth from the Open University in England about two years ago, Arms, while not keenly aware of all the technical nuances, is keenly aware of the importance of having a variety of dp equipment operating in a compatible network.

"Nobody really knows what we will be doing 10 years from now, but all the guesses suggest that there will be many computers. Groups will have their own specialized computers for specialized tasks. In this environment it is important that terminals can be connected flexibly to many machines. So the whole idea is to build a communications network in which all terminals and all computers can be connected to anything [with dp capability]," Arms explains.

While specialized processors are increasing, these users also need to access the larger time-sharing system for calculations not well suited to smaller machines, and that is one of the main reasons why the two dp approaches must be interconnected, he says.

Agreeing that a local network must support different standards and protocols, Arms says terminals are relatively easy because "terminals speak ASCII, and ASCII is standard, but computers speaking to computers is a real problem."

As long as computer A can talk to computer B using a known protocol, the two should be able to connect to a local data network, Arms continues. This assumes that the network knows enough about the protocol used by the two machines so that it can support the computers in a manner that is totally transparent to the users. Initially a



DR. WILLIAM Y. ARMS uses a crt to access the electronic mail system that will be operating on the local data network.

network can support ASCII terminals and then later it can add support for X.25-compatible devices.

At Dartmouth, the first step will be to connect a majority of the 450 on-campus terminals to the local data network. These terminals in many cases now use phone lines to connect to the Kiewit computers. The savings in not having to pay for telephone lines will offset the cost of building the local network, Arms claims. In addition to the cost savings, transmission speeds should increase and the reliability level should reach virtually error-free transmission on the new network, he predicts.

Next, groups on campus that have built up their own dp systems will be connected to the local network. An example is an undergraduate program for scientific study that has several minis but also needs to connect to the large mainframes at Kiewit. Off-campus users of the Dartmouth time-sharing system will be another group interfaced to the local network. This will allow the remote users to interface with the

distributed processing groups if they need such interconnection, Arms explains.

Not to be outdone by its outside users, Kiewit has also begun to diversify its computer resources. It recently installed a Prime 750 processor which will act as a back-end machine to the two Honeywell Level 66/80 DPS 3 mainframes. While the large machines are suited for small and medium size jobs, they are not efficient for larger batch work, Arms says, so the 750 will handle the larger runs. The mainframes and the 750 will interact via the local data network. One major class of users to be tied to the local data network will be the administrative departments at the college. These applications include alumni records, financial records, student files, personnel information, and library data. Each of these users may eventually have a Prime mini-computer for local tasks, and the individual machines will interface with the Kiewit mainframes via the network.

One result of the increased speed and reliability of the local data network will be a lessening of dependence on hardcopy, Arms believes. As users migrate from slower 300 and 1,200 bps teleprinters to 2,400 bps crts, more data manipulation will be done on the screen. In this regard, the Kiewit software staff is developing a screen editor that will be available as "network software" and thus will be available to any crt connected to the network.

One of the most important reasons for building the local data network is that the present system is saturated, says Arms. Since most users come in via phone lines, each ties up a port on the dual 716 front-ends at Kiewit. By connecting users to the local data net and then interconnecting the net to the 716s, Kiewit will be able to serve a greatly expanded number of users.

—R.A.F.

over the all-digital coaxial cable are being evaluated.

There are still problems to be worked out, but Gene Fucci, director of telecommunications, is confident that the system will interconnect the various terminals now operating on campus. This includes LA-36 DECwriters, Datamedia crts, Lear Siegler crts, Tektronix 4010 graphic displays, and a variety of other devices including teletypewriters. "The design goal is to have any RS-232 device compatible with the network," Dunten says.

Even though the Dartmouth local data net is being built to meet specialized needs in an educational environment, its originators at Kiewit acknowledge that the marriage of distributed systems with a centralized time-sharing center has widespread applications. It may be, they agree, that local networks serving a variety of needs can solve similar problems for corporations and other users as well.

—Ronald A. Frank

MEETINGS

RECESSION IS A REALITY

Controlling datacomm costs was the hot topic at Interface '80.

Gone are the days of soft dollar savings. The spending sprees have stopped. The belt tightening has begun. "Recession has become a reality," summed up one data communications manager. This recession mindset was very much in evidence at the Data Communications Interface '80 conference and exposition staged in Miami in late

March.

"We want it cheap. We want it to work. And we want it now," insisted one datacomm user at the conference. Another show-goer echoed these sentiments, saying, "It's getting harder and harder in these times of inflation to cost-justify the purchases we want to make. We're out for a good deal on services and equipment that are reliable and ready. We simply can't afford to wait around for promises a la SBS and ACS."

To help get out from under the economic crunch, many users are turning to productivity ploys. In a session on "Ddp: Ensuring End User Productivity," Allan Elstein, information systems director at ACCO International, sung the praises of distributed data processing. "Every dp user," he said, "has three main goals—reliability, availability, and good response time. Distributed data processing brings these three goals directly to users in the field."

"Companies without a first-rate

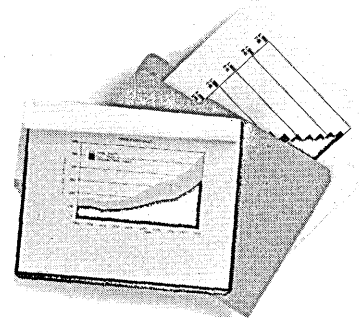
From the graphics leader

Push a button... put virtually any video display on paper in seconds.



Copyright © 1979 Tektronix Inc. All rights reserved.

dry process means no liquid toner mess, no wasted copies. Operation is quiet and thoroughly dependable.



For years, Tektronix has been a leader in the fiber optic technology that provides fast, finely detailed raster scan reproductions. Find out what the 4632 can do for your system. Call your local Tektronix representative or our toll-free, automatic answering service at 1-800-547-1512. In Oregon, call 644-9051 collect.

OEM terms and conditions available.

Tektronix, Inc.
Information Display Division
P.O. Box 500
Beaverton, OR 97077
Tektronix International, Inc.
European Marketing Centre
Post Box 827
1180 AV Amstelveen
The Netherlands

Special symbols.
Graphics.
Multi-font
alphanumerics. Gray
scale. They're all easy
to copy with the
**Tektronix 4632 Video
Hard Copy Unit.**

The 4632 provides high resolution copies of raster scan and other video displays. Their quality is excellent—perfect for formal reports. Yet their cost is low enough to use them for first drafts, and the image long-lasting enough for the file.

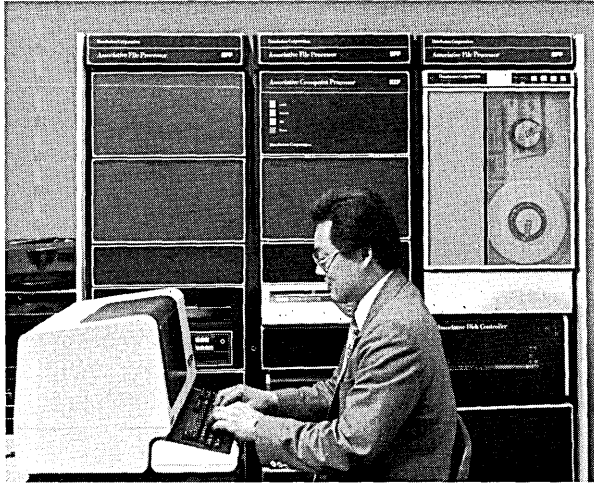
RS170 interface makes the 4632 a natural companion to most video systems. Users of video terminals and systems like the DEC MINC system shown here, are taking advantage of the 4632's high resolution hard copies, available at the push of a button. Our

CIRCLE 53 ON READER CARD

Tektronix
COMMITTED TO EXCELLENCE

The Associative File Processor. AFP.

A Special Purpose Hardware System for Retrieving Textual Information.



Full Text Retrieval. Finds relevant information in large free text files (typically 300 million characters or more) that match queries.

Unrestricted Queries. Unrestricted query vocabulary with boolean AND, OR, NOT and proximity key word logic.

Simple Configuration. AFP® runs on a PDP11 host mini-computer and includes all necessary user software.

Real Time Data Input. New data may be input and searched as it is received, if necessary.

Special Associative Hardware. The processing power is made possible by the special AXP® hardware effectively having the capability of 1200 cpu's.

Affordable. Now you can afford full text retrieval costing only a few pennies per search.

Available in Three Configurations. The AXP100 attaches to an existing PDP11 computer; the AXP200 is self contained with a communication interface to a network or another host computer; the AXP300 is a turn key system including CRT terminals and a line printer.

Application Areas Include:

Military and Intelligence
Law Enforcement
Library Search
Word Processing Support
Abstract Search
Title and Property Search
Trial Transcripts
Patent Search
Litigation Support

Technical Report Retrieval
Generic Record Keeping
Current Awareness Bulletin
Laboratory Testing and Retrieval
Journal Abstracting and Control
Pharmaceutical Literature Retrieval
Product Bibliographies
Chemical Compound Retrieval
Historical Records and Archives



Call (213) 887-9523 or write for a detailed brochure.

Datafusion Corporation

21031 Ventura Boulevard, Woodland Hills, California 91364

CIRCLE 54 ON READER CARD

NEWS IN PERSPECTIVE

information system," he warned, "won't survive the '80s." Elstein firmly believes ddp's benefits outweigh its disadvantages. At least that's the case at ACCO, which has implemented a nationwide integrated distributed processing system that provides selective on-line transaction capability via the host cpu. The system links four of ACCO's plants and five of its distribution centers.

Elstein feels the company's ddp setup has been successful. The payoff has accrued to users, he said, who have been better able to manage their operations and gotten improved response time. The system has also been a big help in applications development and tailoring, he added.

Another session speaker, Dr. Leonard Lipner, a consultant with BGS Systems Inc., pointed out the need for capacity planning as a hedge against skyrocketing personnel costs. "Users," he noted, "now want to know the performance of machines before they're rolled in the door."

"It is imperative," the former IBM systems engineer stressed, "that you know the response time in advance." This can be calculated, he explained, even with very sketchy information. "Then it's the user's responsibility," he declared, "to ensure right up front that the vendor delivers what's promised."

"Users now want to know the performance of machines before they're rolled in the door."

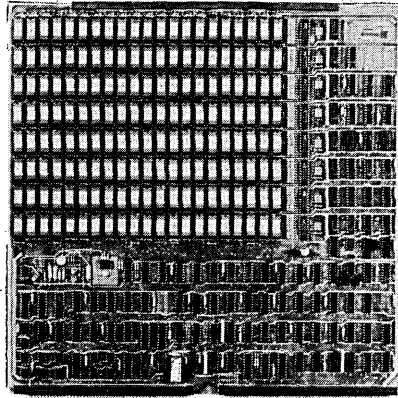
"Every hardware or software decision that's estimated—big or small—has an effect on performance. It's true," Lipner admitted, "that there's partial and uncertain knowledge during the early stages of system acquisition. And system hardware and software decisions and estimates will change many times during the planning stages."

But while it's difficult to plan in this state of flux, where hard data is tough to come by, Lipner maintained it can be done by keeping in mind several key decision areas. His checkoff list includes: transaction volume estimates; host/minicomputer characteristics such as cpu speed, disks, and other peripherals; interaction between ddp and other workloads on the host/mini; line configuration and characteristics; data placement; and programmer projections on resource consumption.

"To keep harmony in the family," Lipner strongly recommended that programmers be involved in this estimating process. While programmers will balk at providing resource consumption estimates before a system is installed, they should be told, according to Lipner, that this information is absolutely essential and is part of their job.

Some more tips on saving dp dollars were offered by another Interface panelist,

ADD-ON ADD-IN



Dataram's 128K x 21 semi
ADD-IN for Data General Eclipse®

See us
at NCC
Booth 2221

FROM DATARAM. THE INDUSTRY'S WIDEST RANGE OF CORE AND SEMI MINI-MEMORIES

If you're looking for a way to get more memory, more throughput, and more performance from your minicomputer without putting too much more into it, the Dataram family of ADD-ON/ADD-IN mini-memories adds up to the right answer for you.

Whether you're adding it on or in, Dataram will meet your mini-memory requirements with core and semi single-board designs that deliver the performance you want, and save you money while doing it. Find out more — return this coupon at once, or call 609-799-0071.

DEC is a registered trademark of Digital Equipment Corporation.
Eclipse is a registered trademark of Data General Corporation.

	CORE	SEMI
DEC®	✓	✓
DATA GENERAL	✓	✓
INTERDATA	✓	✓
VARIAN	✓	
INTEL	✓	

I'd like more answers about mini-memories for my _____ minicomputer.

- Please send information.
 Please have a salesman contact me.

Name _____

Title _____ Phone _____

Company _____

Address _____

City _____ State _____ Zip _____



PRINCETON-HIGHTSTOWN ROAD CRANBURY, NEW JERSEY 08512
TEL: 609-799-0071 TWX: 510-685-2542

Canada: Ahern & Soper Ltd., Alberta, British Columbia, Ontario, Quebec • Finland: Systek OY, 737-233 • France: YREL, 956 81 42 • Hungary/Poland/Romania: Unित्रonex Corporation, WARSAW 39 6218 • Italy: ESE s.r.l., 02/607 3626 • Netherlands: Technitron b.v., 020-45 87 55 • Sweden: M. Stenhardt AB, (08) 739 00 50 • Switzerland: ADCOMP AG 01/730 48 48 • United Kingdom: Sintrom Ellinor Ltd., (0734) 85464 • West Germany: O.E.M.-Elektronik GmbH, 07 11-79 80 47 • Australia/New Zealand: Anderson Digital Equipment, (03) 543 2077 • India: Industrial Electronic Instruments, 79281 • Japan: Matsushita Electric Trading Co., Ltd., 03 (435) 4501

CIRCLE 55 ON SERVICE CARD



**Build your computer room
on a solid aluminum foundation**

FLOATING FLOORS

Accept no substitute.

(100% USA materials & labor)

There is only one Floating Floor System. And it's the only floor system specifically designed to overcome possible costly problems in computer rooms. For instance . . .

- True infinite access is provided by completely stringerless assembly.
- Quick access to underfloor, anywhere, anytime.
- No chance of iron oxide particles entering air supply to play havoc with computer information.
- Static grounding is inherent in construction.
- Unequaled lightness, rigidity and strength.
- May be easily changed around or added to in the future.

To get complete details on why Floating Floors* are the best choice for critical computer room areas, send for our free brochure. A comprehensive AV presentation is available on request.

FLOATING FLOORS, INC., 6955 Wales Road, Toledo, Ohio 43619, Telephone (419) 666-8750.

In Canada: Bruce (EDP) Services Ltd., 3650 Weston Rd., Weston, Ontario M9L 1W2, Telephone (416) 741-0854.

FLOATING FLOORS, INC.

*FLOATING FLOORS is a Registered Trade Mark of Floating Floors, Inc.

CIRCLE 56 ON READER CARD

NEWS IN PERSPECTIVE

TOP 10 INTERFACE SESSIONS RATED BY ATTENDANCE

SESSION TOPIC	NUMBER OF ATTENDEES
All Digital Communications	380
Integrating Voice & Data at the PBX	374
Digitizing Voice	312
Addressing Network Architecture Alternatives	304
Datacomm School—Introduction	302
Intelligent Crt Workstations	300
Achieving Network Performance Goals	295
Datacomm School—Ddp Networking	281
Ddp Requirements Planning	279
Executive Information Service Requirements	279

Database Design Inc. president Dr. Robert Holland. "Proper data base design is the solution for controlling dp costs. What's essential is that you take the user into account," he explained, "during the design stage of ddp."

The promised payoffs from data base management systems, according to Holland, have yet to be realized. To get the full benefit from these systems, Holland pointed out the need to keep applications independent of the physical telecommunications network structure and DBMS implementation. This separation is necessary, he explained, because of continual changes in network structure.

"We've moved from asynchronous transmission to synchronous transmission to packet switching in telecommunications technology. The same changing nature," he said, "is true in DBMS technology, as we've gone from hierarchical to network to relational data bases. Technology won't stand still over the next five years," he added, "so we have to design our applications independent of the physical structure."

Another angle on productivity was taken in a session on "New Ways to Stimulate Corporate Growth Through Data Communications." In discussing the return on investment in datacomm, session speakers stressed the importance of "intangible benefits." The biggest advantage of the technology, they felt, would come from its ability to give business executives and managers better and quicker decision making power.

The evolving field of network management systems was also explored during another session on fail-safe network control. Paul Weiss, director of network control design at Codex Corp., gave a brief rundown on the current status of these functions.

While network management systems are becoming more sophisticated in the areas of fault detection and diagnosis, Weiss pointed out that failure prediction and prevention features have still not been developed. Existing technical control centers, he noted, now include centralized modem control combined with vendor-provided software. As more sophisticated

capabilities are developed, user-programmable software will be added to these systems, he predicted. This will also allow users, he said, to tailor their management features to the specific needs of customized nets.

Since data communications networks typically expand to meet corporate needs, Weiss suggested management systems be designed with enough flexibility to keep pace. And as network characteristics increase in complexity, the need for various control and monitoring functions will become increasingly important. All of this, he predicted, would spur the evolution of network management into advanced functions.

In addition to monitoring capabil-

ities, users should also be aware of the need for intelligent network processors, according to another session panelist, Warren Wubker, president of Transaction Data Systems. Through the development of specialized software, these processors can include adaptive routing capability that he said would allow automatic switchover to alternate network paths when a failure occurs in primary links. Wubker also suggested that important net links could be protected through the use of redundant equipment.

While these network subjects were the hot topic of discussion at several Interface sessions, they were also the focus of product attention at the show. Several vendors unveiled their new net offerings during the four-day conference. Among them was Tymnet Inc., which announced its

"Proper data base design is the solution for controlling dp costs."

OnTyme-II electronic mail service. Designed to provide communications from ASCII terminals to facsimile terminals for hardcopy output, the service will be available next month over Tymnet's public packet net.

BBN Computer, a subsidiary of Bolt, Beranek and Newman Inc., also announced a packet-switched network processor which

Rent data entry and data exitry off-the-shelf.

FOR RENT
Terminals
and Printers
From one to 1,000
... for 30 days
to three years
or more

Rental Electronics, Inc.

Rental Electronics, Inc.
(800) 227-8409

In California (213) 993-7368, (415) 968-8845 or (714) 879-0561
CIRCLE 57 ON READER CARD



You Ought To Be In Pictures.

Computer graphics sure beats searching stacks of printouts. You get the total picture, not just a bunch of numbers. Quickly. Accurately. Easily. Using ISSCO's DISSPLA® graphics software, the typical plot requires less than 10 instructions. DISSPLA works on most large scale computers and a selected number of superminis. It drives any plotting device that can draw a straight line to produce quality graphs and charts. Now for non-programmers there's TELL-A-GRAF® for virtual IBM and DEC systems. Plain English commands easily generate bar, column, line, surface and pie charts without the need for a programmer or artist.

ISSCO®

Integrated Software Systems Corporation

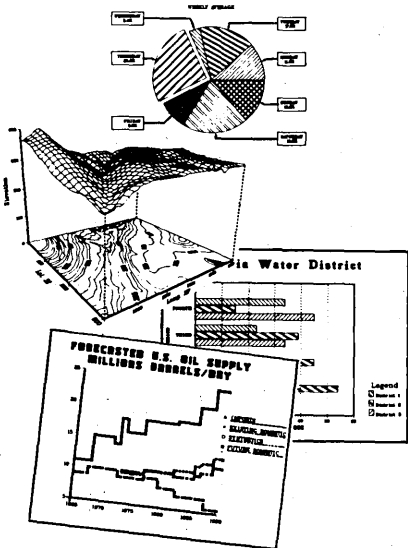
4186 Sorrento Valley Boulevard
San Diego, CA 92121 (714) 452-0170

ISSCO Deutschland GmbH

Dietzstrasse 16
D-5400 Koblenz, West Germany
49-261-407989 Telex: 862891

LEADING THE WORLD
IN MACHINE AND
DEVICE INDEPENDENT
GRAPHICS SOFTWARE
FOR OVER A DECADE.

10
1970-1980



CIRCLE 58 ON READER CARD

NEWS IN PERSPECTIVE



THE HOT SPOT: Interface '80 drew more than 9,000 attendees, including a hefty exhibitor force.

is based on principles developed in the ARPA network. Called the C/30, the processor is said to have about twice the throughput of a Digital Equipment Corp. PDP-11/70 at approximately one-third the price. (The C/30 costs around \$25,000, depending on operating features.)

A satellite communications service for distributed networks also made its debut at the Interface show. Developed by American Satellite Corp., the Distributed Data Exchange (DDX) will also support digital voice and fax, remote job entry, computer-to-computer communications, and word processing applications.

Preshow publicity had touted Interface '80 as "the hot spot for data communications and distributed processing." The "hot spot," according to show sponsors, drew more than 9,000 attendees, including a hefty exhibitor force. Interface organizers had counted on a draw of at least 10,000.

Last year's show in Chicago had pulled in approximately 12,000. Show spokesmen attribute this year's lower attendance to the lack of local walk-ins. The show faces the same situation next year when it returns to Las Vegas. But show planners and exhibitors aren't worried. They feel Interface is gaining momentum and "a quality turnout."

While momentum may indeed be building for the conference itself, some industry insiders are forecasting a market deceleration. "The computer-communications industry," declares one observer, "is consolidating and slowing down. Users don't quite know what's going on with the economy, but they are afraid of a recession. That fear was reflected this year at Interface. The show, as a result, wasn't exactly a 'hot spot.' It was more like lukewarm."

—Linda F. Runyan

Also contributing to this story were Becky Barna, Ron Frank, and Bill Musgrave.

A MASTER OF UNDER-STATEMENT

Dr. John V. Atanasoff talks of a time when "I invented in my mind the computer."

"I knew then that it would go far in solving the practical problems of mankind. But I didn't foresee this."

With characteristic understatement, Dr. John Vincent Atanasoff recalls the days of yesteryear, when he began work in his spare time on the first "automatic electronic digital computer."

Looking back now, he declares with all modesty that his pioneering computer project in the late '30s and early '40s "was an important period in my life." And that too is an understatement. At 76, Atanasoff remains a self-effacing, low-key man. His mind, still acutely active, is anything but.

At the recent Interface '80 conference in Miami, Atanasoff was honored at a luncheon hosted by DPF Inc. The Hartsdale, N.Y., company, a third party leasing concern, had T-shirts made up bearing Atanasoff's stately profile. Although he was admittedly "embarrassed" by this form of tribute, he chalked it up to the influence of "the younger generation."

But Atanasoff did seem genuinely touched by the tribute which DPF said was aimed at "hopefully righting a wrong" by giving the inventor long-overdue recognition. Atanasoff himself doesn't seem at all bothered or bitter about the past—a past which saw the plaudits going to Dr. J. Presper Eckert and Dr. John W. Mauchly of ENIAC and UNIVAC I fame.

In his luncheon address, which he claimed would be a "mundane presentation," Atanasoff made scant mention of the landmark lawsuit which resulted in establishing him and his graduate student Clifford Berry as the original inventors of the

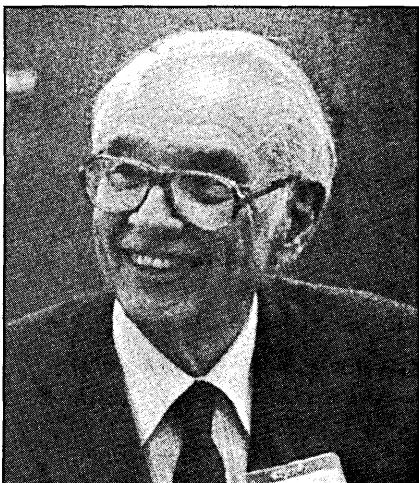
The one-of-a-kind machine ended up costing \$5,000 to build.

electronic digital computer (DATAMATION, Feb. 1974, p.88). What he concentrated on was minutely retracing the steps that led up to the 1942 development of a working computer machine.

Those steps started with a car ride. Traveling at breakneck speed one cold night in the winter of 1937-38, Atanasoff, then a mathematics and physics professor at Iowa State, wound up in a bar 200 miles away in Moline, Il. After a few hours, two bourbon and sodas, and no notes, his brainstorming session had given him the clues—the clues he needed to begin work on an operating breadboard model of a computing machine. That memorable night, Atanasoff recalls, "I invented in my mind the computer." This prototype was then completed in December 1939, and the finished machine was ready to roll in 1942.

Originally designed for the purpose of inverting matrices to help students solve math and physics problems, the Atanasoff-Berry computer (ABC) did indeed do these time-consuming chores admirably. But he did have doubts along the way. "We were not at all sure," he admits, "that vacuum tubes would do." He also says he would have liked to use magnetic memory but he "couldn't afford it."

The one-of-a-kind machine ended up costing \$5,000 to build. It included some firsts, namely the use of the originally troublesome vacuum tubes for logic circuitry and a refreshable memory. Atanasoff also takes credit for inventing the word analog—



DR. JOHN V. ATANASOFF: "We did it. And after that, it's easier for the next man who comes along."

"even Mauchly would admit that," he contends.

In June 1941 on a visit to Iowa, Mauchly received documentation and a demonstration from Atanasoff on the ABC. What Mauchly saw then was an unfinished product which subsequently included two 1,500 bit binary storage drums, 300 vacuum tubes, a spark printer and reader, and an electronic adder circuit. Mauchly, along with Eckert, went on to develop the first large-scale digital computer.

In the court case, the judge on Oct. 19, 1973 found that "Eckert and Mauchly did not themselves first invent the automatic electronic digital computer, but instead derived the subject matter from one Dr. John Vincent Atanasoff." Ironically Sperry Rand had brought the suit against Honeywell, charging the company with infringing Eckert and Mauchly's ENIAC patent.

Atanasoff is reluctant to dredge up the past, preferring to focus on the present. For several years now he's been working in the area of "human communication." His goal is to develop a new phonetic alphabet. But his current pet project has done nothing to erode the pride he clearly has in his former accomplishments. In an oblique reference to Mauchly and Eckert, he boldly proclaims of his and Berry's work: "We did it. And after that, it's easier for the next man who comes along."

—L.F.R.

MINICOMPUTERS

RISKY SUIT FOR DG

At issue is Data General's alleged software/cpu "tie-in."

Data General's long-festering antitrust problems bubbled up from beneath a protective "sealing" court order last month when PCM challengers won an important victory against the Massachusetts minicomputer vendor. Data General's legal problems have drawn relatively little attention until now, in part because of the protective order. But the case has potentially enormous impact upon DG—and not only because it might open the DG base to cpu look-alikes.

DG is being forced to defend the legality of the ingenious and sometimes eccentric marketing schemes that have effectively isolated its user base and protected the firm's industry-leading profit margins. A San Francisco federal court has compounded a number of antitrust cases filed against Data General around the coun-

This little book can save your company big money.



Rental Electronics, Inc.
(800) 227-8409

In California (213) 993-7368, (415) 968-8845 or (714) 879-0561

CIRCLE 59 ON READER CARD

WHY CAN'T MICROPOLIS DO THINGS LIKE EVERYONE ELSE?

To be honest, we could. But our customers have come to expect a lot more from us.

They've come to appreciate our role as a problem solver and a leader in technology responsible for the highest capacity and best performance drives in the industry.

96 TPI is nothing new for us.

Consider the current hubbub about "new" 96 TPI disk drives. You should know that what may be new to our competition is anything but new to us.

After all, we brought the 100 TPI MegaFloppy™ disk drive to the marketplace more than two years ago. And we've delivered more than 50,000 drives already.

To us, a 96 TPI drive is no big deal. So for the customer who's looking for a double track drive offering compatibility with 48 TPI drives, Micropolis can deliver.

Think of us as double headquarters.

We should also mention that our double track disk drives give you all the storage capacity of an 8-inch floppy in the body of a 5¼-inch floppy. And with our double head version, you get up to 1.2 megabytes. That's more than ten times the capacity of other 5¼-inch floppies.

But our innovations don't stop there. Over the years, many of our ideas have

gone on to become industry standards. And many more will.

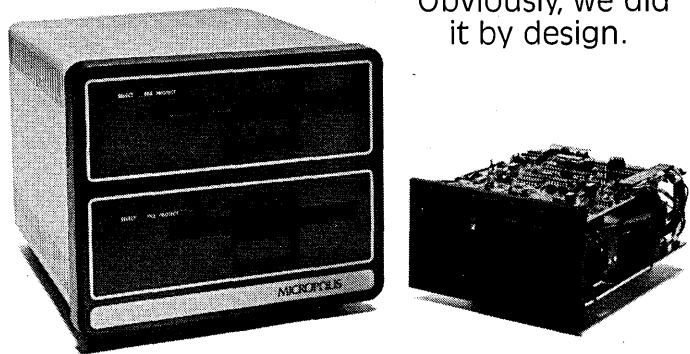
Things like stainless steel, precision-ground lead screws instead of cheaper, less reliable plastic positioners.

We also developed a special disk centering mechanism that is the most accurate in the industry.

And who do you think successfully adapted Group Code Recording technology to the floppy disk drive industry? None other than Micropolis.

Remarkable as our technical achievements may be, some people still wonder how we got to be number two so rapidly in such a fiercely competitive business.

Obviously, we did it by design.



MICROPOLIS™

Where the 5¼-inch OEM drive grew up.

Micropolis Corporation, 21329 Nordhoff Street, Chatsworth, CA 91311. For the telephone number of your nearest OEM rep, call (213) 709-3300.

See us at NCC Booths 1260 & 1262

CIRCLE 60 ON READER CARD

NEWS IN PERSPECTIVE

try, separating them from DG counterclaims of contract violations and theft of trade secrets which will be tried separately and later.

The plaintiffs in the current case, led by Fairchild Camera and Instrument Corp., seek to force Data General to allow PCM customers to buy or license DG operating systems for use on Nova or Eclipse emulators. Using antitrust law, they have accused DG of illegally restricting competition by use of an illicit "tying arrangement," forcing a customer who wants to buy one product (operating system) to buy a second (the cpu). As part of the same suit, Ampex Corp., a manufacturer of memory boards, charged DG with using the cpu as the "tying product" to force customers to buy DG memory boards.

Last month, the San Francisco court declared that the tying arrangements do exist, artificially linking separate products, and brushed aside many of the arguments Data General planned to use to justify those arrangements. In an upcoming jury trial, Data General must now prove that the two "tying products"—operating systems and cpus—are so insignificant in their own competitive marketplace that they lack the requisite "economic power" to corrupt the competitive atmosphere in the "tied" product markets which the plaintiffs want to enter.

The court's ruling came at the end of a year-long pretrial process—the exchange of 600,000 documents, 150 depositions, and hundreds of formal interrogatories among the contesting firms—when both sides unsuccessfully sought summary judgment in their favor.

Federal Judge William Orrick—a former Deputy Undersecretary of State for Administration, former Assistant U.S. Attorney General responsible for the Antitrust (1963-1965) and Civil (1967-1972) Divisions of the Justice Department—took advantage of a "salvage" provision in the federal court pretrial procedures to declare certain facts effectively "uncontested" and therefore proven on the basis of the evidence and arguments gathered for the summary judgment motions. Orrick effectively subtitled the case; he declared the existence of the tie-ins among the "material facts" established "beyond dispute"; and he ordered a jury trial solely on the economic power issue.

The plaintiffs—Fairchild, SCI Systems Inc., Digidyne Corp., Bytronix Corp., Data Compass Corp., and Ampex—were described as "elated" by the development. Data General's subsequent efforts to have Judge Orrick hear new arguments on the foreclosed issues and the summary procedure—or to formally certify them as major case issues to allow immediate appeal—were rebuffed by the court.

Dual product "tying arrangements" of the sort Data General is accused of are classic examples of anticompetitive prac-

tices outlawed by antitrust legislation. But this is apparently the first time such marketing practices have been litigated in the computer industry. In this case, the core issue is not whether joint or "bundled" sales of the two products are allowed, but rather whether a vendor can refuse to offer each product for sale independently.

"Antitrust law treats tying arrangements harshly," Judge Orrick explained in his opinion. "Proof that a tying arrangement possesses certain critical elements will

Last month, the court declared that the tying arrangements do exist, artificially linking two separate products—operating systems and cpus.

render it illegal *per se*" under the Sherman and Clayton antitrust acts.

Citing classic case law, Orrick said, "There are certain agreements or practices which because of their pernicious effect on competition, and lack of any redeeming virtue, are conclusively presumed to be unreasonable and therefore illegal without elaborate inquiry as to the precise harm they have caused or the business excuse for their use.

"This principle of *per se* unreasonableness not only makes the type of restraints which are proscribed by the Sherman Act

more certain to the benefit of everyone concerned, but it also avoids the necessity of an incredibly complicated and prolonged economic investigation into the entire history of the industry involved, as well as related industries, in an effort to determine at large whether a particular restraint has been unreasonable—an inquiry so often wholly fruitless when undertaken."

The litigation focuses on some of the sales techniques that have made DG an industry profit leader. Data General licenses its operating systems only to customers who sign a program license agreement (PLA) promising to use the software only upon a specific DG cpu. Data General also requires its software licensees to purchase a minimum amount of Data General memory and peripheral products (a "minimum equipment configuration," or MEC), calculated differently for each OS product, or pay a sizable license charge.

Both schemes are now rare; the latter perhaps unique among major vendors, and particularly profitable. Both were reportedly developed by DG's outside counsel, the New York firm of Reavis & McGrath, to deal with an early emulator challenge from Digital Computer Controls Corp., a company DG eventually purchased. (Reavis & McGrath senior partner Fredrick Adler, a major figure in DG's early organization, finance, and corporate strategy, is a Data General director.)

Rent an H-P Desktop Computer and figure on big savings.



Rental Electronics, Inc.
(800) 227-8409

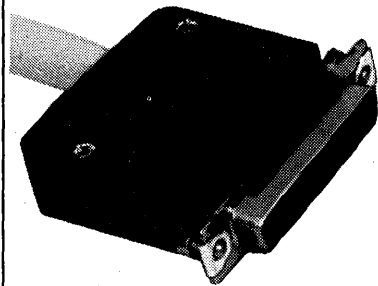
In California (213) 993-7368, (415) 968-8845 or (714) 879-0561

CIRCLE 61 ON READER CARD

**Expand Tech Controls:
Make Floor-to Floor
Installations;
Reclaim Wasted Space
with**

EXTENDED EIA DATA CABLES

Up to 250 feet long!



Locate your terminals where you want them . . . 250 feet from Modems without line drivers. Data Set extends what used to be the maximum of 50 feet by controlling problems of capacitance, impedance and attenuation—through use of proper cable design. Now in operation all over the country—with positive results everywhere.

Quick delivery; priced right. Pinned to your specifications (Normal pins on 18-conductor cable are 1 through 8, 15, 17, 20 through 25).

**\$18.50 plus 75c/foot in
18-conductor cable**

6 Conductors —
\$14.50 plus 35c/foot

12 Conductors —
\$17.00 plus 55c/foot

25 Conductors —
\$18.50 plus 90c/foot



**The Company with
a lot of Connections**

Data Set Cable Company, Inc.

We serve you from 2 locations:
722 Danbury Road—PO Box 622
Ridgefield, Connecticut 06877
(203) 438-9684

3560 Polaris Avenue 21
Las Vegas, Nevada 89103
(702) 873-6291

New catalog available

NEWS IN PERSPECTIVE

The Ampex case against DG focused on the minicomputer vendor's practice of requiring all cpu purchasers to buy a minimum amount of memory boards installed—even if the oem or end user could not or would not actually use DG memory in his installation. (Ampex, in the process of being acquired, actually settled with DG just before Judge Orrick's ruling; in fact, Ampex brought the settlement agreement before the judge for approval the same day. Orrick later refused DG's request that he withdraw that portion of his ruling concerning memory sales and Ampex—and only days later, Keronix Inc. of Los Angeles, an old DG adversary with similar concerns about memory products, filed a new antitrust suit against DG and petitioned for entry in the case.)

Judge Orrick set forth five elements that had to be proven or left uncontested for a Sherman Act tie-in violation—and then proceeded to declare four of them present (as "material facts without substantial controversy") in Data General's entwined OS/cpu and cpu/memory marketing practices. He reserved for jury trial the key and complex issue of whether—in either the operating system software market or the cpu market—DG had sufficient "economic power" to "appreciably" restrain competition in the respective "tied" markets.

Orrick's list of "material facts," the background against which Data General will have to argue its comparative weakness in software and central processors, will severely restrict and narrow the focus of DG's legal defense. Thus far, however, Data General's attorneys have fought a bitter guerrilla war in the courtroom, largely on the defensive, but conceding nothing. Judge Orrick, slicing through the voluminous record, briskly certified the new facts of the case:

1. Data General's OS software and its cpu are separate products subject to a tie-in imposed by DG's program license agreement. Data General's cpu units and main memory boards are separate products subject to a tie-in imposed by DG's minimum memory purchase requirement.

2. Both DG's software/cpu tie-in and the firm's cpu/memory tie-in affect a not insubstantial amount of commerce in the memory market.

3. All plaintiffs except Data Compass, a software firm DG charges breached its contract with the cpu vendor, have "suffered actual injury" of which "a material cause" was the DG tie-in in the two respective markets. (Orrick set aside the question of Data Compass' injury or damage for jury decision.)

4. "There are no legitimate business justifications for either the software/cpu tie-in or the cpu/memory tie-in because less restrictive alternatives are available."

Although early press comment implied a parallel between Data General's

cases and DEC's apparently moribund challenge from National Semiconductor, the cases are very different. The DEC defense against PCMs is built around a bedrock patent, DEC unibus patent. Data General, lacking key patents, uses marketing practices, contracts, copyrights, trademark and trade secret claims to try to isolate its market from emulating competition. Although sometimes referred to as a "bundling" case, and it could perhaps evolve into one, the focus of the plaintiffs' efforts is to force DG to make its OS software available—at a profit, not free—rather than to break up any classic bundling scheme. IBM, even when bundled, allowed customers to use their OS as they would; and most vendors (including DEC) claim they have a policy of allowing purchase license on software. In fact, only IBM, Data General, and (briefly) DEC have faced any PCM challenge and have thus dealt with the issue in the marketplace.

The litigation focuses on some of the sales techniques which have made DG an industry profit leader.

Orrick carefully delineated the differences between this case and the Telex and Transamerica antitrust cases against IBM, when federal courts referred to the OS and cpu as a single unit, one product, and also accepted IBM's distinction that main memory and add-on memory are separate products. He then used a streamlined but subtle legal analysis to reason his way through the complex arguments on market practices and DG policy. As an example, citing case law, he tackled the issue of whether the OS software is separate from the cpu product or just a portion of the single computer product. The test, he argued, was to study the "function of the aggregation," whether the items are normally sold or used "as a unit with fixed proportions," and whether the amalgamation of products resulted in cost savings apart from what could be expected from reduced sales costs and the savings in any joint marketing program.

Judge Orrick argued DG's own marketing practices refute the suggestion that the software and the cpu used in a particular computer system must necessarily be manufactured by the same company. First, he noted, DG admits it sells cpus without requiring the purchaser to obtain DG software; DG price lists show separate charges for hardware and software; until summer 1978, different company executives had responsibility for selling software and hardware.

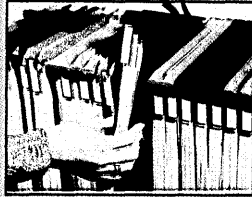
Since cpus can accept several OS software packages, the software is not "sold in fixed proportions" to cpus. Noting DG's claims that coordinated R&D offers cost savings, Orrick said DG offered no evidence that the "asserted benefits of R&D would be sacrificed if DG were to offer its

D.P. Documents... organize and control them in any environment with the DOCU-MATE® filing system.

A single filing method for all documentation, records and reports.

Think about the time and expense involved in the creation of data processing documentation, records and reports and you'll see the importance of organizing these vital information

assets so they are under the control of management. Until recently, this problem of organization was compounded by the many sizes and shapes of documents which created an almost impossible filing, retrieval and referencing problem. Now, the DOCU-MATE filing system solves the problem by providing a single filing method for all documents regardless of their size, shape or location within the information network.



Combine DOCU-MATE filing with open office plan.

If your existing or planned office is designed with panel supported work surfaces, a wide range of DOCU-MATE filing components designed to coordinate with most popular panel systems is available. You can get the advantages of functional organization with filing capability that enhances the aesthetics of your design.

Combine DOCU-MATE with contemporary office furniture.

DOCU-MATE work station filing equipment including: cabinets, documentation organizers and mixed media open shelf files coordinate beautifully with furniture from leading manufacturers. You can plan work stations that provide both a modern crisp appearance and the functional efficiency of organized filing and referencing.



Build total DOCU-MATE filing environments.

While you can integrate DOCU-MATE filing into your existing office plan; you can also create total DOCU-MATE filing environments. A full line of specialized filing work stations, chairs, documentation organizers, cabinets and open mixed media files lets you plan environments



that precisely meet the needs of the people involved.

Coordinate work station and library filing.



With the DOCU-MATE center hook filing and drop filing principle, you can build a total filing network involving group libraries and files and central libraries. Every imaginable type and size of document can be filed interchangeably at every location. You can even intermix sizes and shapes in the same filing equipment. And, since DOCU-MATE filing is designed for both high density, high security filing and high reference filing you can plan filing areas to meet the needs of the people who must work with them.



Send for our free 20 page brochure.

Circle the readers' service number or write direct. Wright Line Inc., 160 Gold Star Blvd., Worcester, MA 01606

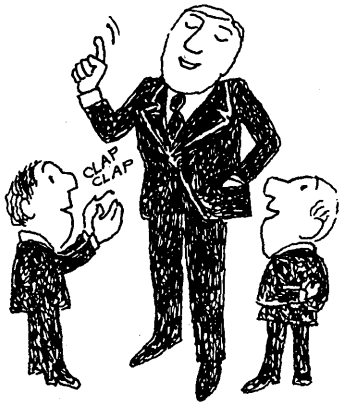
Wright
LINE



a unit of Barry Wright

CIRCLE 63 ON READER

Become an efficiency ~~expert~~ *genius* with KV Jackets.



It only takes an expert to trim costs and increase efficiency. But to improve quality at the same time—that takes genius.

And that's why you should get to know KV Microfilm Jackets. They legitimately provide better filing and retrieval while saving you up to 22% in cost. And because KV Jackets are so durable, you'll probably show even more savings down the line.

How can KV be better for less? Only one answer: superior technology. Our ultrasonic dual seal welding is designed to outlast the "glued on" ribbing on other brands. Especially under high retrieval conditions. And KV Jackets also have skip seals to prevent tearing and promote longer wear.

You get 3 to 5 day delivery instead of 30 to 60. Plus you get jackets with the best duplication characteristics in the industry. Need more facts to prove you're a genius? Send for them anyway! Plus FREE samples and dealer name. Mail coupon today!

**For fast action,
call toll-free 800-238-3966**

KV Jackets, Kleer-Vu Industries, Inc., Dept. 95B
P.O. Box 449, Brownsville, TN 38012

KV Jackets, Kleer-Vu Industries, Inc., Dept. 95B
P.O. Box 449, Brownsville, TN 38012

Send me more on the "more for less" KV story,
plus FREE samples and dealer name.

Print Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Business Phone () _____ Ext. _____

CIRCLE 64 ON READER CARD

90 DATAMATION

NEWS IN PERSPECTIVE

software apart from, as well as together with, its cpu.

"The question is not whether joint R&D is more economical than separate R&D, but whether joint R&D calls for joint marketing," he declared. In light of the undisputed material facts in the record, "the Court is compelled to conclude that software and cpus are separate products."

Although the lawyers for the parties were unwilling to discuss the case publicly, and the evidence of the case is still under judicial wraps, a flavor of the irony inherent in the structure of the case can be found in the oral arguments for the summary judgment motions. Data General, on the key issue of economic power, must minimize its software systems' quality, uniqueness, effectiveness, popularity, and competitiveness. For a tough aggressive marketing organization like Data General, the idea of their lawyers backpedaling around the courtroom trying to avoid saying anything good about DG operating systems and cpus must be painful.

During the courtroom debate, Judge Orrick interjected a question for Data General attorney Richard Goff, with a passing reference to a remark of DG president Edwin De Castro that DG software is "the best in the business."

Mr. Goff: "Some people say it's good. . . ."

Judge Orrick: "You would answer your client: 'Yes, sir, you bet it is,' wouldn't you?"

Mr. Goff: "Some—some people say it's good; other people say it's not. And many customers say it's obsolete and prefer to use other software."

Judge Orrick: "All right."

Mr. Goff: "There's a difference of opinion."

—Vin McLellan

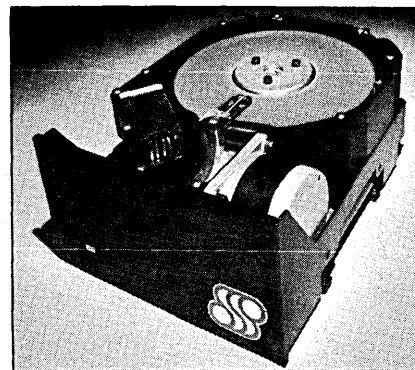
TECHNOLOGY

SIX MB ON EVERY DESK?

Alan Shugart is back in business, this time pushing a 6-megabyte, 5¼-inch Winchester disk drive.

As if a chicken in every pot and two cars in every garage weren't enough, it looks as if 6 megabytes on every desk will be next.

In a hotel suite somewhere near the Anaheim Convention Center this month, a 6-megabyte-capacity, 5¼-inch Winchester disk drive is slated to be shown to a select list of invitees. Their host will be Alan Shu-



DISK DRIVE DEBUT: Shugart Technology is ready to roll with its first 5¼-inch Winchester disk drive.

gart, cofounder and ex-president of Shugart Associates, Sunnyvale, Calif. Shugart is back in the industry after a five year absence, this time as the head of Shugart Technology, Scotts Valley, Calif., which has staked out a pioneering role in this new marketplace.

Initial applications are expected to be in microcomputer-based very small business systems, in personal computers, and in the low-end word processing systems, where typically a system currently uses two 5¼-inch floppy disk drives.

"I think the market available to them is quite sizable," says James N. Porter of Mountain View, Calif., publisher of the "Disk/Trend Report." He observes that shipments of the 5¼-inch floppies over the last few years have been significant. He notes that vendors of small systems are anxious to upgrade from the use of two floppies to a system with more capability—typically one hard disk and one floppy. But for a system oem that has been using 5¼-inch floppies, an 8-inch Winchester disk is just too large.

Current practice seems to be for minicomputer-based systems to use 8-inch and 14-inch disk drives, while microcomputer-based systems are expected to go to diminutive hard-disk storage units.

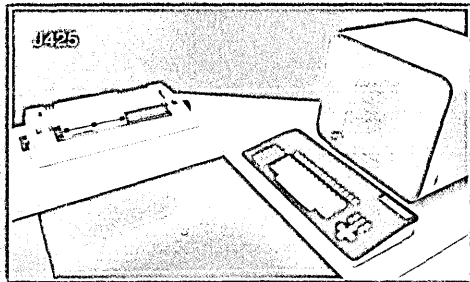
Indeed, to make things easier for the oem now using minifloppies, Shugart Technology has designed the drive package to the same size. "Even down to the same screw holes," says Alan Shugart. And he is using the same voltages. The interface selected is the same as the Shugart Associates 1000 and the track capacity is the same as on the 8-inch Winchester from Shugart Associates. Thus, from the software standpoint it's almost transparent.

Along the same lines, Alan Shugart has taken steps to try to get the industry to standardize—to the extent possible. As soon as Shugart and his media supplier, Dysan Corp., agreed on the dimensions of the disk (130 mm outside diameter with a hole in the center having a diameter of 40 mm), he contacted other disk makers—3M Co., Memorex, and BASF.

AM Jacquard Systems

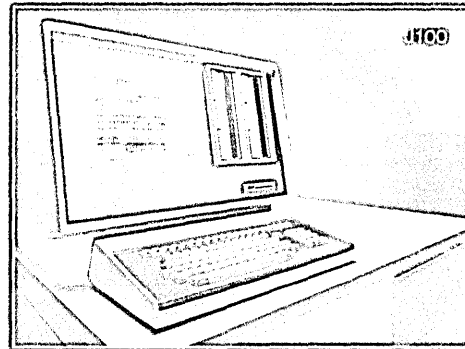
If you're considering a word processing system, consider the best—AM Jacquard Systems. Our word processing equipment and systems are the best in the industry.

Take our 425 word processor. It's a powerful standalone system with full-page video display screen capable of handling your heaviest workload. The 425's sophisticated software is specifically designed to speed up your workflow. And the 425 even interfaces to a phototypesetter for in-house typesetting.



It supports up to 16 work stations, handling word, data and distributed data processing tasks.

Then we offer the award-winning 100 shared resource system for large, more complex assignments.



Highly sophisticated and extremely powerful, the 100 adds a new dimension to your office's operational efficiency. Besides the best systems,

we provide the best training and service, too. The kind you'd expect from a company that's a leading edge division of a multinational, Fortune 500 corporation, AM International, Inc.

Being the best is what counts at AM Jacquard Systems. So, when you're trying to decide what's best for you, let us help. Call or write for more information. AM Jacquard Systems, the Informationists, a division of AM International, Inc., Dept. 777, 3840 Ocean Park Blvd., Santa Monica, CA 90405. (213) 450-1242

LET'S TALK ABOUT WHAT'S BEST FOR YOU.



© 1985 AM International, Inc.
AM Jacquard Systems, the Informationists, a division of AM International, Inc.
AM International, Inc. is a registered trademark of AM International, Inc.

DOGS ALSO
NEAT 3
COMPUTER
INTER



DASD[®]

**AN EASY SWITCH
IN ANY LANGUAGE.**

If you're in the dark about how to make a fast, easy conversion, let DASD shed some light on the subject for you.

We're a nationwide data processing service organization. Professional. Competent. Proven. The combined experience of our very selectively screened and highly qualified staff gives us full capability in a wide range of languages. Practical experience with all major computing software. And a complete background in a wide variety of applications.

Our library of fully documented conversion tools is the most comprehensive available. Anywhere. Our generated programs are efficient, flexible, and perhaps most importantly, readable, easily understood and maintainable.

Switch without a hitch? Tell me more.

Name _____

 Title _____

 Company _____
 Phone _____
 Address _____
 City _____ State _____ Zip _____

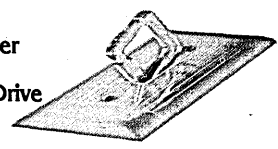
If you'd like a free literature/kit on a specific conversion, please specify.

With DASD's assistance, your completion dates can be met, without the forced postponement of cost justified priorities. If you decide on a Turnkey Conversion, DASD will pre-specify completion dates and costs and provide both the translator and manpower necessary to deliver a thoroughly tested, operating environment.

Or, you can choose from Conversion Support, Lifetime Lease Translator, or Lease Translator Per-Line conversion plans.

Of course, a benchmark is the best way to evaluate any translator and an economical way to estimate your total conversion effort. So, join the hundreds of other satisfied customers, including many Fortune 1000 companies, who have discovered the switch is on to DASD. Send for our free literature/kit on our Low-Cost Test Evaluations. Today.

DASD Corporation
Corporate Services Center
Dept. 226
9045 North Deerwood Drive
Milwaukee, WI 53223
(414) 355-3405



PEOPLE/PRODUCTS/RESULTS

- Atlanta • Chicago • Des Moines • Detroit • Hartford
- Houston • Indianapolis • Kansas City • Los Angeles
- Milwaukee • Minneapolis • Omaha • Philadelphia
- San Francisco • Seattle • Tampa/St. Petersburg
- Washington, D.C.

CIRCLE 66 ON READER CARD

Says Finis Conner, executive vp and cofounder, "It is important for us to convey what it is we're doing, even to our competitors, because we don't want the same fiasco in the marketplace that happened with the 8-inch Winchester, where you wind up with 20 competitors with 20 different products and the system designer doesn't know what to do."

This confusion, which slows market acceptance, is explained by Raymond C. Freeman Jr., consultant in Santa Barbara, Calif. He says there are four dimensions of the so-called 8-inch Winchester disks. There's the 200-mm outside diameter and 63.5-mm inside diameter disk initially developed by BASF and proposed as a standard by the European Computer Manufacturers Assn. There's also the 210-mm o.d. and 100-mm i.d. used by IBM in its Piccolo drive. To add to the confusion, Memorex at last year's NCC introduced a drive with dimensions of 200 and 100 mm, and Control Data is expected to debut a model this year with dimensions of 195-mm o.d. and 100-mm i.d. What's a mother to do? What's a system designer to do? As Freeman says, "Will the real 8-inch disk please stand up?"

This is the type of fiasco that Shugart is trying to avoid in the 5¼-inch hard disk marketplace. "To have that kind of madness occur in the 5¼-inch world would really be a big self-inflicted wound on the industry," says Freeman. "So if Alan is successful in guiding the industry through those shoals in the startup months, he will have made a very large contribution."

The 5¼-inch disk has 15 times the capacity of the double-sided 5¼-inch floppy but at only three times the cost, says Conner. He stresses that they are not pushing the technology, but are using standard Winchester heads, standard stepper motors, and coated disks. "We'll actually have 20% more capacity in our drive than the Shugart Associates 1002, which is their low-end 8-inch Winchester," he adds.

Conner prices the drive at \$1,500 for a quantity of one, \$925 each for a quantity of 500, and says initial shipments of evaluation units will begin next month.

Projections of market size for the small drives have not yet been made by the likes of Freeman and Porter. It's too early to forecast market size, says Freeman, "in spite of the fact that some people are rushing hard to introduce it . . ." He thinks the development cycle for a product like this will take longer than some of the early entrants are hoping.

He believes the market would have developed out of a need in another two years, but that availability of hardware today will create an earlier demand. "I give [Shugart] credit for really doing a lot to accelerate the unfolding of the market," says Freeman. "because it wouldn't have happened on its own for a couple more years."

—Edward K. Yasaki

SOFTWARE

SOFTWARE SLUMP IN SIGHT?

There's little optimism that the '80s will bring big breakthroughs in software development.

This is not to be the decade of dramatic improvements on the software side of computing.

Such was the consensus of speakers at a summit conference on "Future Shock, Computers in the 1980s," staged in late March in Los Angeles by the American Institute of Aeronautics & Astronautics (AIAA), the Data Processing Management Assn. (DPMA), and Technology Transfer Society (TTS).

The degree of pessimism was both varied and tempered. Dr. Willis Ware, corporate research staff, the Rand Corp., said he was "not gloomy and not exuberant . . . just cautiously hopeful."

Dr. Peter R. Kurzhals, assistant director for research & technology, NASA/Goddard Space Flight Center, suggested that rising software costs will force new efficiency measures.

Dr. Roger R. Bate, manager of advanced software technology, Texas Instruments, Inc., said he wanted to "dispel some of the gloom" cast by other speakers on software prospects for the '80s. Yet, he predicted that the cost per person for software people would increase 10% during the decade.

The people factor was most often cited as the big problem facing software this decade. "We've all experienced the fact that talent is in short supply," said Ware, "and the salary structure reflects this."

He pointed out that "a lot of new companies are coming into the business each week and this drives demand. The microcomputer industry is growing to a point where we are going to have computers where they never were before. This too drives demand."

Ware suggested that the proliferation of microcomputers could generate people "who know something about programming. Maybe we can attract them to the computer industry in a new skill class, to be to programmers what engineering technicians have long been to professional engineers." He called these people a potential "cadre of para-programmers."

Ware said the '70s was "the decade in which we learned how to manage it [soft-

ware], but there still are disasters all over the landscape." He said the software development process should be considered very much like that for hardware. "It is not an art form. It is a development process."

Bate seemed to share this outlook, although hinting that he partially deplored it. "Software development is a discipline, not an art." But while there is the need for this kind of outlook, he acknowledged, "it's taken the fun out of software development." He added that the more disciplined approach has made it possible to produce software at a "relatively predictable cost."

Productivity of software developers was also discussed. Ware called the term "productivity gap" an unfortunate phrase. He said he prefers "productivity shortfall. What an individual does is not the issue."

Of higher order languages, Ware said, "They are always on the scene but the impact of new higher order languages in the '80s will be very modest. There is too much present investment in existing languages. We can't afford to junk that heritage."

He believes higher order languages will only affect new applications, those getting started in the '80s. "And I'm not strong on that. Many programming shops are dedicated to a single language."

TI's Bate said of higher order languages that they generally are the result of a committee development effort and, as such, don't represent a single concept but a collection of concepts.

Other current problems with programming languages listed by Bate were that specifications are frequently incomplete, languages are too complex to learn easily, most languages fail to detect logic errors, and many languages lack adequate support for debugging.

The demand for software people is predicted to grow by 10% per year, from 563,000 people in 1980 to 1.5 million by 1990.

He urged the software community to "identify and back the most promising language for standards, training, and support, and find a single, cohesive, easy-to-learn, general purpose language which enforces correct programming techniques and usage."

Bate said the software community is "not doing at all well" in testing. He said testing bears a share of software cost which must be weighed against the cost of deferred errors.

"Static program verification methods," Bate said, "may be the most feasible way to test complex multiprocessor systems." He said static analysis can be used on code complexity, tracing of logical paths, cross references and program verification, whereas dynamic testing is preferable for program tracing, interactive

NEWS IN PERSPECTIVE

debuggers, and instruction-level simulation.

Bate said that in testing in integrated hardware/software developments, "testing requirements synchronize hardware/software efforts. From the start," he stated, "configuration management is critical. In-circuit emulation provides powerful testing tools. Multiprocessor real-time systems require special care."

He wasn't quite as worried as Ware about the shortage of software people in the decade. He predicted the demand for software people would grow by 10% per year, from 563,000 people in 1980 to 1.5 million by 1990, but he sees a leveling off of the software population caused by an increase in the number of units of computer capacity. He defined these units as "that amount of computer capacity which keeps one software person busy. One unit supports one person."

Ware said the way software organizations will respond to the changes of the '80s will depend on their history and heritage. "New organizations can move most rapidly. Older organizations will have a more difficult time responding to new things that come along."

He listed as positive signs that an organization might respond to change and improve in the '80s: management visibility at the top of the software operation; a stable environment; alertness to modern tech-

niques and willingness to make investments to do it better.

Signs indicating organizations might have trouble improving in the '80s, Ware said, include: lots of old software; scarcity of management experience with the software job; geographically scattered operations; and a sequence of jobs, each one getting better in the '80s. He noted, "The IRS has hundreds of thousands of lines of code written in assembly language."

—Edith Myers

AMERICAN SOFTWARE DREAM

What started out as a nightmare for Britain's Altergo Software now looks like a dream come true in its pact with Insac to export software to the U.S.

The lure of lucrative software in the U.S. could prove to be the bait in a vicious trap unless companies have the resources to handle the cash flow problems created by bal-

ancing the high cost of marketing and software development with the long-term pay-back on investment.

That is the warning delivered by David Brownlee, managing director of Altergo Software, who still has fresh in his mind the bittersweet taste of the American Software Dream. Despite great user acceptance of the British firm's products in its first three years of U.S. trailblazing, Altergo Software Inc. (ASI) found that the costs of entering this new market drained the resources earmarked for enhancing existing products and developing new ones.

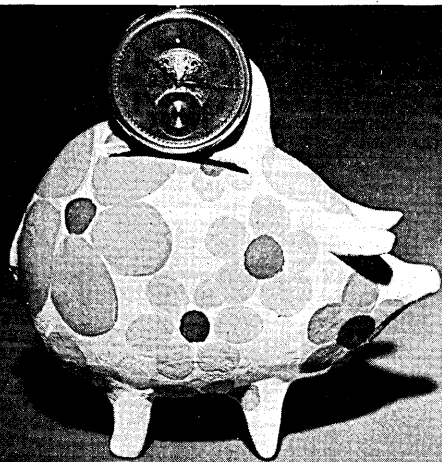
So, earlier this year, ASI was sold for around \$4 million to the company started by the British government to promote the export of software, Insac Products. This deal gives Insac a readymade marketing outlet complete with 40 staff members, seven offices in North America, over 500 product installations and a wide range of product offerings. For ASI back at its London headquarters, it means more money is freed for product development, and it still has a U.S. outlet via Insac.

The pact between Insac and Altergo is fraught with irony. Insac was formed three years ago by the government's National Enterprise Board (NEB) with the intention of helping to export software. At that time, Altergo was starting to move into the U.S. market, with the Shadow II IBM teleprocessing monitor as its spearhead. Insac's main emphasis then was on trying to form a consortium of the largest British software and systems companies, such as Logica and CAP. Smaller companies which were showing private entrepreneurial spirit in setting up American sales, such as Altergo and MSP with its Datamanager system, were thought too small to be aligned with the Insac set.

Now that Insac's initial strategy of bringing together a "supergroup" consortium has effectively failed, it is relying on the ASI base as a springboard for selling what is likely to be its most successful line of IBM-compatible products. In addition, Insac will sell products for other manufacturers' systems.

Altergo's software products strategy is based on a simple formula: stick to IBM-compatible systems which have a proven user need and demonstrable productivity gains. Although ASI's Brownlee says there has been a shift in emphasis recently from products aimed at improving machine productivity, such as Shadow II, to "people productivity aids," such as its CPG communications program generator, there has been no basic change in Altergo's approach. But then, the company was first formed as a four-man outfit in 1969, and it took until October 1973 for the first release of Shadow to appear.

At first, Altergo's target was primarily PL/1 programming and consulting. But in 1973 the company took under its wing a product developed by a user, the



QDMS-IT'S ABOUT TIME!

QDMS. The Q could stand for quick. Real quick. QDMS cuts programming time by as much as 95%. It's got a report generator that gives you vital reports fast. Non-technical people can learn the system in no time. And users commonly compress application development from months to days, even hours.

That's only part of the reason Datapro's recent survey showed users rating QDMS over any other PDP-11 data management system.

The Best Part — \$8,175. QDMS costs far less than many data management systems that can't do nearly as much, or as well. So get the story. **Quick.** Call or write Tom Schreier. (203) 728-6777.

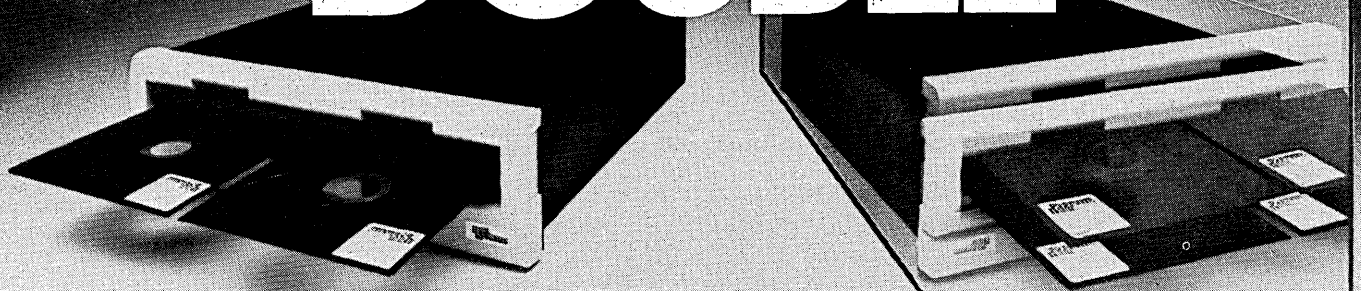
Quodata
Specialists in DEC Systems

196 TRUMBULL STREET • HARTFORD, CT. 06103

CIRCLE 67 ON READER CARD

**DSD
480**
IS COMPATIBLE
WITH ALL
IBM & DEC
DISKETTE
FORMATS!

INTRODUCING THE DOUBLE DOUBLE



**DOUBLE SIDED. DOUBLE DENSITY.
DOUBLE THE DEC® RX02.**

FULL RX02 COMPATIBILITY—HARDWARE, SOFTWARE, AND MEDIA.
DOUBLE THE CAPACITY—ONE MEGABYTE ON EACH DISKETTE.
BUILT-IN BOOTSTRAP—CONFIGURE AN ENTIRE LSI SYSTEM IN A FOUR-SLOT BACKPLANE.

THE DSD 480

- FOR PDP®-11 OR LSI-11 SYSTEMS.
- ALL IBM AND DEC DISKETTE FORMATS—convenient data exchange between DEC and IBM systems.
- EXCLUSIVE "HYPERDIAGNOSTICS"—Built-in intelligence for switch-selectable self-testing and display.

THE DSD 470

- FOR LSI-11 SYSTEMS.
- LSI-11/23 FOUR-LEVEL INTERRUPT ACKNOWLEDGEMENT—DEC standard for all future peripherals.
- ON-BOARD DIAGNOSTICS FROM ODT—Simplified incoming inspection or system analysis.

LOW PROFILE, MODULAR PACKAGE—ONE HALF THE SIZE OF THE RX02.
HIGHER PERFORMANCE—34% FASTER AVERAGE ACCESS THAN THE RX02.
Advanced technology and innovative engineering deliver DEC-compatible flexible disk systems with added capabilities and superior performance. When you need increased storage capacity and proven reliability for your DEC computer, look to the leader—DATA SYSTEMS DESIGN.

Please call me. Please send me more information.
My system: LSI-11, PDP-11/03, LSI-11/2, LSI-11/23, PDP-11/_____

Name _____ Title _____ Company _____
Address _____ City _____ State _____ Zip _____
Telephone _____

Data Systems Design, Inc.
3130 Coronado Drive
Santa Clara, CA 95051
(408) 249-9353
TWX 910-338-0249

Eastern Regional Sales
990 Washington Street, Suite 101
Dedham, MA 02026
(617) 329-5730
TWX 710-348-0563

D 5/80

**Data
Systems**

® Registered trademark of Digital Equipment Corporation

CIRCLE 68 ON READER CARD

Projects and careers going places!

For 11 years TELOS has been providing challenging assignments to our employees and excellent service to our customers. We have supported government and industry in systems development for the Voyager Jupiter/Saturn Mission, the Advanced Attack Helicopter, and the Defense Meteorological Satellite Program. Our projects involve systems analysis and design, software development, installation, maintenance and training.

TELOS employees have discovered growth opportunities unavailable at other companies. Our diversification into different computer service market places allows you to broaden your experience by choosing assignments in a variety of disciplines.

TELOS has immediate openings for programmers/analysts at several locations nationwide:

CONNECTICUT Norwalk	CALIFORNIA Santa Monica Orange County Pasadena Oxnard/Ventura San Diego Santa Barbara Sunnyvale	MASSACHUSETTS Boston
		OKLAHOMA Lawton (Ft. Sill)
		VIRGINIA Hampton
		WASHINGTON Seattle

TELOS is a career-oriented company offering excellent salaries, attractive fringe benefits, plus personal and professional advancement. We seek individuals who share our appreciation for good performance and pride of workmanship, and are in the top 10% of the realtime/systems programming community. If you are truly serious about going places, please rush your resume to:

TELOS

TELOS COMPUTING, INC.
Equal Opportunity Employer M/F

Penny Bevier, Telos Systems Development,
3420 Ocean Park Blvd.,
Santa Monica, CA 90405
(213) 450-2424

CIRCLE 69 ON READER CARD

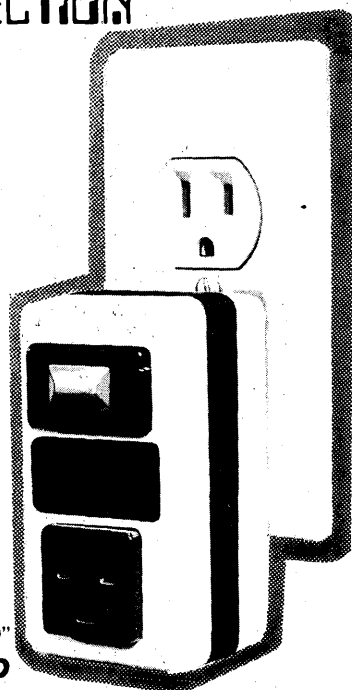
IGNORING EQUIPMENT PROTECTION CAN COST \$\$\$\$

**THE POWER-SENTRY™
PROTECTS AGAINST
TRANSIENT OVER-VOLTAGE,
REDUCING EXPENSIVE
EQUIPMENT DOWNTIME,
ELIMINATING MAINTENANCE
AND PROVIDING LONGER
EQUIPMENT LIFETIME.**

Provides protection to Computers,
Copy Machines, Business Machines
and Communication Equipment
operating on 120 Volt, single phase
60 Hz. Power line.

"DEALER INQUIRIES INVITED"
SURGEONICS LIMITED

155 Kisco Ave., Mt. Kisco N.Y. 10549 • 914-241-3203



CIRCLE 70 ON READER CARD

NEWS IN PERSPECTIVE

Thomas Cook travel organization; this product became Shadow.

Underlining the need for strong financial backing in software development, Brownlee points out that although Shadow is seven years old, the company is investing twice as much this year in its development than it did last year. "We will never get to the end of its development," Brownlee comments. He believes that any company contemplating the development of a new software product should work on a five- to seven-year period before reaching a break-even point. And that's why, he explains, his company needed the cash injection from the ASI sale to finance future developments.

Although Shadow II remains the flagship of the company, Brownlee claims Altergo can now offer IBM users a range of software which could be taken as a complete package or from which individual systems can be selected. These systems are grouped under the name Altergo Communications Alternative and include the Quota II on-line program development system (which received an honorable mention in the 1979 Datapro software survey), the GUTS timesharing service, and the AROS data base management system. In the U.S., ASI also markets for the Dutch company Corodale BV, the disk and tape Space/Manager system, another product which earned a 1979 Datapro mention.

With this product range and with its U.S. activities now covered by Insac, Brownlee has his sights set on new markets in Japan, Spain, Australia, and South Africa. At present, 40% of Altergo's software sales are in the U.S. and 20% in the U.K. Brownlee's aim is for a growth to about 60% of its sales in the U.S., which he notes is the estimated U.S. share of the world software market. At the same time, Altergo hopes to increase sales in the rest of the world. Last month an Altergo software office was opened in Spain. And the company is currently talking to prospective agents in Japan, although Brownlee believes that it will be about four years before the Japanese market will "come good." He believes that the use of software in Japan is still many years behind the rest of the world and that the market for independent software will really start to grow when Japanese manufacturers begin to charge realistic prices for their own software. He expects to operate independently in Japan, selling to users of IBM and Japanese-made hardware; Brownlee considers it a bad idea to become closely associated with any one Japanese supplier.

From its four-man PL/1 team in 1969, Altergo has grown to a \$30 million company with a staff of over 500. As well as providing a base for its own future growth, the seeds sown by Altergo in the U.S. could flourish into a healthy British software export industry with its roots firmly established in the rich soil of IBM and IBM look-alike systems.

—Malcolm Peltu

PASCAL CONFUSION EXPLAINED

SofTech Microsystems defends its right to market the university-developed version of PASCAL.

Like those of Mark Twain's death, reports of controversy surrounding SofTech Microsystems' exclusive license to market UCSD PASCAL are labeled by the company as "greatly exaggerated."

The California subsidiary of SofTech, Inc., Waltham, Mass., was organized last year with the sole purpose of licensing and enhancing the popular version of the PASCAL programming language which was developed by the Institute for Information Science at the University of California at San Diego.

The version of the language was developed under the direction of UCSD Professor Kenneth Bowles with portability as the most desired feature. UCSD Pascal has become a virtual standard for microcomputer applications of the language, with more than 10,000 users running it on microcomputers from Apple, Digital Equipment, NorthStar, Pertec, Radio Shack, Texas Instruments, Western Digital, and other manufacturers.

At first UCSD licensed the language's use just to other campuses of the University of California. But its popularity grew, leading to a volume of requests for licenses that created an administrative burden the university was ill equipped to handle.

So, the university approached the California office of SofTech, Inc. and SofTech Microsystems was launched.

Some at the time questioned whether a software product developed at a state land grant college by university-paid professors and their students and at least partially funded by tax monies should not properly be placed in the public domain.

C.A. Irvine, vice president and director of engineering of SofTech Microsystems, said, "We are just an agent of the university as many other firms are for many universities, licensing uses of books and many other products." And, he said, "we intend to put as many dollars into UCSD PASCAL as the university did."

Irvine explained that the university had two types of licenses before it entered into its agreement with SofTech. One was an end user license granting the licensee use of the language but prohibiting him from reproducing it for sale or to give away. These licenses, he said, contained a clause which would grant the user full and unlim-

ited use at the end of two years.

"When we were negotiating with the university," Irvine said, "we saw this as a time bomb which could result in our license having no value."

These end user licenses also contained a clause providing that they could be canceled by the university at any time for any reason. "The university, to preserve value, chose to cancel," Irvine said.

"There were some who were upset that something they had paid \$200 to \$300 for had been canceled and there was some confusion as to what users could do with what they had in their possession. What they could do was what anyone can do with copyrighted materials under copyright laws and the fair use doctrine."

He said a few "were so paranoid they got hold of the fair use doctrine and read it. They feared that entering the language into memory could constitute copying."

The other licenses granted by the university prior to its agreement with SofTech were licenses for distribution, and Irvine estimates there were about 30 of these. Some were assignable, he said, some were nonassignable, and some were even cancelable.

The assignable licenses were assigned to SofTech. Those unassignable and uncancelable, such as one to Apple Computer, continue as before with licensees paying royalties directly to the university.

SofTech has denied published reports that it had tried to get Apple to pay royalties to SofTech. "We want them to sell as many systems as possible to boost the popularity of the language," said Irvine. "They can sell only on Apple computers and we license for the rest."

One of SofTech Microsystems' first moves after being named exclusive licensor by the university was to announce the availability of the UCSD PASCAL Adaptable System. This system can be used on microcomputers using 8080, Z-80, 6502, 6800, and 6809 microprocessor cpus in systems that use any type of floppy disk stor-

"We are just an agent of the university as many other firms are for many universities."

age, including single or double density, standard or minidisks, and hard or soft sectoring.

The application of the UCSD PASCAL Adaptable System to additional microprocessors, Irvine said, means that more OEMs will be able to provide UCSD PASCAL to their customers. "This, coupled with the wide range of I/O environments possible, broadens the options that systems suppliers will be able to offer to end users wanting a PASCAL-based system. Programs developed with the UCSD PASCAL system are compiled into a universal pseudocode that can be exe-

cuted using the UCSD PASCAL interpreter and operating system. The technique allows the same program to run on a wide range of microcomputers without change. Thus, any PASCAL software is now available to virtually any microcomputer user."

John W. Brackett, president of SofTech Microsystems, said the use of UCSD PASCAL software is doubling every few months.

He said companies using a variety of different microcomputers may obtain a license allowing unlimited internal distribution of the UCSD PASCAL system for all their machines, thus allowing standardized company-wide microcomputer usage.

Irvine likes to tell of an aerospace company that, in dealing with the proliferation of microcomputer systems in its engineering ranks, issued the decree: "Get any kind you want, but make sure it runs UCSD PASCAL."

—Edith Myers

STRATEGIES

1403S AT BARGAIN PRICES

Spur Products undercuts IBM's Cadillac prices on the once Cadillac-classed printer—and offers a good deal more.

The venerable IBM 1403 printer is in trouble, but IBM isn't the source for this information.

The 1403 line printer, oldtimers will recall, was introduced with the 360 line in 1964. Immediately it was classed as the Cadillac of printers—superbly engineered,



RAY LORENZ OF SPUR: A 1403 printer for any computer, at bargain prices.

Tomorrow's Database Software, Today.

When your long-range plan for database software systems includes Cullinane's comprehensive and fully integrated family of advanced database software products, you don't have to wait five years to make it happen.

Because IDMS is truly a data dictionary-driven system, any component you require—regardless of when you acquire it—is fully integrated with the DBMS via the data

dictionary with great attendant benefits.

For example, a dictionary-driven teleprocessing system can be reconfigured dynamically without ever bringing the system down and disrupting operations.

Also, it is now possible to have a fully automated applications development system which will greatly improve programmer productivity in years to come.

Database Management

IDMS is the state-of-the-art database management system for use in the IBM environment (including the new 4300 series). The only DBMS named to the Datapro Honor Roll for four consecutive years.

Data Communications

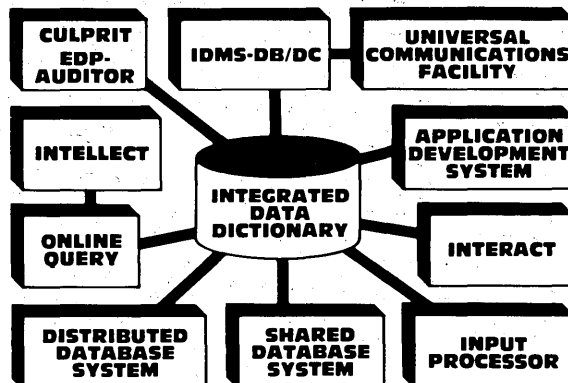
IDMS-DC is the only data communications system designed specifically for use in the database environment. Fully integrated with IDMS, IDMS-DC therefore gives faster response time, more economical use of memory and greater simplicity of use than any other TP monitor can in a sophisticated multi-terminal configuration. IDMS-DC provides a powerful recovery facility, mapping support, storage protection and many more superior programmer productivity and data integrity features.

Integrated Data Dictionary

IDD is the only "active" data dictionary because it is fully integrated with a database system. It is a powerful design and control tool for use with IDMS and with the other Cullinane software components, yet it can be used as a stand-alone system to define and standardize all data resources whether manual or automated, database or conventional file systems. IDD supports FORTRAN, COBOL, PL/I and Assembler.

Report Generator

CULPRIT can be used to produce even the most complex reports quickly, easily and with a bare minimum of coding. It can access virtually any file structure including conventional files or databases. CULPRIT is economical. It can produce up to 100 reports with a single pass. CULPRIT can be used as a powerful stand-alone or as part of a fully-integrated database management system from Cullinane. EDP AUDITOR combines the capabilities of CULPRIT with a special Library of Audit Routines to make it the premiere audit package available.



INTELLECT

This sophisticated English language inquiry system is designed for use by those in top management who have no background in computers, but have a need for timely information. Operating with a large, flexible dictionary, this new system has an outstanding ability to respond to conversational questions.

OnLine Program Development

INTERACT is an online system for program development, remote job processing, text editing and word processing. INTERACT is the programmer productivity system. It offers a powerful command repertoire, fast terminal response time, and economical CPU requirements.

Input Processor

IDMS-Input allows programmers, as well as non-technical end users, to develop application programs in an IDMS batch environment. This new product comes with its own simple language, making it easier and faster to program with IDMS-Input than with traditional programming languages.

Universal Communications Facility

Applications developed with IDMS/UCF will run under any TP monitor without modification—a truly major technical accomplishment. With IDMS/UCF, programmers don't even have to know the characteristics of the TP monitor they are using or may use. Applications will execute equally well through terminals connected to CICS, SHADOW II, Intercomm, Westi, Task/Master and others.

OnLine Query

OnLine Query, Release 2.0, is a major new advance in interactive information retrieval systems. Fully integrated with IDMS, it requires no programming in order to be immediately useful upon installation. OnLine Query provides managers and user departments with a powerful, easy-to-use set of English commands that allow instant access to selected information stored in the database.

ESCAPE

ESCAPE is an interface that lets a DL/I application program access an IDMS database. Now, users with an investment in DL/I applications can take advantage of the benefits of IDMS without having to re-write their DL/I programs. And, IDMS users can take advantage of the many useful DL/I programs available from independent vendors.

Distributed Database

Cullinane's Distributed Database System allows multiple IBM computers to share a common IDMS database. Distributed database is a unique Cullinane capability. For the first time you can support applications programs at remote sites and allow them to access a central database with complete user transparency and full data integrity. Cullinane Distributed Database is the system of the future—available today.

Attend a free seminar in your area.

Start planning for the future today. Send for information on these products, plus a schedule of our free management seminars.

Cullinane Corporation
20 William Street,
Wellesley, MA 02181
Phone (617) 237-6600



Database: Cullinane

NEWS IN PERSPECTIVE

with upper and lower case text, fonts for COBOL, FORTRAN, OCR and PL/1 symbols and an overprinting technique that allowed users to print scientific symbols. IBM sold about 100,000 of them and priced some 1100 lpm models at \$34,000. When it stopped making the 1403 about 10 years ago, IBM raised its price well over \$41,000.

And if you want a 1403 from IBM today, the price still is \$41,000.

So how can a tiny Los Angeles company, called Spur Products Corp. be offering 1403s at less than a third of the IBM price? President Ray Lorenz explained the phenomenon last month: IBM's marketing

people don't always talk to IBM's pricing people. The computer giant is now pushing sales of its newer printing models, such as the 3203 and the 3800 laser printer, to customers upgrading to newer models and at prices lower than the \$41,000 it's asking for a 1403. The result: as users switch, leasing companies have a glut of 1403s in their warehouses.

"There are at least 25,000 to 30,000 1403s that are going to be available at bargain basement prices," says Lorenz. He estimates they'll be available for as low as \$12,000 from these sources.

So Spur, which a half dozen years

ago began making controllers and interfaces that enabled non-IBM computers to be connected to 1403s, plans to buy up this excess inventory and to sell it with the controller and interfaces at prices ranging up to \$32,000. Lorenz hopes to be selling a system a month by year-end and that figure should rise in 1981 and continue upwards until the 1403 actually bites the dust, "probably in 10 to 15 years."

Lorenz got the idea a few months ago after learning of the drastic price dive the 1403 had undergone after IBM began making it attractive for customers to buy its newer models at prices lower than it was asking for the 1403. Spur already had installed some 90 controllers and interfaces that allowed users to attach any kind of computer to the 1403. That included three models of the DEC PDP line, all Univac models, the XDS Sigma series, the HP 3000, most Burroughs computers, Control Data models 3000 and 6000, the General Automation SPC-16, the Digital Scientific Meta 4, and even the IBM model 1130 which didn't interface with the 1403.

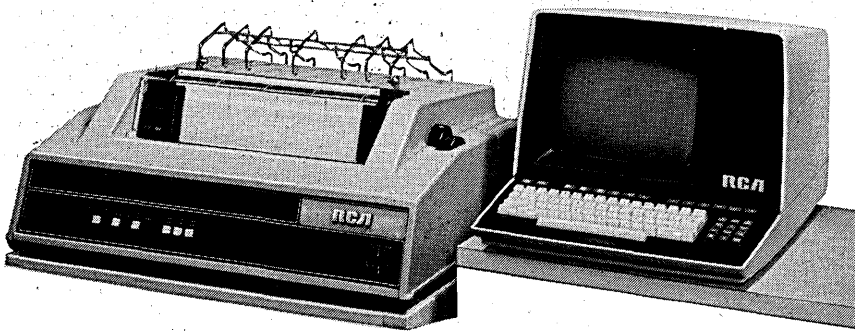
Lorenz, a mechanical engineer, was a founder of Dataproducts Corp., the largest independent manufacturer of printers. While at Dataproducts, he became vice president of product development for end user printers and, he recalls, the most frequent complaint he got from customers was, "Why can't you make it print as good as the 1403?"

Sensing a market for the 1403, Lorenz took off and formed Spur to allow every computer owner to use a 1403. Three years ago he sold manufacturing rights for his controller and interfaces to Grumman Data Systems, but last August bought it back when Grumman found that the size of the market couldn't match the overhead of a large corporation.

Spur now is negotiating to buy printers from leasing companies, refurbish them so that they're certifiable for IBM maintenance, and resell them to users with or without the controllers and interfaces. Lorenz thinks a lot of users can't afford to pay IBM's asking price, so they'll opt for his and then they'll be able to run the printers off any kind of computer. "One prospect told me he planned to discard his 1403 for a higher speed 2200 lpm printer offered by Control Data. I told him, 'Keep the 1403 and buy another from us, because if the CDC printer goes down, you're out of business. With two 1403s, if one goes down, you'll at least be printing at 1100 lpm.' I think we've made the sale," he said.

Spur isn't the only player. Many brokers are jumping on the bandwagon and unloading 1403s at the \$12,000 price. "But they're like used car dealers, making it on volume and then probably disappearing." Spur offers maintenance at \$125 below IBM's monthly rate of \$450, and has refurbishing centers in Washington, D.C., New York, and Los Angeles, from where it also

Available immediately from RCA.



Dataspeed* 40/3 (KDP) Emulation.

Right Now! You don't have to wait. Our new Dataspeed 40/3 emulation has enhanced features including 16K RAM, giving five pages of memory instead of the standard three.

Another big feature you'll appreciate is that it carries *the lowest price tag in its category!*

So why wait for Bell Telephone's Dataspeed 40/3 when RCA can deliver *immediately* for less money. Check our *low, low price!* Lease or outright purchase available with service. RCA Data Services has a nationwide network of service specialists to handle all your maintenance requirements.

Call toll free 800-257-7784 (except NJ), 800-232-6973 (NJ only) or mail the coupon today. Get what you need now . . . and pocket the savings!

RCA Data Services

*Registered trademark of Teletype Corp.

RCA Service Company, A Division of RCA, Data Services, Bldg. 204-2, Route #38, Cherry Hill, NJ 08358

E 192

Contact me about how I can benefit from the RCA Dataspeed 40/3 emulation. Fast!

Name _____

Title _____

Company _____

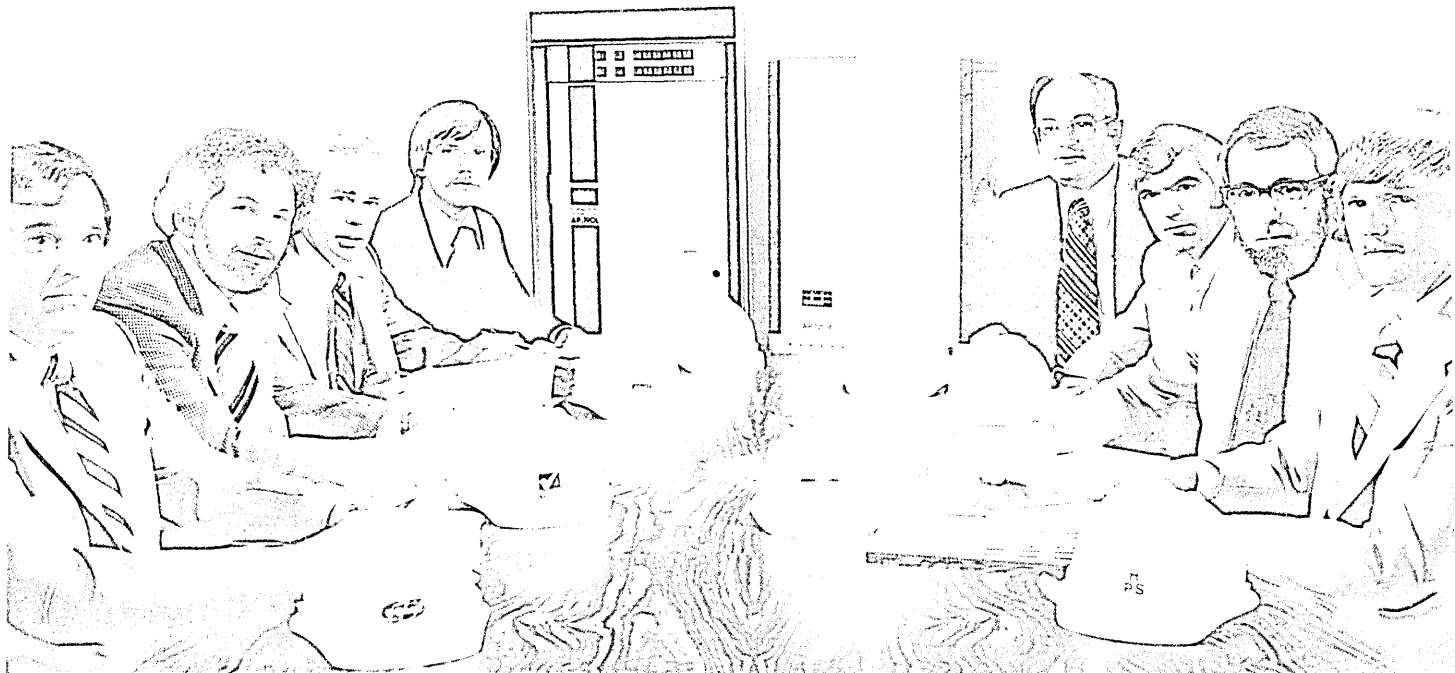
Address _____

City _____ State _____

Zip _____ Phone _____

CIRCLE 73 ON READER CARD

Why Industry Leaders Use FPS Array Processor Computers



"Because we are in a very competitive environment, it was important to our purchase decision. Of course, the speed first caught our attention. *Flexibility?* ... So good we take it for granted." Larry Everett, President, Ram Computer, Inc.

"The FPS Array Processor makes our software one of the world's highest performance seismic data processing systems." Al Weller, Vice President and General Manager, Seis, J. & Associates.

"Digitel offers a variety of business and scientific computing services in a multiprocessing environment. FPS Array Processors allow us to stay competitive in both performance and service." Don Simpson, Vice President of Operations, Digitel.

"FPS understands seismic data processing, we obtained a four-times improvement ... fast processing *turn-around* means an enhanced decision process on land lease and purchase." Harry Kowalchuk, Systems Analyst, Aquitaine Co. of Canada, Ltd.

"Seismic processing is our business. We use FPS Array Processors to keep our client's seismic data point systems floating." Larry Fitchner, Vice President/Marketing Director, Veritas.

"We realized an improvement in computational throughput of two or three times ... greatly increasing the *availability* of our resources for business data processing and program development." Don Peters, Coordinator, Home Oil.

"We get equivalent computer power at half the cost of the IBM 3838." James Stuart, Manager of Geophysical Processing, Dome Oil, Ltd.

"I continue to be most impressed by the *computational speed* and *reliability*." Hans Hoogstraal, President, H.P.S., Ltd.

To find out how FPS Array Processors can benefit your company, contact FPS or our sales office nearest you.

CIRCLE 74 FOR MORE INFORMATION.



CALL TOLL FREE (800) 547-1245
 Ex. 4899 P.O. Box 22489 (S-500)
 Portland, OR 97223 (503) 621-3151
 Telex 360470/FLOATPOINT/PTL

CIRCLE 75 FOR CONTACT BY FPS.

FPS Sales and Service Worldwide: Bramiree, Boston, Calgary, Chicago, Connecticut, Denver, Houston, Laguna Hills, Los Angeles, New Orleans, Orlando, Oakland, Ottawa, Philadelphia, Portland, Riverdale, San Francisco, Seattle, Toronto, Washington, D.C. International Offices: Geneva, India, London, Munich, Paris, Tel Aviv (Easton), Uchi, Tokyo (Hakuto Co. Ltd.)

NEWS IN PERSPECTIVE

provides maintenance. It also has third-party maintenance agreements with Sorbus and Sirvess.

And in case its new plan doesn't work out, it's about to announce a new product—the Universal Subsystem Adaptor (USA)—which will enable any IBM-compatible peripheral to be attached to anybody else's computer. First component of the USA product is one that allows a Xerox 9700 printer to be attached to Burroughs machines.

—Tom McCusker

TOSS OUT PEN AND PENCIL

A terminal for every programmer is the motto of Maestro Systems.

Within four or five years, all programmers will work in front of a crt terminal. It just doesn't make economic sense to retain the pen-and-pencil method anymore, says B. R. Cabaniss, president of Maestro Systems Inc. The San Francisco, Calif., company is

a spin-off from Itel Corp. and is selling a programmer workstation system that places programmers at a terminal but offloads them from a host cpu.

Cabaniss' projection of four or five years is conservative compared with predictions of two to three years by some in the user community. The interest in speeding this day comes from an appreciation of the increased productivity that results.

"If you can get programmers on-line—off paper and pencil, if you will—you'll increase productivity. No question about that," says a spokesman for the Bank of America. He says studies cite percentage increases ranging from 40% to 80%. While that large computer user organization has not run its own study, its belief is that productivity increases of at least 40% are realistic, but not 80%. And this increase is only from getting programmers onto a tube of some kind.

At the B-of-A, there are 500 users of the 200-or-so TSO terminals. But for the last year they also have been using a Maestro system on an experimental basis. Marketing rights to Maestro had been acquired by Itel in 1978 from a Munich, Germany, company called Softlab GmbH. The Germans, who began selling this system under the Pet name in '76, have installed more than 100 in Europe. In the U.S., some half-dozen have been installed by Maestro Systems, which acquired rights from Itel last year.

The system, designed for the development and maintenance of programs, supports all current languages and can be used with any mainframe that supports normal RJE protocol. But Maestro seems to work best for COBOL programmers because FORTRAN and BASIC shops tend toward line-by-line compilation, the type of feedback that COBOL doesn't have and Maestro doesn't provide. Still, its ability to work with those

"People don't know whether five lines of debugged program per week is good or bad."

languages is said to make it appropriate for mixed shops. It is also strong in a TSO shop.

"We have shoes for the shoemaker's children here," says Cabaniss, who formerly was Itel's vice president of program products. He thinks programmers for too long have been neglected, called on to work late at night or on weekends in order to gain access to the mainframe. "At the price programmers are getting these days, you can't afford to have them roaming from room to room, looking for a terminal not in use, or waiting for one to become available," he adds. "So you're much better off having the tool sitting there, even if it's idle a great deal of the time."

Resistance to the Maestro system is said to come not from programmers but from management. "They already believe that there is a distributed solution for their keypunch operators and their secretaries," explains Maestro vice president Roger Lehman. Companies seem not to object to spending thousands of dollars for terminals for those people. "But they don't agree with that when it comes to programmers, who cost them two to three times as much as a data entry person."

Or when terminals are purchased for programmers, they're attached to the mainframe. And then response times rise dramatically when all these programmers begin vying for mainframe cycles for themselves. And so the company goes out and buys a bigger computer.

"I'm not sure that the dp industry is at that point where everybody understands that this off-line approach is going to be the way it is, that every programmer is going to have a terminal," says Lehman.

And it appears the only thing that will convince them is to be able to prove that productivity increases are real and are achievable. But even that isn't possible without knowing what the base is. "People don't know what they're getting out of programmers," laments Cabaniss. They don't know whether five lines of debugged program per week is good or bad. And if they don't know that, he adds, they won't be able to determine whether terminals, on-line or off, really do increase programmer productivity, and by how much. It's a dilemma.

—Edward K. Yasaki

**Prime Information
business systems.
They'll grow as fast as
your business.**

There are plenty of small business systems on the market. But only Prime Information systems can grow from wherever you are to wherever you want to be.

Unlike other systems, all Information systems hardware and software are totally compatible. So you can move from an I 500 to an I 1000 to an I 5000, and all your programs and data can move with you.

You should also know that Prime Information systems can be queried in simple everyday language. And because our network of authorized Prime dealers offers a wide range of application programs, you can get down to business right away.

For more information, contact your nearest dealer in the Yellow Pages, or call (617) 879-2960, ext. 4754. Otherwise, write the Advertising DL Dept., 3 Newton Executive Park, Newton, MA 02162.

**PRIME
Computer**



CIRCLE 76 ON READER CARD



120 CPS FLEXIBILITY AT YOUR FINGERTIPS

Whatever your application requirements, Carterfone's 5130 data terminal offers all the flexibility you need. Designed to meet a full range of user requirements, the cost-efficient 120 cps printer can be operator-programmed to new applications simply and easily.

In addition to outstanding applications flexibility, the 5130 provides smart bi-directional printing at 180 cps, 14 baud rates and a built-in 1k buffer to keep pace with incoming data. Attributes such as variable horizontal and vertical pitch, tabbing, forms control, answerback and 45 other keyboard selectable features are standard in every 5130.

For the best price/performance value in a data terminal, consider the flexible 5130, available from Carterfone through equally flexible lease, purchase or rental plans. For complete information, call or write Carterfone today.



Carterfone

Member of the Cable and Wireless Telecommunications Group

1111 W. Mockingbird Lane, Suite 1400
Dallas, Texas 75247 (214) 630-9700



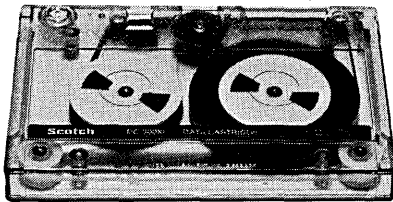
**AVAILABLE
FOR IMMEDIATE
DELIVERY**

CIRCLE 77 ON READER CARD

SALES & SERVICE OFFICES

Atlanta; Boston; Burlingame CA; Charlotte; Chicago; Cincinnati; Cleveland; Columbus; Dallas; Davenport IA; Denver; Detroit; Fairfield NJ; Garden Grove CA; Hartford; Honolulu; Houston; Jamaica NY; Kansas City; Los Angeles; Memphis; Miami; Milwaukee; Minneapolis; New Orleans; New York; Norfolk; Oklahoma City; Omaha; Orlando; Philadelphia; Phoenix; Pittsburgh; Portland; Raleigh; Sacramento; Saginaw; San Antonio; San Diego; San Francisco; Santa Clara; Seattle; South Bend; St. Louis; Syracuse; Washington DC.

THE FIRST DATA CARTRIDGE THAT ALWAYS FINISHES LAST.



3M's DC-300-XL Data Cartridge always finishes last because it records and stores at a field-tested rate of 6400 bpi on 450 feet of tape. And that's 150 feet more than standard data cartridges.

Which means you won't have to change it so often. And you'll have fewer cartridges to mess with. Or lose.

Like all 3M DC-300-A data cartridges, the DC-300-XL has the same metal base-plate. And the ANSI three-point positioning system.

What's more, it's the exact same size as other 300-foot cartridges. So you can use it in any drive that accepts standard cartridges. Yet the DC-300-XL stores 50% more data.

You see, sometimes finishing last has its advantages, too.

For information about where to get the DC-300-XL, call toll-free, 800-328-1300. In Minnesota, call collect: (612) 736-9625. Or write: Data Products/3M, 223-5E, 3M Center, St. Paul, MN 55101.



CIRCLE 78 ON READER CARD

NEWS IN PERSPECTIVE

COMPANIES

ICL HOPES DAP WILL ZAP U.S.

Once the first commercial DAP is up and running in June, ICL expects its award-winning processor to sell itself.

British mainframer ICL is preparing to ship a revolutionary computing engine to the U.S. by the year's end to probe what it sees as a big technology gap in this country. ICL is hoping to capitalize on what it believes to be a two-year technology lead over the Americans at the "supercomputer" end of the business.

Sources within ICL say the company expects to ship its Distributed Array Processor (DAP) to America in the last quarter of this year. More than 60 solid inquiries for the processor, described by British experts as "revolutionary," are expected to net the first orders for the machine by the summer. Already tipped as a possible first site in the U.S. is Princeton's Plasma Fusion Lab near ICL's U.S. home base in New Jersey.

Of perhaps even more importance to ICL, for the first time since their launch as the firm's "new range" in the mid-'70s, ICL's 2900 family of large mainframes will be sold in the U.S. So far ICL has had no answer to criticisms from U.S. commentators that the company is not really committed to this market until it sells the "climax" of its product portfolio here in the States.

The DAP is described by ICL, and by the British Computer Society whose annual technology achievement award it won, as the world's fastest and most powerful processor, as well as the most technically advanced. The world's most powerful computer in the early '70s, the CDC 7600, has become the standard for measuring processor strength. One 7600 would typically offer 10 MIPS (millions of instructions per second), experts say. Today's leader, the Cray 1, plus a front-end system, is said to offer four to 10 times the processing speed of a 7600 for an average cost of \$10 million.

ICL claims that the DAP, when linked to a host 2900, will offer speeds in excess of the Cray 1 and at about one-fifth the price.

The reason for this, ICL says, is that the DAP is the world's first processor to be based on a matrix of distributed micro-processors, or processing elements, clustered together in what is known as an "array." In this way, each DAP processing engine is in reality a marriage of thousands of smaller processors which work together at speeds far in excess of conventional computers.

The first generation DAP, which goes into manufacture this summer, is based on an MSI array of over 4,000 processing elements. But ICL plans show that the company is working on much denser (LSI) arrays based on over 16,000 processing elements.

Though ICL is reluctant to discuss its plans, the company made clear its belief that there is no competition for DAP in the U.S. "All current American supercomputers from the likes of Cray and CDC are based on conventional or linear processors," comments DAP marketing director Colin Aldridge, "and we estimate that we have a two- to three-year lead over those companies that are developing distributed arrays."

The first American concern to make DAP commercially available could be the Goodyear conglomerate, which has been chosen to develop a DAP for NASA/Goddard Space Flight Center. Sources say that Goodyear's Staran development is one of several costly American projects that have so far failed to produce a DAP (or parallel processor). They add that Goodyear's latest designs are close to ICL's DAP in conception.

Nobody is certain how much federal pressure was exerted, but it is known that ICL wasn't allowed to bid on the NASA/Goddard contract last year. By the autumn of last year, ICL seemed to be despairing of ever capitalizing on lucrative federal contracts through its "technology lead," and it seemed to settle for a selling burst in other technical and scientific areas.

But lately a cautious mood of optimism has been sensed among ICL's top management. Their feeling is that there may have been a shift in attitude by such U.S. agencies as NASA and ERDA, allied to new directives and statements from the U.S. government on the use of non-American gear. Part of this change has come from a

ICL believes there is no competition for DAP in the U.S.

softening of the U.S. stance within NATO, as well as a desire by the U.S. to encourage its European partners.

Though all of this has undoubtedly encouraged ICL, there is still the suspicion in the U.S. that there are not as many market opportunities for superfast number-crunchers as were first envisioned. Fueling this feeling are IBM's apparent hesitancy to make any major moves of its own in this area, as well as the industry leader's lack of commitment to Josephson Junction circuit developments.

But perhaps as much to its own surprise as anybody's, ICL has discovered that it is unlikely to be limited to just technical and scientific number-crunching with its DAP. So far, applications work on the first DAP prototypes has been limited. "But though the machine was designed around weather forecasting applications," says

Announcing

a number cruncher for
low-cost processing of
large-scale scientific
applications



The FPS-164 Attached Processor

EXTENDED PRECISION • 64-bit floating-point arithmetic provides greater than 15-decimal digit accuracy.

LARGE MEMORY • Main memory is expandable to 1.5 million 64-bit words (12 megabytes) for programs and data.

HIGH SPEED • 12 million floating-point operations per second concurrent with 6-million integer operations per second.

• Advanced array processor architecture with parallel 64-bit memories, multiple 64-bit data paths, and 64-bit arithmetic elements provides up to 60-million instructions per second.

EASY TO USE • Full complement of programming and development software ... ANSI-77 FORTRAN compiler ... extensive math and application library ... plus conventional support software.

ECONOMY • A small fraction of what you must otherwise spend for comparable computing power.

And there's more. The FPS-164 features a vectored interrupt structure for real-time capabilities, privileged instructions, and base and limit registers for multi-user protection. It is built on dependable, proven design concepts that have made FPS the world leader in array processors.

The FPS-164 is particularly well suited for solving scientific and engineering problems such as global weather modeling, structural analysis, multi-dimensional image processing, seismic data reduction, oil reservoir simulation, quantum chemical calculations, nuclear codes, and computer-aided design and analysis.

For more information contact our sales office nearest you, or Carl Haberland, FPS-164 Product Manager, (503) 641-3151.

See the FPS-164 at NCC Island 2452 May 19-22, Anaheim, CA.



FLOATING POINT
SYSTEMS, INC.

... the world leader in array processors

FPS Sales and Service Worldwide: Boston, Calgary, Chicago, Dallas, Denver, Detroit, Houston, Huntsville, Los Angeles, New York, Orlando, Ottawa, Philadelphia, Phoenix, Portland, San Francisco, Toronto, Washington, D.C. International offices: Geneva, London, Munich, Paris, Tel Aviv (Eastronix, Ltd.), Tokyo (Hakuto Co. Ltd.)

CALL TOLL FREE (800) 547-1445
Ex. 4999. P.O. Box 23489 (S 500),
Portland, OR 97223 (503) 641-3151,
TLX: 360470 FLOATPOINT PTL

CIRCLE 80 ON READER CARD FOR MORE INFORMATION
CIRCLE 79 ON READER CARD FOR CONTACT BY FPS

NEWS IN PERSPECTIVE

ICL's Aldridge, "we've been delighted to find that the DAP is ideal for image processing." Applications software will undoubtedly provide the key that can unlock the door to U.S. markets. Next year ICL will push hard any business area which has a high element of technical computing; likely targets are America's oil and construction companies. Once these customers are secured, many people at ICL are betting, the applications "bandwidth" can be widened further to embrace straight business computing and networking areas.

To this end, ICL is expected to build smaller DAPs that can be used with business

computers and mainframes under the medium level. At this moment, ICL seems to have no plans to sell small DAPs in bulk to oem buyers, or as front-ends to other host computers, but these do offer further investment opportunities.

Applications software will undoubtedly provide the key that can unlock the door to U.S. markets.

Though all of this paints a rosy picture for ICL, there are several dark clouds

massing on the horizon. The chief worry is where ICL will get the considerable extra financing needed to back its ambitious plans. Some of the money may come from a rights issue of new shares that the company is known to be planning for this year. But much of this funding is expected to be aimed at new acquisitions.

ICL is pinning some hopes on getting monetary support from the British government and from a more nationalistic and protective European community. ICL has already had around \$1 million from Britain's Department of Industry (DOI) to help develop its original DAP prototype. But delays in developing the first DAP for a customer—Queen Mary College in London—have resulted in many opponents to the ICL development plan in Britain. The college will not get its DAP until June—nine months behind schedule.

While the DOI has been largely sympathetic to ICL, the company's delay in producing a demonstrable system, or first showpiece site, have harmed the department's attempts to promote DAP in the lucrative defense sector. One key source at ICL said the Ministry of Defense's expressed opinion was that "ICL is unwise to involve itself in the DAP, as its potential market lies mainly in the U.S.A."

The U.S. could now become a key factor in ICL's latest lobby to get funding for a new LSI or second generation of DAPs. One conservative set of figures floating around ICL suggests that the company is looking to sell some 65 DAPs (both MSI and LSI) over the next 10 years, with profits of some \$50 million on sales of around \$220 million. To do this, the government would have to help ICL find an extra \$25 million or so to get it through to 1985 or 1986, when it expects its first positive cumulative cash flow from DAP. And these figures don't take into account any moves into high volume small LSI DAPs, nor do they account for the resulting high volume of 2900 sales.

So far, ICL's problems have resulted from doubts in the U.K. that the DAP will be just another typical British project that doesn't fulfill its theoretical promise on real problems—a doubt that was given greater credence when ICL's U.S. boss and himself an American, Dick Bright, resigned last month. In essence, ICL has been unable to sell DAP off the drawing board.

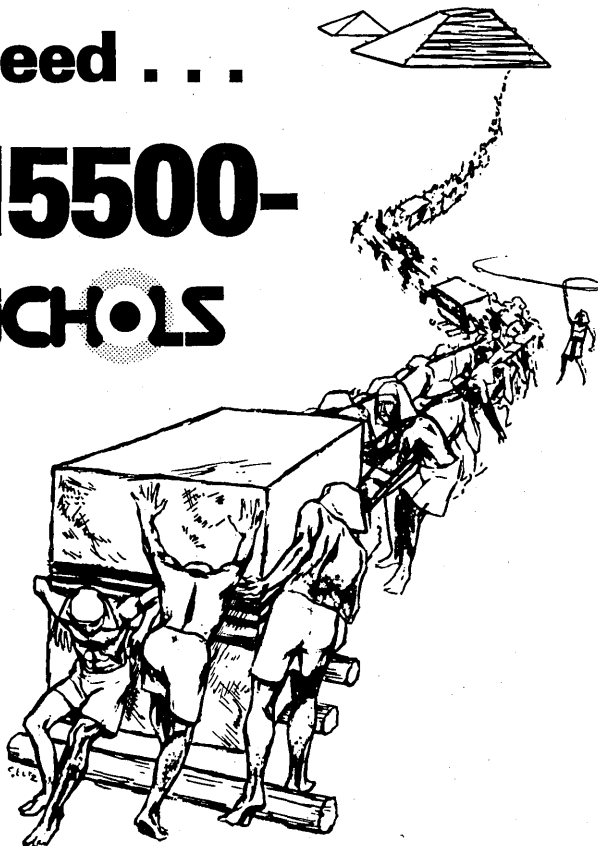
But now that ICL's preparations for the Queen Mary College DAP site are going into their final stages and a visible product is appearing, the company's whole marketing effort is being set for overdrive. It's likely that after June ICL will mount a shuttle service to get interested Americans over to visit the first DAP site. What these observers think and say about DAP will, probably more than anything else, determine the future of this product.

A rumor that some U.S. federal agencies may be prepared to fund further development work on DAP if it is as good as

**Unless you have
an unlimited budget . . .
an enormous staff . . .
and a hundred years
to finish your project . . .**

You need . . .

**-N5500-
NICHOLS**



Nichols and Company
Project Management Systems
5839 Green Valley Circle, Culver City, CA 90230
(213) 670-6400

CIRCLE 81 ON READER CARD

Multidrop communications for minicomputer users. Save lines, save modems, save money.

If you're supporting asynchronous dumb terminals remotely on your minicomputer system, you're probably resigned to the high cost of those point-to-point leased phone lines. It's the price you pay for using low-cost terminals, right?

Wrong! With MICOM's new Micro900 Multidrop Concentrator, you can multidrop those dumb terminals at different remote locations, singly or in clusters, and share a single multipoint telephone line. You can slash your phone bill immediately *without special software*. What's more, the Micro900 provides automatic retransmission-on-error to ensure *error-free* communications on the multidropped

telephone line. It is ideally suited for use with DEC, Data General, or any other minicomputer system.

If the Micro900 sounds too good to be true, send for our point-to-point Micro800 Data Concentrator, the single location cluster controller for dumb terminals. Yet more than 10,000 Micro800's are already in service, installed by the user as painlessly as plugging in a terminal.

So if you use dumb terminals, but you want to enjoy state-of-the-art communications efficiency, right down to the last drop, send for complete details of the Micro900 today. With prices starting at only \$1250 for a 2-channel unit, we know you'll love it!

Is the cost of leased phone lines becoming a real grind?

Does the cost of multidrop terminals leave a bitter taste?

For multidrop lines with dumb terminals, try our Multidrop Concentrator...

The perfect economy blend!

MICOM Micro900
Multidrop Concentrator

MICOM™ MicroComputers for Data Communications™

MICOM SYSTEMS, INC. • 9551 Irondale Avenue • Chatsworth, California 91311 • Telephone (213) 882-6890 • TWX 910/494-4910
Regional Offices • Atlanta (404) 452-1600 • Boston (617) 235-8870 • Chicago (312) 823-9330
Denver (303) 371-7616 • Philadelphia (609) 267-9665 • Washington, D.C. (703) 241-7803

Available now from these International Distributors:

Australia (02) 929-8887 • Belgium (02) 648-4470 • Canada (416) 291-7121 • Denmark (08) 352345 • Finland (0) 716707
France (1) 533-0401 • Germany (06) 951-27054 • Hong Kong (6) 796038 • Israel (03) 454-9754 • Italy (071) 728081 • 445
Japan (03) 252-2855 • Luxembourg (41) 7172 • Netherlands (070) 210101 • New Zealand (8) 49-88 • Singapore (89) 39
South Africa (011) 789-1221 • Spain (01) 409-0362 • Sweden (08) 289480 • Switzerland (022) 208846
United Kingdom (0908) 565656

CIRCLE 62 ON READER CARD

NEWS IN PERSPECTIVE

ICL says has so far been denied by both parties. But this is the big prize ICL is aiming for. Regardless of what happens in Britain by way of support, it is in the U.S. federal arena that DAP's future as a winner or an also-ran will be shaped.

One thing is certain: if ICL's DAP turns out to be as powerful an engine as the company claims, it will have to be driven with great care through the U.S. marketplace. If, as is speculated, the DAP probes a large weak spot in U.S. computer technology, no one will thank ICL for touching that nerve.

—Ralph Emmett

NEW FIRM, BIG HOPES

Upstart Ungermann-Bass has its sights set on making disparate digital devices talk to each other.

One would expect that a company like Data-point could provide a local communications network to which one could attach processors, disk drives, and terminals. And Xerox

could, too. But a new company emerged in March, one that wants to make it possible to interconnect a wide range of different types of digital devices, including computers and keyboards and printers, from three or four vendors initially.

"We believe in distributed processing and we believe it's a multivendor business," says Ralph K. Ungermann. He contends that a distributed system comprised of a number of disparate devices that cannot talk to each other will not be effective. It's just not conducive to the control and sharing of data. "It needs an underlying glue that holds it together, and that's our product. It's the glue that allows various types of distributed processing equipment to be interconnected so those users can share data and resources."

Net/One is the name of the first product of Ungermann-Bass Inc., Santa Clara, Calif. Ungermann was earlier a co-founder of Zilog, developers of the Z-80 microprocessor chip being used heavily in the Net/One interface box that makes his network tick. The transmission medium linking the boxes will be coaxial cable, but other devices will be used as they become commercially available. The interface boxes initially will perform speed conversion and code conversion, in time handling high-level protocol conversions, too.

"Some of our customers are looking at interconnecting more than a thousand terminals, a few hundred microcomputers, 50 minicomputers, that kind of interconnect scheme," says Ungermann. Those would be scattered in four to six buildings close by, operated in factory environments, industrial laboratories, and in offices.

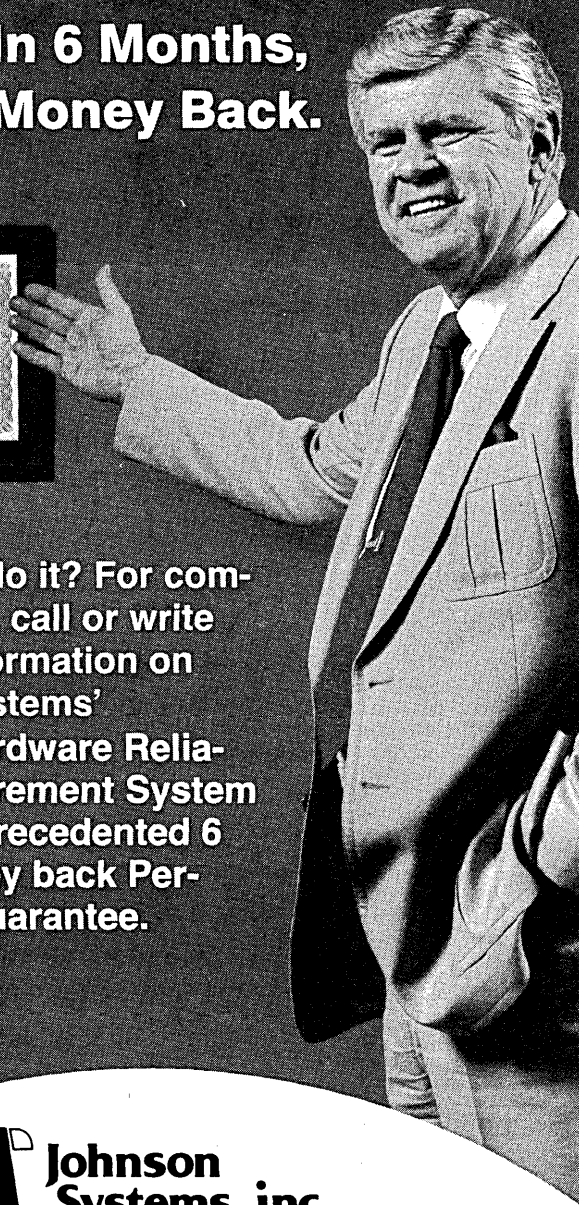
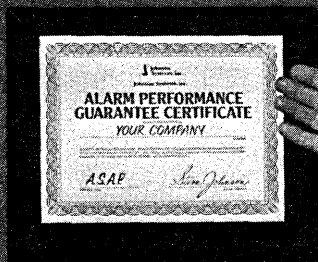
One interface box will be able to serve from four to 20 devices and become a node on the network. The price of the box depends on the number of serial and parallel ports and the amount of memory required. But including the 4 megabit coaxial cable, the price per user port is expected to be between a few hundred dollars and a thousand dollars. Like the Xerox Ethernet, the network will have no central control. And a node can go down without affecting the rest of the network.

Ungermann points to a teletypewriter outside one office with an interface to Telex and TWX. Across the way from it is a word processing system that cannot communicate with the teletypewriter, which means the only way to enter text from the wp system is to rekey it at the teletypewriter. "That's ridiculous," he says. "There ought to be a way for the systems to access each other's resources." And that capability, of course, is what the wp systems companies are providing. But Ungermann is also looking at other working environments.

"Today, factory automation is more advanced," he notes. "Productivity is the problem, and that's what we're aiming at."

—Edward K. Yasaki

Cut DP Center Downtime By 50% In 6 Months, Or Your Money Back.



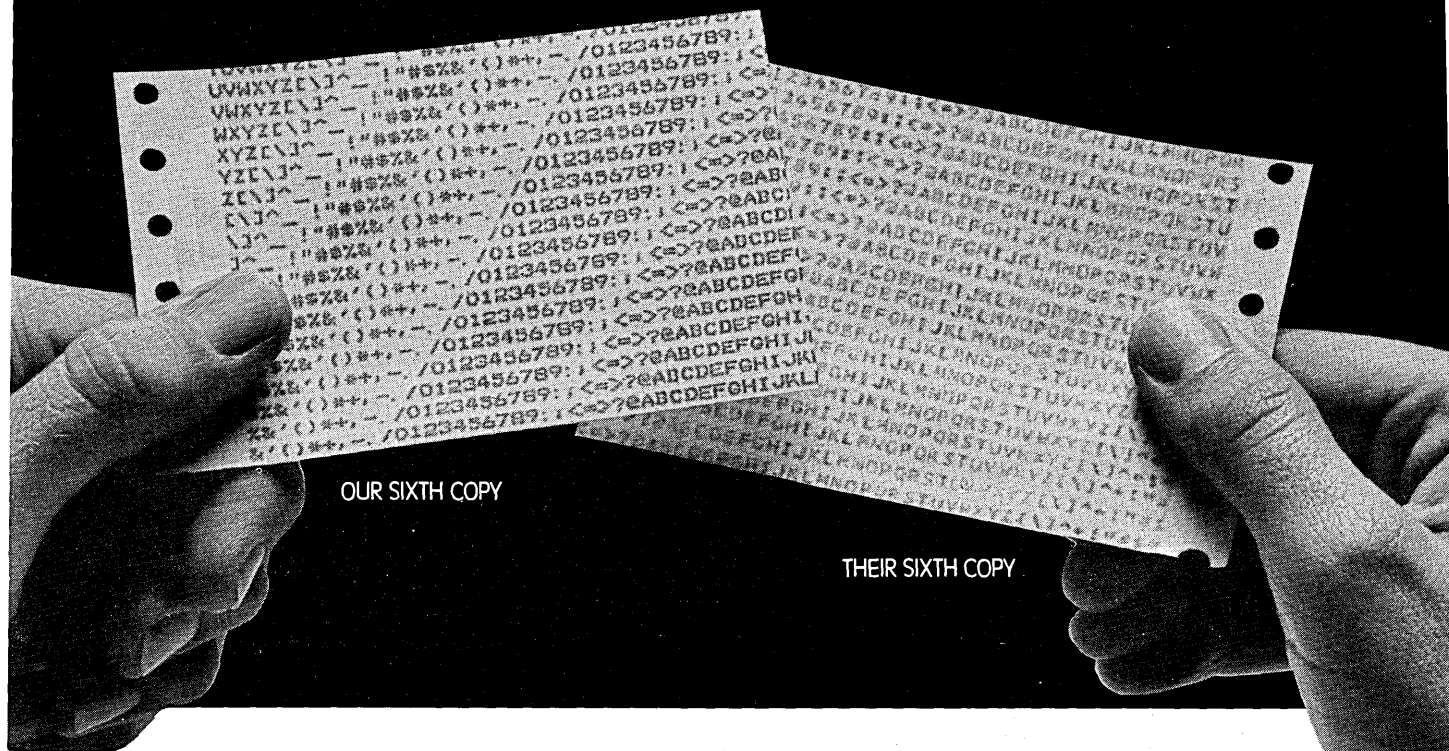
How do we do it? For complete details, call or write for more information on Johnson Systems' **ALARM® Hardware Reliability Measurement System** and our unprecedented 6 month money back Performance Guarantee.

 **Johnson
Systems, inc.**

7923 Jones Branch Drive • McLean, Virginia 22102
Phone: (703) 821-1700 • Telex: 89-9100 D001

Check our quality
at NCC, Booth #131-
North Hall.

OUR QUALITY COMES IN QUANTITY.



OUR SIXTH COPY

THEIR SIXTH COPY

Many printers can give you good print quality on a first copy. The real challenge is to give you that same quality, copy after copy, on multi-part forms.

Obviously, most printers can't. The further they get from the first copy, the more their quality fades. But, as you can see here, the quality of Printronix' sixth copy continues sharp and clear.

This superior quality is achieved through a simple printing mechanism quite unlike any other. It forms characters by printing one dot row at a time, overlapping rows vertically and horizontally, while maintaining uniform hammer impact energy. The result is unequalled print quality and characters that appear solid.

This same design approach also

requires fewer moving parts, eliminates most bearing surfaces, and employs simple hammer drive circuits. All of which means there's less to go wrong. And that's why Printronix can give you a full one-year warranty, not the 90-day warranty typical of most other printers.

For more information on the complete line of Printronix printers, call: (714) 549-7700. Or write:

Printronix Inc.,
17421 Derian Ave.,
P.O. Box 19559,
Irvine, CA 92713.

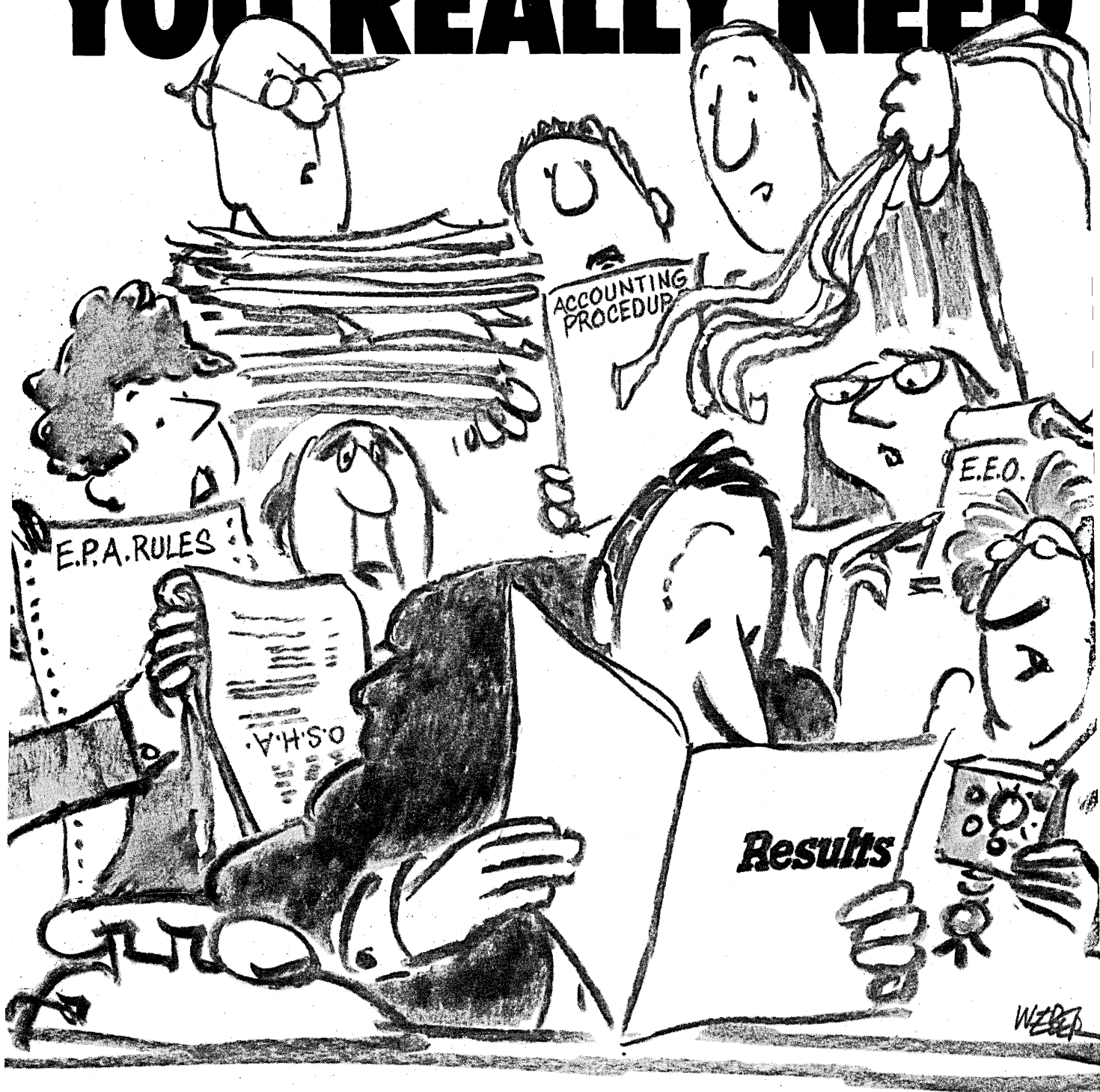


PRINTRONIX
It's simple, to be reliable.

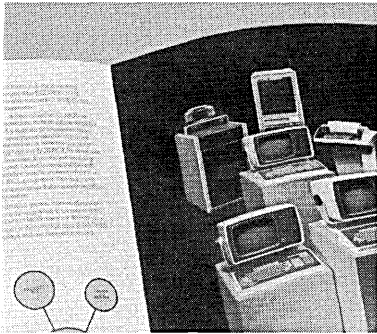
REGIONAL SALES OFFICES: WESTERN; 17421 Derian, P.O. Box 19559, Irvine, CA 92713. CENTRAL; 414 Plaza Drive, Suite 106, Westmont, IL 60559. SOUTHERN; 2220 Parklake Drive, Suite 180, Atlanta, GA 30345. EASTERN; 7 1/2 Harris Road, Nashua, NH 03060.

CIRCLE 84 ON READERCARD

IF FAST CHANGING ARE SLOWING YOUR YOU REALLY NEED



FACTS PRODUCTIVITY, RESULTS.



**THE NEXT STEP IN DATA BASE
MANAGEMENT IS HERE.**

And to help you get them, Data General announces DG/DBMS, a brand new, results-oriented database management system for ECLIPSE® distributed data processing systems.

DG/DBMS is a sophisticated CODASYL-based DBMS. And it's described in detail in a booklet every productivity-minded data processing manager ought to read. The title? Appropriately enough, it's called "Results."

We designed DG/DBMS to let you change as fast as the facts change. Company expansion and diversification plans, plus frequent changes in accounting regulations, EEO rules, EPA laws, privacy laws, all dictate the need to respond fast when changes occur.

Our DBMS begins saving you time and money right in the computer room. DG/DBMS is designed for ease-of-use so programmers can be more productive. One user, in fact, reported productivity gains of twenty-five percent. Beyond the computer room, our DG/DBMS interactive query facility provides fast data inquiry and report generation in user departments. That's why our DBMS is more cost-effective, reliable, and more manageable than any other. Put it together with our new XODIAC™ Network Management System, our new AZ-TEXT™ word processing, our RCX70 emulation software, and all our other fully compatible AOS-based ECLIPSE software tools and processors, and sophisticated languages. You'll have all the data processing power and growth you'll need to take care of business through the 1980's and beyond.

Find out about our new DG/DBMS and ECLIPSE Data Systems. Send for our brochure: RESULTS.

Data General Corporation, Westboro,
MA 01580 (617) 366-8911
ECLIPSE is a registered trademark
and XODIAC and AZ-TEXT are
trademarks of Data General.
©Data General
Corporation, 1980

VISIT US AT BOOTH #1339 AT MCC,
ANAHEIM, CA., MAY 19-22, 1980.

CIRCLE 109 ON READER CARD

Data General

Mail to: Data General Corporation, Westboro, MA 01580
 I want Results. Get that booklet in the mail now!
 I demand Results. Get a sales rep in here ASAP!

Name _____ Title _____
 Company _____ Address _____
 City _____ State _____ Zip _____

Tel. _____

The Computer
of the U.S. Olympic Sports
Medicine Committee

D580

NEWS IN PERSPECTIVE

BENCHMARKS

ACM CENSOR SCANDAL: The Association for Computing Machinery has been accused of censorship by Dr. Herbert Grosch, council member and prior president of the organization, and who is currently running for reelection to the council. Presidential candidate Roger Mills makes these censorship accusations as well. The defense by ACM vp (and presidential candidate) Peter Denning is that it was not censorship, merely normal editing policy. The ballot statements for the upcoming May 13 election of ACM national officers represent the sore spot. These statements, subject to the "normal editing process," appear in *Communications of the ACM* (CACM), the association's technical journal, as well as on the ballots. Historically, Grosch notes, these statements have never been tampered with in this manner. Grosch's omitted (or edited-out) statement was as follows: "This entire election is scandalous. The nominations were badly botched; attempts to open up stuffy procedures were destroyed in council; letters to the CACM Forum about the fiasco were suppressed ("electioneering"), while Denning's puffery and attacks by Robert Korfhage, an ACM council member, were officially published; the petition process was subverted. I'm not being paranoid; the Establishment [of ACM] is using every trick in the book to recapture the few beachheads the practitioners and chapters people and humanists have seized since the mid-'70s." He continues with a paragraph, which remained on the ballot, on the declining quality of ACM publications, and how he will continue to pursue higher quality publications, "liberal election procedures," better chapters support, and "more contributions to the human world about us," whether or not he is returned to council. The closing sentence, also omitted from the published statements, read: "And I can be more effective if the officers are not unanimously hardhat, so I strongly recommend you also vote for Portia Isaacson." Election of Dr. Isaacson is a controversial subject as well, as her dp "practitioner" background allegedly conflicts with ACM leadership's academic leanings. Presidential candidate Mills' statement was altered as well, though only in one sentence.

CALCOMP CONCEDES: Sanders Associates, Inc., parent company of CalComp, has decided not to pursue its \$300 million antitrust suit against IBM. The appeal to the Supreme Court was not followed through, Sanders' attorneys said, because positive results seemed doubtful. The action began in October 1973, and at that time the stakes were \$100 million. In June 1979, the Ninth Circuit Court of Appeals granted IBM's motion to dismiss the entire case. In February, CalComp received a month's delay to decide whether or not to bring the

case to the Supreme Court. Charles Howe, general counsel for Sanders, stated, "It was a management decision. We generally felt it was not in the best interest of the company to pursue it."

OPEL'S A GEM FOR IBM: John R. Opel, the heir apparent, has officially been named to succeed Frank T. Cary as chief executive officer at IBM next January. Thus, the IBM tradition of promoting the next in line to top-dog positions and corporate executives stepping down at age 60 continue. Cary will remain chairman of the board, concentrating "primarily on board matters, and also on relieving some of the time demands placed on IBM management by the 11-year-old Department of Justice lawsuit and other litigation." Opel will be the fifth chief executive officer since 1924, when IBM was known as Computing-Tabulating-Recording Co. Chronologically, his predecessors were Thomas J. Watson Sr., Thomas J. Watson Jr., T. Vincent Learson, and Cary. Rumors that IBM was unhappy with the Cary/Opel team have been denounced by the disclosure. After this announcement, and a second one concerning a new company debt, IBM stock moved around like a roller coaster. This latest of IBM's borrowings was in the European marketplace, where the company placed \$53 million of 10% notes with European investors. In March, IBM revealed it had borrowed a total of \$277 million through European bank loans and various private placements, with interest rates ranging from 6% to 10%. Dean P. Phypers, IBM senior vice president, finance and planning, said, "We won't pass up opportunities to borrow if we find credit available at attractive terms." The amount IBM borrows this year will depend on two key factors: availability and cost of money, and on how much it needs to finance its lease base.

SECOND TIME AROUND: Greyhound Computer's second antitrust case against IBM has had another postponement, this time on the grounds that pretrial discovery could not be completed by May, as originally scheduled. The retrial is now set for Feb. 3, 1981. District Court Judge William P. Copple said Greyhound's witnesses on the "essential question of damages" were not ready to testify. This case has a lengthy history, dating back to 1971. In the slew of trust suits against IBM, it was preceded in court only by the Control Data case in 1968. Greyhound vs. IBM went to trial in 1972 and ended with a directed verdict in favor of IBM. Greyhound appealed, and in 1977, the Ninth Circuit Court in San Francisco remanded it to the district court in Phoenix. In January 1978, the U.S. Supreme Court rejected IBM's appeal to override the appellate decision, thus paving the way for the retrial.

JOINT DISK VENTURE: Memorex and

Olivetti have teamed up to start manufacturing 8-inch Winchester-type disk drives in Ivrea, Italy. The agreement requires Olivetti to take a 10% equity stake in Memorex's R&D subsidiary, Memorex Mini Disk Drive Corp., San Jose, Calif. Olivetti facilities in Italy will be used to produce the new firm's 11.7-megabyte Memorex 101 drives. The joint venture calls for Olivetti to take a 60% interest in the firm and Memorex 40%. Details on capital investments have not been disclosed. The drives will be used by Olivetti in future systems and sold by Memorex in the European marketplace. Plans are for production to begin this year, and the companies are hopeful of manufacturing 10,000 units in their first year. Memorex is expected to supply the technology, some components, and media, while Olivetti will handle facilities and the necessary working capital.

ADAPSO, CITIBANK AT IT AGAIN:

ADAPSO has filed a petition to barr Citicorp's Citibank from entering the remote computing services industry. This is the latest move by ADAPSO in its two-and-a-half year struggle to keep Citibank out of the time-sharing business. It started in 1977, when ADAPSO charged that Citibank's proposed dp services would be anticompetitive and in violation of government banking regulations. A little over a year later, a half-hearted agreement was reached between the two.

Citibank agreed to separate as much as possible its dp services from its banking activities, though this was not the decision ADAPSO was hoping for. Along with the petition against Citibank, ADAPSO is also challenging Citicorp's Citishare remote computing service, which has filed an application to operate under provisions of the Federal Bank Holding Company Act. According to ADAPSO, Citibank and the Comptroller of the Currency are to respond to the petition early this year.

ONE MORE DOMSAT: Southern Pacific Communications Co. has filed with the FCC for authorization to construct a \$200 million domestic satellite communications network. The proposed three-satellite system would be in competition with existing and potential carriers such as SBS (Satellite Business Systems), RCA, AT&T, RCA, Western Union, and possibly Hughes Communications Corp., which filed its application last December. The SPCC satellites would be equipped with twice the capacity of domestic satellites now used or planned. The company claims this increase in capacity is due to more efficient use of the transmission spectrum, and the use of integrated C-band (4-6GHz) and Ku-band (11-14GHz) transmissions frequencies. Initially, three earth stations will be built, and the number could eventually rise to 100. Coverage by SPCC could include all 50 states. *

Will American productivity be crushed by the paper weight?

There's still a chance you can escape the paperwork pile-up that threatens productivity all over the country.

At NBI, we're helping cut the problem down to size.

We build the NBI System 3000, an office system designed to manage all the paperwork, information processing and communication problems your company can generate.

Unlike most systems, we try to make every task as automatic as possible. Functions like outlining, indexing, sorting, footnoting and equation typing can be done easily, with minimal operator effort. And the NBI System 3000 is document oriented so any time you make a change, the copy

adjusts — page by page — without operator assistance.

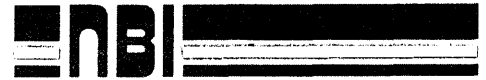
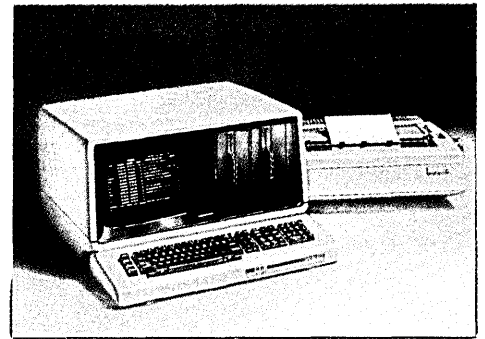
Of course, the NBI System 3000 does all the things you'd expect of a leading word processor — text editing, communications, arithmetic, mailing list control and repetitive typing. The NBI System 3000 just makes it all easier and more efficient.

People become more productive, automatically and electronically.

So if paperwork is starting to pile up around you, remember, you've still got a chance.

Call NBI, 1695 38th St., Boulder, CO 80301, 800/525-0844.

In Colorado, call 303/825-8403.

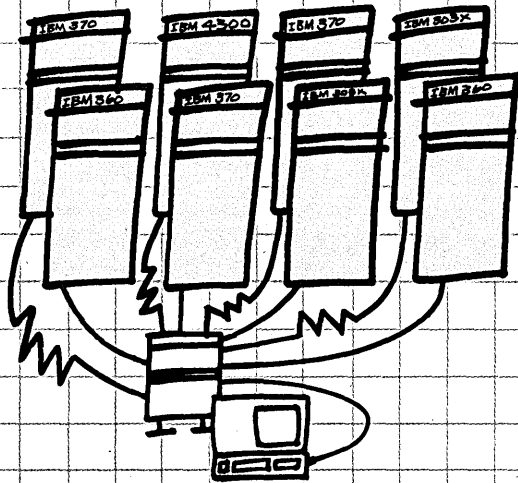


Lifting America from under the paper weight.

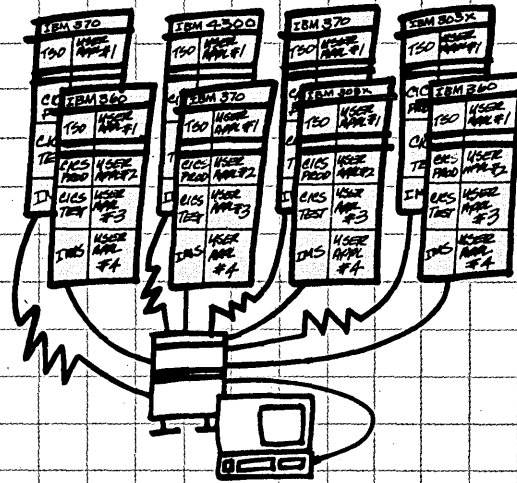
CIRCLE 85 ON READER CARD



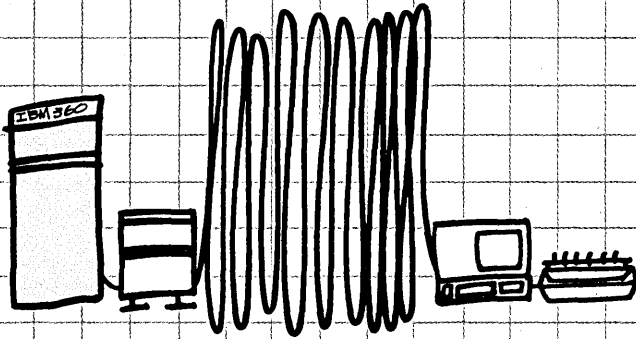
Network Managers: Think with a computer based terminal system that can



access up to eight IBM host computers,
either local or remote, from a single terminal



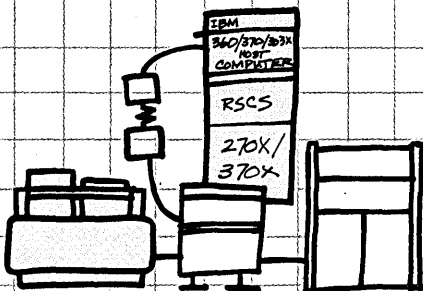
access up to fourteen partitions
—with up to eight partitions per host—
from a single terminal



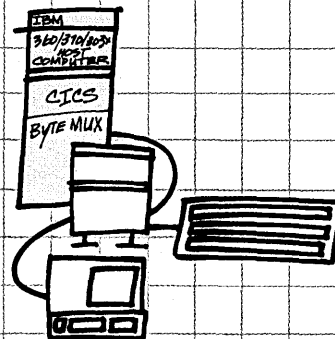
do local processing up to 7,500 feet from the host
computer and save remote connection expense



assume the software transparent identity
of multiple IBM systems with a single
computer/controller and look like...
a local interactive communication system



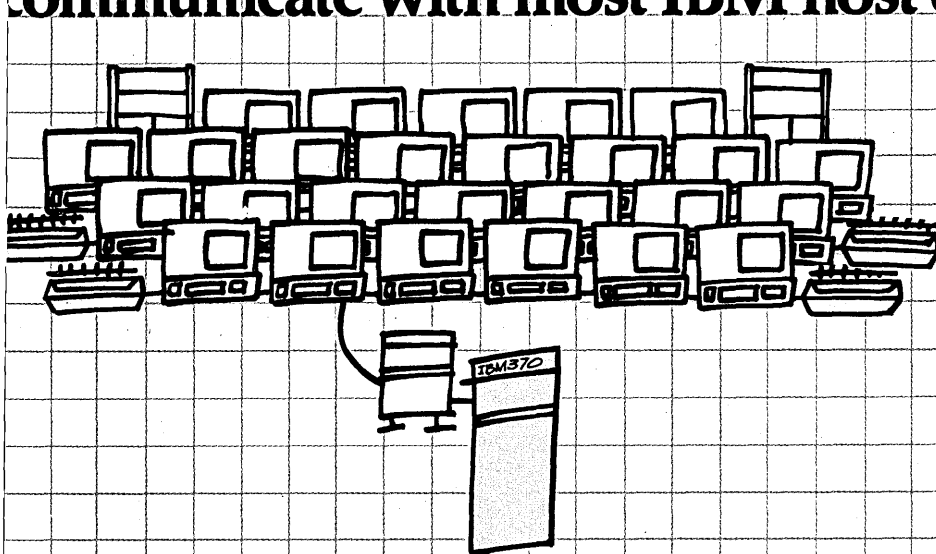
a remote job entry system



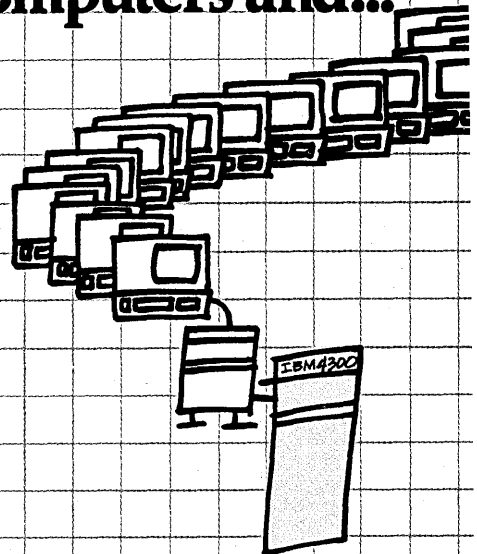
a screen editing system

What Great Things You Can Do

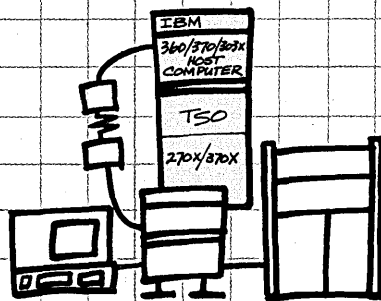
communicate with most IBM host computers and...



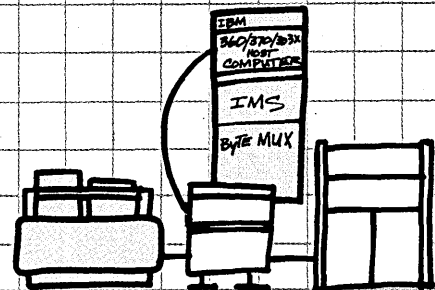
control up to 32 peripherals (card readers, CRTs, printers and disk drives) with a single system



multi-drop up to 16 CRTs on one coax to save cable



a remote interactive communications system




a local job entry system

It's almost unbelievable. But whatever networking requirements your plan calls for, chances are the Braegen computer-based Multi-Task Terminal System can meet them. And when your requirements grow, the Braegen system will still meet them — without changing controllers or making other costly system revisions — because the Braegen MTTs is software based. You get system flexibility never possible before. And think of the money you can save! Another great thing about the Braegen MTTs is Braegen service and support — in 52 cities with more than 300 personnel.

So put Braegen in your plan.

Write for our new brochure and tell us your system requirements. It's time to do great things!

CIRCLE 86 ON READER CARD



Put Braegen in Your Plan.

Name _____ Title _____


Company _____

Mailing Address _____

City _____

State _____ Zip _____

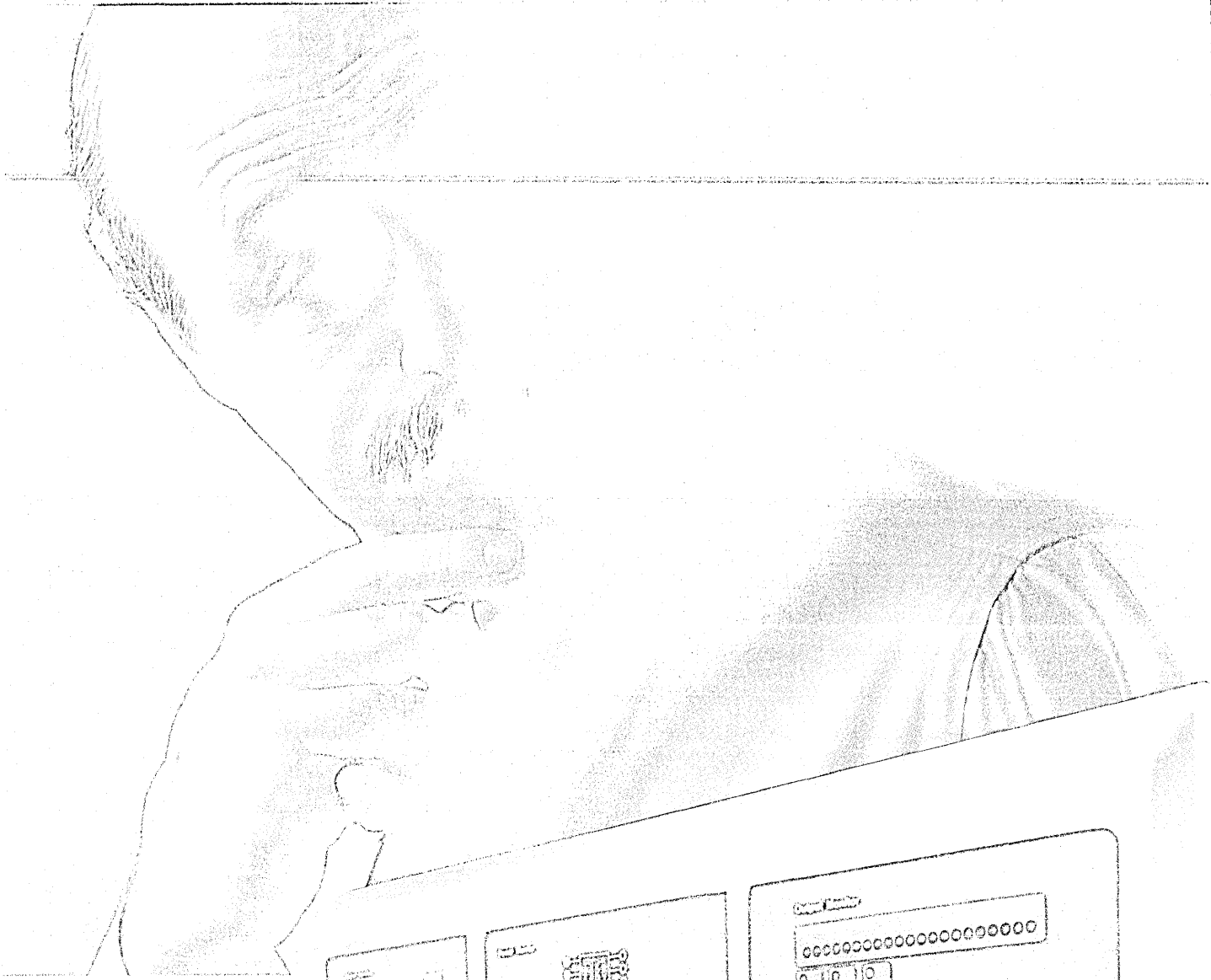
Telephone _____



BRAEGEN

Braegen Corporation, 20740 Valley Green Drive, Cupertino, CA 95014 • (408) 725-1252

6 How did Conditioned Power become the computer power leader...so suddenly? 9



The control panel graphic is divided into three distinct sections. The leftmost section consists of a vertical column of controls, each with a small square indicator to its right. The middle section features a central graphic of a circuit board or microchip, with several smaller icons or buttons arranged in a grid below it. The rightmost section contains two horizontal progress bars, each with a row of small circles representing a scale or status indicator. Below these progress bars are several small square buttons or indicators.

Conditioned Power Corporation
1987

Because it wasn't so suddenly.



In a very real sense, Conditioned Power had an enviable track record . . . even *before* we opened our doors! Our parent company is Liebert Corporation . . . since 1966, world leader in computer room air-conditioning systems.

It was expected that we would produce a high quality line of products, but that's not the real news. Our engineers achieved a *major* technological break-through. It is called . . .

The Power Management Center

Here is a complete, self-contained package that requires only a single point connection to building power. It is, also, *the only total system* on the market today! — Total because it combines *all four* key ingredients of a computer power system:

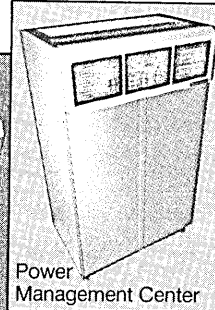
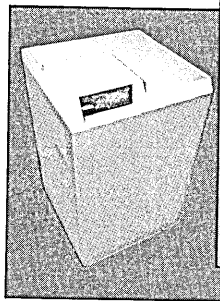
Conditioning — The Power Management Center eliminates all power transients; conditioning raw input power varying as much as plus or minus 40% from nominal.

Distribution — These systems offer unlimited growth as a benefit of the flexible plug-in distribution cables (additional cables may be added).

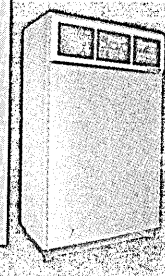
Monitoring — Continuous, precise measurement of the entire system; backed by solid state reliability.

Control — Power Management Centers feature total control of input and output power as well as individual circuits — with built-in circuit breakers.

Mini-Center



Precision Power Center



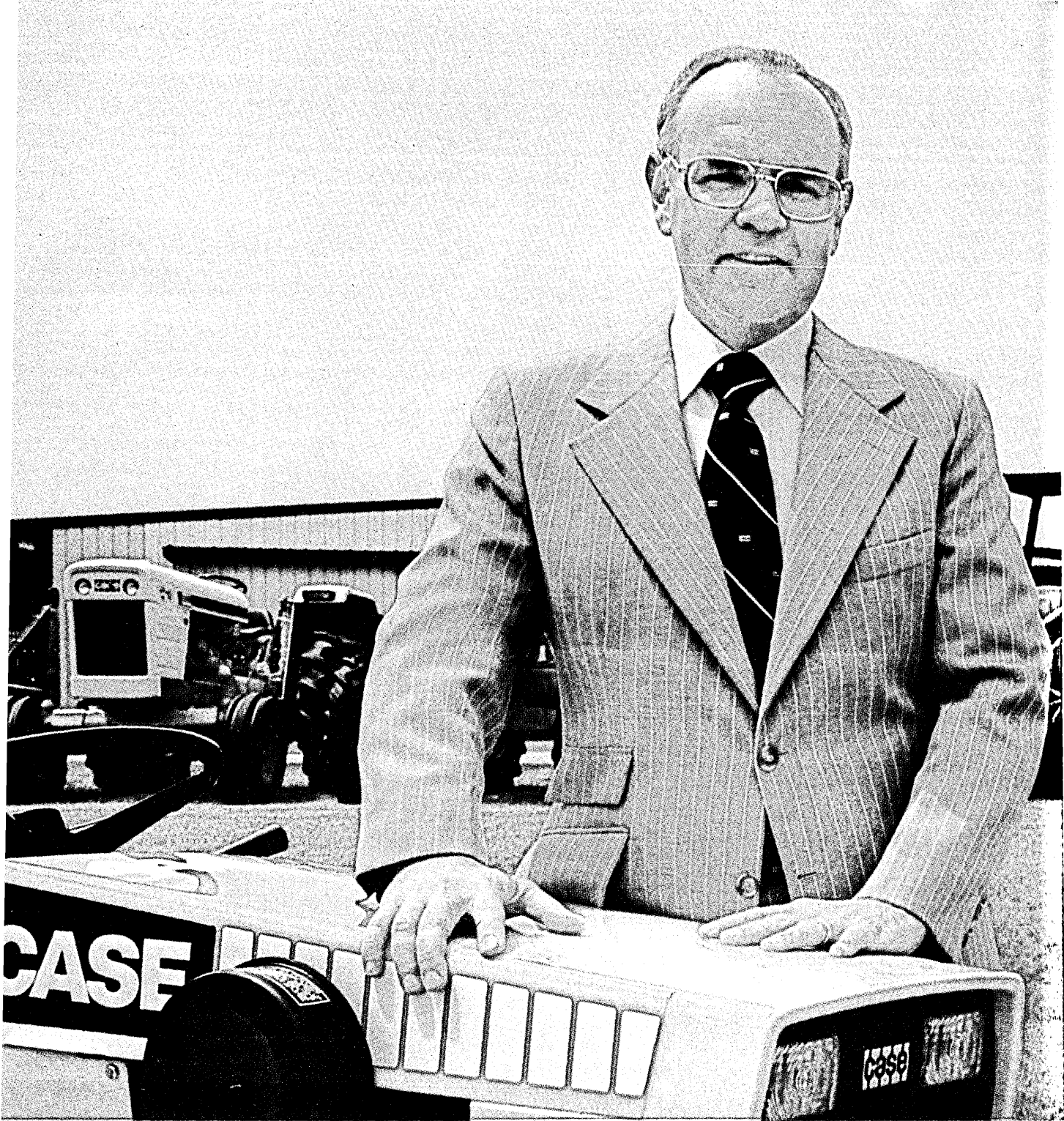
The first family of computer power!

Conditioned Power has created the computer industry's most versatile, yet cost-efficient line of computer power systems to serve your needs — no matter what data processing equipment you may have! Write: Conditioned Power, 1050 Dearborn Drive, P. O. Box 29186, Columbus, Ohio 43229 or call (614) 888-0246.

 **Conditioned Power**
subsidiary of **Liebert**

Visit us at the National Computer Conference, May 19–22, Anaheim. Booth NO's, 2400, 2401, 2402, 2404, 2500

CIRCLE 87 ON READER CARD



R. W. Bare, Assistant Corporate Controller, J I Case, A Tenneco Company, Racine, Wisconsin

The IBM Series/1 is a family of small, powerful, general-purpose computers for both distributed processing and standalone use. At over 50 company-owned stores nationwide of J I Case, a leading manufacturer of construction equipment and farm machinery, Series/1 systems are resulting in greater customer satisfaction through faster service on crucial parts orders.

“Through a visual display at the parts counter, a store clerk can gain

full information on the availability of a part in that store,” says R. W. Bare, assistant corporate controller. “If the part is ordered, the Series/1 prints a picking ticket and produces an invoice to accompany the order.

“By speeding order handling and accounting procedures, the system has cut related workloads in half in some stores, helping to support a 10% to 20% growth in parts sales in the stores in which it is used. This productivity benefit alone justifies

the system for us. Most important, by transmitting consolidated data daily to Case headquarters, it gives management greater control over financial and production planning.”

The IBM Series/1 is small enough to fit almost anywhere, flexible enough to manage a variety of data processing tasks and powerful enough to handle both remote terminal and central information processing. It features online capability so that information is available to

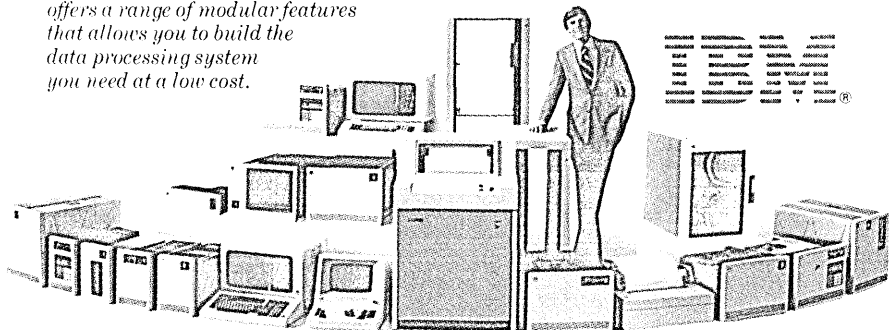


"Our IBM Series/1 network helps meet growing customer needs for parts and service while increasing productivity up to 30%."

you at any terminal just as quickly as it's processed. And because it's modular, Series/1 is ready to grow when you are. What's more, Series/1 is supported by an extensive service organization that enables IBM to respond promptly to your service needs, even in remote areas.

To learn more about the Series/1, get in touch with your nearby IBM General Systems Division office. Or write IBM, P.O. Box 2068, Atlanta, GA 30301.

The remarkably flexible IBM Series/1 offers a range of modular features that allows you to build the data processing system you need at a low cost.



A small computer can make a big difference.

CIRCLE 88 ON READER CARD

Full DEC*

Introducing the Mostek VAX Add-In. Now we have all the cards.

With the addition of our 256K byte add-in memory for the VAX-11/780, we now have a full line of add-in, add-on memories for DEC minicomputers. Your advantage? All the inherent advantages of dealing with a reliable single source supplier.

The new Mostek VAX incorporates the same quality found in all our memory systems: Total hardware and software compatibility. High density for maximum capacity in a minimum number of card slots. Burn-in and stress tests at the component level. Pre-burn, burn and post-burn tests at the system level. Standard and optional system features for greater system flexibility and significant cost savings. And a full one-year warranty on all memory boards.

PDP-11/70

MK 8601

Total capacity of two megabytes in a 7" chassis. 256KB or 512KB increments with ECC standard. Can operate in the serial and interleave modes simultaneously. Maintenance program available.

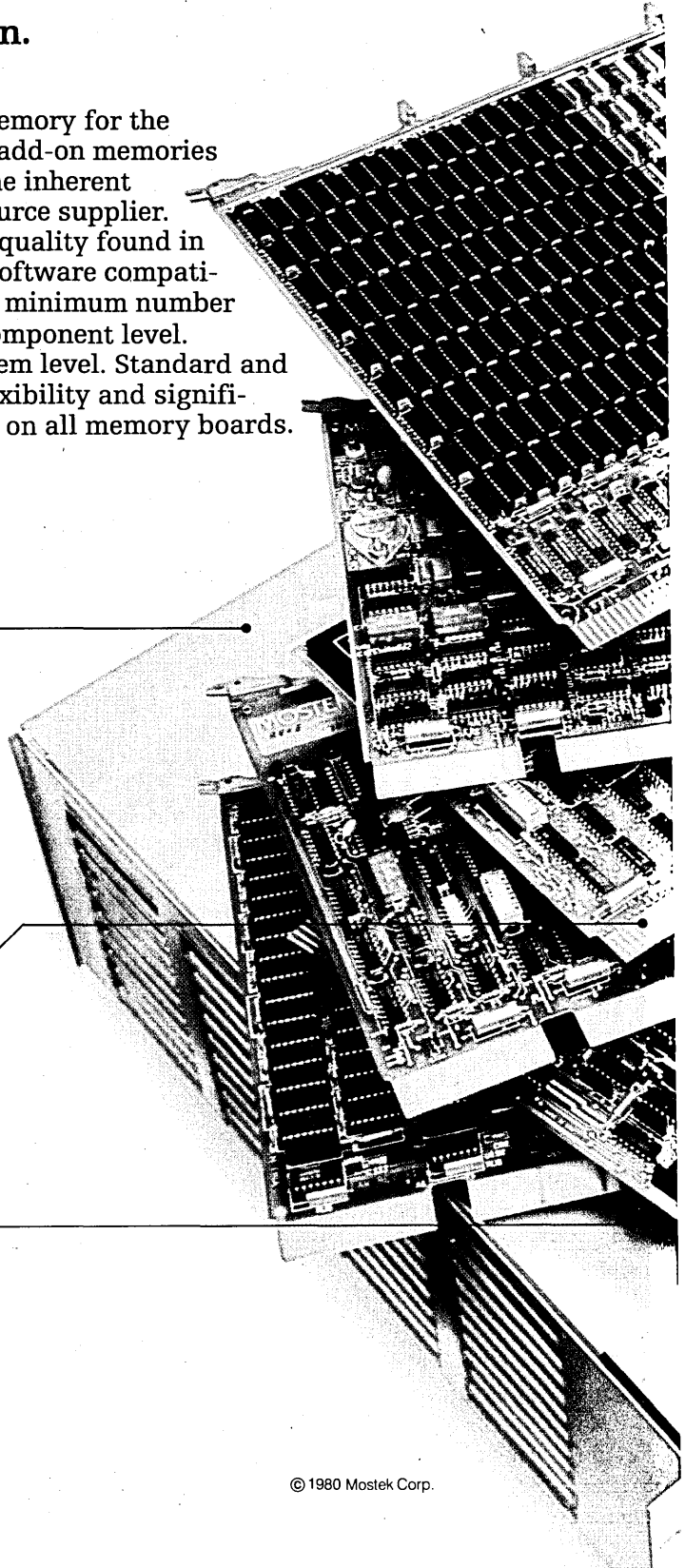
PDP-8

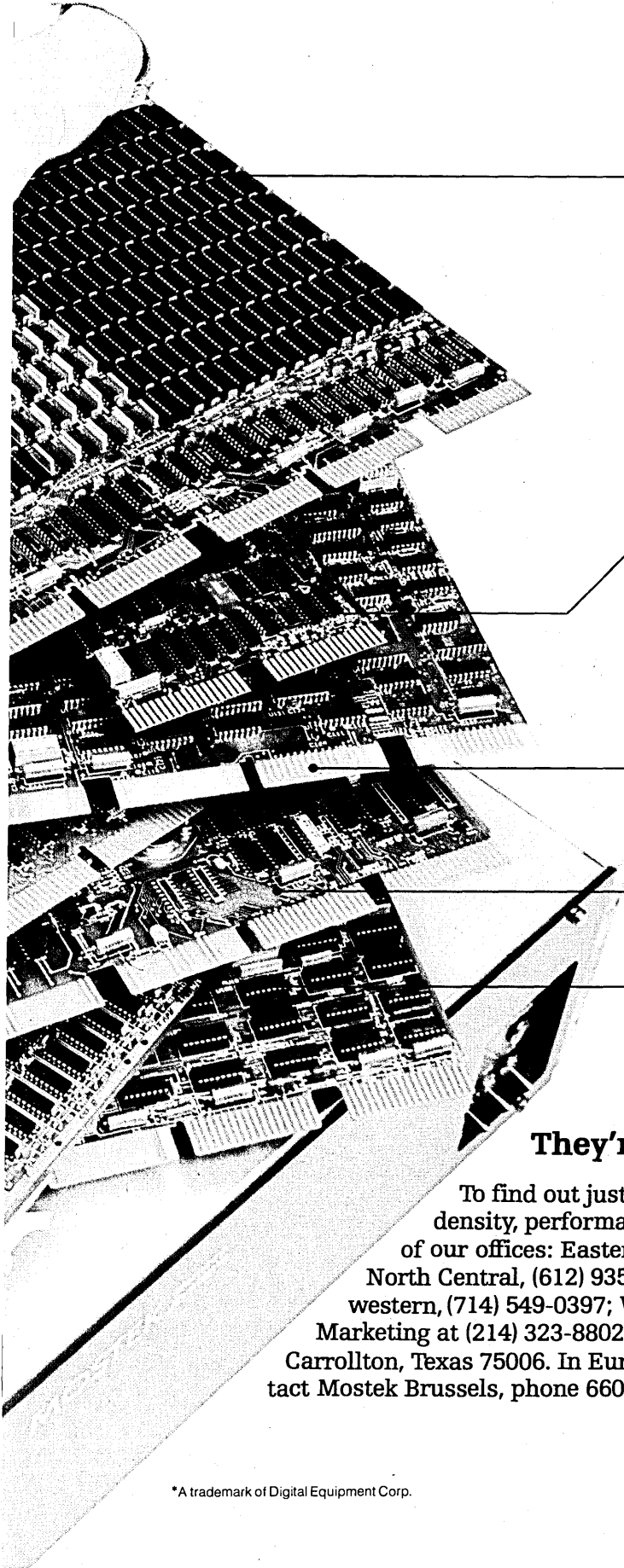
MK 8009 A1"X" (PDP-8A)

16K, 32K, 48K, or 64K words x 12 bits. Compatible with DEC memory management to extend total capacity to 128K x 12 with just two cards.

MK 8009 A0"X" (PDP-8E,F,M)

16K or 32K words x 12 bits. Single +5V supply with synchronous "hidden" refresh control.





VAX-11/780

MK 8016

256KB single board capacity (32K words x 72 bits with 64 bits data and 8 bits ECC). Totally hardware and software compatible.

LSI-11/2 or LSI-11/23

MK 8005 (PDP-11/03* 23)

8K, 16K, or 32K words x 18 bits with optional byte parity generation and checking.

PDP-11/04 through 60

MK 8011

16K, 32K, or 64K words x 18 bits with on-board parity generation and checking.

MK 8001

16K, 32K or 64K words x 18 bits with parity standard.

MK 8012

64K x 18, 96K x 18, or 128K words x 18 bits with parity standard.

They're available out of stock.

To find out just how well Mostek Memory Systems stack up in density, performance, reliability, availability and price, call one of our offices: Eastern, (201) 842-5100; Northeastern, (617) 256-1500; North Central, (612) 935-4020; South Central, (214) 386-9141; Southwestern, (714) 549-0397; Western, (408) 287-5081; or Memory Systems Marketing at (214) 323-8802. Mostek Corporation, 1215 West Crosby Road, Carrollton, Texas 75006. In Europe, contact Mostek Brussels, phone 660.69.24.

MOSTEK Memory Systems

*A trademark of Digital Equipment Corp.

CIRCLE 89 ON READER CARD

NCC has trimmed its exhibitor waiting list by going to a second parking garage in Anaheim. But this year the air conditioning will work.

COPING WITH CROWDS



by Tom McGusker

It'll be easier to attend technical sessions and easier to exhibit at this year's National Computer Conference, May 19-22 in Anaheim, Calif. And it'll be cooler.

Those 57,000 persons who jammed the Anaheim Convention Center when NCC last was held there in 1978 will remember a parking garage that was called the "West

Hall" where despite an air conditioning system of sorts, the temperatures soared to a sweltering 80 degrees. Exhibitors will remember the long waiting list to become a part of the NCC exhibit. And persons who pay up to \$75 to attend technical sessions will particularly remember the NCC in New York last summer, where they had a choice of 156 sessions going on during a four-day period and the huge exhibition by 443 companies—and

the problem of where to start.

The American Federation of Information Processing Societies, which sponsors the NCC, thinks it may have come up with solutions to some of these problems.

Examples:

- It has cut the number of technical program sessions to around 100, from the 156 listed last year in New York.
- Anyone registering to attend the technical

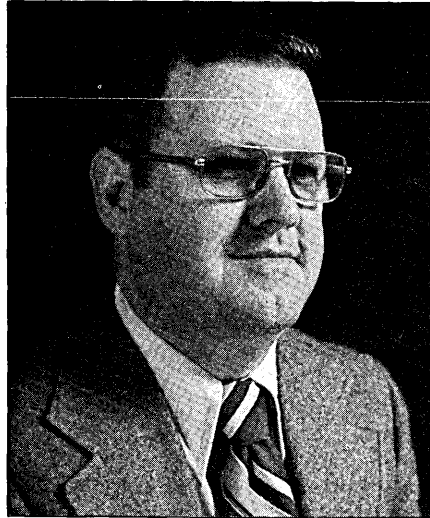


ILLUSTRATION BY DICKFAN/PALU

The program consists of a broad-based agenda designed to appeal to people who come to learn what's new in computing.



HERBERT B. SAFFORD—Chairman of National Computer Conference.



DR. DON B. MEDLEY—Program chairman of NCC.

program will receive a printout that will list the exhibits and the technical sessions that are of interest to these people.

- An additional 222 exhibit areas for 101 exhibitors have been added this year to the total 1,418 exhibit areas in the Anaheim Convention Center to enable NCC to cut its waiting list of 250 would-be exhibitors down to 150.

- Although the overflow to the convention center two years ago was a garage outside the center and this year the additional area also will be a garage underneath the Disneyland Hotel, both have been specially air-conditioned at a cost to AFIPS of \$300,000.

These new features, say the AFIPS people who plan and execute the largest U.S. computer "happening" of the year, should contribute to a smoothly run conference and exhibit that will, as program chairman Dr. Don Medley says, "give people more bang for their buck."

The conference chairman, Herbert B. Safford, of GTE Data Services, Inc., of Los Angeles, says the conference definitely will be more manageable than in 1978, when those 57,000 persons jammed the registration areas in the Anaheim center and where some persons had to wait in line up to four hours for an admission badge. "Unless there's a big crunch in transportation costs next May and companies curtail the number of persons they'll allow to attend the conference, we expect about 60,000 persons . . . maybe up to 70,000," he said.

And all sorts of incentives are being offered for registering ahead of time for the NCC. For example, early registrants will be mailed a questionnaire in which they can list the kinds of exhibits and technical sessions that interest them. These will be processed by a computer whose software was developed by National CSS, a Dun & Bradstreet network

services company, and they'll be mailed a printout of the location of the exhibitors and the time and location of the technical sessions that meld with their needs. The service also will be available to people who register during the four-day NCC for technical sessions.

"For people who attend technical sessions, there is a time factor," said an NCC spokesperson. "They've got several sessions to take in and some exhibits. We feel our computer printout service will help them use their time more effectively."

People who register in advance of the conference will be offered a \$15 discount on the registration fee of \$75. And there'll be an "early birds" registration reception on May 18, the evening before the conference, in the Anaheim room of the Convention Center. The reception will include free cocktails, a five-piece band and a disco dance group.

Coping with crowds—both attendees and exhibitors—is not an unfamiliar problem to AFIPS. In the late '60s when it staged joint computer conferences in the spring and fall, hordes swelled showplaces in Boston and Las Vegas. So AFIPS decided to "hide" succeeding shows in places like Houston, Texas, just when the recession of the early '70s set in. That's when it decided to turn the twice a year conferences into once a year affairs—the first one in New York in 1973, when attendance soared to 25,000. It jumped to 32,000 in Dallas four years ago, to 57,000 in Anaheim, and to nearly 80,000 in New York last summer.

TECHNICAL SESSIONS REDUCED

And although the New York registration of 8,156 for the technical sessions was somewhat of a record, people apparently didn't show up at them, leaving some with turnouts of 11 and 13. That

caused the worried NCC board to make a study of why some sessions pulled so badly. Their conclusions and their orders to his year's organizers: "Cut the number of sessions to 95. Be critical of the content."

In carrying out this edict, Safford said, the program chairman "was the subject of the wrath of a lot of authors wanting to submit papers." Medley, who has been a data processing instructor at Moorpark College near Los Angeles for 11 years, put it more graphically: "I'm a bastard, and other program chairmen weren't."

Medley, who was part of the NCC committee that studied the New York program attendance, said he and his committee reviewed more than 200 proposals for papers or sessions. He said he was insistent that they be of broad interest and not limited to "special interest groups." But he added that he had mixed feelings about last year's poor attendance. NCC people, he said, are different from those attending the more specialized conferences. For example, he said, a session that drew 137 persons to a room for 700, actually brought in 300 people during the two hours it was in progress. "There are people who float in and out all of the time. They come to listen for a while and to sample what is being discussed. Others are there to hear one particular speaker and then they'll leave."

The program, wrapped up in late March, consists of a broad-based agenda designed to appeal people who come to learn, generally, what is new in computing.

THE NCC

Dates: May 19-22

Place: Anaheim Convention Center and Disneyland hotel, Anaheim, Calif.

Conference Program: Monday, 1:30 p.m. to 4:45 p.m.; Tuesday, Wednesday and Thursday, 8 a.m. to 4:45 p.m.

Exhibits: Monday, 11 a.m. to 7 p.m.; Tuesday and Wednesday, 10 a.m. to 6 p.m.; Thursday, 10 a.m. to 4 p.m.

Fees: Conference, exhibits and proceedings for four days: \$75 (\$60 for advance registration). Exhibits one day, \$10. Exhibits and conference for one day, \$25. Four days of exhibits, \$25. Students, \$10 for entire conference and exhibits. Personal Computing Festival, \$9 for three days; \$8 for Personal Computing Festival proceedings; \$15 for three days and the proceedings; \$5 for one day, applicable to NCC registration.

Sponsor: American Federation of Information Processing Societies, 1815 North Lynn St., Arlington, VA 22209, (703) 243-4100.

HOLLYWOOD TIME IN ANAHEIM

With the magic kingdom of Disneyland right across the street, it is only fitting that the 1980 NCC should include a series of sessions on computers and entertainment.

Suzanne Landa, a consultant to the movie industry on computer technology and a proposal manager in communications and office automation at Bunker Ramo, Westlake Village, Calif., is area coordinator for the sessions.

As a kick-off to them she'll entertain NCC attendees with what she terms "a humorous look at computers in the movies" at the All-Conference reception Monday evening, May 19.

To put prospective attendees in the mood, she has devised a test. Try to match the computer stars with the movies in which they appear.

For answers, to the test, attend the reception.

Computer Stars

1. ALPHA 7
2. COLOSSUS
3. NOVAC
4. M505
5. RITA
6. JOSHUA
7. MOTH
8. ETERNAL TABERNACLE
9. ALFRED
10. ICARUS
11. GUARDIAN
12. COM 9001
13. MU/TH/UR 6000
14. ZERO
15. EMMY
16. ALPHA 60
17. BIOCENTRAL COM 2100 Series G
18. HAL
19. MOTHER
20. PROTEUS

Movies

- a. The Forbin Project
- b. Dr. G and the Bikini Machine
- c. Demon Seed
- d. The Phynx
- e. Barbarella
- f. The Love Clinic
- g. The Gladiators
- h. Alien
- i. Hot Millions
- j. Desk Set
- k. Rollerball
- l. GOG
- m. Zardoz
- n. 2001
- o. Alphaville
- p. Sleeper
- q. Dark Star

Landa feels 1980 is an appropriate year for inclusion of movies in an NCC program. "This past year, the annual conference of the Society of Motion Picture and Television Engineers included an entire day on applications of computer technology to film and videotape. This year, ACCESS, a computer-based sound editing system, won the Technical Achievement Academy Award. The time is right for the computer industry in turn to recognize the growing relationship between computer technology and entertainment."

One of the NCC sessions will cover "Computers in Amusements and Sporting Events." Its leader will be Dave Snyder, Walt Disney Productions. Among the participants will be Richard Grey, a consultant on computer uses in special theaters, especially planetariums, who did computer design work on the San Diego Space Theater. Philip C. Stover of Walt Disney Productions will deliver a paper on "Computers and Sports: A Natural Marriage."

A session on "Computers and the Performing Arts" will include a paper on "Computers Helping Dance Notation Help the Dance," by Stephen W. Smoliar, General Research Corp., Santa Barbara, Calif.

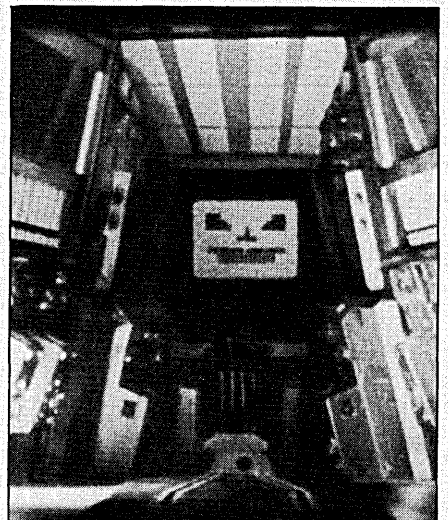
Charles Tucker, Twentieth Century-Fox, Beverly Hills, will chair a session on "Computer Support Behind the Scenes in Movie and Television Production." Participants will include Bill Eberly, Walt Disney Productions, and Terry Gates, General Cinetrics.

"Computer Use for Special Effects in Movies and Television," is the title of a session to be led by William R. Deitrick, Mini-Micro Systems, Inc., Anaheim, Calif. Among the papers to be delivered is one on ACCESS (Automated Computer Controlled Editing Sound System) by R. David Snyder, Wed Enterprises, Glendale, Calif. Another covering Automatic Camera Effects System (ACES), by Steven N. Crane, Wed Enterprises, treats a system up for an Academy Award next year.

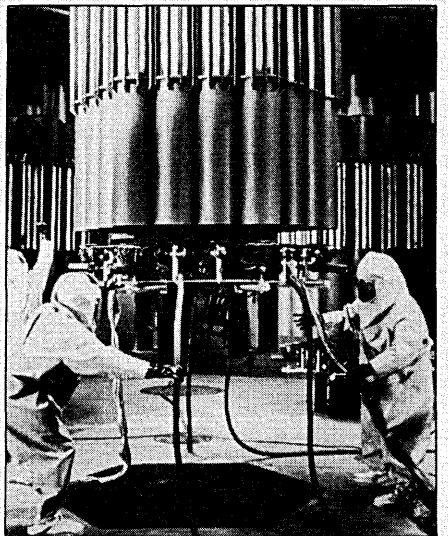
Steven Levine, Lawrence Livermore Laboratories, Livermore, Calif., will chair a session on "Computers in Animation." Participants will include: Edward Catmul, Lucas Films; Don Greenberg, Cornell Univ.; and John Whitney, Information International. The session will include a demonstration of a model of an automated stage set designed in 1963 (System Development Corp. and Rockwell were making it when the Viet Nam war halted the project) and more feasible now than ever with the advent of microprocessors.



HAL



MOTHER



PROTEUS

SHARE TO CELEBRATE 25TH YEAR DURING NCC

NCC '80 Pioneer Day, Wednesday, May 21, will commemorate the 25th anniversary of the founding of SHARE.

The first computer user group, SHARE got started as an ad hoc idea of early IBM 704 customers in the Southern California area. It held its first official meeting during the week of Aug. 22, 1955 at the Rand Corp.

Of the 65 people who attended the first two SHARE meetings, all but 11 were traced and invited to participate in the Pioneer Day program, which is jointly sponsored by NCC and the American Federation of Information Processing Societies (AFIPS) History of Computing Committee, under the direction of Mort Bernstein of System Development Corp.

The first half of the program will focus on the computing environment of the 1950s and why an organization such as SHARE was needed. A highlight of this part of the program will be a 20-minute film, "Piercing the Unknown," covering the IBM 701. Panels of pioneers will describe scientific computing machinery of the era as viewed by its users and their supplier, IBM.

The second half of the program will

address the birth pangs of SHARE itself: the needs of science and industry, the politics of reality, and the evolution of the structure that laid the foundation for SHARE as it is today. This portion will conclude with a retrospective view of SHARE's first quarter-century and address the question of its past, present, and future effectiveness.

A history of SHARE printed in a 1973 SHARE reference manual concludes "... the organization has been most effective when it has been aggressive and taken the lead, far less so when its mode has been reactive ..."

Although the name SHARE stands only for the concept embodied in the ordinary English word, the organization is not without an acronym. It's SCIDS, for SHARE Committee for Informal Discussion Sessions, a tradition born at SHARE II, held in Philadelphia.

Pioneer Day will conclude this year with SCIDS, which will provide an opportunity for reminiscing, long-awaited reunions, and for the younger members of the information processing community to meet and converse with the pioneers.

—Mort Bernstein

Two sessions reflect what Medley said was an attempt by the program committee to expose instances of where computer technology can be "married" to other disciplines. One is a series of talks on the use of computer technology in the entertainment industry (see box). Another is on medical imaging as a method for using computer technology to keep health costs within reasonable limits. A third, on solar energy computer simulation modeling that will be presented by researchers at Jet Propulsion Laboratories, Pasadena, and representatives from the Solar Energy Research Institute and Science Applications, Inc., will give an update on the exploration of alternative energy sources. The organizers note that since a large scale solar energy industry doesn't currently exist, the application of models will be able to save years that might otherwise be wasted on unfeasible systems.

Medley says a series of sessions on office automation follows the same theme of a marriage of computers with another industry. Caroline M. Watteuw, of Office of the Future, Inc., Guttenberg, N.J., has organized a session entitled "Developing Technologies in Office Automation Systems" that will explore "the use of efficient, well-integrated computer tools to cut costs, boost productivity, and increase efficiency" in tomorrow's offices. One paper will describe an experimental multifunctional information system that has been developed in Sweden for office automation.

Sessions on data base technology, which were so popular in New York last year, will be presented as well as sessions on supercomputers, software engineering, designing, distributed data processing, and "PASCAL in the Real World."

Another hot topic, electronic mail, will be discussed in a session entitled "Electronic Mail: Current Developments and State of the Art." It will bring together speakers representing corporations and vendors. Says the session chairman, Walter Ulrich, "The economics in favor of electronic mail will become overwhelming in the next 18 months."

SPECIAL SEMINAR SCHEDULE

Besides the program of nearly 100 sessions, a professional development seminar schedule also is planned, featuring 22 sessions on the following subjects:

- A pragmatic view of distributed processing systems
- Designing and programming parallel systems with dynamic architecture
- Quality control for software
- Performance measurement in systems and programming
- Structuring the day to day system projects
- Software design techniques

- Computer security
- The structured techniques and the project life cycle of the '80s
- Data processing management styles: selecting the successful approach
- Software tools
- Update on small computer systems
- Packaging your image for success
- How to develop a long range plan
- An overview of distributed processing
- Software engineering that works
- Transition from technician to manager
- Design by objectives
- Contract negotiations
- Data base machines are coming back
- Future computing
- Evaluating text editing and office automation systems
- Shifting gears to matrix management

These seminars, which previously took up nearly all the time of attendees, thus keeping them away from the technical program and exhibits, are being revised somewhat this year. Nine will be half-day sessions, and attendees will be referred to exhibits or to papers on the technical program that relate to the topic for the other half of the day. NCC officials said they received 87 submissions for the program and narrowed the subjects to 22 after making a thorough check of the authors' credentials and their track records in presenting seminars on the subjects.

The NCC keynoter is David Packard, chairman of Hewlett-Packard Co. and former Undersecretary of Defense, who will address an opening session on Monday, May 19. The conference luncheon speaker that day is John P. Imlay, chief executive officer of MSA, who will talk about the industry in the '80s. Edson deCastro, president of Data General, will ad-

dress a plenary session May 20 on "The Small Computer Phenomenon and Its Present and Future Impact." Donn B. Tatum, chairman of the board of Walt Disney Productions, will speak at a plenary session on May 21, and Robert T. Cowan, vice president with C. Itoh Electronics, will discuss the "Impact of the Worldwide Computer Suppliers Market" at a session May 22.

A highlight of the science film theater will be a film tracing the role of computers in the making of the movie *Star Wars*.

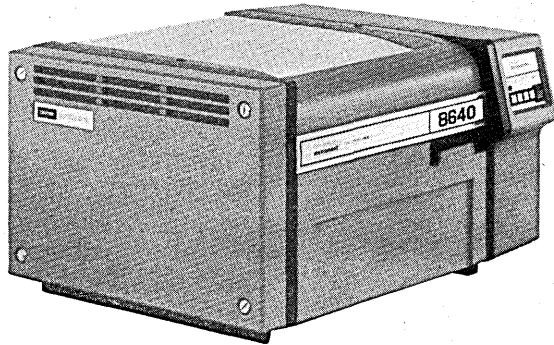
The NCC exhibit will include 414 companies, compared with 443 that exhibited last year in New York (New York was able to provide 1,668 exhibit spaces compared with the 1,640 available in the Anaheim convention center and the Disneyland hotel, about a mile away).

There were 354 companies exhibiting two years ago, when the NCC was last held in Anaheim. Next year in Chicago, the huge McCormick Place will provide 1,900 booth spaces and just might be able to accommodate all the firms who wait in line for precious exhibit space.

Because of the long waiting lists, the sponsors last year began limiting the size of booths to 2,000 sq. ft. for island booths and to 600 sq. ft. for linear booths. That plan will be in force this year and again in Chicago, when the personal computing exhibit will no longer be separated from the NCC exhibit.

The personal computing exhibit is being held this year in the Disneyland hotel ballroom with 76 exhibitors. But many other personal computing companies—such as Apple and Commodore—will be exhibiting as part of the NCC as more and more of their products are aimed at businesses instead of hobbyists. *

"MOST COMPANIES OFFER YOU A PLOTTER"



"WE OFFER YOU A SELECTION..."

*Incremental, Electrostatic
or Thermal"*

Houston Instrument offers the most complete line of digital plotting and printing devices available ... incremental, electrostatic and thermal. As a result, we can evaluate your specific graphics need and recommend the plotter, printer, or plotter/printer that's tailored to your requirements.

Our **CØMPLØT**® incremental plotters are available in 7 different models with X-Y plotter sizes of 8½" X 11" or 11" X 17" and drum plotter chart sizes of 11" to 42". Pen speeds range from 240 to 4000 steps/sec. Prices start as low as \$1,085.*

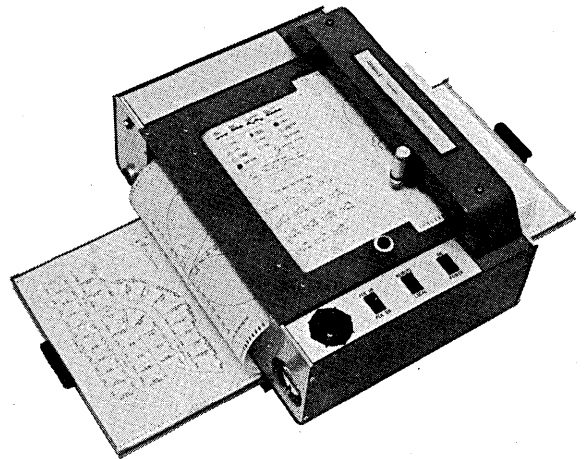
CØMPLØT electrostatic plotters and plotter/printers are available with models for printing (2,400 lines per minute on 8½" fan fold paper or 1000 lines per minute on 11" paper); plotting (2" per sec. on 8½" paper or 1.5" per sec. on 11" paper); or simultaneous plotting and printing.

CØMPLØT electrostatic CRT copiers provide fast, quality hardcopies from Hewlett Packard Series 2640 terminals or Tektronix® 4010 family terminals at only a few cents per copy. Prices for the Houston Instrument electrostatic products range from \$3,450 to \$5,975.*

The new Model 6000 TISPP Thermal/Intelligent/Strip/Plotter/Printer lets you get quality graphics output from either an analog or digital source and provides the continuity and clarity of a continuous trace with alphanumeric annotations under intelligent control. It's the ideal graphical output device for the new generation of microprocessor controlled instrumentation. Available in one or two pen versions. Prices start at \$1,640.**

So... when you think of graphics, think of HI.

For complete information on any of Houston Instrument's digital plotters, printers, and plotter/printers, contact Houston Instrument, One Houston Square, Austin, Texas 78753. (512) 837-2820. For rush literature requests call toll free (outside Texas) 1-800-531-5205.



**houston
instrument**

DIVISION OF BAUSCH & LOMB

"the graphics - recorder company"

Visit us at NCC show at Booth 1539

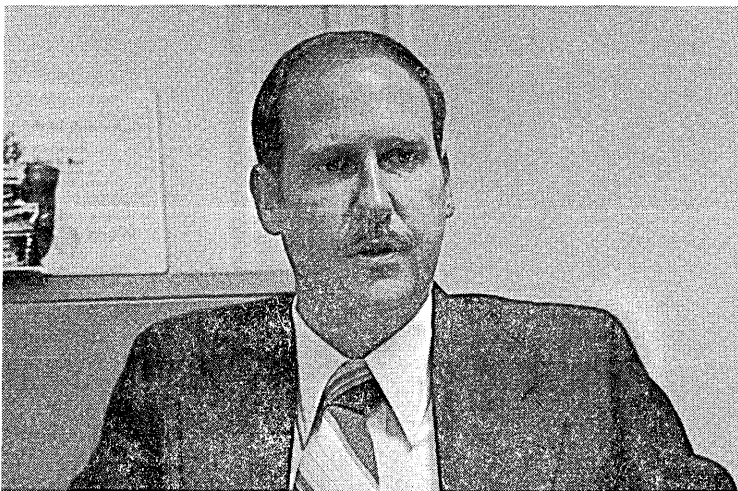
® Registered trademark of Tektronix, Inc. *U.S. Domestic price only **U.S. Domestic Price, OEM version only ® Registered trademark of Houston Instrument

Circle Number 280 For Literature

Circle Number 281 To Have A Representative Call

INTERACTIVE USER REPORTS

"A very versatile computer."



*Dean A. Banz, Manager, Information Services,
Burr-Brown Research, Tucson, Arizona*

Versatility.

"Burr-Brown develops, manufactures, and markets a broad line of high-performance electronic components and systems.

"We wanted a computer that could be used efficiently by many departments and realized that a batch system couldn't handle the job. We needed a very versatile computer. One that could bring large system capability to the different people who needed it.

"We chose the interactive DECSYSTEM-2040.

"Now we have 25 terminals at various locations—all doing different jobs, all at the same time. We run applications like Materials Requirement

Planning, Customer Order Entry, Inventory Control, Product Design, Cost Accounting, Payroll, and Statistics. The 2040 handles all our requirements for both batch and interactive processing, and several different languages.

"The versatility of the DECSYSTEM-2040 has contributed greatly to the growth of our business."

Expandability.

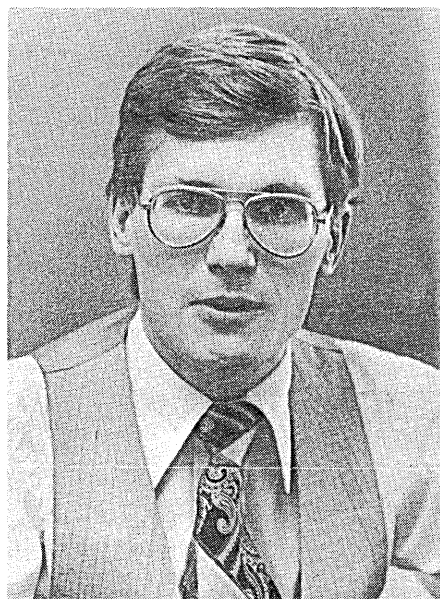
"We provide computer services to our Research Center for use in engineering and scientific analysis as well as information processing related to cancer and solar energy research.

"Because service bureau computer time became too expensive we decided to install our own in-house system, a DECSYSTEM-2040.

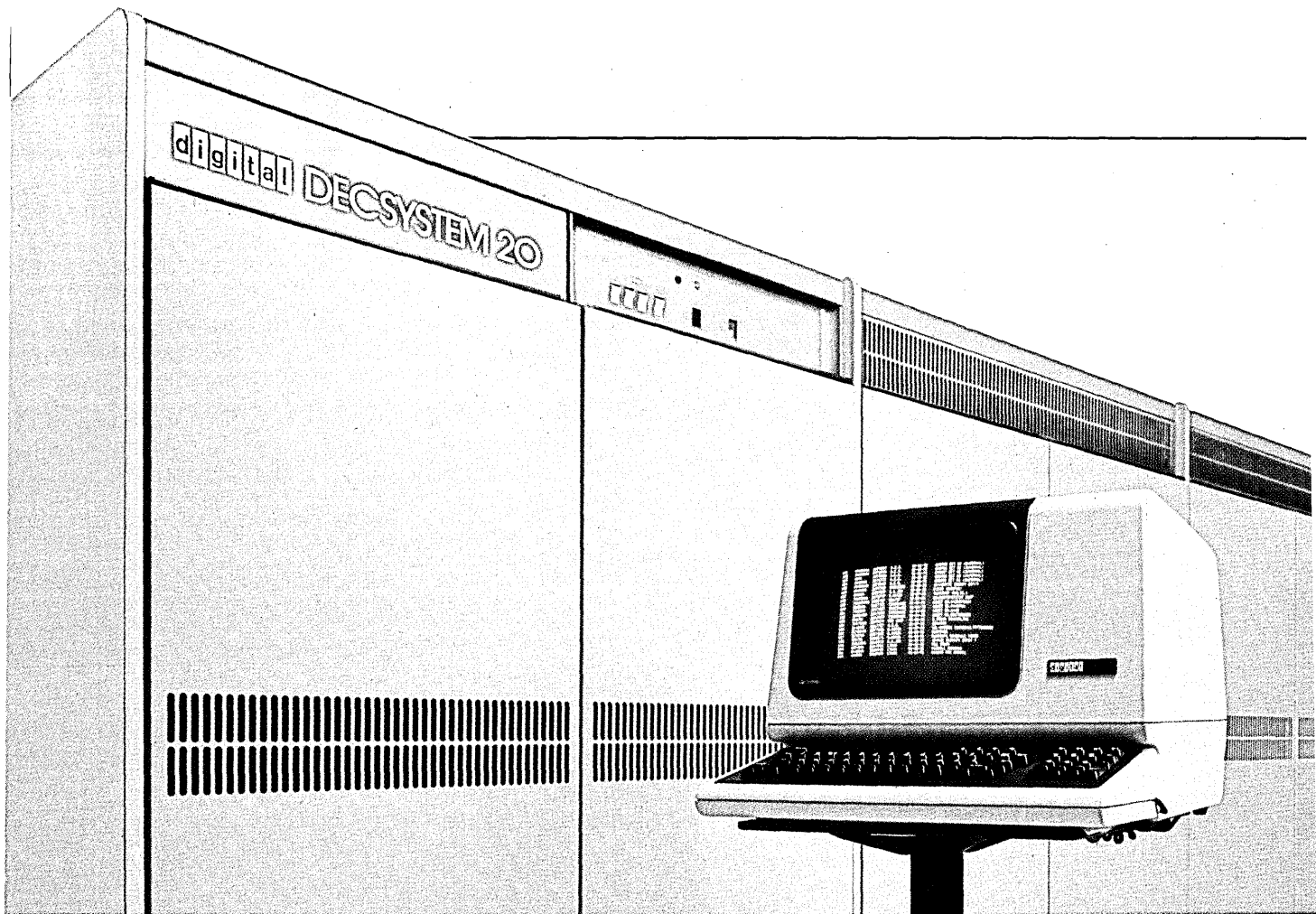
"We started out with eight terminals, but when we found out how productive the system was, we began expanding. Today, we have 45 terminals running simultaneously,

including one in a vice president's home. We've even added cache memory without any software changes. And we still haven't reached the capacity of the system.

"By expanding the DECSYSTEM-2040, we've been able to lower our costs by 40-50% and at the same time substantially increase our services."

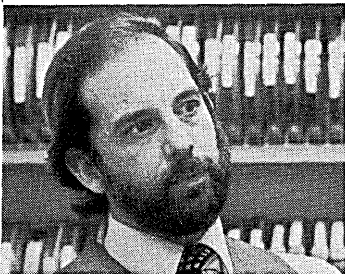


*Michael Jaskowiak, Manager,
Franklin Institute Computer Center,
Philadelphia, Pennsylvania.*



Productivity.

"The USRA was created by an act of Congress in 1973 to reorganize bankrupt railroads in the Northeast corridor.



*Bill Kelleher, Chief,
Computer Facility,
United States Railway
Association,
Washington, D.C.*

"We were using service bureaus, but it became so expensive that we decided to get an in-house computer.

"We chose the DECSYSTEM-2060 because of its low cost, its interactive capabilities and its excellent implementation of APL. We also hoped

that the interactive, user-oriented operating system would improve programmer productivity.

"Our productivity figures are impressive. Now we're able to develop and enhance software during prime time and run complex models overnight that would be too costly to run at service bureaus.

"With the DECSYSTEM-2060, we estimate our return on investment is five to one."

THE DECSYSTEMS The interactive computers for the big system jobs.

- Please send your Interactive User Reports Brochure.
- Please have a sales representative contact me.

Name _____

Title _____

Company _____

Address _____

City _____ State _____

Zip _____ Telephone _____

Send to: **Digital Equipment Corporation,**
MR1-1/M55, 200 Forest St., Marlboro, MA 01752.
Tel. 617-481-9511, Ext. 6885.

A-5-0



Voice Recognition Modules.

NOW!

Call Interstate now. We're geared to ship Voice Recognition Modules (VRM) — in quantity — today.

It's amazing single printed circuit board makes it easy to add voice recognition to your computer products. It handles up to 100 word vocabularies at 99 percent accuracy. That means natural language. And it's priced to be reasonable for your market —

under \$2,000 in quantity.

OEMs purchased over 200 sample units the first three months after introduction. Now it's available to you.

Don't delay. Call the Manager, Marketing, Voice Products at (714) 635-7210 or (800) 854-6279 toll free.

Just give us the word and your VRM modules will be on their way.

CIRCLE 92 ON READER CARD

For complete details write Interstate Electronics Corporation, 1001E Ball Rd., P.O. Box 3017, Anaheim, CA 92803.

**INTERSTATE
ELECTRONICS
CORPORATION**

SUBSIDIARY OF

AT&T

In the 1,640 exhibit spaces, a total of 414 companies will be showing their products.

NCC PRODUCT PREVIEW

If their feet and eyes hold out, attendees at the NCC will be able to visit 1,640 exhibits by 414 companies. Here are some of the products that will be shown, and the booths at which they can be found.

ABLE COMPUTER **Irvine, Calif.** **MICROPROGRAMMABLE** **INTERFACE** Booth 3411

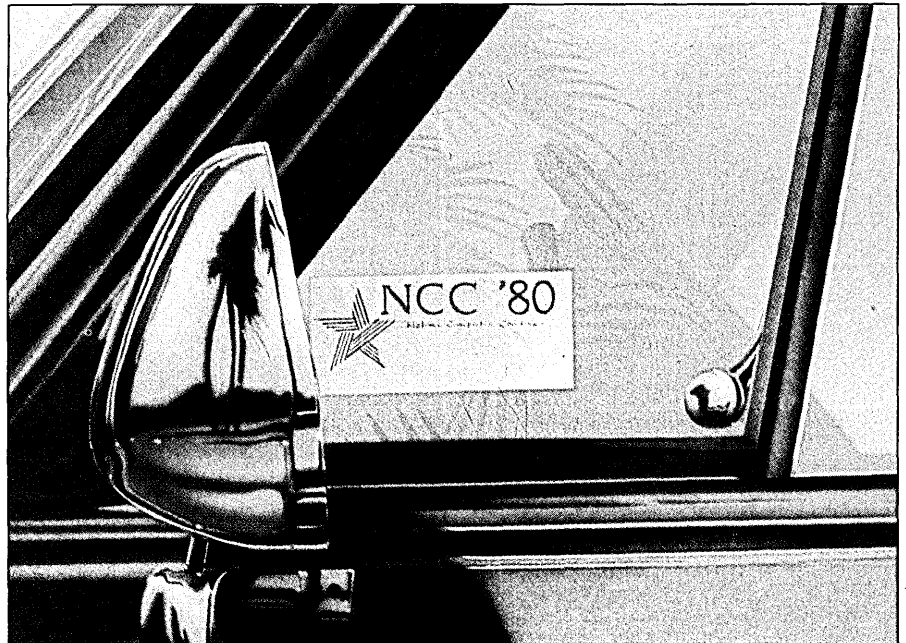
The Uniface—a single board, microprogrammable controller—allows oems to create proprietary device controllers, preprocessors, and the like for use with DEC PDP-11 processors. In fact, the Uniface is said to be the basis of this vendor's DV16 multiplexor. It plugs into the PDP-11 Unibus. The Uniface uses 2901 bit-slice microprocessors, and implements a 32-bit-wide microword instruction set. It has a 200nsec instruction cycle speed. A microconsole and a portable FORTRAN IV microassembler are available to help the oem build special purpose devices. The Uniface sells for \$4,500.

FOR DATA CIRCLE 316 ON READER CARD

ANN ARBOR TERMINALS, INC. **Ann Arbor, Mich.** **CRT TERMINAL** Booth 1247

The Graduate crt terminal will debut at this vendor's booth. Said to include most functions—short of word processing—set forth in the latest ANSI standard for display terminals, the Graduate features a 24-line by 80-column display, with two additional lines for status information. The upper and lower case ASCII terminal has a detachable keyboard with up to 36 function keys. Features include complete line and character editing, user-selectable blinking or nonblinking cursor, and user-definable operating parameters held in battery backed-up memory. Field attributes include guarded (not transmitted in page mode), protected (writable by the computer, but not the user), secure (held in memory but not displayed), and highlighted. Display attributes can be selected on a character by character basis, and more than one attribute can be placed on a character (say, reverse vid-

ILLUSTRATION BY DICKRAN PALULIAN



eo and blink). Transmission rates range from 110bps to 19.2Kbps. Interfaces include RS232 and RS449. A single Graduate is priced at \$1,300.

FOR DATA CIRCLE 300 ON READER CARD

ATLAS ENERGY SYSTEMS **South El Monte, Calif.** **POWER SYSTEM** Booth 4427

With the quality of clean electric power declining around the country, this vendor has developed an uninterruptable power conditioner designed for use with medium to large scale minicomputer systems. Dubbed the UPC/Mini-Series, it combines the ride-through capabilities of an uninterruptable power supply with the conditioning capabilities of a motor generator. The Mini-Series is said to provide up to a quarter of a second ride-through and 100% guaranteed clean power (if the unit fails to deliver clean power, the user can return it for a full refund). There are three models in the Mini-Series, capable of accepting three-phase input (208 volts, 230 volts, or 480 volts) and providing 120 volt or 208 volt,

three phase output power. A 5KVA model sells for \$8,795, a 10KVA model is \$9,295, and a 15KVA model is \$9,995.

FOR DATA CIRCLE 319 ON READER CARD

CALIFORNIA COMPUTER **PRODUCTS, INC.** **Anaheim, Calif.** **PLOTTER** Booth 2629

An alternative to large flatbed plotters, this vendor's model 970 beltbed plotter combines features of a flatbed plotter with those of a drum plotter. Capable of drawing on papers up to 52 inches wide and 80 inches long, the 970 moves the paper under the pen as well as moving the pen over the paper. Cut sheets of paper are taped to a mylar belt running between the drum and an idler roller. The 970 plotter operates at up to 30ips and has a resolution of 0.00049 inches. It has four pens, allowing plotting in multiple colors and line widths. The 970 can be operated on-line, off-line, or in a remote time-sharing environment (with communications speed running to 9600bps). With interfacing for most mini-

This year's NCC will have 222 more exhibit areas than were available two years ago.



computers and mainframes, the 970 carries a price tag of less than \$51,000.

FOR DATA CIRCLE 320 ON READER CARD

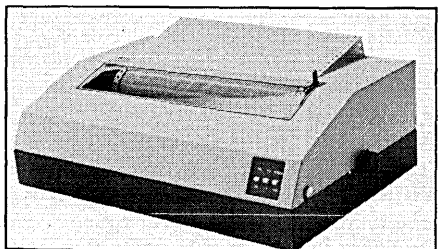
C. ITOH ELECTRONICS, INC. Los Angeles, Calif. PERIPHERALS

Booth 4207

The American arm of this giant Japanese company ('79 revenues in excess of \$32 billion, worldwide) will bring out its new line of computer peripherals for oem systems integrators at this year's NCC. The offerings will include floppy disk drives, daisywheel printers, and matrix printers. Two floppies will be on hand: the 8-inch Maxi-Flexi and the 5¼-inch Mini-Flexi. Both are double-density, double-sided drives, with capacities of roughly 1.5MB and 425KB respectively (the spec sheets give the capacities in terms of bits, with the Maxi-Flexi rated at 12.8MB and the Mini-Flexi at 3.5MB). Both drives "meet all industry standard interface requirements." In quantities of 500, the Maxi-Flexi sells for \$549 and the Mini-Flexi goes for \$249.

The two daisywheel printers are known as the Starwriter and Starwriter II; both use standard 96-character print wheels, and can print 136 columns in 10 pitch type or 163 columns in 12 pitch. Both have parallel interfaces as well as RS232C interfaces. The Starwriter operates at 25cps, while the Starwriter II operates at 45cps. In quantities of 500, the Starwriter sells for \$1,080 and the Starwriter II is \$1,445.

The Comet line of 9 by 7 dot-matrix printers are microprocessor-based impact printers; the Comet is an 80-column unit with



four character sizes, while the Comet II is a 136-column printer with two character sizes. Four international alphabets are offered: English, German, Japanese, and Swedish. Both have industry standard parallel interfaces and RS232C interfaces. Both print at 125cps, with bidirectional throughput of 63 lpm (Comet) and 40 lpm (Comet II). Pricing, in lots of 500, for the Comet is \$449 and for the Comet II, \$691.

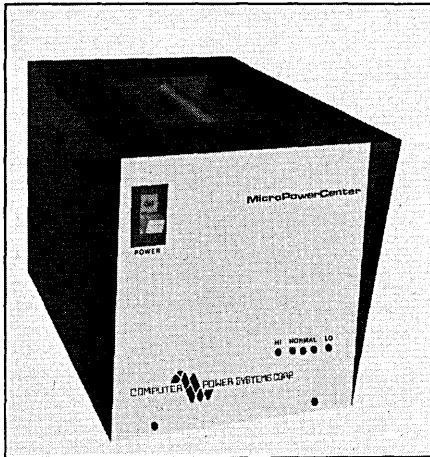
FOR DATA CIRCLE 301 ON READER CARD

COMPUTER POWER SYSTEMS CORP.

Carson, Calif.

POWER REGULATOR Booth 2612

The MicroPower series of computer power interfaces isolate, regulate, and filter power coming from wall outlets and going to terminals or mini and microcomputers. The units protect against power line fluctuations. Computer equipment is protected from brownouts when line voltages fall up to 22% and from



overvoltages of up to 15%. An audible alarm sounds when line voltages pass the normal high or low operating voltage; a green LED indicator shows that line voltage is within limits, and red LEDs indicate out-of-range conditions. An AC filter protects both input and output lines. The MicroPower series come with four output receptacles (1KVA and 3KVA versions), and eight outputs (5KVA, 8KVA, or 10KVA versions). The units operate with 120VAC or 240VAC, single phase, 60Hz power. Quantity one pricing starts at \$795.

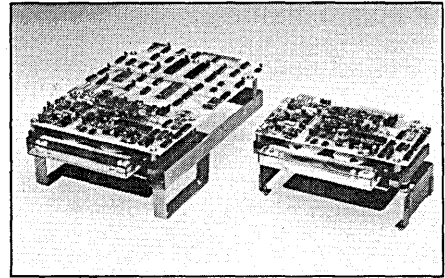
FOR DATA CIRCLE 302 ON READER CARD

DATA ELECTRONICS, INC. San Diego, Calif. CARTRIDGE TAPE DRIVES

Booth 2100

With smaller, fixed-media Winchester disks becoming ever more popular, this vendor is introducing a pair of streaming digital cartridge tape drives for disk backup. The tape

drives have capacities of 10MB and 20MB per cartridge. Both use ¼ inch ANSI/ECMA Data Cartridges, and both are physically compatible with industry standard mounting slots for floppy disk drives. The drives can be supplied with or without streaming electronics. Oems can buy the drives with streaming electronics



for \$746 (10MB) or \$788 (20MB); without streaming electronics the prices are \$415 and \$525, respectively. These prices apply to quantities of 1,000 units.

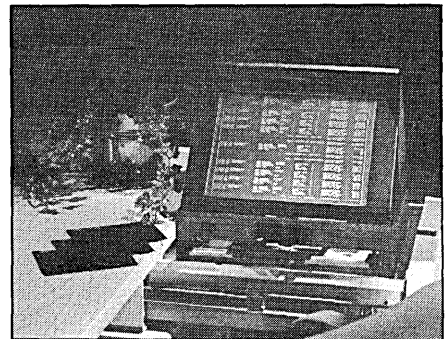
FOR DATA CIRCLE 303 ON READER CARD

DATAGRAPHIX, INC.

San Diego, Calif.

MICROFICHE READER Booth 4201

The DeskMate microfiche reader is a 75% blowback reader that fits into a standard office desk drawer. The user need only pull open the desk drawer, pull up the viewing screen, and the DeskMate is ready to use. In



singles, the DeskMate sells for \$239, with volume discounts offered.

FOR DATA CIRCLE 317 ON READER CARD

DIGITRONICS, Div. of Comtec Information Systems, Inc. Cumberland, R.I.

TERMINAL

Booth 2464

The microprocessor-based Series 400 Alpha-verter remote batch data entry terminals consist of a 55-key alphanumeric keyboard with imbedded calculator keypad, hardcopy printer, mag tape unit, and an acoustic coupler. The Alpha-verter can accept input in either freeformat or under program control with prompts displayed on the printer or an optional display. Data are printed as entered, and at

Don't get lost in the equipment jungle... find your way through with DataWorld.

It's easy for even the most skilled professional to get lost in the jungle we call the EDP marketplace. It seems that new products, new vendors, and new vendor claims are continually entering the already tangled scene.

But you can find your way through with **DataWorld**, AUERBACH's four-volume reference that provides the most comprehensive coverage of the world's most widely-used and actively-marketed EDP products and services.

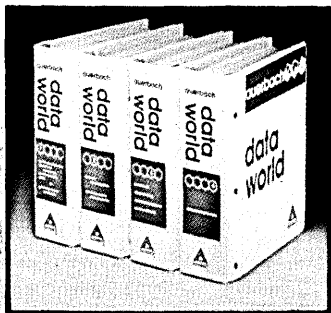
No other competitive information source can match this monthly-updated service in content or scope of coverage.

If you now depend on trade journals, newsletters, or other reference services for your EDP information, chances are you're not getting the facts you really need to effectively analyze vendor offerings.

Equipment specifications, prices, objective evaluations, international coverage, management and technology tutorials...you'll get it all in DataWorld...and at a price much lower than the closest competitive service.

One more thing about this AUERBACH service. With DataWorld, you'll get all the information you need, all in one place...no need to buy additional volumes or to run to other sources for information.

So don't get lost in the treacherous equipment jungle. Find your way through with DataWorld...the complete information service.

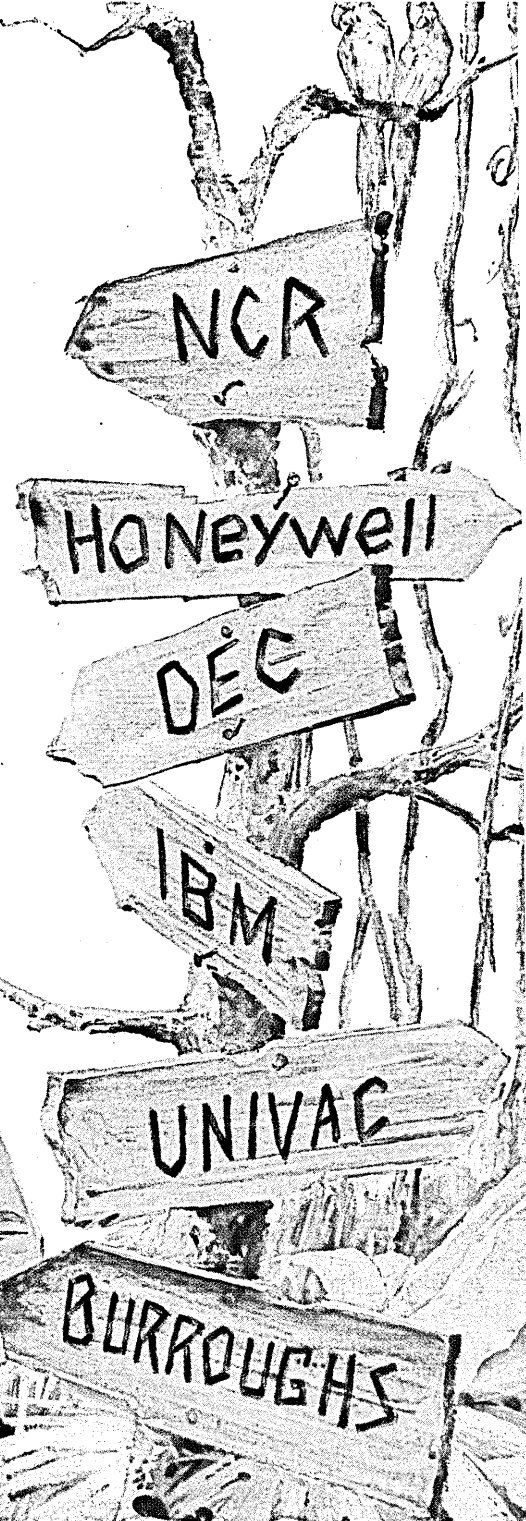


Act now and save 10%

Find out for yourself just how good DataWorld really is. Simply return the coupon now, and we'll rush this service to you under a 30-day no-risk guarantee.

And...by trying DataWorld now, you'll receive a 10% discount off the regular one-year subscription price of \$535 (plus shipping and handling). This discount offer expires June 27, 1980.

**Visit us at NCC '80 May 19-22 Booth 1615.
CIRCLE 93 ON READER CARD**



NO-RISK OFFER

AUERBACH Publishers Inc. 6560 North Park Drive
Pennsauken, N.J. 08109 (609) 662-2070, Ext. 230
Telex: 831 464

- Please enter my order for a one-year subscription to DataWorld. I understand that if after 30 days, I am not completely satisfied, I am entitled to a complete refund. I also understand that by ordering now, I am receiving a 10% discount off the regular subscription price of \$535 per year.
- Enclosed is my check for \$481.50* (plus applicable state sales tax).
- Bill me. My purchase order number is: _____
- Send me more information about DataWorld.

*Discount offer expires June 27, 1980.

Name/Title _____

Address _____

Company _____

City _____ State _____ Zip _____

Telephone No. () _____

Signature _____

Where reliability counts, the word is Racal-Milgo



When you're counting on a data communications network to stay up and running, you need system hardware you can rely on. That's why so many of the world's largest data communications users, like International Harvester, continue to choose Racal-Milgo equipment. In hundreds of smaller systems, too, where uptime is just as vital, Racal-Milgo is the first choice.

We can provide the reliability you demand, whatever your network size, with technically-advanced modems, network management systems, terminals, data security devices—and unmatched service support. We've become the industry leader by taking a total systems approach to each of our customer's needs.

For the full story on reliable data communications, send for a package of our latest product literature. Or contact your nearby Racal-Milgo communications consultant today.

Racal-Milgo Information Systems, Inc.
8600 N.W. 41st Street Miami, Fl. 33166 Telephone (305) 592-8600

Racal-Milgo™
RACAL
The Electronics Group

Photo courtesy of International Harvester.

CIRCLE 94 ON READER CARD

Both the convention center and its overflow garage have been specially air-conditioned by AFIPS.



the same time recorded on the unit's "carrtape." Each tape has a capacity of 87KB. After the data are entered off-line, the user has the option of initiating transmission to his computer via the Alpha-verter's acoustic coupler, or the terminal can be remotely polled from a central site. The unit has an RS232 interface, and communicates asynchronously at 1200bps (other speeds are available). There are four models in the Series 400: the numeric-only model 401, the alphanumeric model 421, and models 411 (numeric) and 431 (alphanumeric) which include 40-character vacuum fluorescent displays. A single model 401 sells for \$3,350 (\$2,325, quantity 50), and the 421 is \$3,475 (\$2,450, quantity 50); corresponding models with fluorescent displays are priced \$375 higher.

FOR DATA CIRCLE 304 ON READER CARD

**EDGE TECHNOLOGY INC.
Portland, Oregon
TELEX COMMUNICATIONS**

Booth 4253

The Telex Buffer allows use of a Teletype Model 43 terminal over the Telex network. Provided as a board that fits into the Model 43's option mounting area, the Telex Buffer contains the Telex interface and 4KB or 8KB of buffer memory. This memory allows the user to compose messages without using paper tape; it also allows more flexible editing than paper tape does. Reliability should be increased, as the Telex Buffer has no moving parts. It's operated by mnemonic commands entered from the keyboard. A 4KB Telex Buffer sells for \$595, and an 8KB version is \$895.

FOR DATA CIRCLE 314 ON READER CARD

**FLOATING POINT SYSTEMS
Beaverton, Ore.
ATTACHED PROCESSOR**

Booth 2452

The 64-bit FPS-164 attached processor, intended for high-speed scientific applications, will be shown for the first time in Anaheim. Used in conjunction with a host processor, the FPS-164 can be viewed essentially as a

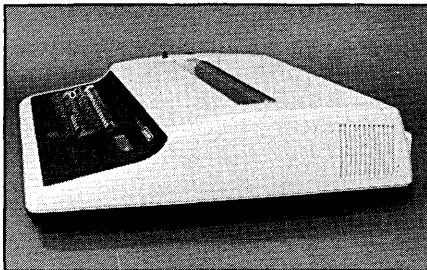
"subroutine box," off-loading the host when applications call for high-precision vector processing, such as FFTs. More detailed information on the FPS-164, which carries a price ranging from \$200,000 to \$600,000 depending on configuration, can be found in last month's hardware section.

FOR DATA CIRCLE 311 ON READER CARD

**GENERAL ELECTRIC CO.
Waynesboro, Va.
TERMINALS**

Booth 4031

The TermiNet 2000 family of impact matrix printers initially consists of a 30cps and a 120cps version, either of which can be had without keyboard. The 30cps model 2030 and the 120cps model 2120 use a 7 by 9 dot-matrix print mechanism, and feature bidirectional printing and underlining capabilities. Friction-feed is standard, with forms tractors optional (and field-installable). Up to three copies can be printed, with horizontal spacing of 10cpi, 13.2cpi, or 16.5cpi, and vertical spacing of 2, 3, 4, 6, 8, or 12 lines per inch.



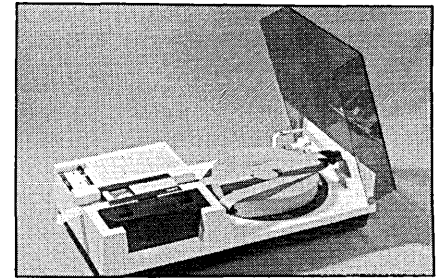
The dual-8085 microprocessor-based terminals can be had with a variety of keyboards, including an ANSI typewriter-paired layout, ANSI/APL, and international keyboards. A numeric keypad is optional. RS232 interfacing is standard. Options include current loop interfaces, 300 bps modems, 4KB data buffer, and a 32KB edit buffer. End user pricing for a single TermiNet 2030 ranges from \$1,400 (receive only) to \$2,300 for a "fully featured unit"; 2130 prices range from \$2,100 (RO) to \$3,000. Discounts are offered to OEMs.

FOR DATA CIRCLE 305 ON READER CARD

**GNT AUTOMATIC INC.
Waltham, Mass.**

SMART TAPE PUNCH Booth 2252

This vendor's 3601 paper tape punch, shown at last year's NCC, has been enhanced with a microprocessor based interface capable of making code conversion without help from the host computer. Two typical applications cited by the vendor are converting to five-level Baudot code for use on Telex networks, and converting to RS244 tape format for use with numerically controlled machine tools. In either case, the user specifies the desired con-



version, and gets a 3601 that accepts ASCII data via its RS232C interface. The 3601 punches at 75cps, and sells for \$2,195.

FOR DATA CIRCLE 306 ON READER CARD

**INTERNATIONAL MATHEMATICAL
& STATISTICAL LIBRARIES, INC.
Houston, Texas
SOFTWARE**

Booth 1657

TWODEPEP—Two Dimensional Elliptic Parabolic and Eigenvalue Problems—is a finite element program for solving time-dependent, steady state, and eigenvalue problems in two-dimensional regions. Applications include solving problems involving potential energy, elasticity, heat conduction, and fluid flow. To simplify the user's effort in solving general partial differential equations, TWODEPEP has automatic mesh refinement and grading capabilities. For solving large problems, the package has an out-of-core storage capability. The program is said to solve many highly nonlinear problems, and handle general regions, including those with curved boundaries or holes. TWODEPEP runs on a number of machines, including IBM mainframes, Univac 1100s, VAX-11/780s, and large Burroughs and Control Data computers. The program leases for \$1,500 per year, with discounts offered for educational institutions and multiyear subscribers.

FOR DATA CIRCLE 313 ON READER CARD

**INTERNATIONAL POWER
MACHINES CORP.
Mesquite, Texas
UPS**

Booth 2501

Specifically designed for common battery operation with the vendor's isolated-redundant 415Hz systems, this 120kW/150KVA can provide power outage protection for from one minute to one hour (or more), depending on battery selection. The UPS can be supplied with all standard 50Hz voltages, reports the vendor. A mimic bus format features a full array of instruments, controls, and indicator lights; remote status stations are among the available options. Batteries and options selected determine pricing, said to range from roughly \$70,000 for a one minute system to \$80,000 for a 30 minute system.

FOR DATA CIRCLE 307 ON READER CARD

Computers, peripherals, applications packages, and software systems will be on display.

KEYTRONIC CORP. Spokane, Wash. OCR READER

Booth 2159

The MR10 is a single font, single line, hand-fed OCR reader offered as both an attachment to existing terminal devices and as a unit that can be integrated (by an oem) into new equipment. Intended to reduce manual data entry in real-time applications (such as banking, point-of-sale, and factory data collection), the MR10 can read any number of characters on a single line. The unit is activated as the user slides a document through a slot in the MR10. The MR10 can read at speeds varying from 3ips to 15ips, and its bidirectional read capability allows single-hand operation by both right- and left-handed users. The unit comes with a standard RS232C interface. It recognizes either MICR (E13B) or OCR-A characters. The reject rate is reported to be less than one in 10,000 characters, and substitution errors are said to be less than one in 20,000 characters. A single MR10 sells for \$1,500.

FOR DATA CIRCLE 312 ON READER CARD

MCCORMACK & DODGE CORP. Needham Heights, Mass. SOFTWARE

Booth 4327

This software vendor will highlight its \$18,000 Purchasing Information Management System and its \$5,000 on-line module for its Accounts Payable Information System. Both packages are for use on IBM mainframes ranging from the aging 360 line through the most recently announced 4300 series.

Among the Purchasing System's capabilities are automatic matching of invoice, receipt, and purchase orders based on user-specified criteria, cash commitment reporting (both long and short term), vendor evaluation reporting, and generating user-specified reports via a report generator. The system also interfaces to general ledger and inventory systems.

A/P Plus On-Line places account information at the fingertips of accounts payable managers and data processing personnel. The system is said to make voucher entry more efficient for data entry personnel by signaling format and accounting errors for individual vouchers or batches of vouchers. Format corrections can be made immediately; error-free vouchers are accepted immediately. Accounting personnel can use the system's two-level search feature to locate and correct errors made during voucher entry. The accounting manager is said to gain improved control over cash flow associated with the remittance procedure. The On-Line module handles a variety of voucher types, including regular invoices, credit memos, debit memos, prepaid checks, contract payments, void checks, and void adjustments. Enhance-

ments planned include inquiry to the A/P open master file, high volume entry and edit, and repeating voucher format.

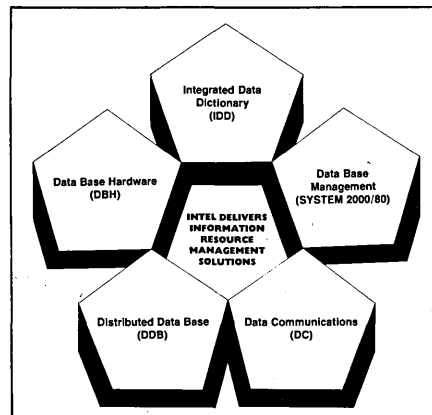
FOR DATA CIRCLE 308 ON READER CARD

MRI SYSTEMS CORP. Austin, Texas INFORMATION RESOURCE MANAGEMENT

Booth 1354

MRI will stress its new name, the Commercial Systems Div. of Intel Corp., in light of its acquisition by the expanding Silicon Valley semiconductor giant. Under the Commercial Systems banner, the firm will present, primarily through video tape productions, its latest generation of data base software and hardware.

To maintain product identity, the vendor calls its latest offerings System 2000/80. The Integrated Data Dictionary (IDD), for use in both batch and interactive modes, simplifies designing, analyzing, defining, and



modifying data structures. The IDD has data modeling and application prototyping capabilities, and it allows the data base to be reconfigured even after it has been placed in production. IDD also provides security, in the form of password protection, all the way down to the item level.

System 2000/80 acquired its 80 suffix after being enhanced to increase performance and reliability, while becoming more efficient for people to use. Capable of running on mainframes from IBM, CDC, and Univac, System 2000/80 can handle both on-line transaction processing and large volume batch applications. Multiple languages provide access to the data base. For end users with ad hoc applications, Quest—a relational query/update language—provides a free-form, natural language path to the data base. It can also help applications developers in prototyping and testing. For use in production environments, PLEX (Programming Language Extension) gives COBOL, FORTRAN, PL/1, and assembly language programmers a high-level access method; PLEX is translated by a pre-

processor into actual calls to the data base management system. Finally, a report writer allows end users and applications programmers alike to use a free-form language to specify complex reports generated against all or selected portions of the data base.

At the base of System 2000/80's capabilities, the Data Base Manager handles IDD, Quest, PLEX, and report writer requests, translating each into physical accesses to the data base.

For data communications, System 2000/80 has a Generalized Communications Interface to CICS, Shadow II, and Intercomm, as well as TSO and TONE. Multiple Systems Coupling (MSC), a feature for channel-to-channel communications between IBM (and IBM-compatible) mainframes, allows distributing a data base among a number of hosts; MSC resides in all processors in the distributed network, but only the host assigned data base management responsibility requires a resident copy of System 2000/80.

For the casual user in a 3270 environment, Query/Update By Example (QUBE) allows access to data using a light pen or the keyboard to move through the data base. QUBE is reportedly similar to IBM's QBE, and requires very little training (two hours or less, the vendor reports, with the first hour spent primarily in learning how to use the terminal).

Hardware—the Data Base Assist Processor (DBAP) option for Intel's FAST 3805 semiconductor disk replacement—reportedly gives IBM users up to a 100% throughput capacity increase while reducing response time by 50% or more. The DBAP keeps System 2000/80 strategic data base index and record location data in semiconductor storage (with less than a 1usec access time). Data base requests are processed through the DBAP-equipped 3805, thus reducing the number of disk accesses required to reach the data.

System 2000/80 software pricing ranges from \$60,000 to \$100,000 (including maintenance), depending on the modules selected.

FOR DATA CIRCLE 315 ON READER CARD

SAS INSTITUTE, INC. Gary, N.C. SOFTWARE

Booth 4446

Graphic presentations make statistical reports easier to understand, and this statistical software vendor will be showing its latest graphics capabilities, SAS/Graph, at NCC. SAS/Graph implements the same procedures that supply printer graphics for SAS, but with a twist: the new software is interactive, exploiting the advanced capabilities of intelligent graphics devices from a variety of hardware manufacturers, including Tektronix, Hewlett-Packard, and CalComp. Running

Introducing The PTS-2000.

Your low-cost, expandable window
to today's and tomorrow's
3270-type networks.

The PTS-2000 States is Raytheon's brand new information display system for the 8000s.

In its normal configuration—available right now at prices up to 45 percent below comparison—the PTS-2000 system includes the small-discrete 3276-type information display system. It is designed to support both binary synchronous and 3270/3271-type operating protocols, 9600 bps data rates, screen modes up to 32x80 characters. And all of the advanced features you expect from a business network terminal system: cursor control, zoom, line, and color compatibility within a 3276-type network.

But don't let these similarities end. Because the PTS-2000 is designed to go far beyond alternative products of its class: to give you more intelligence, expandability, compatibility, and dependability than any other 3270-type terminal system. Soon it will be expanded to emulate 3274-type large-discrete systems, to support local disk drives for queued input, and to link Raytheon's WII word processors. Later, the family will grow even further—to become powerful SNA-compatible distributed processing, combined word and data processing, and network processing systems.

The PTS-2000 in 3276 mode operation is the stem of an information display terminal family that will grow with your computer needs far into the future. And with total compatibility and dependability.

Get your first PTS-2000 system today. Call our PTS-2000 hotline at (610) 225-9275, or write to PTS-2000, Box 84, at our headquarters for more information.

Another Raytheon
Intelligent Associate
product.

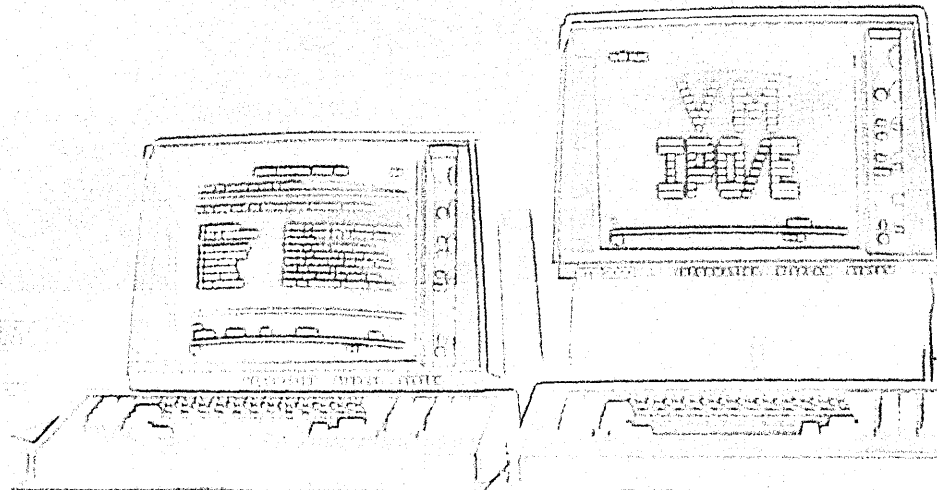


RAYTHEON DATA SYSTEMS

Raytheon Research Corp., Office of Sales for Systems
and Information Systems, 100 Main Street, Waltham,
Massachusetts 01981

© 1981 Raytheon Company. All rights reserved. In the U.S.A.
RAYTHEON, MASS, WALTHAM, MA 01981

SHRIMPING, BUCKLE UP, AND BOARD



How to Improve Your Image



The Problem: Glare. And poor image-to-background contrast. They wash out displayed information, cutting operator efficiency and lowering productivity.

The Solution: OCLI Contrast Enhancement. It reduces glare by 17 to 1 over untreated glass. It's working now for some of the biggest names in display technology, including IBM, Four-Phase and Tektronix. Write us. We'll explain how it can work for you.

I'd like to improve my image.

Tell me more about OCLI Contrast Enhancement for CRTs.

Name: _____

Title: _____

Company: _____

Address: _____

City: _____ State: _____ Zip: _____

OCLI

DEPT. 109-1, 2789 Giffen Ave.,
P.O. Box 1599, Santa Rosa, CA 95402
TWX (510) 744-2083 Telephone (707) 545-6440

D-80

VISIT OUR BOOTH AT THE NATIONAL COMPUTER CONFERENCE IN ANAHEIM.

CIRCLE 96 ON READER CARD

under VM/CMS and TSO on IBM mainframes, SAS/Graph produces color graphics, typically requiring only two or three statements to produce a display. The vendor sees the software saving time in three ways: computer time, drawing time, and user time. Current SAS installations can get SAS/Graph for \$2,500 the first year, and \$1,000 for each subsequent year. The complete SAS package, including SAS/Graph, goes for \$7,000 the first year and \$2,500 a year thereafter.

FOR DATA CIRCLE 309 ON READER CARD

SOFTWARE AG OF NORTH AMERICA, INC.

Reston, Va.

DATA BASE LANGUAGE

Booth 1816

Natural is an interactive data base language for use with ADABAS files on IBM (and IBM-compatible) mainframes. Natural reduces program development time by handling the "mechanics" of file definitions, OPENS and compilations. The language can be integrated with either the Data Dictionary or user-supplied ADABAS files; Natural programs can be saved in the Data Dictionary for later use, or editing of either source or object code. Relational data base facilities allow users to process logical relationships between data in different files or from the same file viewed in different ways. Natural's mapping facilities are independent of the installations teleprocessing monitor. Additional features include report generation capabilities, logical coupling, and intermediate processing, including sorting, data base maintenance, and explicit looping. Natural carries a purchase price of \$24,000; leases are also offered.

FOR DATA CIRCLE 310 ON READER CARD

SOLA ELECTRIC

Elk Grove Village, Ill.

SMALL UPS

Booth 4422

Intended for use with low power electronic equipment—minicomputers, POS cash registers, etc—the Mini-UPS protects equipment from line noise, transients, and brownouts when the AC line is live, and if and when the line fails, internal batteries power the Mini-UPS's inverter and continue to provide power to the attached electronics. The unit takes 95 volt to 125 volt AC, 60 cycle (plus or minus 10%) power input, and provides 115 volt (plus or minus 3%), 60 cycle output. The unit is available in 400VA and 750VA versions, with 25 minutes and 12 minutes of backup time respectively. The 750VA unit sells for \$1,100, and the 400VA unit is \$900.

FOR DATA CIRCLE 318 ON READER CARD

Perform a death-defying act.

Reduce if overweight.

Give Heart Fund
American Heart Association

INTRODUCING HP-85.

A NEW WORLD OF PERSONAL-PROFESSIONAL COMPUTATION.

Imagine the new world that would unfold before you if you had a powerful, portable, completely integrated computer system at your personal disposal. And at an affordable price. That's exactly what Hewlett-Packard has just created.

THE HP-85: A PERSONAL COMPUTER FOR PROFESSIONALS.

At the lab, on your desk or in your study this 20-pound, self-contained system provides professional computing power when and where you need it. That means no more waiting for data to be remotely processed and returned.

A COMPLETE COMPUTER SYSTEM IN ONE SMALL PACKAGE.

You get all this in the HP-85:

Interactive graphics under keyboard control.

16K RAM Memory standard.

Standard typewriter keyboard with separate numeric key pad and eight user-definable special function keys.

High resolution CRT display with powerful editing capability.

Built-in thermal printer produces a hard copy of the display on command.

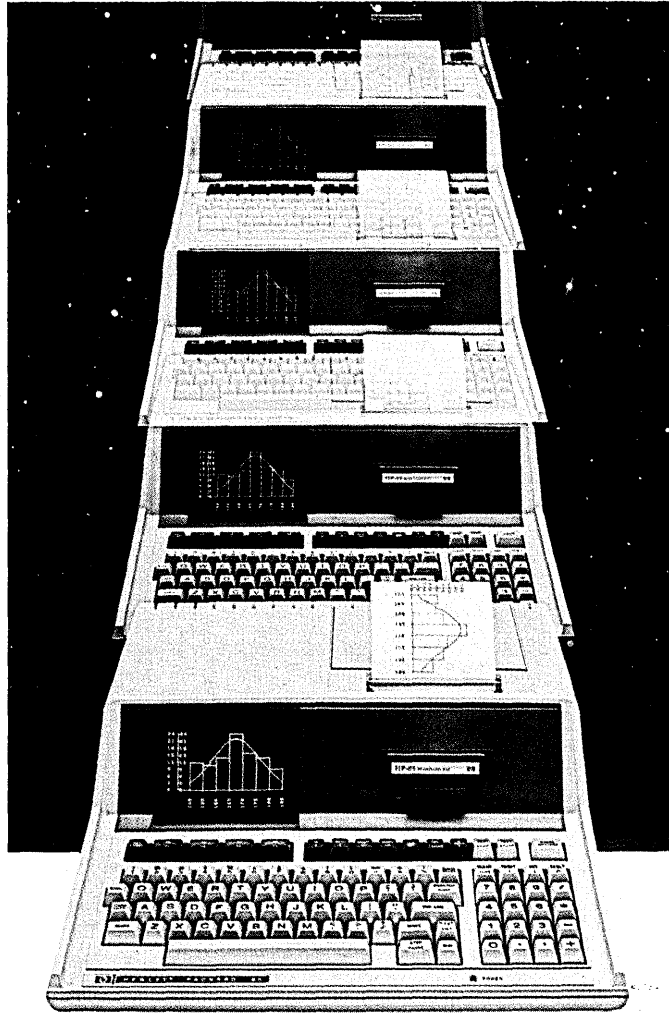
Built-in tape cartridge drive. Each cartridge provides 217K bytes of storage capacity.

Operating system and BASIC language, permanently stored in ROM.

A SOPHISTICATED COMPUTER AT YOUR FINGERTIPS.

Hewlett-Packard has combined these sophisticated capabilities with advanced design to give you a system that is easy to use yet uncompromised in its power.

A key to this achievement is Hewlett-Packard's choice of BASIC for the HP-85's language. The



You can enhance the system's capability by adding powerful HP peripherals like a high-speed, full-width line printer, full-size plotter, or flexible disc drives.

And HP Application Pacs offer preprogrammed solutions in a wide variety of disciplines on prerecorded magnetic tape cartridges.

So, when you buy the HP-85, you're not just buying a computer system, you're buying the confidence that the Hewlett-Packard name brings and the knowledge that the HP-85 can expand with your changing needs.

For the address of your nearest HP dealer, CALL TOLL-FREE 800-547-3400 except from Hawaii or Alaska. In Oregon, call 758-1010. For details on the HP-85, send the attached coupon, or write: Hewlett-Packard, 1000 N.E. Circle Blvd., Corvallis, OR 97330, Dept. 275B.

HP-85 has more than 150 commands and statements to let you solve your problems swiftly and easily.

In addition, sixteen graphic commands have been added to the HP-85's extended BASIC to give you easy control of its amazingly versatile graphic capabilities.

DESIGNED FOR TODAY AND TOMORROW.

Whether you're in science, engineering, industry or business, the HP-85 you need today can easily be expanded or customized to meet your needs tomorrow.

You can double RAM capacity to 32K or expand ROM firmware to 80K with optional modules that plug right into the HP-85.

 **HEWLETT
PACKARD**

619/26

HEWLETT-PACKARD
Dept. 275B
1000 N.E. Circle Blvd.
Corvallis, OR 97330
Please send details on HP-85.

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

CIRCLE 87 ON READER CARD

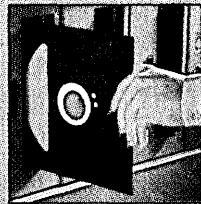
NOW CLEANING YOUR COULD SAVE YOU A AND A L

The recording heads on your diskette drives may be filthy—and that can cause you a lot of grief. There's the serviceman you have to call when the machine doesn't perform. (You know how much service calls cost these days!) There's machine down-time. Idle data entry clerks. All the other delays a cranky machine can cause.

And that service call might not even be necessary.

3M SOLVES THE PROBLEM IN SECONDS— AND LEAVES YOUR HEADS "COMPUTER ROOM CLEAN".

The new Scotch® 7400 head-cleaning diskette kit lets you clean the read-write heads on your 8" or 5¼" diskette drives. In just 30 seconds, without any disassembly, mess or bother, the heads can be completely



cleansed of dirt, dust, magnetic oxides — all the things that can get into your machines every day. And foul them up.

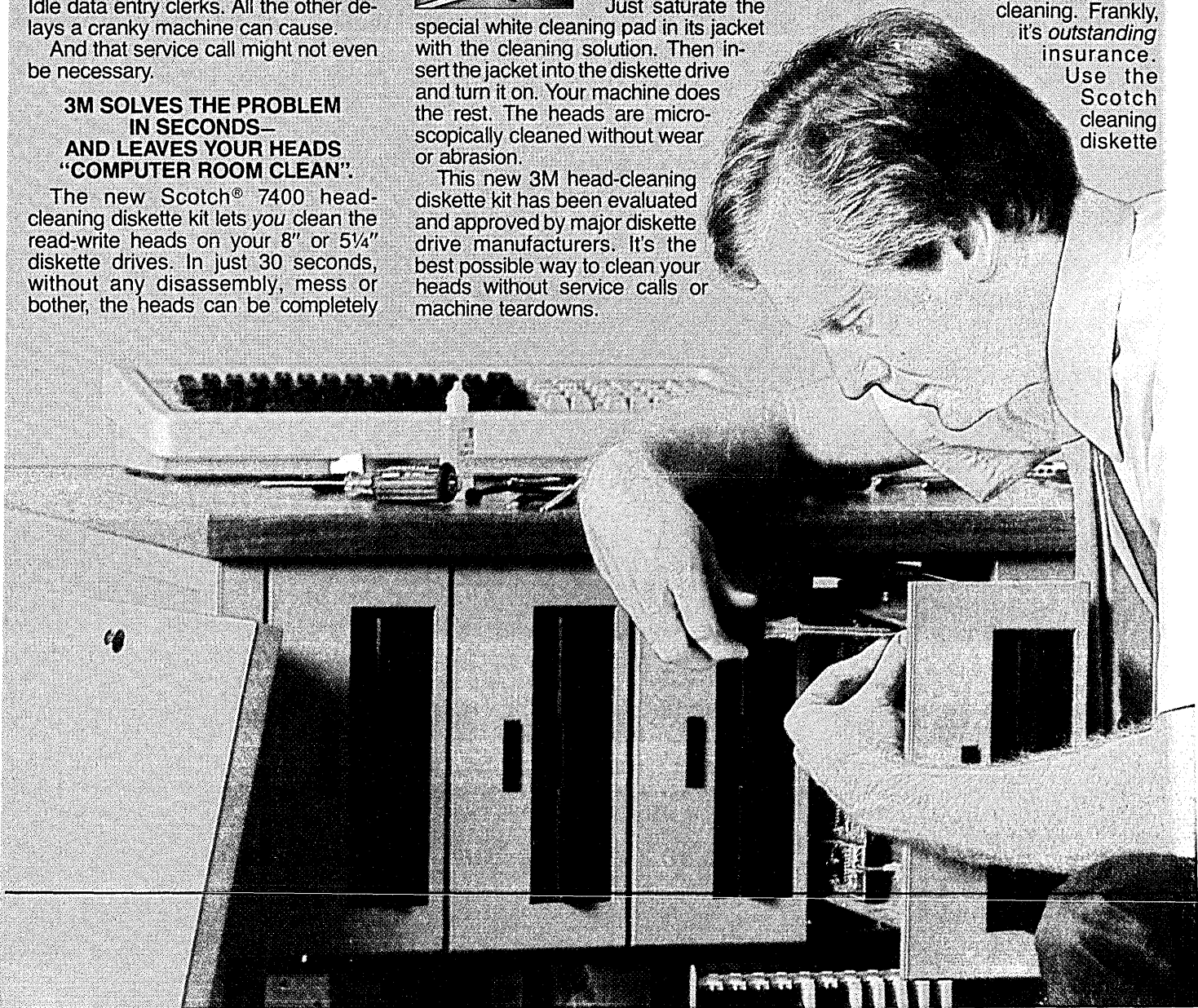
Just saturate the special white cleaning pad in its jacket with the cleaning solution. Then insert the jacket into the diskette drive and turn it on. Your machine does the rest. The heads are microscopically cleaned without wear or abrasion.

This new 3M head-cleaning diskette kit has been evaluated and approved by major diskette drive manufacturers. It's the best possible way to clean your heads without service calls or machine teardowns.

AT ONLY \$1 PER CLEANING IT'S THE BEST INSURANCE YOU CAN GET.

This fast-cleaning new Scotch kit comes with everything you need (including special fluid, applicator tip, cleaning diskettes) to handle up to 30 cleanings. That's only about a dollar a cleaning. Frankly, it's *outstanding* insurance.

Use the Scotch cleaning diskette



WIN DISKETTE HEADS 40 SERVICE CALL. T MORE.



A Scotch cleaning diskette shown before and after 15 cleanings of recording heads.

frequently, to make sure your diskette heads are kept clean. And to help them perform at the level specified by the manufacturer.

You could save yourself a lot more than just a service call. So we want you to try this remarkable new kit now. Order before June 30 and get \$6.00 off... a full 20% discount. Order from your local Scotch Brand Information Processing Products distributor, or send it right to us. Coupon must accompany order. One kit per coupon.



\$6.00 OFF!

We'll take \$6 off the list price when you order the 7400 Kit with this coupon and your check or money order. So send for this special offer today. (Send to: 3M, Dept. P, P.O. Box 33984, St. Paul, MN 55133.)

D5

My Name _____ (PLEASE PRINT)

My Company _____

Address _____

City _____

State _____ Zip _____

Please send my new kit for \$24. I enclose
 Check Money Order. Add state sales tax where applicable. Make check payable to 3M.

Diskette size: 5 1/4" 8" (Not yet available for Burroughs Mini-Disk II or Vydec drives.)

(Offer good in U.S. and Canada only. Void where prohibited by law. Expires June 30, 1980.) Offer valid only if coupon is completed.

CIRCLE 98 ON READER CARD

3M

“If you’re thinking about minicomputers, consider this...

Control Data’s complete makes the Series/1

“Our new Certainty Series is a complete line of competitively-priced products that’s ready to help you get optimum performance from the Series/1.

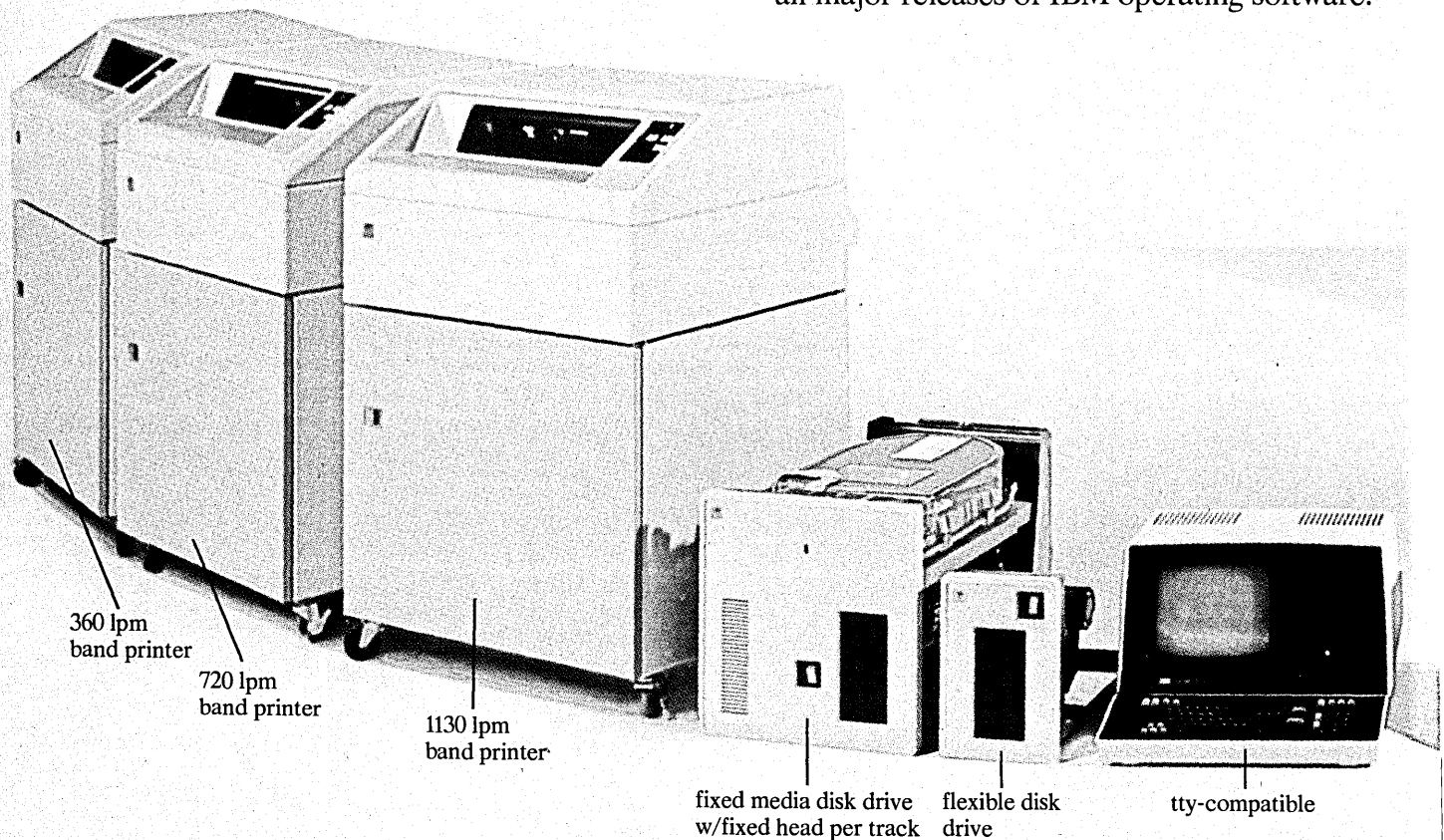
“Now you can add up to 240 Mbytes of removable storage with our Storage Module Drives. Their popular format attaches to the Series/1.

“Our Certainty line printer that gives you clean, crisp printing at 720 lpm and more. It can also cut your paper usage by 30% when you use its compressed pitch option.

“Our display stations eliminate the need for expensive video cabling. Certainty display stations use low-cost digital cabling. So you can put your terminals where your people are—up to 4,000 feet from the cpu.

“Controllers? No outboard controllers, because we incorporated all controllers and interface logic into our hardware. And we engineered Certainty Series around the Series/1 architecture, retaining the important cycle steal feature. All of these products are ready right now to be plugged into the Series/1.

“Control Data knows how important support is. With our miniperipherals, Control Data also provides the required software support of all major releases of IBM operating software.



line of miniperipherals even more attractive.”

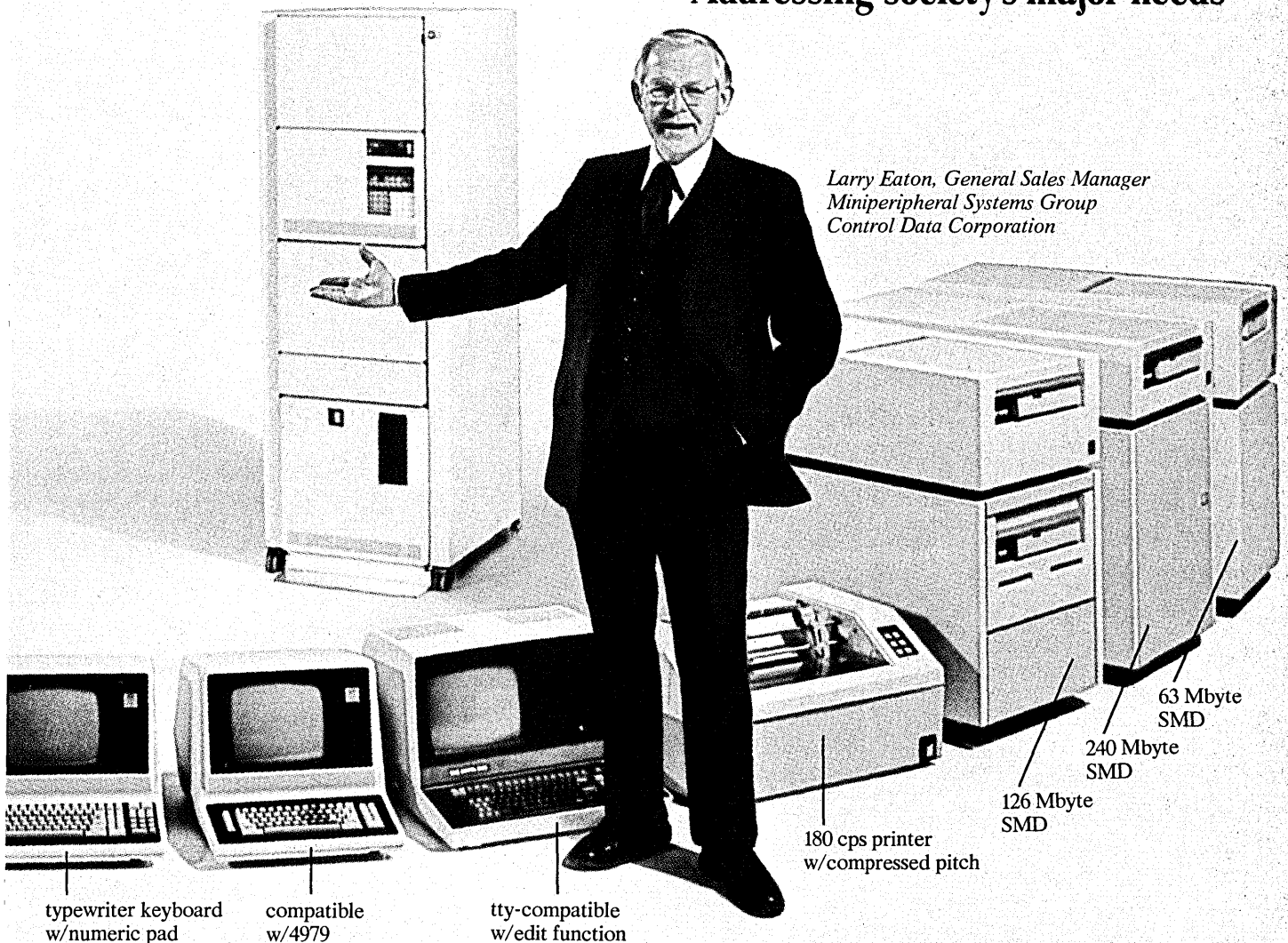
“More than 4,800 Customer Engineers in our worldwide maintenance organization support our products. Our Education Company can train your people. Our Professional Services Division can help you program your applications. Through Commercial Credit, an important part of Control Data, we can provide financing for your purchase.

“Let us show you how our Certainty Series makes the Series/1 even more attractive. For data sheets and more information, call today toll free. 800/328-9565.”

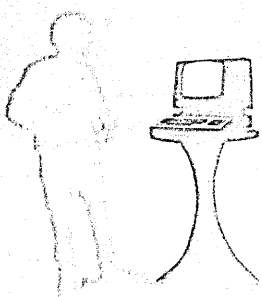
GD CONTROL DATA CORPORATION

Addressing society's major needs

*Larry Eaton, General Sales Manager
Miniperipheral Systems Group
Control Data Corporation*



CIRCLE 99 ON READER CARD



The goal of this new computing language is to be a personalized information portfolio and application specific desk calculator.

PRESENTING ROSETTA SMALLTALK

by Scott K. Warren
and Dennis Abbe

Nearly 10 years ago I was among a group of about 20 university students gathered to hear Alan Kay of the Xerox Corp.'s Palo Alto Research Center's Learning Research Group.

Those were the days when "small computer" meant "mini," time-sharing implied BASIC and a Teletype Model 33, and logic design courses used the 7400/5400 TTL data books as standard references.

Seers were predicting computers the size of cigar boxes; stories of a new language for teaching, LOGO, were coming out of the Boston/Cambridge intellectual incubator.

Kay told our assembly of his visions for Dynabook, a notebook-sized personal computing device able to handle the information needs of an individual user. Dynabook would be able to store thousands of pages of text, display images with resolution surpassing newsprint, and perform real-time audio synthesis with similarly high fidelity. The imagined computer would talk Smalltalk, which seemed to bear a striking resemblance to LOGO. The language was intended to be adaptable to each user's individual needs.

I left convinced that Kay was a madman. It just wasn't possible to build so much computer into so small a package. Hewlett-Packard had yet to introduce its Model 35 handheld calculator, and Silicon Valley wasn't making microprocessors yet.

Not too many years later, microprocessors and microcomputers were household words, and many of the technological stumbling blocks to Dynabook were gone. Prototypes the size of minis were designed and built at PARC. And a few years later, one of the Dynabook people mentioned that Smalltalk's object-oriented structure actually made LOGO a subset of Smalltalk.

The authors of this article are working to bring object-oriented programming to easily accessible hardware. Rosetta Smalltalk now runs on two different Z-80-based micros; from this test bed, work proceeds to develop a version that will run under CP/M.

—Bill Musgrave

The Rosetta Smalltalk Project grew out of the determination of one of us (Scott Warren) to create a personal computing language after having studied language principles, compiler construction, and the automatic implementation of languages at Rice Univ. Although Warren was entranced with the new microcomputer, it seemed to him that over the long haul there would have to be a radical departure from the BASIC-dominated style of computing then in use on these machines. BASIC was not going to enable people to do the things they wanted to do. Rosetta was thus founded on the conviction that a new personal computing language was needed, one that acted not as a closed universe but rather as an open-ended continuum. This concept of a programming language as the center from which a universe expands reminded Warren of the Rosetta stone, so the name was adopted for our business.

All we could find out about Smalltalk from PARC was that the instruction manual for Smalltalk 72 was out of print. Then, Kay's articles appeared in *IEEE Computer*¹ and in *Scientific American*'s special issue on microcomputing, and in early 1978, we acquired the Proceedings of the ACM Fifth Annual Principles of Programming Languages Conference, where Don Ingalls of PARC had given a paper on Smalltalk 76. The threads we picked up from these documents hinted at the foundation of Smalltalk. The historical currents are clear to someone who has studied programming languages. Smalltalk combines LISP and Simula with the concept of crt windows for interaction. After seeing windows, talking to a Teletype feels like working with blinders.

While the work of the PARC Learning Research Group provided our inspiration, the Rosetta Smalltalk language is our own.

AN IDEAL PERSONAL COMPUTER

The ideal personal computer could store, retrieve, and edit almost any information its owner was interested in: notes, drafts of papers, phone lists.

1. Goldberg, A. and Kay, A. Personal Dynamic Media. *IEEE Computer*, March 1977, pp.31-41.

The same notation for sending messages to objects can add two numbers, turn on a peripheral, rename a file, or invoke an application package.

structured files of data, pictures, simulations, music, and so on. Suppose it could be used as an interactive desk calculator for any problem domain, permitting its owner to deal directly with items in which he is interested, such as notes, timbres, and pitches in music; equations and substitutions in mathematics; or paints, cels, and frames in animation. How could the user, not a computer specialist, cope with the immense variety of data formats, language rules, and processing conventions found among so many diverse application packages? How could he sufficiently understand the intricacies of all of this prewritten software to be able to customize it to his own needs, or to combine separate facilities to accomplish a particular task? And how could he add new facilities of his own, without a large programming effort?

The answer seems to be an open-ended conversational medium in which many special-purpose tools can be embedded, then accessed via a single uniform notation. The goal of Rosetta Smalltalk is to be a personalized information portfolio and application specific desk calculator. The system provides the user with an APL-like workspace which contains all data and programs and which is retained from session to session. Program text is a kind of data and can be manipulated as naturally as numbers and strings.

Such an environment has been called *residential*,² since everything of interest to the user resides within the system rather than being stored and edited by an external facility. The user is given interactive access to his workspace contents, with rich visual feedback. The underlying language of the system treats all entities in the same way, and can be customized with new syntax and new kinds of objects for a particular interest. The system encourages a tool-building paradigm of problem-solving. Tools are built by extending the base language rather than by writing monolithic programs, and are easily combined within the existing language framework.

One of the major goals of Rosetta Smalltalk is to provide a medium for spontaneous problem solving. While the injunction "Think first, program later" is good advice when engineering a software product, it amounts to a straitjacket for the conversational user. It is not uncommon to make false starts or interrupt one activity in order to do something else. In Rosetta Smalltalk, multiple independent crt windows make these shifts of attention easy.

In many ways windows behave like pieces of paper on a desk. We can move them around on the screen; if two windows over-

FIG. 1

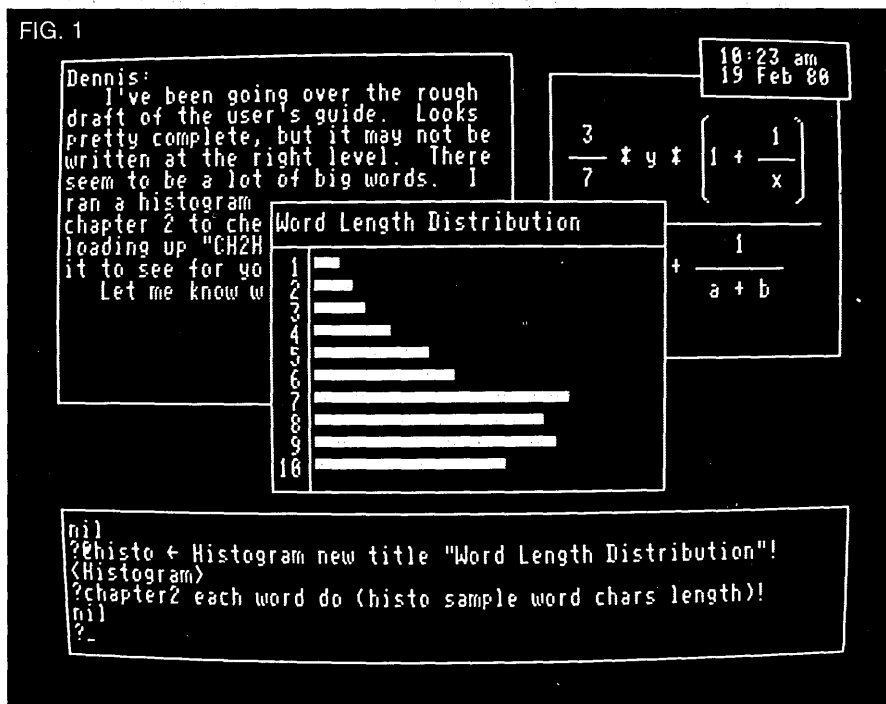
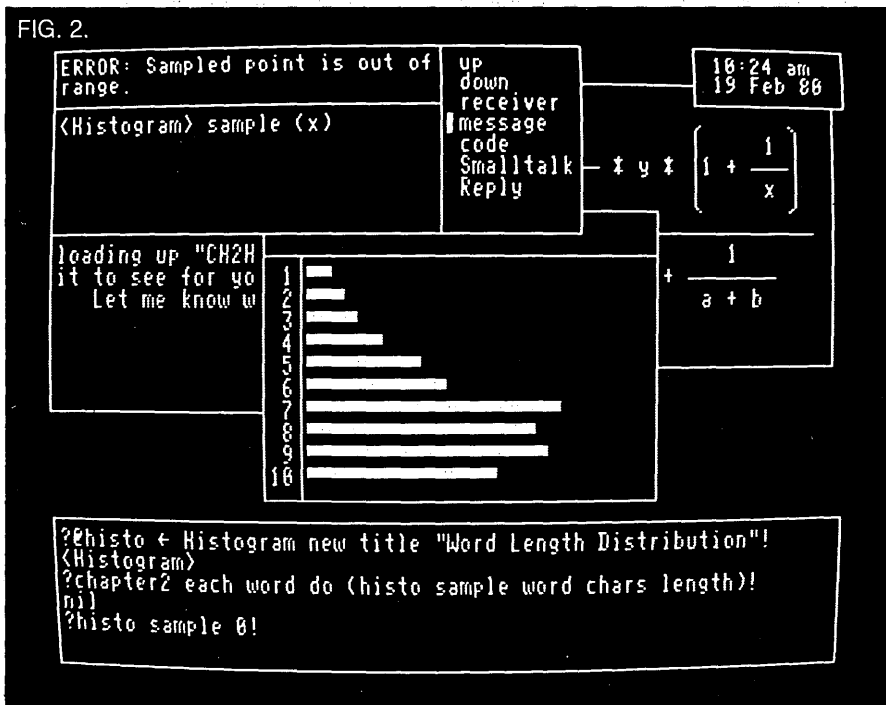


FIG. 2



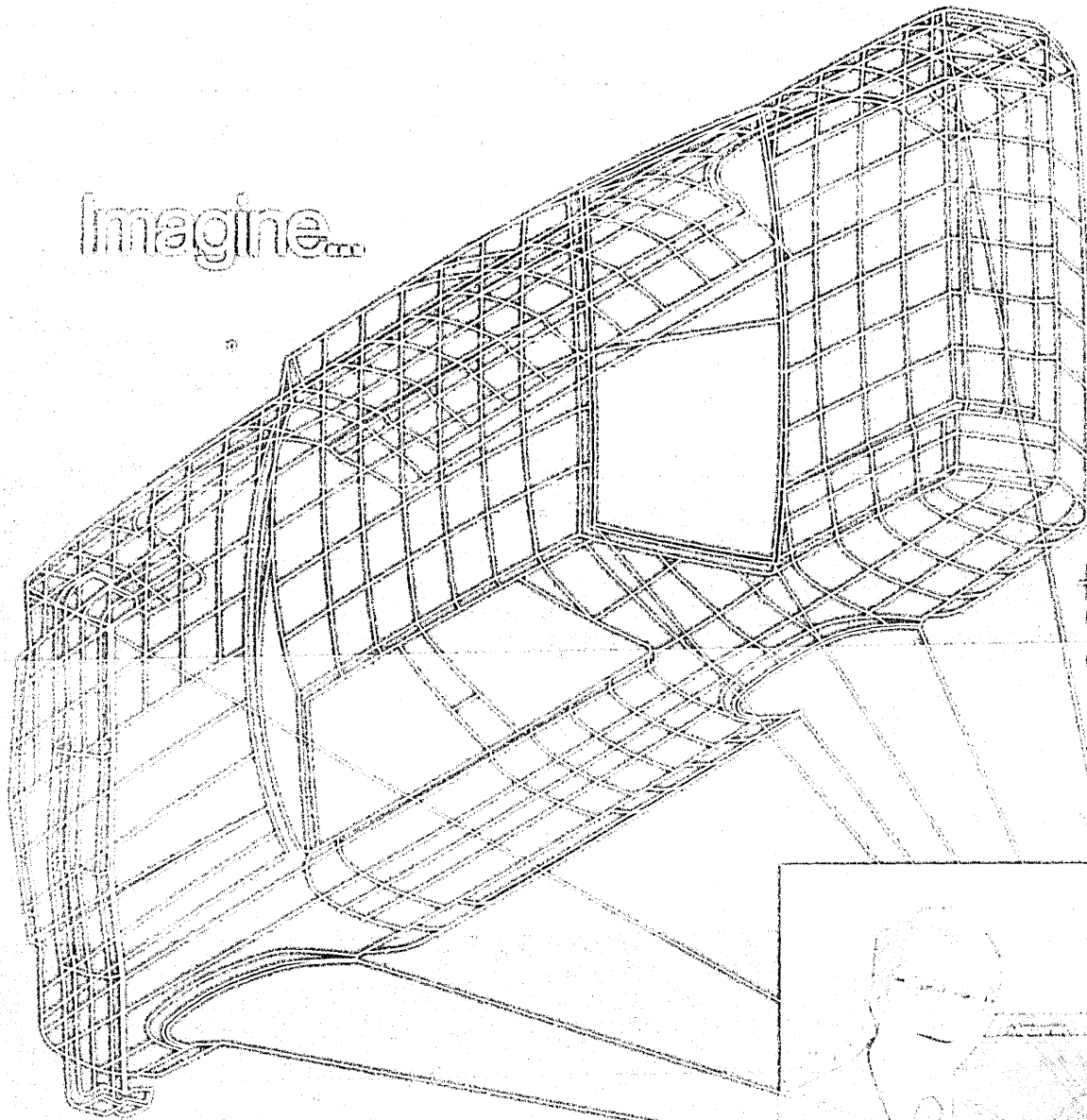
lap, one will be partially hidden behind the other, but its contents are unaffected. When we move the window in front, the window behind it is instantly redisplayed. Using windows we can keep more information visible at once than if the whole screen were dedicated to imitating a single hardcopy device. This visual richness augments our short-term memory, helping us do several things at once without losing our place.

IN AND OUT THE WINDOW

Figs. 1 to 3 show an (admittedly contrived) example in which we type a command in one window and view its output, a histogram, in another. Our next command causes a third window to display an error message, and we use a fourth to edit the code in error. If the screen is too small to display all of this at once, we can rearrange the windows as necessary, moving

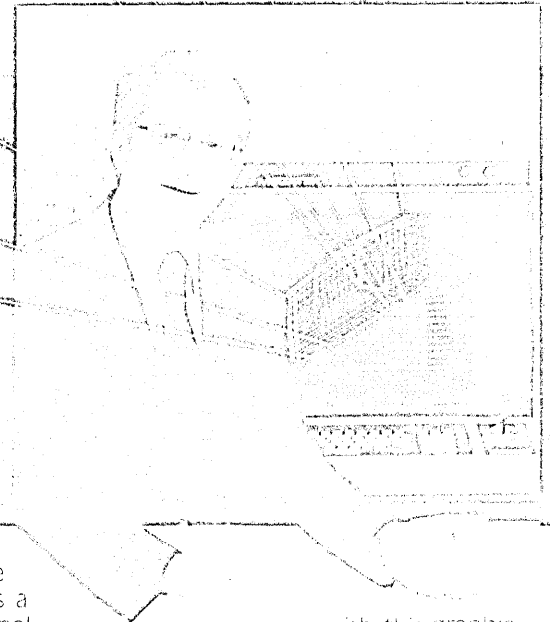
2. Sandewall, E. Programming in an Interactive Environment: The "LISP" Experience. Computing Surveys, March 1978, pp. 1,053-1,058.

Imagine...



VIEW ROT
ROT X-Y
ROT Z/SWAP
SHADE X-Y
SHADE Z-Y
SLID UP/DOWN
SLID LEFT/RIGHT

from mind to matter. With Megatek.



Imagine a computer-aided graphics system that interfaces directly to the mind's eye, that takes a designer's visual perception of his design and does everything but weld it together.

Manufacturing and Consulting Services, Inc. has done it with their AD-2000 software package... CAD/CAM software that does it all—from design to fully annotated drawings to parts, numerical control tapes, tool paths, die casts and assemblies and much more. The AD-2000 project management interface that enables

the designer to communicate directly with the computer is a Megatek vector refresh terminal. Dr. Patrick Hanratty, MCS president tells why.

"Megatek's refresh display is an extremely powerful tool for visualizing, manipulating, experimenting and altering design parameters.

"Megatek systems interface easily to a broad range of computers and enhance the engineer's feeling of direct interaction with his design.

Dr. Hanratty summarized his enthusiasm for Megatek

with this graphic display of confidence:

"Customers for our software package can select any graphics terminal they want. A large percentage choose Megatek. Price/performance is the reason why. If I were going to put down dollars for a production refresh terminal, I'd put my money on Megatek. I've provided a list of Megatek's terminals and software to the Computer Graphics Institute, 2000 Commonwealth Blvd., Cambridge, MA 02142. Call for a copy at (617) 455-5500."

MEGATEK

COMPUTER GRAPHIC SYSTEMS
CIRCLE 100 ON READER CARD



See us at IEC
Booth 1114

Smalltalk encourages the construction of open-ended tools rather than fixed solutions to a problem.

an interesting window where it can be seen or pushing others out of the way.

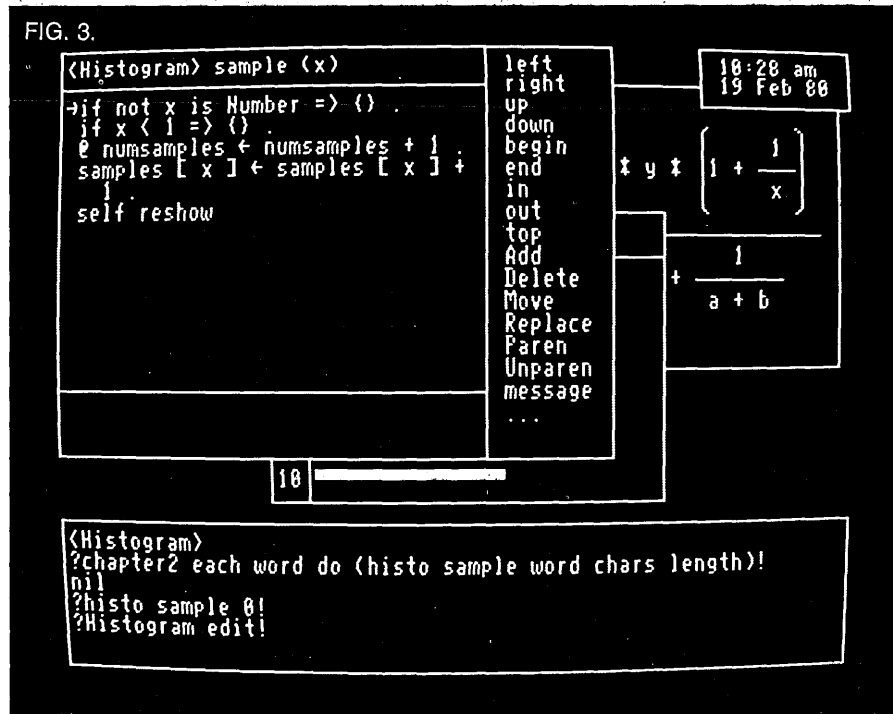
The standard way of communicating with items in the workspace is by typing in commands for immediate execution. Rosetta Smalltalk makes no distinction between program text and commands from the keyboard, and vice versa. Input may be as simple as $2+2$ or may contain multiple statements including control structures, so there is no need to write a program to try something out. Most work is done incrementally by typing in commands and immediately observing their effect, rather than by first writing and then running a long program. Solving problems in this way is faster and more natural than in the conventional "edit-run-debug" programming cycle, because each command we type performs some part of our actual task and gives us immediate feedback. The fully conversational aspect of Smalltalk simplifies testing new code and allows Smalltalk to be used as its own debugging language.

The Smalltalk language is based on the single notion of objects communicating by sending and responding to messages. Every entity in Smalltalk is represented as an object, from numbers and strings to control structures and arbitrary facilities defined by the user. The only operation in Smalltalk is to send an object a message requesting it to perform some action and possibly send back a reply.

Objects are grouped into classes which describe their representation, the messages they can receive, and the methods they use to respond. Thus the same notation for sending messages to objects can add two numbers, turn on a peripheral, rename a file, or invoke an application package. Rosetta Smalltalk thus serves as a command language, a programming language, a debugging language, and host to any number of special purpose applications. This uniformity greatly simplifies the user's view of the system, and reduces the system's size by eliminating the need for several distinct language processors. The user also has an unusual amount of power available at the command and application control levels, since Smalltalk variables and control structures may be used there as well as in programs.

The Rosetta Smalltalk user can easily customize his system by defining new classes of objects or adding new messages to existing classes. The necessary programming is done conversationally, testing each definition as it is entered. The user then solves his problems at the keyboard by directly executing Smalltalk commands. His extensions customize the language so that variables can hold things like musical scores, payroll records, or circuit diagrams, and his commands do real work like playing music, calculating payroll deductions, or simulating waveforms.

FIG. 3.



Extensibility permits new facilities to be used as if they were built in. The user interacts with new objects through the same notation for sending messages with which he is already familiar. When the user adds an extension to his workspace, such as a set of objects for composing and playing music, he gets more than he would from a monolithic program performing the same functions. He has not just a music program but a music language. As an extension of Smalltalk, this language contains powerful features for programming as well as for performing music.

Rosetta Smalltalk encourages the construction of open-ended tools rather than fixed solutions to a problem. The notion of objects sending messages provides a uniform way of accessing extensions to the system, and the class mechanism permits extensions to be self-contained and thus suitable for loading into any workspace. As a result, separately written tools may be combined with relative ease. For example, the music extension mentioned above could be combined with an extension for statistical analysis to permit the interactive search for patterns in a set of scores. A third extension for drawing histograms could be added so that such patterns could be viewed graphically.

There is no need to venture outside of Smalltalk into the realm of operating systems to make the connection between applications. Smalltalk thus supports the same "software tools" approach to software development practiced on the Bell Labs UNIX system, but without the distinction between command language and programming language.

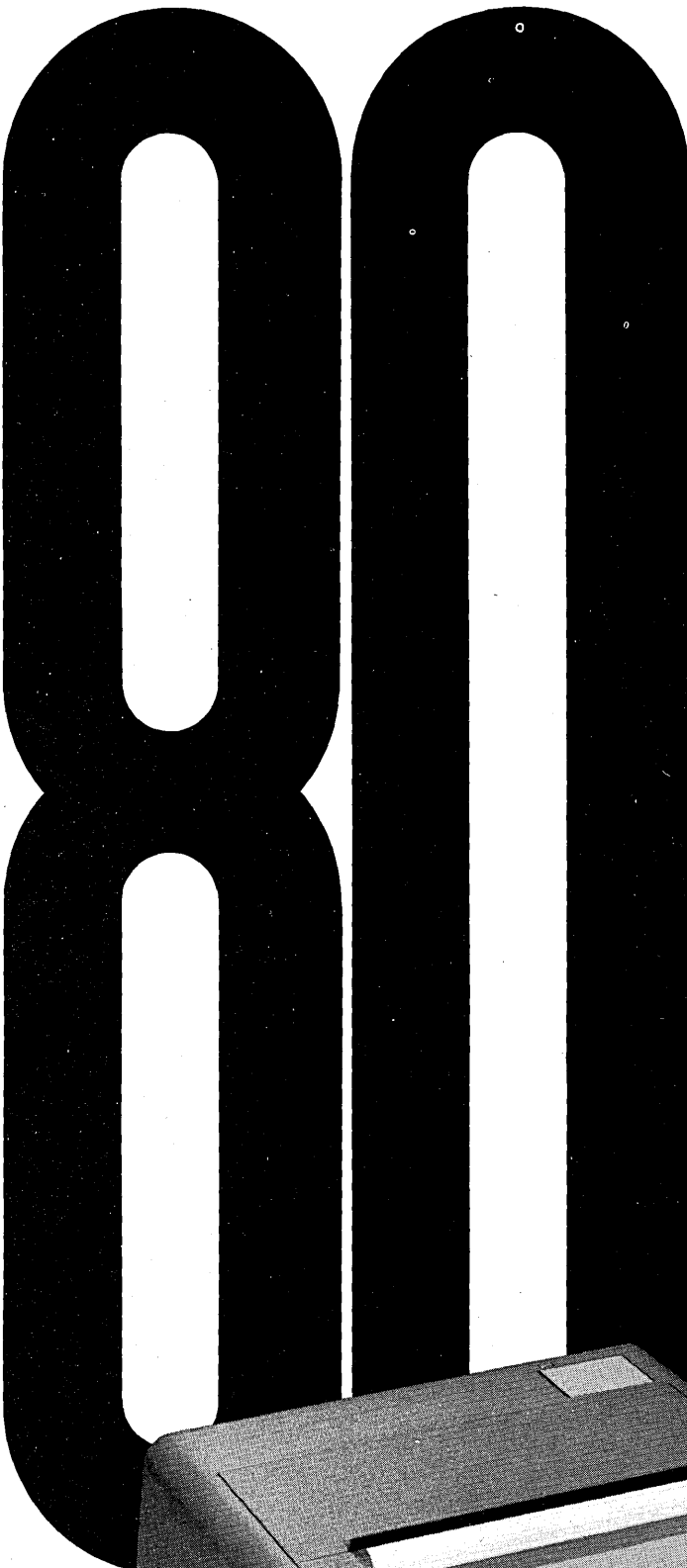
INTERACT THROUGH WINDOWS

As we have said, many windows may be displayed at once. Each window may represent a different activity or view into the workspace. We turn our attention from one activity to another by pointing at the window interest with the cursor; the window we select can then receive our keyboard input. For example, while editing a document in one window we might use a second window to consult a reference.

Different styles of interaction may also be associated with different windows. One window might be used for dialog with Smalltalk, another might represent a menu of key-selectable commands, and a third might simply display some text. Three styles of window interaction are part of the basic Rosetta Smalltalk system: dialog windows, diagnostic windows, and editing windows. Later it will be shown how other kinds of windows may be defined.

A dialog window is used for typing Smalltalk code for immediate evaluation. The user's keystrokes and the result of each evaluation are printed in the window. A dialog window is thus the standard way of interacting with objects in the workspace, providing the "desk calculator" mode of operation common to most conversational systems. The bottom window in Fig. 1 is a dialog window.

Each time a dialog window is ready for input it invokes the system scanner named *read*. *Read* prompts with a "?" followed by a cursor. Input is gathered up until a special key called DOT is pressed; this key is chosen as



That's how much one Fortune 500 company slashed the man-hours required for their field transactions. 80%.

The reason? Productivity through Portable Processing. With the Miniterm® 1206, a lightweight, briefcase-size portable computer, people take data processing power directly to the work being performed. Wherever it is.

That way, essential decision-making information that can determine success or failure in the field is available on the spot, at the point of transaction. Important sales orders can be processed immediately with greater accuracy, and confirmed without delay. Transactions that took weeks by mail now take only minutes. And, human resources are used far more productively.

Just as important, this same information is available immediately to management via telephone when it's most timely and valuable, so that business trends can be spotted . . . and planned for.

Today, more and more companies in such diverse industries as pharmaceuticals, apparel, finance, agriculture, manufacturing, insurance, and others are integrating portable Miniterms into their field operations to extend the economy and efficiency of computers right to the source of the work.



I'd like to know more about Portable Processing and the Miniterm's potential in my company.

Please send me your brochure.
 Please have your representative call me.

COMPUTER DEVICES INC.
 25 North Avenue
 Burlington, MA 01803

Name _____
 Title _____
 Company _____
 Street _____
 City _____ State _____ Zip _____
 Type of Business _____

D

Available under GSA

The potential applications of portable computer systems are just beginning to be realized. If you'd like to explore Miniterm's potential for your company, fill in the coupon. Or call Computer Devices, Inc. toll-free: 800-225-1230. In Massachusetts call (617) 273-1550.

Europe: Computer Devices, Inc. 108 Place Des Miroirs. 91000 Evry, France. (6) 079 0077. Telex 692 671.

We travel in the best companies.

CIRCLE 101 ON READER CARD

The full power of Rosetta is available as a debugging tool, making a special debugging language unnecessary.

convenient for each keyboard, but always echoes as “!”. Before he presses DORT the user can edit his input by pressing keys to delete the previous character, the entire current line, or all of the input typed so far.

When DORT is finally pressed, the input is evaluated and the result printed. By convention all objects print themselves in the window named *disp*. Each dialog window evaluates its inputs in a context in which *disp* may be temporarily re-bound to another window to send output elsewhere.

USING SEVERAL WINDOWS

It is often convenient to use more than one dialog window. A running program, for example, may prompt the user for input. He can then open a new dialog window, perform some calculations, and finally reply to the waiting program with his calculated value.

When an error is detected during Smalltalk evaluation, a diagnostic window will appear with a brief statement of the complaint. In this window the user can examine the context of the error. The message receiver, the message it received, and the Smalltalk code it was running can be displayed upon request. The user can engage in Smalltalk dialog in the context of the error, for instance, to print or modify variables in the local name scope.

The full power of Smalltalk is available as a debugging tool, making a special debugging language unnecessary. It is also possible to move up and down in the chain of contexts that led to the error, inspecting each one in turn. After examining and perhaps modifying the context of the error, the user can either terminate the suspended execution or resume it in a context prior to the one in which the error occurred. In the latter case he may supply a value to be used as the result of the suspended context. When he is done the diagnostic window disappears; any windows it obstructed become visible again. A diagnostic window appears in the top left corner of Fig. 2.

Like most other Smalltalk system facilities, the error machinery is easily accessible to the user. By evaluating something like *error "This my complaint"* any Smalltalk program can open up a diagnostic window.

Smalltalk programs are typically edited with a hypertext³ editor which uses windows for displaying, entering, and pointing to program text. Fig. 3 shows the screen layout after this editor has been invoked. The window at the top describes what is being edited. The largest rectangle is the text window, in which the current portion of program

text is shown.

The window at the right is a menu of available editing commands. Selections from this menu are made by pressing single keys corresponding to the first character of a command name. Selecting the “. . .” command brings a new menu of additional commands into the window.

The bottom window is used to enter lengthy pieces of text such as insertions. The implementation of the editor is simplified by the fact that each of these windows may be scrolled, cleared, and so on, independently of the rest.

The editor knows about the structure of Smalltalk programs and uses this knowledge to format the displayed code attractively and to allow easy selection of substructures for examination. The Smalltalk code is always shown neatly indented, with each statement starting on a new line. Whenever text is altered it is immediately reformatted.

Only the top level of the code is displayed in the text window; parenthesized subexpressions are simply shown as “{ }.” The *in* command descends into one of these subexpressions to see its top level. The code in the window may be altered by selecting other commands from the menu, with the current version of the text always visible. The *out* command returns to the surrounding level.

To illustrate the use of the editor, suppose we want to insert some new text into the current program level. First, we position the editor's cursor to where we want the text to go by using some combination of the *left*, *right*, *up*, *down*, *begin*, and *end* commands. Next we press *a* for *add*. Immediately the menu goes blank to indicate that no selection from it can be made until our insertion is complete. Simultaneously the prompt “*add?*” appears in the bottom window, followed by a typing cursor. We are now talking to the same read object used by dialog windows. After typing in the new text, we press DORT and the text window immediately shows the result. At the same time, the bottom window clears and the menu reappears.

The Smalltalk language is based on a metaphor of intelligent objects which communicate by sending and responding to messages. An object cannot be operated on directly, but can only be sent requests to perform actions and return replies. Every object is a member of some class that describes its representation, the messages it can receive, and the methods it uses to answer them. Smalltalk is easily extended with new classes of objects and new syntax for messages.

A message is sent by writing the message receiver followed by the message itself. For example, to move the window *disp* to a different place on the screen we can say *disp move to 10 2*

In this expression *disp* is the message receiver and “*move to 10 2*” is the message being sent. We represent the syntax of this message by the message pattern

. . . *move to (newl) (newc)*

The elipsis (. . .) indicates the message receiver, and the parenthesized variables indicate evaluated parameter slots. An object may also receive message parameters unevaluated. For instance, the control structure object *do* responds to a message of the form

. . . *(n) (@code)*

The symbol “@” indicates that *code* is received by *do* unevaluated.

When we send

*do 3*4 (disp hide show)*

n is 12 and *code* is the list (*disp hide show*). *Do* answers this message by evaluating *code* 12 times, causing *disp* to repeatedly disappear and reappear.

The object *x* is returned as the reply to a message by evaluating

reply x

When a message is sent to an object just to achieve an effect and not to compute a result, *reply* may be omitted. In this case the message receiver itself is replied by default. This reply permits several messages to the same object to be cascaded together, as . . . *hide* and . . . *show* were in the example above. Rosetta Smalltalk uses periods to separate message sendings when it is not intended for the reply of one message to become the receiver of the next. Thus the expression

*do 3*4 (disp hide. disp show)*

has the same effect as the example above.

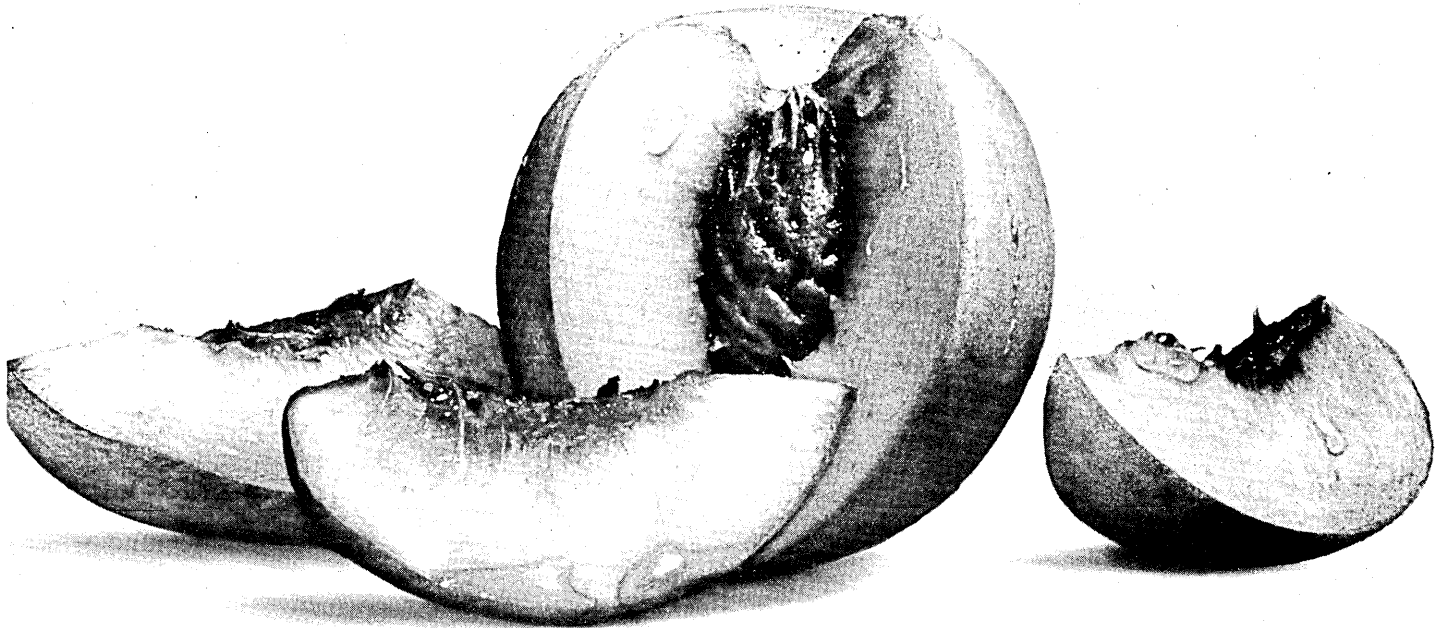
Smalltalk evaluates an expression by first obtaining the message receiver, then matching message patterns against the following tokens. Only those patterns belonging to the receiver's class are eligible to be matched. Matching proceeds from left to right, interleaved with evaluation of subexpressions corresponding to parameter slots. Smalltalk matches a specific token in preference to a parameter slot, and always takes the longest possible match. The empty message will be matched if the receiver can answer it and no longer pattern is found. Once a unique pattern is matched, Smalltalk sends the message, setting up a new context for the object to respond in.

SOME PRIVATE DATA

Every Smalltalk object owns some private data that can be directly accessed only by itself. These *instance variables* are property names common to all instances of a class, for which each instance has particular values. For example, a window object's size is described by two variables and refers to them whenever it is asked to show on the screen. We cannot change these values directly, but a window

3. Carmody, S., Gross, W., Nelson, T.H., Rice, D., Van Dam, A. A Hypertext Editing System for the S/360. Pertinent Concepts in Computer Graphics, University of Illinois, 1969, pp.291-330.

Any way you slice it



ICCC/80 is going to be a real peach of a conference

Send for your pre-registration package now. And reserve your slice of the Fifth International Conference on Computer Communication.

ICCC/80 convenes October 27-30, 1980, at the spectacular Peachtree Plaza, the world's tallest hotel, towering 70 stories above Atlanta, Ga. The American Telephone and Telegraph Company is the conference host.

But applications are limited, so be sure to pre-register by September 1. Only 1,500 conferees can be accommodated.

The theme is **Computer Communications: Increasing Benefits for Society**. We'll be probing the exciting technical, socio-legal and practical

The International Conference on Computer Communication is held every two years (Kyoto, Japan, in 1978) as an interdisciplinary forum for exploring social, economic, political and technological aspects of computer communication networks.

CIRCLE 102 ON READER CARD

developments of computer communication networks ... and their global implications for the Eighties.

You'll hear from acknowledged leaders in the field, like keynote speakers Lewis Branscomb, IBM's chief scientist; AT&T's Archie McGill and Henry Geller, of the U.S. Department of Commerce.

All in all, you can choose among 40 sessions with over 100 first-rate papers. Plus, of course, opportunities to gather informally and sample the extraordinary hospitality of Atlanta—the charm and flavor of the Old South in the lifestyle of a modern, dynamic metropolis.

Pre-registration before September 1, 1980

ICCC/80: October 27-30
Peachtree Plaza Hotel
Atlanta, Georgia, USA



To: ICCC/80 Executive Committee
P.O. Box 280
Basking Ridge, N.J. 07920
USA

Send my pre-registration application package to:
(Please type or print)

Name: _____
(Last Name) (First Name) (Initial)

Affiliation: _____

Address: _____

Country: _____ Telephone: _____

(Pre-registration will be \$175; at the conference, \$200)

By creating new classes, the Smalltalk user creates objects modeling his own abstract ideas, and invents his own notations for using them as well.

will do so if asked:

```
disp grow to 10 30
```

Sending this message has the visible effect of setting *disp*'s size to 10 lines of 30 columns each. To accomplish this, *disp* has to hide itself, adjust its text buffer to 300 characters, update its *h* and *w* values, and show itself again. Because unauthorized access to instance variables is prohibited, the window is able to ensure that its buffer size and visible appearance remain consistent with its height and width.

Objects answer their messages by running pieces of Smalltalk code called methods. A method refers directly to the object's private data by mentioning its instance variable names. The method can also mention the special name *self* to refer to the object receiving the message. Objects often send themselves messages this way. For instance, the method by which windows respond to the "grow to" message could be

```
... grow to (newh) (neww) =>
( self hide.
  @text ← String new newh*neww.
  @h ← newh. @w ← neww.
  self show)
```

An object may reveal as much or as little of its representation as it desires by the messages it chooses to answer. It can grant full access to its representation by answering

```
... 's (@code) => (reply code eval)
```

When this message is sent, *code* is an unevaluated piece of Smalltalk code, and the object replies with the result of evaluating that code in its private context. If this message is defined for windows, sending

```
disp's h
```

will reply with the height of *disp*. This kind of message is helpful when debugging, but must be used with care since the object's assumptions about its own data can be disrupted. For instance,

```
disp's (@h ← h+2)
```

increases *disp*'s height without making a corresponding adjustment in its text buffer, and will cause an error the next time *disp* is asked to show.

There are actually three sets of variables in the local context of a message sending: temporary variables, instance variables, and class variables. All three kinds may be accessed directly by a method.

Temporary variables are created when a message is sent and disappear as soon as a reply is made. These variables may be used as scratchpad storage while the method is running. Certain temporaries are initialized with values from the message and thus serve as formal parameters; the variables *newh* and *neww* in the "grow to" message are examples of this. Instance variables are names for the data private to each instance of a class, as discussed above. Their values persist between message sendings as long as the object

exists.

Class variables are accessible to all instances of a class. They usually hold data for communication between instances or for classwide bookkeeping. Their values are stored within the class itself and persist as long as the class exists. Class variables play the role often filled by global variables in other languages, but in a more secure and modular way. The shared information held in class variables is accessible only to members of the class and not to the world at large.

When a name is mentioned that is not one of the three kinds of locals, Smalltalk looks for it in the dynamically enclosing context—that is, the one from which the current message was sent. The search ends in the user's workspace. A common problem with dynamic name scoping is the accidental hiding of global variables when code is run inside a context that happens to use those names for another purpose. Rosetta Smalltalk does not suffer from this problem because all class-related data is accessible from the innermost context, including the class variables that would have been global in some other languages.

CLASSES OF OBJECTS

We group objects into classes so they can share the same representation, message patterns, and methods. The Smalltalk class mechanism is modeled after that of Simula 67, but Smalltalk is unique in representing every facility as an instance of some class. A new class is a description of a kind of object, or data type, of which there may be many instances. A new class is thus a semantic extension to the Smalltalk world.

Furthermore, the message patterns of a new class form a direct extension to the language syntax. By creating new classes the Smalltalk user creates objects modeling his own abstract ideas, and invents his own notation for using them as well. Classes are a tool for extending a language in a modular way. The representation of an object is ordinarily concealed from outside the object, providing information hiding in the sense of Parnas.⁴

The only operation that can be performed on an object is to send it a message requesting some action; how that action is carried out is no concern to the sender, and it may be changed without affecting existing code. Moreover, this object-oriented style of programming collects related code into a central place, the class definition. For instance, details of how a class of objects should be printed are grouped with other details about the class rather than in some all-purpose print

routine. This makes it easier to find all affected code when a change is made.

A new object is created by sending a . . . *new* message to the desired class. The object should respond to a message beginning with the special token *isnew* by initializing its instance variables appropriately. One cannot forget to initialize an object because the *isnew* token is automatically supplied by the system. Apart from this bit of synchronization, *isnew* messages are no different from other messages.

For example, a new window must be told its initial size and location. To create a new window and name it *mywindow*, we say

```
@mywindow ← Window new 5 30 2 2
```

This creates a new window which immediately receives the message *isnew 5 30 2*. The new window initializes its height and width to 5 lines of 30 columns and its screen location to line 2, column 2. Other instance variables are computed from the given information. For instance, *mywindow*'s text buffer is allocated to hold 150 characters.

Every object in Rosetta Smalltalk belongs to a class, and classes are no exception. Every class is an instance of the class named *Class*; this class has the unique property of being an instance of itself. To create a new class we send the . . . *new* message to *Class*:

```
@Stack ← Class new
```

Of course, the new class must be given variable dictionaries, message patterns, and methods for it to be useful. This could be done by sending appropriate messages to *Stack*, though we would ordinarily invoke the built-in hypertext editor.

One can also extend or modify the definitions of existing classes. This includes predefined classes of the Rosetta Smalltalk system as well as those created by the user. As a simple example, suppose we want windows to be able to flash themselves in order to attract our attention. We must define two things: the syntax of the message and the method used to answer it. Our new message syntax will be

```
... flash (n) times
```

The method for flashing will be to erase and redraw the window's frame the requested number of times. We can add this capability to class *Window* by evaluating

```
Window answer @ ( flash (n) times)
```

```
by @ ( do n (self unframe frame) )
```

This is just a message to *Window*. The "@" tokens indicate that the following parenthesized lists should be taken literally rather than evaluated. After adding the above message to class *Window* we can say

```
mywindow flash 20 times
```

and our window will blink its frame off and on 20 times. Note that when a new message is added to a class, all existing instances can immediately respond.

1. Parnas, D. On the Criteria to be Used in Decomposing Systems into Modules. Comm. ACM, Dec. 1972, pp. 1,053-1,058.



**On October 15,
Amoco Container
saw our ad.**

**Today,
they're in it.**



The people at Amoco Container Company* are celebrating more than a new year. They're celebrating two brand new software systems and the short three months it took to install them.

It all started when they saw MSA's October ad and took us up on our offer to help. With the assistance of MSA and MSA's training aids, including audiocassettes, workbooks, and on-site training classes for data processing and user department personnel, Amoco actually implemented two of MSA's major Big 8™ systems in less than 90 days from the time they decided to do it.

So, while we're happy to have helped the dynamic people at Amoco, we'd be even happier to do it again. For anyone. Anytime. Anyplace. We can help you.

*Amoco Container Company, a subsidiary of Amoco Chemicals Corporation, is one of the largest manufacturers of blow molded polyester containers.



MSA has a software system that's on target for your application needs. Send in the coupon below and we'll get you off to a running start in 1980.



3445 Peachtree Road, N.E.
Suite 1300
Atlanta, GA 30326
Attention: Robert Carpenter
(404) 262-2376

I am interested in the following MSA systems:

- Total Financial Management System—Big 8
- General Ledger/Budgeting—G/L 80
- Payroll/Labor Distribution
- Accounts Receivable
- Financial Forecasting & Modeling
- Fixed Assets/Property Control
- Personnel Management & Reporting
- Accounts Payable
- Supplies Inventory Control & Purchasing
- Procurement Matching

Name	Title
Company	
Address	City
State	Zip
Telephone	Computer Model



DAT-5/80

CIRCLE 103 ON READER CARD

The basic Smalltalk system provides fundamental programming language elements and some high-level building blocks to support interactive computing.

BUILDING EXTENSIONS

The message sending discipline we have explained is only a language framework. This skeleton must be augmented with enough predefined objects to enable the construction of extensions. The basic Rosetta Smalltalk system provides fundamental programming language elements and some high-level building blocks to support interactive computing. This set of basic objects includes the primitive classes *Atom*, *Number*, *String*, and *List*; the objects *yes* and *no*; the control structure objects *if*, *do*, *for*, *repeat*, and *done*; the objects *Window*, *read*, *kb*, *File*, and *lp* for input and output; the workspace management objects *vars* and *erase*; and of course the class *Class*. In addition there is a hypertext editor for creating and modifying classes and other program text. Our summary of the basic system is rather informal; many of the predefined messages answered by these objects are omitted.

There are several messages that every object should be able to answer. Rosetta Smalltalk supplies default methods for answering these messages to every new class. These are:

- `..print` = print the title of the object's class in brackets
- `..is?` = reply the object's class
- `..is(c)` = reply *yes* if the object is an instance of class *c*; otherwise reply *no*

Usually the default print method gets replaced by something more useful.

The classes *Atom*, *Number*, *String*, and *List* are primitive classes. We use these objects for variables, arithmetic, and data storage. These classes use familiar notation for concepts found in other languages, such as arithmetic and assignment.

Atoms are LISP-like symbols used as variable names and syntactic tokens in messages. When an atom receives a message of the form `... ← (ob)` it will bind itself to the object *ob* in the current context. Binding occurs under the rule of dynamic name scoping discussed earlier. The message `... eval` sent to an atom replies with the object to which it is bound.

The atom spelled "@@" is always bound to an object called *quote*, which receives a single unevaluated parameter and replies with that parameter. And object may thus be referred to literally in a message by preceding it with @. For example, the result of evaluating @ *x* is just the atom *x*. An "assignment statement" in Smalltalk hence looks like @ *x* ← 3. After this assignment the atom *x* is bound to the number 3.

Atoms also answer messages to print themselves, obtain their print names, and inquire whether one atom is the same as another.

Numbers in our prototype implementation are provided only in the form of small integers. These numbers respond to the usual complement of arithmetic and relational messages. Examples of other messages are

- `97 chars` replies the string "97"
- `97 ascii` replies the string "a"
- `97 print` performs `disp ← 97 chars`
- Strings* are sequences of characters that respond to a rich set of string manipulation messages. For instance, if *s1* and *s2* are strings, then
 - `s1 length` replies the number of characters in *s1*;
 - `s1 + s2` replies the concatenation of *s1* and *s2*;
 - `s1[k]` replies the *k*-th character;
 - `s1[j to k]` replies the substring of *s1* from positions *j* to *k*;
 - `s1 find first s2` replies the position of the leftmost occurrence of *s2* in *s1*

and so on. Strings may also be used as byte arrays which may be selectively updated. For example

- `s1[k] ← "a"` replaces the *k*-th character;
- `s1[j to k] ← s2` replaces a substring of *s1*.

LISTS LIKE STRINGS

Lists are arrays much like strings except that each position of a list can contain any object. Most of the string messages are also answered by lists; one may concatenate two lists, pick out an element of subsequence of elements, or replace elements of a list. Lists also have a method for iterating over their elements. The expression

`1 each x do (x print)`

will print each element of the list *l*. Smalltalk also uses lists to represent programs. A list will respond to the message `... eval` by running itself as Smalltalk code. The Smalltalk interpreter is thus just another method of the class *List*.

Control structures in Smalltalk are implemented by objects which answer messages containing unevaluated code as parameters. Users can easily define new control structures of their own. We have already seen an example of how *do* works. Other control structure objects are briefly discussed below.

The object *if* implements the McCarthy conditional, as found in LISP. The syntax of *if*'s message is

`... (expr) => (@yespart)`

The expression *expr* should evaluate to either *yes* or *no*. If *expr* is *yes*, the *yespart* code is evaluated and the entire list in which the *if* occurs is exited. For example,

`(if i < j => (i print). j print)`

will print the smaller of *i* and *j*. If the value of *expr* is *no*, *if* does nothing and replies immediately with itself. This permits a series of

else-if tests to be cascaded together, as in

- `if x < node val => (left)`
- `x > node val => (right)`
- `x = node val => (found)`

The object *for* implements a for-loop control structure. It answers a message of the form `... (@var) ← (lb) to (ub) do (@code)`. For example, the expression `for k ← 1 to n do (k print. cr)` will print the first *n* integers on separate lines.

The object *repeat* implements an infinite-loop control structure. Control leaves the loop when either the user interrupts, or the object *done* is invoked. For instance, `repeat (read eval print. cr)` is a typical Smalltalk dialog loop.

The object *done* performs single level exits from *for*, *do*, and *repeat* loops, and from the list iteration method for the `"... each"` message. A use of *done* may optionally exit a loop with a reply, which becomes the reply of the loop itself. Thus the loop `repeat (if i < j => (@i ← i + 1). done with "ok")`

will reply with the string "ok" when *i* becomes greater than or equal to *j*.

SMALL-TALK INPUT

Smalltalk input is done primarily with the objects *kb* and *read*. *Kb* will wait for a single keystroke and reply with the ASCII code of the key depressed. The object *read* is used to input Smalltalk tokens or untokenized lines of characters. A token is any instance of one of the classes *Atom*, *Number*, *String*, or *List*. *Read* can thus read anything from a single number to an entire Smalltalk program. By default, *read* reads from the keyboard and echoes in the window named *disp*; its reply is a list of the tokens read. The following messages to *read* are also defined:

- `read in w` echoes input in window *w*;
- `read of ob` *ob* can be a string or any object that replies to the message `... next` with a character; result is as if the characters were typed at the keyboard but no echoing occurs;
- `read line` replies a string of the characters typed, which are echoed in *disp*;
- `read line in w` like *read line* but echoes in window *w*.

Windows display themselves as rectangular areas on the screen, optionally bordered by a frame. Each window has its own size, screen location, text buffer, cursor, and status bits. Each window may be written into, scrolled, cleared, moved, changed in size, and so on independently of the rest of the screen.

Examples of some messages to windows include:

A CHALLENGE FOR THE 1980s:

'Control your information or it will control you.'



Are you looking for better ways to access system information? And, at the same time, enhance the value of the system to your organization?

NCR has a proven answer. It's Micrographics, the data processing technology that puts data in people's hands in its most useful format.

Micrographics is fast, accessible and very easy to use. It maximizes the value of the substantial investment in your system by making data conveniently available to every facility in your organization, regardless how small or remote.

NCR Does It All

NCR is uniquely a total systems company, the only company to provide it all: A wide range of computer systems; data terminals and communications networks; Micrographics hardware, software and consumables; and one of the best and largest service organizations in the world. With this total systems approach to information management, it's no wonder that NCR is a leader in Micrographics data processing.

We're ready to build on that leadership.

We're poised for new growth, to be an even greater force in Micrographics through new and enhanced user benefits.

NCR has been helping people manage data for nearly a century. We can help you now. Contact us to find out how. You'll be glad to discover how easy it is to turn your system's problems into opportunities.

—Amnon Ben-Yehuda
General Manager
NCR Micrographic Systems Division

Micrographic Systems Division
NCR Corporation, Box 606
Dayton, OH 45401

NCR

Complete Computer Systems

See Us At
NMA Booth No. 2532

CIRCLE 104 ON READER CARD

Although the prototype implementation of Rosetta Smalltalk was deliberately kept simple, the system's performance is encouraging.

w ← "some text" writes the text in *w* at the current position of its write cursor;

wclear fills the text buffer with blanks;

wunframe erases *w*'s frame;

wat 2 1 sets *w*'s cursor to its line 2 and column 1;

while erases *w* from the screen; previously obstructed parts of other windows are brought into view;

wshow displays *w* on the screen;

wgrow to 10 30 gives *w* 10 lines of 30 characters each;

wmove to 15 1 moves *w* to line 15, column 1 of the screen;

wscroll scrolls the text in *w* up by one line.

The class *File* provides sequential and random access to secondary storage. The contents of a file are a sequence of bytes. Examples of file messages include:

fopen "x" opens *f* for output with filename "x";

f ← "some text" writes the text to *f*;

fseek n sets *f*'s position to its *n*-th

fnext byte; reads the next byte from a file open for input;

fend replies *yes* if at end of file;

fclose closes the file.

The object *lp* is used to write to a hard-copy device. *Lp* answers some of the same messages as do windows; in particular, *lp* ← "print it" prints the text "print it" on the line printer.

As mentioned earlier, all atom bindings not local to a particular message sending context are made in the user's workspace. A list containing all the atoms so bound can be obtained from the object named *vars*. The object *erase* will remove variables from the workspace, e.g., *erase (x y z)*.

New classes are created by sending the message *new* to the class named *Class*. The messages and methods of a class may be changed by using the messages

answer (message) by (method)
forget (message)

The method for a particular message may be obtained by sending

method for (message)

The *messages* message to a class will

reply with a list of all its message patterns. Messages for changing the other parts of a class also exist. A class can be edited using the hypertext editor by sending it the message *edit*.

SYSTEM WAS KEPT SIMPLE

Our prototype implementation of Rosetta Smalltalk, which currently runs on two different Z80-based personal computers, was intended as a feasibility demonstration and design tool rather than a finished product; its implementation was deliberately kept simple even where it was clear that special-case optimizations would be needed for adequate performance.

Despite this the system's performance is encouraging. The basic system we have described occupies about 16K bytes, consisting of 12K of machine code and 4K of predefined objects. This does not include the workspace. No thorough benchmarking has been done, but an in-memory bubble sort runs seven times slower than the same algorithm in interpreted BASIC on the same machine. We believe we have learned enough from our prototype to design a new version of the system with performance comparable to BASIC.

Our experience in using Rosetta Smalltalk, though limited, has also been encouraging. We have created a number of extensions ranging from menu-driven drawing tools to a simple discrete-event simulation system. In addition, we built several versions of the hypertext editor in Smalltalk before manually translating it into assembly language. Only a few persons besides ourselves have used the system, but they have reacted enthusiastically.

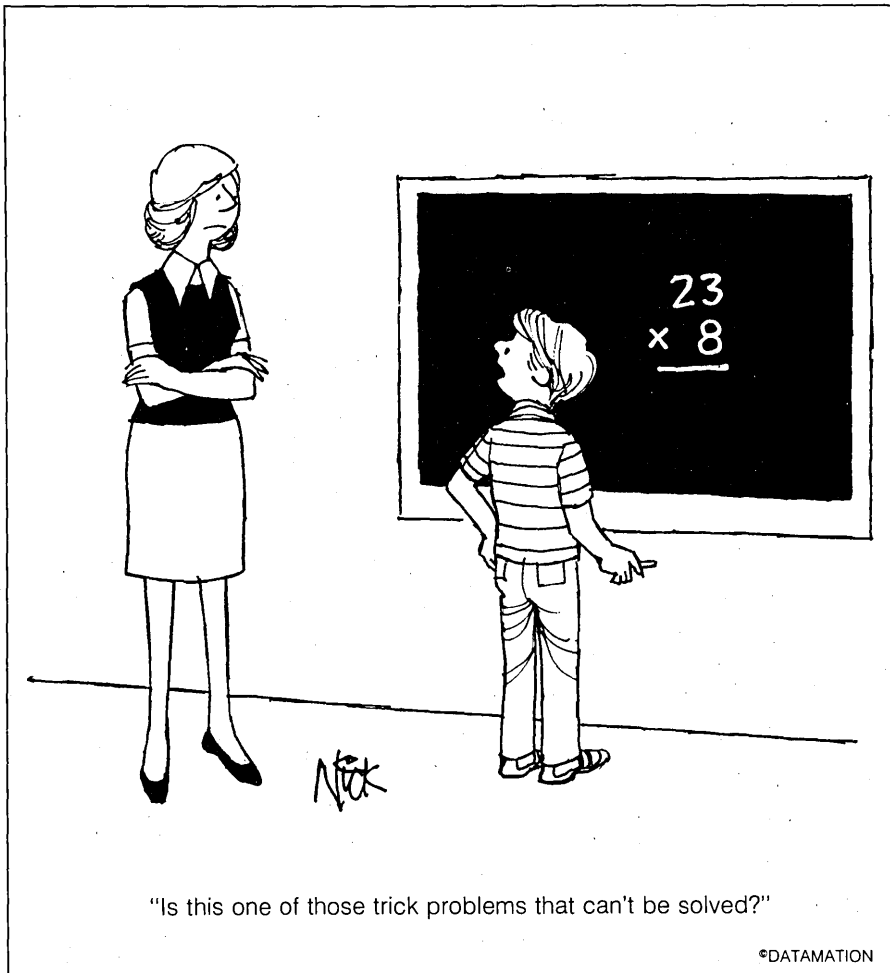
We are aware of a number of limitations in our present system; some are the result of deliberate design tradeoffs, some are due to the simple implementation of the prototype, and some are imposed by our target machines. These limitations include:

No declarations: This is a simplification for the novice and is traditional in highly interactive languages, but the drawbacks are lost security and the necessity for interpretation; we plan to add an incremental declaration facility in a later version.

Dynamic parsing: In the absence of declarations, message pattern recognition must be interleaved with evaluation; message patterns allow a friendly, readable syntax and easy syntactic extensibility, but can be confusing if deeply nested or if one is not familiar with the classes of intended message receivers; also, code may be parsed in an unexpected way if the class of a message receiver is not what was expected.

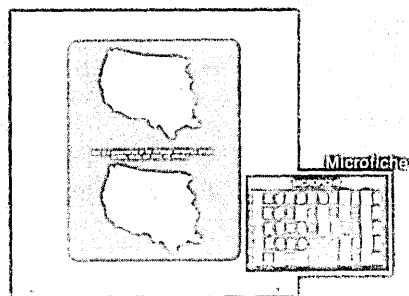
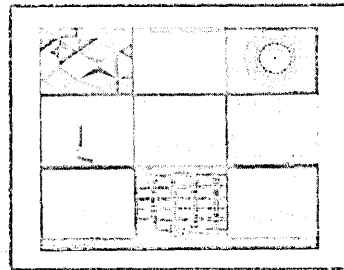
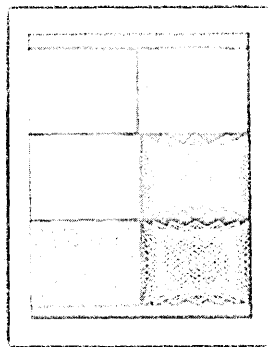
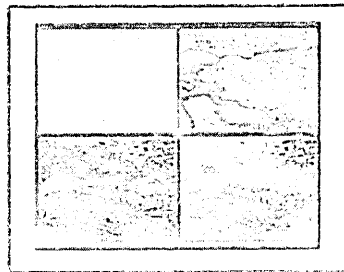
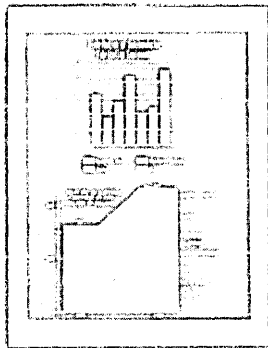
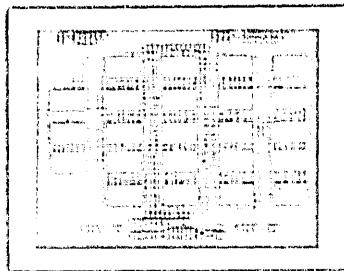
No subclass capability: The use of the subclasses makes the effort involved in defining a new class less, but it is difficult to provide in our prototypes' implementation of parsing.

CIRCLE 105 ON READER CARD ▶



©DATAMATION

CARTOON BY NICK HOBART



Color Graphics Hard Copy... Made Easy

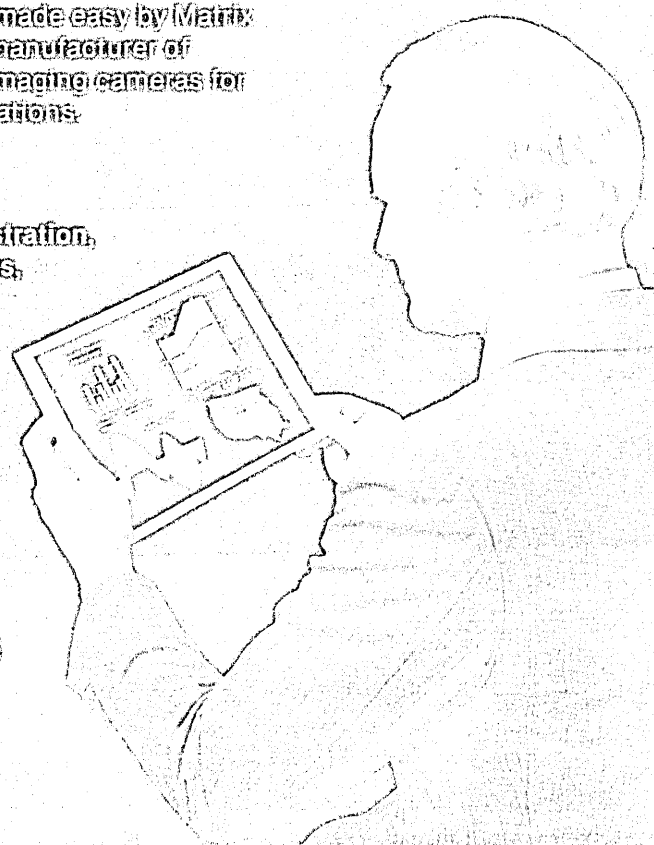
The Matrix Color Graphic Camera System converts the output of any raster scan computer color terminal into brilliant, high resolution photographic hard copy. Both line and continuous tone images can be made with accurate, bright, saturated colors.

Our system does what no other instrument can do -- it produces instant, on-the-spot results with Polaroid® 8 x 10 film, 8 x 10 color transparencies for backlit displays and overhead projection, 35mm color slides, 60 image color microfiche, and 16mm/65mm color animation films. All with one camera system. It also allows recording of multiple image formats. Related and sequential images can be recorded in orderly arrays, on a single sheet of 8 x 10 instant print film. The resultant ease of comparison and analysis is unmatched. The system is also fully modular and field upgradeable...you purchase only the capability that you need now.

Microprocessor based electronics provide many automation, self-calibration, self-diagnosis and remote control functions. Color graphics hard copy made easy by Matrix Instruments, the leading manufacturer of precision electro-optical imaging cameras for diagnostic medical applications.

For more information,
film samples, or a demonstration,
contact Matrix Instruments,
230 Pegasus Avenue,
Northvale, New Jersey
07647.
Telephone (813) 439-8832.
Or call toll-free:
(800) 524-1596.

**MATRIX
INSTRUMENTS**



Overhead projection transparency



Slide

Hard copy shown reduced from original 8 x 10" slide and microfiche films.
Multiple images recorded on a single sheet of film.
"Polaroid" is a registered trademark of the Polaroid Corporation.

Programmers and nonprogrammers alike readily accept the metaphor of active objects communicating by sending messages.

No coroutines: As with subclasses, this desirable feature was sacrificed in favor of simplicity in the prototype.

Low bandwidth: Of course our target machines do not have the high-resolution graphics or the computational resources of PARC's interim Dynabooks; still, our system is qualitatively similar to PARC's.

No applications software: The most serious limitation of our present system is the lack of

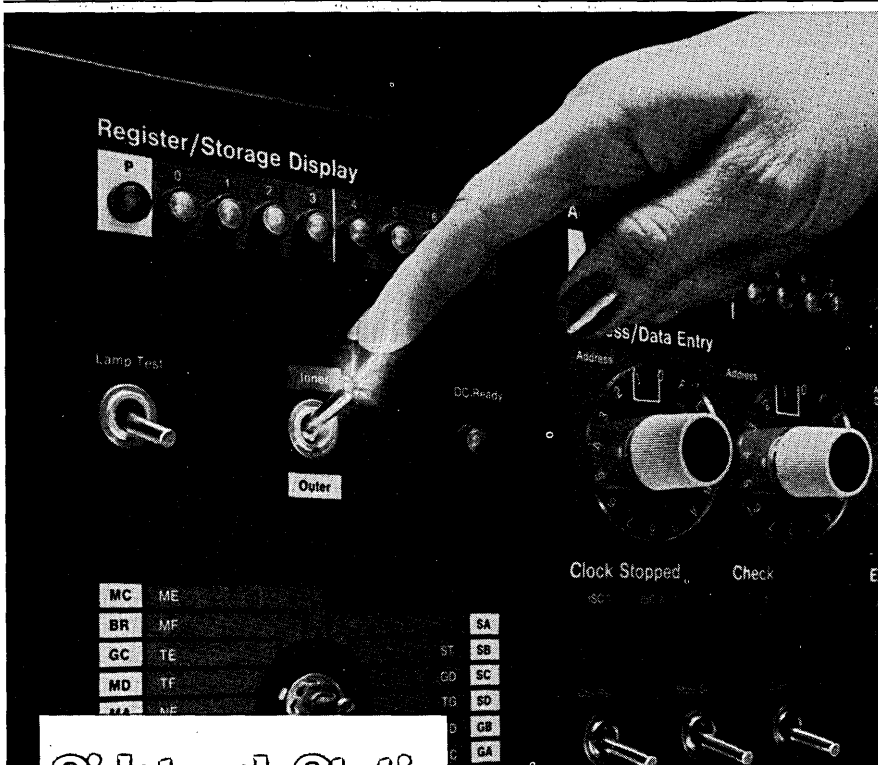
the application extensions that would make Rosetta Smalltalk a full-fledged personal information handling system.

Rosetta Smalltalk is a system offering a rich interactive style, a fully conversational language, a single uniform notation for all operations, syntactic and semantic extensibility, and the modularity to permit building general tools.

But perhaps its most important

characteristic for personal computing is its friendliness. The notion of communicating with intelligent objects has an anthropomorphic flavor which puts abstract data types in a lively, concrete setting. The idea of classes is based on the familiar idea of grouping objects that share common properties.

The Rosetta Smalltalk syntax has a pleasant, readable appearance because syntactic extensibility allows a suggestive notation to be chosen for every operation. Our experience and that of Xerox's Learning Research Group show that programmers and nonprogrammers alike readily accept the metaphor of active objects communicating by sending messages, and can effectively use the powerful tools for abstraction and extensibility that Smalltalk provides. *



Sidetrack Static Electricity With Star-Zap Mats and Matting.

Star-Zap mats and matting effectively sidetrack static electricity... prevent it from reaching and disrupting equipment functions. Constructed of anti-static conductive 100% nylon yarn, they instantly dissipate electrostatic energy generated by walking across carpet or tile. Special back keeps mats in place. There are no ground wires to connect, so there are no wires to break. Just place mat on the floor.

Star-Zap mats are soil, stain and skid-resistant and retain their anti-shock feature even after repeated washings. The mats carry our 5-year wear surface warranty and are available in five decorator colors.

Ideal for use in Computer Centers • Data Processing Centers • Elevators • X-ray Equipment Areas • Offices

Patent Pending

See your soft goods supplier or write Ann Banks, Marketing Services, Dept. CR-33, Crown Industries for more information.

Crown Industries

2100 Commerce Drive — Industrial Park
Fremont, Ohio 43420
Ph: (419) 332-5531 • TWX - 810-247-2910

A DIVISION OF
Ludlow
CORPORATION

SCOTT K. WARREN



Dr. Warren is president of Rosetta, Inc., and one of the designers of the Rosetta Smalltalk system. He has worked on programming

languages for microcomputers since 1976. Previously he was a founding partner in a software house specializing in interactive information systems for large computers, where he designed and implemented user-oriented command languages. Dr. Warren received his PhD from Rice University in Houston for research into techniques for constructing compilers automatically.

DENNIS ABBE



Mr. Abbe is a vice president of Rosetta, Inc., and one of the designers of the Rosetta Smalltalk system. He spent a year in graduate school at

Carnegie-Mellon University studying artificial intelligence, then took a leave of absence in 1978 to join Scott Warren in implementing Rosetta Smalltalk on a microcomputer. Mr. Abbe received his degree in computer science from Rice University in 1977.

people who play the computer specify Verbatim®

Virtuoso performers at computer keyboards deserve the ultimate in recording quality. That's why you should specify Verbatim brand diskettes, minidisks, cartridges and data cassettes for your computer or word processing system.

At Verbatim, the whole message is quality. We specialize in digital data recording media and have become the world leader by setting the standards for flawless, dropout-free magnetic media. Every size, every format, and available everywhere. Order them from

your computer supplies dealer.
Simply specify Verbatim.

For the name of your nearest Verbatim distributor, call:

800-538-1793

In California call:

(408) 737-7771 collect

Verbatim Corporation
323 Soquel Way
Sunnyvale, CA 94086

In Europe:

Verbatim S.A.

Case Postale 296

1215 Genève 15

Switzerland

Telephone: 41(22) 34-90-55

Telex: 22647 ITGE CH.



"See Us At NCC
Booth #'s 1228-1234"

CIRCLE 107 ON READER CARD

From the graphics leader.

The Practical Plotters. By Tektronix.



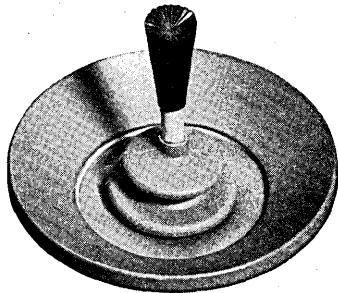
Copyright ©1979 Tektronix Inc.
All rights reserved.
OEM terms and conditions available

Do your big plotter work. At a small plotter price. That's practical!

At Tektronix, we build plotters that pay for themselves.

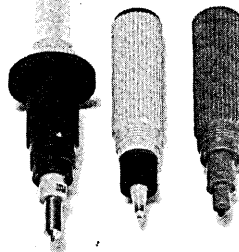
Practicality is why Tektronix pioneered the smart small plotter. Why we led the move to more reliable, digital technology. We're proving that big plotter performance can take a small plotter price, with capabilities like those of our C-size (A2) 4663.

Economy. Instead of waiting in line for large plotter output, you can typically do two-thirds of your plotting on our 4663, with comparable quality. Faster turnaround. Tremendous cost savings.

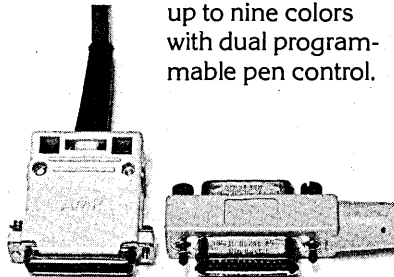


Interactivity. Microprocessor intelligence not only makes the 4663 semi-independent, it lets

you draw real curve forms. Rotate characters. Digitize with built-in joystick control. All right at your workstation.



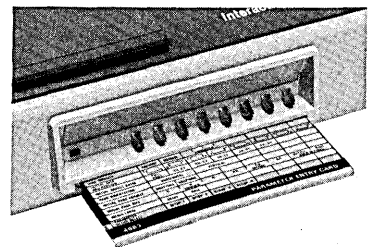
Versatility. The 4663 plots on paper, film or Mylar.® With felt tip, wet ink or ballpoint pens. In up to nine colors with dual programmable pen control.



Compatibility. From its RS-232-C and GPIB (IEEE-488) interfaces, to options like foreign language fonts and circular interpolation, our plotters mesh with your present system and particular needs. Powerful, wide-ranging software routines are both inexpensive and easy to use.

Simplicity. Our parameter entry card replaces rear panel straps and switches with a simple system for setting up to four sets of operating

conditions right from the front panel, so one plotter can instantly accommodate four totally different jobs.



Bring Tektronix into your bidding picture. It's the only practical thing to do. Next time you're shopping for plotters, let your local Tektronix representative show you output samples of what our 4663 and B-size (A-3) 4662 can do for you. Call him directly, or call our toll-free automatic answering service at 1-800-547-1512. In Oregon, call 644-9051 collect.

Tektronix, Inc.
Information Display Division
P.O. Box 1700
Beaverton, OR 97075

Tektronix International, Inc.
European Marketing Centre
Postbox 827
1180 AV Amstelveen
The Netherlands

The practical plotters

Tektronix®
COMMITTED TO EXCELLENCE



"Series 80 TOTAL and Environ/1 gives us the power and versatility to handle a complex data base involving wide-ranging manufacturing applications and service a 400-terminal network with up to 85,000 transactions daily."

George B. Ream
Division Manager
Systems & Information Services
Mack Truck, Inc.



Mack is one of the leading manufacturers of heavy-duty trucks in North America.

SERIES 80 TOTAL.[®] THE DBMS YOU'LL BE IMPRESSED WITH AFTER YOU'VE BOUGHT IT.

Almost every data base management system is impressive on paper. But Series 80 TOTAL is every bit as impressive in the real world of data processing operations.

Because in addition to giving you what you expect from a DBMS as a data processing specialist, it also gives you what you need as a manager.

That's not just us saying so. It's what DBMS users told International Data Corporation (IDC)—the independent research group—in the most comprehensive study of this type ever.

SAVES MAN-HOURS AND TIME

For example, IDC reported Series 80 TOTAL saves man hours two ways. First, it only requires an average of one person spending half his time to support the system. That's one fourth the people required by another leading package which needed four people on average and sometimes as many as 12. Unlike another leading package, Series 80 TOTAL was reported up and running right on schedule, not behind it. And unlike two other major packages, Series 80 TOTAL users were completely satisfied with its fast response time in actual operation.

EASILY ADAPTS TO CHANGE

It stands to reason that the more useful a DBMS is to management, the more they'll use it. According to the IDC survey, users integrated Series 80 TOTAL into an average of 41% of all applications. That's more than any other DBMS and almost twice as much as the next leading system.

That's because with Series 80 TOTAL's powerful data structuring capabilities almost any data relationship can be rapidly and easily defined.

And, as your business needs change, Series 80 TOTAL's modular step-by-step development capabilities are flexible enough to be adapted to change, quickly and economically.

You can add new data, new functions, even new applications without having to scrap, update, maintain or rewrite a dozen existing programs for every new one.

KEEPS ALL ITS PROMISES

Many DBMS packages promise to do everything we have just told you Series 80 TOTAL does. But when IDC asked DBMS users how they'd change their present package, Series 80 TOTAL was the only one of the three leading systems to emerge with a clean bill of health.

None of this is the least bit surprising. Because many of the new features and facilities that have made Series 80 TOTAL so successful come from more than 3,000 users who have used Series 80 TOTAL in almost half their operations over the last decade.

The end result is a DBMS that easily accommodates distributed processing, data base machines, even migration to the new IBM 4300 (because it supports VSAM) and TIS, Cincom's revolutionary new Total Information System. So, if you don't want to take our word, take the word of the users IDC surveyed.

Fill in the coupon below, or call Dennis Yablonsky, our National Sales Manager at (513) 662-2300 and we will review all the pertinent details of the IDC study. You will learn how Series 80 TOTAL has been designed and engineered for the 80's.

Contact us now, because the best time to find out how well a DBMS will do after it's installed, is before you buy it.

Please bring me proof of why Series 80 TOTAL outperforms the competition.

Name _____ Title _____

Company _____

Address _____

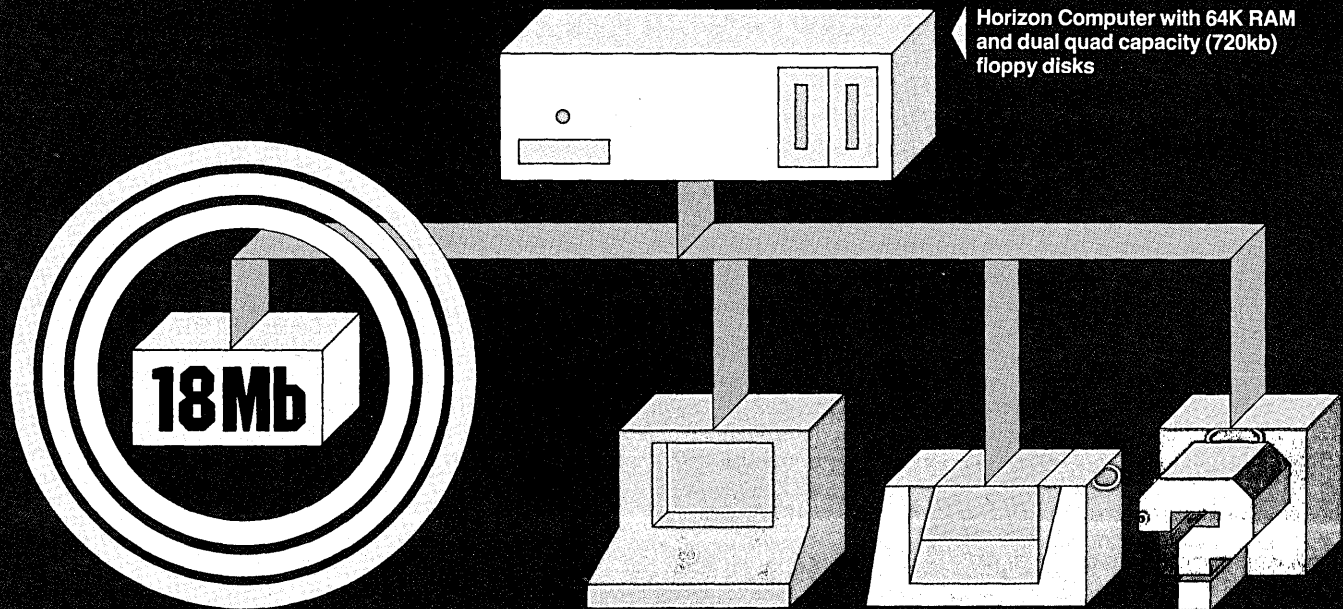
City State _____ Zip _____

Mail to: U.S.A.: Department D.C.
Cincom Systems, Inc., 2300 Montana Ave.,
Cincinnati, Ohio 45211, (513) 662-2300
International: Cincom Systems International,
17-19 Rue Montoyer, 1040 Brussels, Belgium,
(02) 511-6548



Cincom Systems
Systems Software Division

New on the North Star Horizon: 18Mb Hard Disk Drive!



Up to four 18Mb Winchester-type hard disk drives

Display terminal

Letter-quality or dot matrix printer

Horizon I/O flexibility allows expansion to meet your needs

Unsurpassed Performance and Capacity!

North Star now gives you hard disk capacity and processing performance never before possible at such a low price! Horizon is a proven, reliable, affordable computer system with unique hardware and software. Now the Horizon's capabilities are expanded to meet your growing system requirements. In addition to hard disk performance, the Horizon has I/O versatility and an optional hardware floating point board for high-performance number crunching. The North Star large disk is a Century Data Marksman, a Winchester-type drive that holds 18 million bytes of formatted data. The North Star controller interfaces the drive(s) to the Horizon and takes full advantage

of the high-performance characteristics of the drive. Our hard disk operating system implements a powerful file system as well as backup and recovery on floppy diskette.

Software Is The Key!

The Horizon's success to date has been built on the quality of its system software (BASIC, DOS, PASCAL) and the very broad range and availability of application software. This reputation continues with our new hard disk system. Existing software is upward compatible for use with the hard disk system. And, with the dramatic increase in on-line storage and speed, there will be a continually expanding library of readily available application software. For further information, contact the OEM sales department at North Star Computers, Inc.

North Star OEM Prices

HORIZON-HD-18

Horizon computer with 64K RAM, 2 quad capacity mini drives and one HDS-18 hard disk drive

\$5880*

HDS-18

Additional 18Mb hard disk drive for expansion of Horizon HD-18, or your present Horizon

\$3150*

*in OEM quantities

NorthStar

North Star Computers, Inc.
1440 Fourth Street
Berkeley, CA 94710
(415) 527-6950 TWX/Telex 910-366-7001

CIRCLE 95 ON READER CARD

THE NOMAD APPROACH

by Daniel D. McGracken

Writing software that is reliable, on time, and easy to modify remains today what it has always been: the limit on what we can do with computers. Attacks on this bottleneck have included such improvements as higher level programming languages, report writers, structured programming and design, reusable code, and specialized applications packages. All approaches have helped; none has solved the problem.

Here, we will present another approach: a data base management system combined with a flexible inquiry language. There are a number of systems of this general sort; we will discuss the one with which we are most familiar—NOMAD, which is available on the National CSS time-sharing network and with the NCSS 3200 series computers.

NOMAD can be used by non-dp people to gain quick access to existing data bases. Procedural language, subschemas, and protection of data integrity and security made it suitable for volume data entry by data entry clerks. It also has features for use by dp professionals either to prototype major jobs for improved communication with clients, or for implementing big systems.

Rather than supporting these assertions with abstract discussion, we will show some of the major features in the context of an illustrative application. The example necessarily involves a small data base for simplicity, but the five-year-old NOMAD has several thousand users in a variety of real-world applications, some involving very large data bases. We will conclude with the diary of a terminal session in which we work with a predefined data base of information about the stock holdings of the Jones family.

The numbering of the paragraphs that follow is keyed to the numbers in the left margin of the accompanying terminal session printout. Our input is printed in lower case, the system's response in upper case.

1. While in the CSS time-sharing mode, we print the schema for the illustrative data base. The data base has two masters (groups of data) in a relational implementation. STOCKMASTER is keyed on SYMBOL; INSERT=KEYED guarantees that no two instances of the master will be allowed (by NOMAD) to have identical keys.

For each data item in a master we specify an item name and the format in which it should be printed in reports (the external, or display, format). SYMBOL is three alpha-

```

1 13.22.48 >print jonestok schema

SCHEMA;

MASTER STOCKMASTER INSERT=KEYED(SYMBOL);
  ITEM SYMBOL      A3 HEADING 'STOCK:CODE';
  ITEM STOCKNAME   A25 HEADING 'STOCK NAME';
  ITEM LATESTPRICE $999.99 HEADING 'LATEST:PRICE';
  ITEM LATEDATE    DATE HEADING 'LATEST:PRICE:DATE';

MASTER HOLDING INSERT=KEYED(CODE, OWNER, PURCHDATE);
  ITEM CODE        A3;
  ITEM OWNER       A8;
  ITEM PURCHDATE   DATE HEADING 'PURCHASE:DATE';
  ITEM NOSHARES    9999 HEADING 'NUMBER:OF SHARES';
  ITEM PURCHPRICE  $999.99 HEADING 'PURCHASE:PRICE';
  ITEM CERTNO      A10 HEADING 'CERTIFICATE:NUMBER';
  DEFINE STOCK     EXTRACT'STOCKNAME
                   FROM STOCKMASTER KEY CODE';
  DEFINE PRICE     EXTRACT'LATESTPRICE
                   FROM STOCKMASTER KEY CODE';
  DEFINE PRICEDATE EXTRACT'LATEDATE
                   FROM STOCKMASTER KEY CODE';
  DEFINE MARKETVALUE $999,999 HEADING 'MARKET:VALUE'
                   EXPR = NOSHARES * PRICE;

END;

2 13.23.25 >nomad
NOMAD version 6 04JAN80
>database jonestok
3 >list segment stockmaster

PAGE 1

      STOCK          LATEST
CODE  STOCK NAME    PRICE  DATE
-----
AHG   AMALGAMATED MERCURY    $255.88 01/02/80
AMC   ACME MANUFACTURING     $122.22 01/24/80
CFI   COMPUTING FUTURES INC.   $53.88  01/24/80
CTE   COMBINED TAX EXEMPT FUND $28.39 12/31/79
DDD   DIGITAL DATA DISTRIBUTORS $69.87 01/24/80
OFF   OFFSHORE DRILLING CORP.    $ 2.16 01/02/80
RLD   RETAIL LUMBER DEALERS     $23.25 01/24/80
USC   UNITED STATES CHROMIUM    $378.50 01/24/80

```

numeric characters, LATESTPRICE is five digits with a dollar sign and a decimal point externally, etc. This is all we have to say; the program figures out the internal formats in which item values are stored in the data base. DATE is a special data type permitting much flexibility in the input and output of dates, as we shall see. For any item that does not have a HEADING entry, the item name will be used as a column heading in reports. If this is not suitable, a HEADING entry can specify the desired heading. Either can be overridden in asking

for the report, as we shall also see.

The DEFINE entries are instructions to NOMAD. The first three specify how to obtain data from the first master while asking for reports based on the second. The last DEFINE, of MARKETVALUE, refers to information that is not stored with the data at all, but is computed whenever needed.

2. Executing the CSS command NOMAD, we are in the interactive NOMAD environment. We specify the data base we wish to use.

NOMAD can be used by non-dp people to gain quick access to existing data bases.

3. We ask to see everything in the segment (master) named STOCKMASTER, and get a report formatted according to the information specified in the schema.

4. We ask for a listing in ascending sequence by stock name, and in ascending sequence by owner within each stock. (The BY calls for this sorting.) For each grouping we ask for the purchase date and the number of shares, and ask for a subtotal on the number of shares within each stock grouping. On the report, these subtotal lines are identified by asterisks; if we had added the modifier LABELST they would have been identified by the stock name instead of an asterisk.

When a command takes more than one line, we place a space and a hyphen at the end of all lines except the last.

5. A table is often the clearest way to present information, such as, for example, the market value of the stocks held by the family members. The ACROSS does this, with an automatic sort on the value of the item named in the ACROSS thrown in. Getting row and column totals is a matter of adding ROWTOT and TOTAL to the specification of what is to be in the body of the report. We could have asked for more than one thing to be reported in the table, with row and/or column totals on none, any, or all of them.

6. Now we would like a summary report showing the lowest and highest prices paid for the stocks owned by the Jones family parents, Fred and Martha, along with the current market value and the total change in value of each stock between the purchase date(s) and the latest price quote.

To compute the value change we use the DEFINE command, which we see can be done at execution time as well as by placing the DEFINE in the schema. Either way, the DEFINE causes the program to make the computation when (and only when) the DEFINED item is referenced. That is, the values resulting from the computation are not stored in the data base at all, but are computed at runtime as needed.

The screening of the data base to include only data for Fred and Martha is done by the SELECT, using an AMONG. The lowest and highest prices are obtained with the MIN and MAX report functions, and in each case we ask for the associated date. As with any date, we can specify the format in which we want it printed; here we ask for month and year. SUM is a report function that returns one value for each group generated by the previous BY. We specify a title, calling for today's date with the &DATE variable that is kept by the system, but in a different format from that of the dates in the body of the report. Since this will be a one-page report, we suppress the otherwise automatic page numbering.

After the report has been printed, we remove the SELECT screen, which would

```

4 list -
  by stock -
  by owner -
  purchdate -
  noshares subtotal for stock

PAGE 1

STOCK          OWNER          PURCHASE DATE  NUMBER OF SHARES
-----
ACME MANUFACTURING  FRED          02/29/72      40
                  MARTHA        08/01/74      40
*
                  80

COMBINED TAX EXEMPT FUND  FRED JR      06/01/78      60
                  12/01/78      70
                  JANE         06/01/78      60
                  12/01/78      70
                  MARTHA       06/01/78      60
                  12/01/78      70
*
                  390

COMPUTING FUTURES INC.  FRED          06/13/79      20
                  FRED JR      06/13/79      50
                  JANE         06/13/79      50
*
                  120

OFFSHORE DRILLING CORP.  FRED          02/29/72      100
                  02/20/76      400
*
                  500

UNITED STATES CHROMIUM  FRED          02/25/77      20
                  03/29/78      10
                  03/20/79      10
                  07/09/79      20
*
                  60

```

```

5 list -
  by code -
  across owner -
  sum(marketvalue) rowtot total

PAGE 1

CODE          FRED SUM MARKET VALUE  FRED JR SUM MARKET VALUE  JANE SUM MARKET VALUE  MARTHA SUM MARKET VALUE  TOTAL SUM MARKET VALUE
-----
AMC           $4,888
CFI           $1,077      $2,694      $2,694
CTE           $1,080      $3,690      $3,690      $3,690      $11,070
OFF           $22,710
USC           $22,710
=====
              $29,755      $6,384      $6,384      $8,578      $51,101

```

The Leader for full color graphic displays

**C², CCIS, Mission Planning, and Situation Analysis User Interface Consoles utilize
AYDIN CONTROLS 5216 Color Graphics Display Computer**

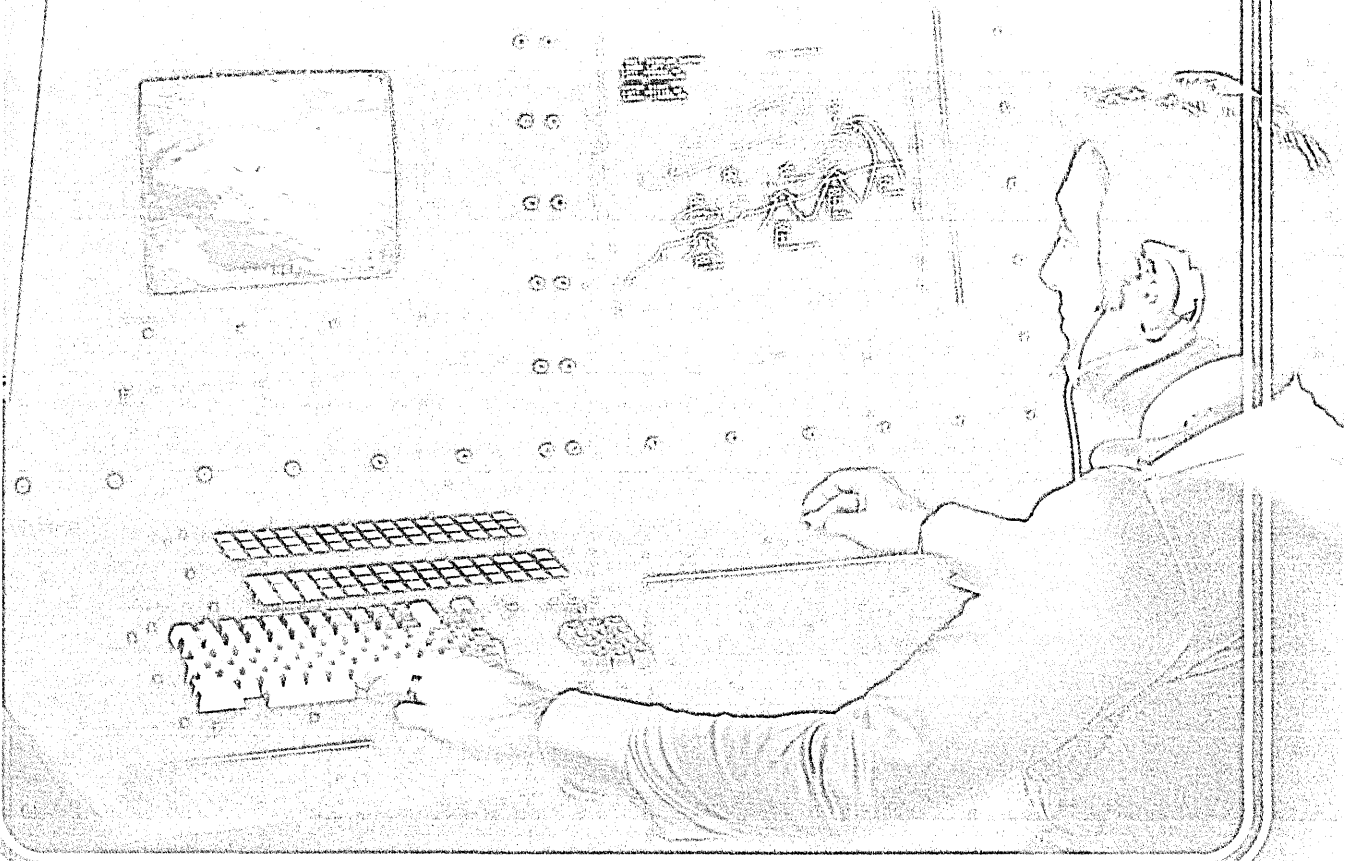
AYDIN CONTROLS 5216 multi microprocessor based color display console provides a complete intelligent color graphics system that includes multitasking, multiuser list processing utilizing the most advanced state-of-the-art hardware.

Designed for modularity and human engineering, the AYDIN color graphics system permits many configurations, enhancements and options.

The console is designed to meet the rigid requirements of NACSEM 5100 (TEMPEST).

Demanding programs like the BETA, BMEWS-TOR upgrade, Cruise Missile Mission Planning, and ANTIPO 27 Program currently depend on AYDIN CONTROLS' 5216 color graphics computer systems.

When your application requires high resolution, intelligent color graphics, data and communication processing, AYDIN CONTROLS' complete line of modular software and high reliability hardware can be customized and programmed for your application. Look to AYDIN CONTROLS — the pioneer and leader in military color graphics.



AYDIN  **CONTROLS**

The pioneer and leader in computer graphics

414 Commerce Drive • Fort Washington, Pa. 19034 • (215) 542-7300 • TWX 510-661-0518

CIRCLE 50 ON READER CARD

Visit Us At: **ANUSPEC**
Booth # 2105-2106

Dp professionals can use NOMAD to prototype major jobs for improved communications with clients.

otherwise apply to all subsequent operations in this terminal session.

7. As noted, this application was implemented using the relational model. (NOMAD also supports the hierarchical model.) This means, among many other things, that we can ask for reports in terms of the relationships between contents of different masters. For example, suppose we want a report showing which of the stocks in STOCKMASTER the Jones family does not own. The LIST request here says to prepare a report in sequence by SYMBOL, the name of the three-letter code on which STOCKMASTER is sequenced, but REJECT any value of SYMBOL for which there is a MATCHING value of CODE, the name of the three-letter code on which HOLDING is sequenced. This leaves those stocks in STOCKMASTER that are not in HOLDING; for each of these we also print the name of the stock. Other relational operators are MERGE, SUBSET, and EXTRACT.

Although NOMAD is a relational data base system, the usual terminology of that field (domain, n-tuple, Cartesian product, third normal form, etc.) has not been used, in an attempt to make the system more widely understood by general business users.

8. All the previous examples have involved producing reports from previously loaded data. NOMAD also has facilities for loading and maintaining data bases. The LOAD command can be used both to enter data into a data base initially and to maintain an existing data base. In either case, the external file is not required to have been established with this purpose in mind, and need not have been written by NOMAD.

For an example in our context, suppose we have a file containing today's prices for certain stocks. For simplicity, we'll assume that this update information is identified with the same three-character stock code we use here. We begin with a CSS FILEDEF command to identify the file, which could be a tape, card deck, sequential or ISAM file, or whatever, regardless of the type of program that wrote it. Then the LOAD command specifies that the STOCKMASTER master is to be updated: when the code in the external file matches that of an instance in STOCKMASTER, LATESTDATE is to be given today's date and LATESTPRICE is to be changed using the value from the external file. Nonmatching updates are simply to be ignored. For items in the external file that are in a different format from the way they appear in STOCKMASTER, we specify the necessary format data.

NOMAD's report that 67 transactions were rejected means that the external file contained data on stocks not in STOCKMASTER.

An ISAM file containing market update information is, in fact, commercially available. Since it contains data on tens of thousands of stocks and bonds, it would be

```
6  define valuechange as $999,999 heading 'value:change' -
    expr = (price - purchprice) * noshares

select owner among('fred', 'martha')

list by code -
  min(purchprice) heading 'lowest:price' -
    with purchdate heading 'as of' as date'mm-yy' -
  max(purchprice) heading 'highest:price' -
    with purchdate heading 'as of' as date'mm-yy' -
  sum(marketvalue) total -
  sum(valuechange) total -
  title 'fred and martha's stocks as of' -
    &date as date'dd mon yy' -
  nopageno
```

FRED AND MARTHA'S STOCKS AS OF 03 FEB 80

CODE	LOWEST PRICE	AS OF	HIGHEST PRICE	AS OF	SUM MARKET VALUE	SUM VALUE CHANGE
AMC	\$97.50	02-72	\$115.75	08-74	\$9,776	\$1,246
CFI	\$37.88	06-79	\$37.88	06-79	\$1,077	\$320
CTE	\$32.97	12-78	\$34.19	06-78	\$3,690	\$-668
OFF	\$0.88	02-72	\$1.88	02-76	\$1,080	\$240
USC	\$220.00	03-78	\$301.50	07-79	\$22,710	\$7,052
					=====	=====
					\$38,333	\$8,190

```
select clear
```

```
7  list by symbol -
    stockname -
  reject matching code -
  title 'stocks in stockmaster not held by jones family' -
  nopageno
```

STOCKS IN STOCKMASTER NOT HELD BY JONES FAMILY

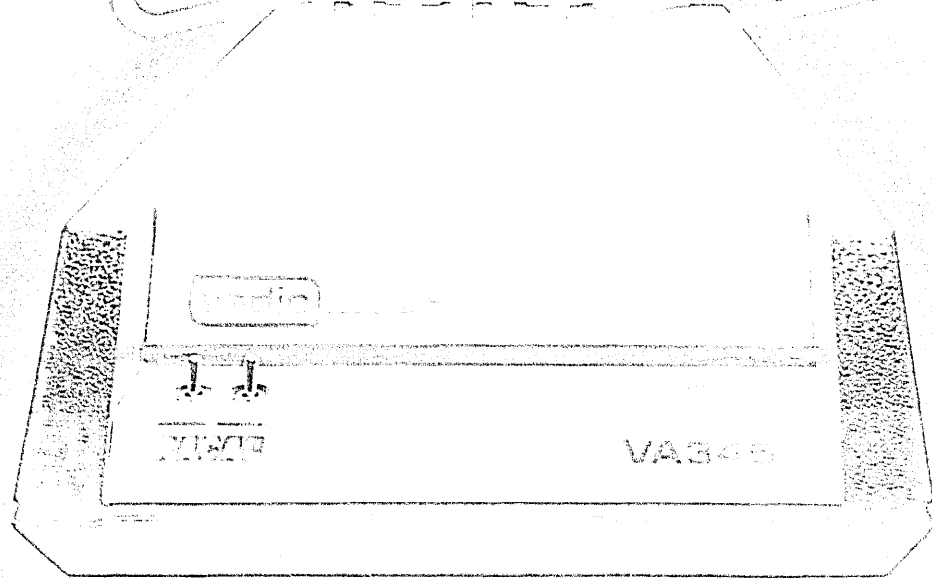
STOCK CODE	STOCK NAME
AHG	AMALGAMATED MERCURY
DDD	DIGITAL DATA DISTRIBUTORS
RLD	RETAIL LUMBER DEALERS

```
8  css filedef infile dsk updates data

load stockmaster -
  onmatch change latestdate = &date -
    latestprice -
  nomatch noinsert -
  read infile -
  set -
    &symbol -
    space -
    &latestprice form n5.2
```

```
LOA340: 67 INPUT TRANSACTIONS REJECTED.
NOMAD:
>quit
```

Triple Modem



Dear Ma,

Imagine a VA3400, a 212A, and a 103 in a low profile cabinet designed for remote terminal users.

Racal-Vadic has closed the loop, Ma, with a direct-connect, originate/answer TRIPLE MODEM for remote terminal users.

It combines a 1200 bps full duplex VA3400, a 1200 bps full duplex Bell type 212A, and a 300 bps full duplex Bell type 103 in a compact low profile cabinet. Including the VA3400 at NO EXTRA COST is very important, Ma. After all, Racal-Vadic invented the 1200 bps full duplex modem. There are over 60,000 in operation. Also, the VA3400 can be acoustically coupled while the Bell 212A can't. It has many technical advantages too, which, I guess, is why major terminal manufacturers are incorporating VA3400 modems into their new equipment.

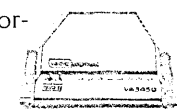
With TRIPLE MODEMS available for the central computer site, and remote ends of the network, users can lease or buy from Racal-Vadic and satisfy every full duplex switched network requirement from 0 to 1200 bps, which sure beats "renting forever."

Better phone for the whole story, or send for our new color brochure today.

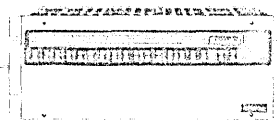
Your independent thinking son,

Alexander Graham Jr.

Member IDCMA



Remote Terminals
VA3450 Triple Modem



Central Computer Sites
VA3467 Triple Modem

222 Caspian Drive,
Sunnyvale, CA 94086
Tel: (408) 744-0810 • TWX: 910-339-9297

The Electronics Group

Available from these stocking reps...

Alabama: (800) 327-6600 • Alaska: (907) 344-1141 • Arizona: (602) 947-7841 • California: S.F. (408) 249-2491, L.A. (714) 635-7600, S.D. (714) 578-5760 • Canada: Calgary (403) 243-2202, Montreal (514) 849-9491, Toronto (416) 675-7500, Vancouver (604) 681-8136 • Colorado: (303) 779-3600 • Conn.: (203) 265-0215 • Dist. of Columbia: (301) 622-3535 • Florida: Ft. Lauderdale (800) 432-4480, Orlando (305) 423-7615, St. Petersburg (800) 432-4480 • Georgia: (800) 327-6600 • Illinois: (312) 255-4820 • Indiana: (317) 846-2541 • Kansas: (913) 362-2366 • Maryland: (301) 622-3535 • Mass.: (617) 245-8900 • Michigan: (313) 973-1133 • Minnesota: (612) 944-3515 • Missouri: (314) 821-3742 • New Jersey: North (201) 445-5210, South (609) 779-0200 • New York: Binghamton (607) 785-9947, NYC (212) 695-4269, Rochester (716) 473-5720, Syracuse (315) 437-6666 • N. Carolina: (800) 327-6600 • Ohio: Cleveland (216) 333-8375, Dayton (513) 859-3040 • Oregon: (503) 224-3145 • Penn.: East (609) 779-0200, West (412) 681-8609 • S. Carolina: (800) 327-6600 • Texas: Austin (512) 451-0217, Dallas (214) 231-2573, Houston (713) 688-9971 • Utah: (801) 484-4496 • Virginia: (301) 622-3535 • Wash.: (206) 763-2755 • Wisconsin: (414) 547-6637

Racal-Vadic Regional Offices: West: (408) 744-1727 • East: (301) 459-7430 • Central: (312) 932-9268 • Northeast: (617) 245-8790 • Southwest: (817) 277-2246

CIRCLE 112 ON READER CARD

Visit Racal-Vadic in booth 1838 and 1840 at NCG Show, Anaheim

We have a chance to see the implications of the proposed changes before making them.

inefficient to read the entire file with the LOAD, only to reject all but a tiny fraction of the total records. Instead, we would use DEFINE EXTRACT to obtain only those records that match stocks in our data base, which can be done rapidly.

9. We want to enter some new data shortly, and we're not happy with the data base design and organization. We would like to be able to identify the exchange on which each stock is traded—which requires a new item in STOCKMASTER—and we want to delete the certificate number item from HOLDING since it has not turned out to be as useful as we expected.

Getting out of NOMAD by typing QUIT, we invoke the text editor and make these changes in the schema.

10. Now we recompile the schema using SCHEMA, adding the optional word REORG to specify that the data base should be reorganized to reflect these changes, which of course impact the existing stored data as well as future data entry. Since adding one item and deleting another changes the entire contents of the data base, which could cause a great deal of pain if done incorrectly, NOMAD gives us a chance to see the implications of the proposed changes before making them. We could also have changed item lengths, added new aliases, headings, or DEFINES, brought in entire new masters, etc.

The REORG option is a powerful feature, responding, as it does, to the routine need to make changes long after systems are up.

11. We ask to see the first instance of STOCKMASTER. The newly added data item EXCHANGE has automatically been given the NOMAD value for missing values: "N/A", which is used to designate "not available" or missing—data. Using the interactive NOMAD CHANGE command, we change the N/A for stock exchange (EXCHANGE) to AMEX, move to the NEXT instance of STOCKMASTER and make its exchange NYSE, and move to the third instance and make its exchange OTC. We won't bother to change the others.

12. Now we want to enter some new data. We choose to have the program prompt us for the values of each STOCKMASTER item.

13. We want to enter data about three new purchases, all made by Fred. We give values to an & variable corresponding to the item for owner, then ask the program to prompt us for the other item values in STOCKMASTER three times. Getting impatient, we try to enter a date where we should have been entering a lot size; since the formats don't match, the value is rejected. Two impossible dates are likewise rejected.

Note, incidentally, that dates were entered here in four different formats, without any special notification to the program; with minor changes we could have entered dates in

```

9 13.28.34 >edit jonestok schema
EDIT:
>locate /stockname/
ITEM STOCKNAME A25 HEADING 'STOCK NAME';
>insert item exchange a8;
>locate /certno/
ITEM CERTNO A10 HEADING 'CERTIFICATE:NUMBER';
>delete
>file

10 13.29.19 >schema jonestok reorg
INTENDED CHANGES:

MASTER STOCKMASTER
ADD ITEM EXCHANGE

MASTER HOLDING
DELETE ITEM CERTNO

DO YOU WANT TO MAKE THE ABOVE CHANGES?(YES/NO)>yes

13.29.55 >nomad
NOMAD version 6 04JAN80
>database jonestok
11 >first stockmaster
AHG AMALGAMATED MERCURY N/A $255.88 01/02/80
>change exchange = 'amex'
AHG AMALGAMATED MERCURY AMEX $255.88 01/02/80
>next stockmaster
AMC ACME MANUFACTURING N/A $122.22 02/03/80
>change exchange = 'nyse'
AMC ACME MANUFACTURING NYSE $122.22 02/03/80
>next
CFI COMPUTING FUTURES INC. N/A $53.88 02/03/80
>change exchange = 'otc'
CFI COMPUTING FUTURES INC. OTC $53.88 02/03/80
12 >prompt stockmaster
SYMBOL=>ssf
STOCKNAME=>special situations fund
EXCHANGE=>otc
LATESTPRICE=>23.98
LATEDATE=>jan. 24, 1980
SSF SPECIAL SITUATIONS FUND OTC $23.98 01/24/80
13 >&owner = 'fred'
>prompt code noshares purchprice purchdate do 3
CODE=>ssf
NOSHARES=>50
PURCHPRICE=>23.98
PURCHDATE=>24 january, 1980
SSF FRED 01/24/80 50 $23.98
CODE=>cfi
NOSHARES=>100
PURCHPRICE=>53.88
PURCHDATE=>24 jan 80
CFI FRED 01/24/80 100 $53.88
CODE=>usc
NOSHARES=>1/24/80
PRO157: 1/24/80 - INVALID FORMAT
NOSHARES=>10
PURCHPRICE=>369.50
PURCHDATE=>1/32/80
DAT190: INVALID INPUT DATE '1/32/80'
ASG239: EXPRESSION CANT BE EVALUATED FOR &PURCHDATE
PURCHDATE=>2/29/81
DAT190: INVALID INPUT DATE '2/29/81'
ASG239: EXPRESSION CANT BE EVALUATED FOR &PURCHDATE
PURCHDATE=>2/29/80
USC FRED 02/29/80 10 $369.50

```


IF YOU LIKE OUR 3270 ALTERNATIVES, YOU'LL LOVE OUR NEW ASCII TERMINAL.

DELIVERING NOW!

With the new Telex 310 ASCII terminal, you get the same standard reliability and ease of use that have made our 3270 terminal line the widely accepted industry alternative.

We've designed the 310 to include standard features not offered or optional on other ASCII terminals. Like a big 15-inch diagonal screen that's easy to read. And a convenient movable 3270-styled keyboard for operator comfort. In short — we offer an ASCII terminal with many of the operator conveniences and performance features of our latest 3270 keyboard displays.

In addition, you can easily maintain the Telex 310 with on-hand spare modules or get convenient service by return mail at a Telex repair depot. Besides easy maintenance, the simple modular design also makes our ASCII terminal attractively priced.



New Telex 310 ASCII Terminal

FEATURE	TELEX 310	TEAR 310	ADIS 520	TELETYPE 1520	DATAEDIT 1521	IBM 3101-10/12
Teletype Compatible	STD	OPT	STD	STD	STD	STD
Self-Diagnostics	STD	—	—	—	—	STD
2000 Position Char/Display	STD	—	—	—	—	STD
25th Line	STD	—	—	—	—	STD
15-Inch Diagonal Screen	STD	—	—	—	—	—
128 Display Symbols	STD	—	—	—	STD	STD
Reverse Video	STD	—	STD	STD	—	STD
10-Digit Right-Justified Cursor Positioning	STD	—	STD	STD	STD	STD
Selectable Cursor Blinking	STD	—	STD	—	STD	STD
Detachable Keyboard	STD	—	OPT	—	STD	STD
Program Function Keys	STD	—	—	STD	OPT	STD
Numeric Key Pad	STD	OPT	—	STD	OPT	STD

*Based on published manufacturer specifications

The new 310 is teletypewriter-compatible and features all 128 ASCII characters. Its non-glare screen displays 1920 characters on 24 lines with a standard 25th line for status indicators. The 3270 typewriter-style detachable keyboard has a total of 87 keys, and includes a 10-key numeric pad and program function keys to reduce multi-keystroke tasks. And the Telex 311 matrix printer provides hard copy print-out of displayed information.

Feature-for-feature, there's no better priced ASCII terminal available for your interactive applications. Generous volume discounts save you over 25% in purchase price, too. For more information, contact your nearest Telex representative, or fill out the coupon and mail today.

I'd like to know more about the complete Telex 310 ASCII Terminal and 311 Printer.

Send me more information. Please have a Telex representative contact me.

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____ Phone _____

The innovation continues... **TELEX**

Telex Computer Products, Inc.
Terminals/Peripherals/Data Entry and Word Processing Systems/OEM Products

6422 East 41st/Tulsa, Oklahoma 74135/(918) 627-1111
362 Consumers Road/Willowdale, Ontario M2J 1P8/(416) 494-4444

SEE US AT THE NCC,
BOOTH 2553.

A procedure can send user-specified error messages for unacceptable data.

other formats as well.

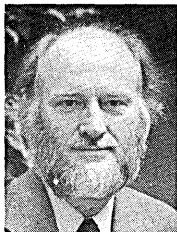
14. Here, we'll prepare a report in decreasing sequence of average purchase price for each stock, showing also the number of lots, the number of shares, and total market value.

A report like this, along with some of the others, would probably be needed on a routine basis. It would be poor practice to require that such requests be typed in each time the reports are needed, which is slow and error-prone. NOMAD provides a procedural mode in which we can prepare a file containing the procedure; its name then becomes—for us—a new command. A procedure is in effect a user "program" written in NOMAD commands; any command that can be issued interactively can also be issued from within a NOMAD procedure. A procedure can prompt for input, send user-specified error messages for unacceptable data, call other procedures, INCLUDE prewritten procedure sections, and use DO-groups in IF-THEN-ELSE constructions, among other things.

In running this example we begin by invoking the text editor to create a procedure named AVRPRICE to carry out the needed actions. After entering the text we print the file to check for errors, then file it and execute it by typing its name as a (new, for us) command. Observe that in a procedure hyphens are not needed, since each command is terminated with a semicolon.

The procedure begins by creating a temporary data base containing the information needed for the report, using an expression in a CREATE command, modifying headings, employing report functions, specifying formats (the AS 9999), and naming some of the created items for simplicity in the following LIST. The LIST then produces the report. Note here the departure from prior indentation conventions: five item names appear on one line. All such conventions are at the discretion of the user. *

DANIEL D. McCracken



Daniel D. McCracken is an author and consultant who has been a frequent contributor to DATAMATION. He is currently

completing his two-year term as president of the Association for Computing Machinery (ACM). His latest book is *A Guide to NOMAD for Applications Development*, (Addison-Wesley, Reading, Mass., 1980).

```

14 >edit avrprice
NEW FILE.
INPUT:
>define lotprice as 999999 expr = purchprice * noshares;
>
>define exch as extract'exchange
>  from stockmaster key code'
>;
>
>create by code
>  first(exch) heading exchange
>  (sum(lotprice) / sum(noshares)) as $999.99
>  heading 'average:price' named averprice
>  number(stock) as 9999 heading 'lots' named lots
>  sum(noshares) heading 'shares' named shares
>  sum(marketvalue) heading 'value' named market
>;
>list from temp
>  by averprice desc
>  code exch lots shares market
>  total all
>nopageno
>;
EDIT:
>top
>print 99
DEFINE LOTPRICE AS 999999 EXPR = PURCHPRICE * NOSHARES;

DEFINE EXCH AS EXTRACT'EXCHANGE
  FROM STOCKMASTER KEY CODE'
;

CREATE BY CODE
  FIRST(EXCH) HEADING EXCHANGE
  (SUM(LOTPRICE) / SUM(NOSHARES)) AS $999.99
  HEADING 'AVERAGE:PRICE' NAMED AVERPRICE
  NUMBER(STOCK) AS 9999 HEADING 'LOTS' NAMED LOTS
  SUM(NOSHARES) HEADING 'SHARES' NAMED SHARES
  SUM(MARKETVALUE) HEADING 'VALUE' NAMED MARKET
;

LIST FROM TEMP
  BY AVERPRICE DESC
  CODE EXCH LOTS SHARES MARKET
  TOTAL ALL
NOPAGENO
;
EOF:
>file
NOMAD:
>avrprice

AVERAGE
PRICE  CODE  EXCHANGE  LOTS  SHARES  VALUE
-----
$276.46 USC  N/A        5     70     $26,495
$106.63 AMC  NYSE       2     80     $9,776
$45.15  CFI  OTC        4    220    $11,853
$33.52  CTE  N/A        6    390    $11,070
$23.98  SSF  OTC        1     50     $1,199
$1.68  OFF  N/A        2    500    $1,080
=====
                20   1310  $61,473

NOMAD:
>quit

13.50.15 >

```

With Kodak film... get it on, get it out. Faster, cheaper.

These days, every impact your printer makes on paper makes an even bigger impact on your budget.

Consider that in 1978 you had to pay about \$18.64* for 1000 pages of 3-part computer paper.

By 1979, that price had increased by nearly 36%, to \$25.29.

And this year, it could hit about \$29.00—56% more than it was two years ago.

That's why it makes more sense to use a Kodak Komstar microimage processor. This dry laser printer doesn't use *any* paper. It prints on microfilm, instead. Rather than spending \$29.00 to print a 1000-page, 3-part report, you'll spend only about \$1.00—the price of 9 microfiche.†

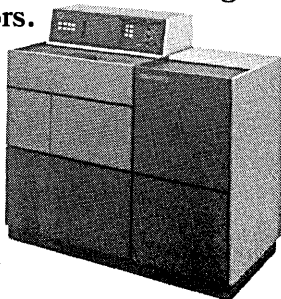
A Kodak dry laser printer works on-line *or* off-line. It's 6-8 times faster than an impact printer, which means you'll save more on time and labor. Decollating, bursting, binding, and packaging a 1000-page report takes almost 50 minutes against only 9 minutes to print, duplicate, and package the *same* report on microfiche.

If savings like these interest you, send us the coupon for more information. Or ask your Kodak representative for a demonstration of Kodak Komstar microimage processors.

Better do it soon, though. Because you'll never know how much you can save on paper until you start using a printer that never needs any.

*Prices vary with geographic location and grade of paper purchased.
† Includes one original set and two duplicate sets.

Kodak Komstar microimage processors.



© Eastman Kodak Company, 1980



EASTMAN KODAK COMPANY • Business Systems Markets Division
Dept. DP0594, Rochester, NY 14650
(716) 724-4877

Please send me more information about Kodak Komstar microimage processors.

Please have a Kodak representative contact me.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____ CITY _____

STATE _____ ZIP _____ PHONE _____

My total monthly volume of computer printout pages is _____

TANDEM NonStop™ PATHWAY

NOW ON-LINE'S AS EASY TO PROGRAM

On-Line Programming—25 to 50% cheaper. User developed on-line applications packages just got a whole lot easier. And better. Not to mention 25 to 50% cheaper. We've eliminated all the time-consuming grief of dealing with terminal handling characteristics for one. And not incidentally, there's even greater protection in data base integrity, too.

PATHWAY has all the programs, procedures and structures you need to get your applications up and running, in NonStop™ operation, in record time. Inexpensively.

Terminal Independent Applications.

By taking the on-line programming task on in component parts rather than attacking it as an all-encompassing, monolithic whole, PATHWAY software makes the transaction processing system job relatively simple, and frees the application programmer from concern over terminal characteristics.

PATHWAY handles four of the critical operations in transaction processing applications as modular, inter-connectable elements: Terminal Interface handles multi-terminal I/O; Field Validation performs

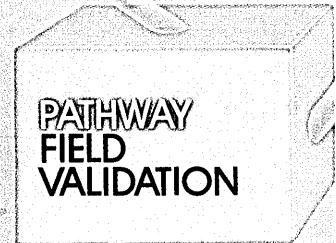
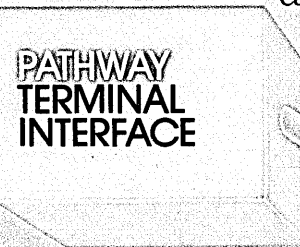
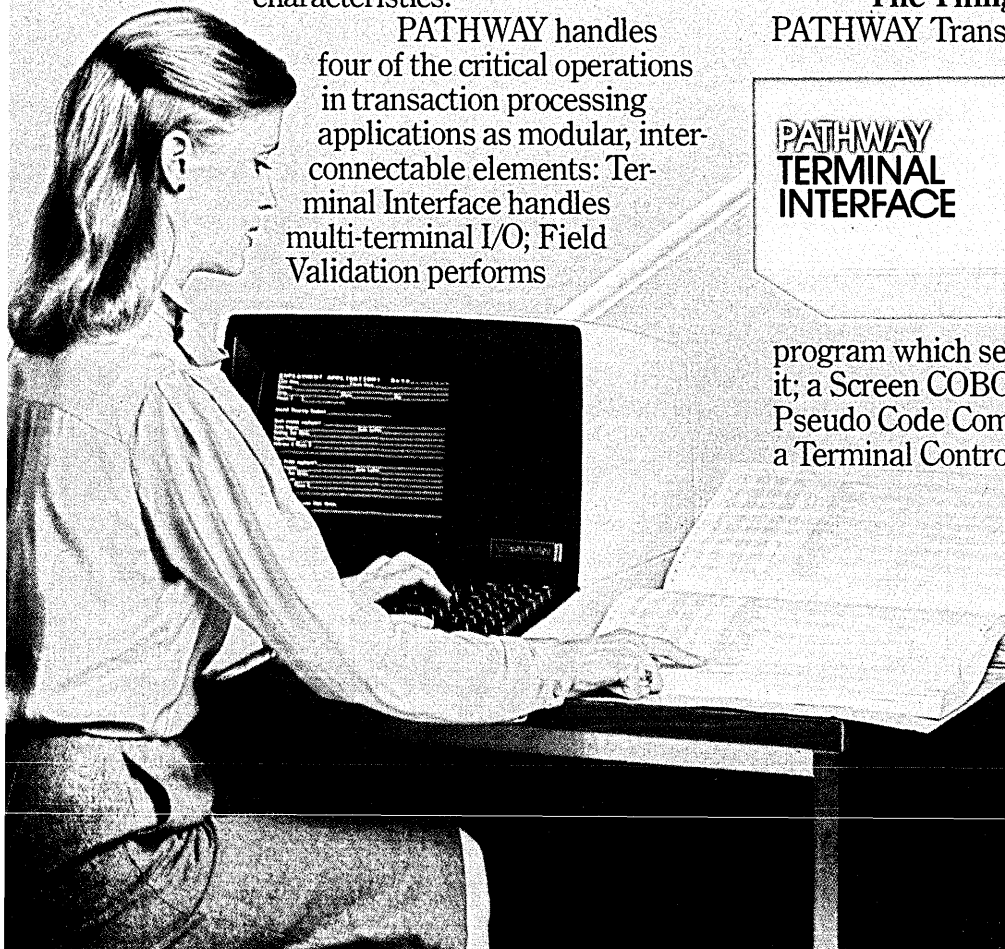
data consistency checks; Data Mapping controls data conversion and formatting; and Transaction Control covers application and transaction flow. Each resource is partitioned, with well-defined interfaces between them. This is the secret to a modular systems' success. It allows optimized utilization of all the resources and permits additional resources to be dovetailed into the system as needed—without rewrite, without redesign and without degrading system performance.

We Speak Your Language. When it's time for the fifth operation—interaction with the data base—a Data Base Application Program can communicate in any of the languages available on the Tandem NonStop™ System: industry standard COBOL, FORTRAN, MUMPS, or our own transaction-oriented language, TAL, all facilitated by Tandem ENSCRIBE to interact with the Data Base management capabilities.

The Things You Can Forget. The PATHWAY Transaction Processing System capabilities include an Interactive Screen Builder which builds the screens interactively at a terminal, independent of the application

program which serves it; a Screen COBOL Pseudo Code Compiler; a Terminal Control

Program to interpret the pseudo code library and



AS BATCH.

check the flow and content internally; the Applications Monitor which has power to create, track and alter the application run time environment; and finally the Application Monitor Control Language which lets an operator communicate with an active Application Monitor. It's a powerful system, easy to use and inexpensive. With everything you need to get your on-line transaction applications up and running, with all the benefits of a NonStop™ System, in record time.

Dynamic Load Balancing. It comes from taking logical advantage of the multi-processor environment. There is no need for the programmer to consider load balancing with the PATHWAY Transaction Processing System. It's handled automatically; with additional copies of PATHWAY applications started in designated CPUs as needed. And deleted when no longer required. Dynamic load balancing—built into the system's resource management capabilities.

And PATHWAY software also takes full advantage of the unique multi-page storage capabilities built into our new 6520 terminal.

PATHWAY DATA MAPPING

Because terminal mapping translates physical into logical characteristics, programmers can forget about code signal conversions and call on terminals by name. And there's one more major advantage of the PATHWAY Transaction Processing System: one

PATHWAY TRANS- ACTION CONTROL

system can be used for convenient development, testing and production of application packages.

The Tandem NonStop™ System. Even when it wasn't this easy, it was miles ahead in the on-line world. With immediately available alternatives in all hardware and software elements, the NonStop™ System can go right around any failed element and never skip a beat. Even when a failure occurs in a processor, an I/O Channel, a disc, or a disc controller. Remarkable.

This is the one system in the world which lets you start with only the computing power you need right now and add as your needs grow, in low cost modular elements. From an entry level two processor system, you can go to sixteen processors with thousands of terminals and not lose one cent on your original investment.

Protection From Loss. Because of its unique parallel operation at all critical points, no transaction in process is ever lost or duplicated.

The data base and programs in operation can be readily duplicated, hence completely protected from damage or destruction.

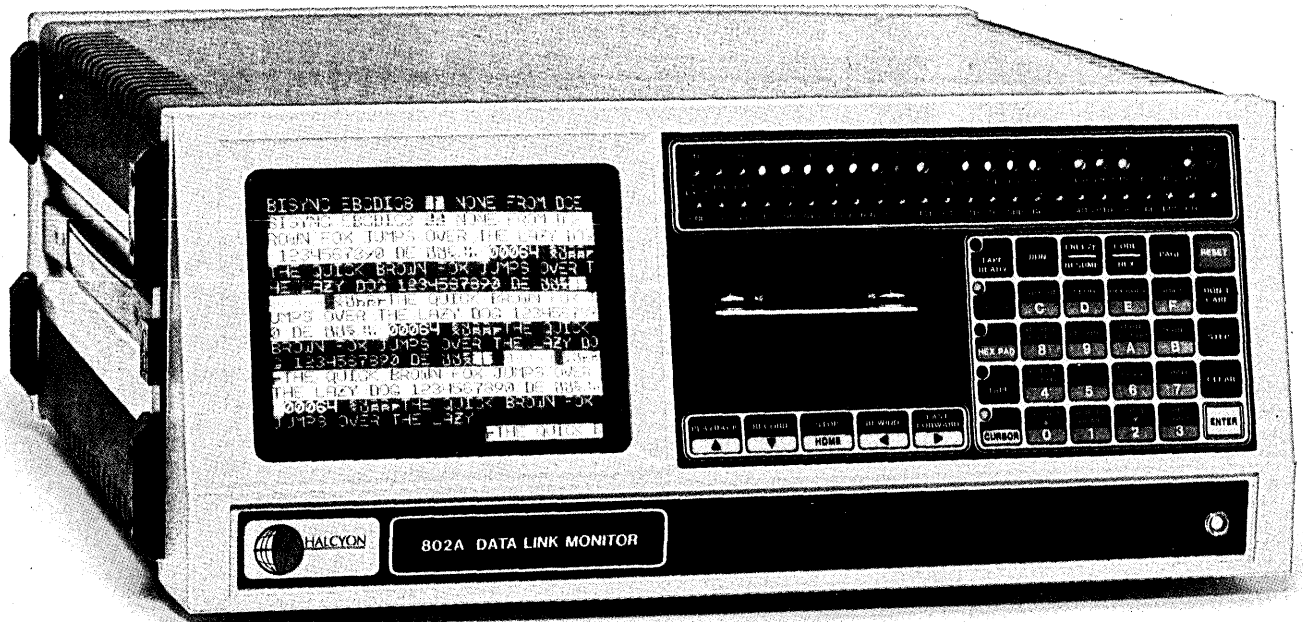
RECORD IN RECORD OUT DATA BASE SERVICE

For Complete Information. Call or write for a demonstration of our unique capabilities, and for the name and address of your local Tandem sales and service representatives, domestic and international.



TANDEM

Worldwide Headquarters: Tandem Computers, Inc.,
19333 Vallco Parkway, Cupertino, California 95014
TOLL FREE 800-538-3107 or (408) 725-6000 in California.



Automatic data monitoring. Just plug in and power up.

There's no question about it. Automatic data monitoring is big news. Since we introduced the 802A Data Link Monitor, people have come to realize that there's no need to program or set switches for standard line codes, protocols, bit rates, and other configuration parameters. The 802A automatically detects full line configuration details—in both transmission directions.

Now there's more big news. You can use the 802A for real-time data recording. In addition to the capture buffer (up to 8K), the 802A can be equipped with an on-board recorder for permanent storage of up to 500K bytes of real-time data.

When you consider the instrument's extensive timing, counting, and trapping capability, that 500K

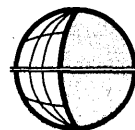
represents a lot more than raw data. A relatively inexperienced technician can collect the data, then bring it back for expert analysis: Everything from the efficient solution of transmission problems to the accumulation of statistics on response time, block lengths, and so on.

Regardless of whether you order the on-board recorder, the 802A offers outstanding capability. It automatically monitors any line at up to 56K bps, full duplex. The large, 7-inch (diagonal) CRT displays up to 512 or 1024 characters in either the line-multiplex or time-multiplex mode. And captured data can be shifted one bit at a time to achieve synchronization. For bit-oriented protocols, a cursor on the control field can be used to literally take each character apart and explain it.

Then there's color. The built-in display uses normal, reverse, and dim video, plus flashing and underlining for an unambiguous presentation. But the instrument is also equipped to drive an external color monitor—in as many as seven distinctive colors.

And don't forget transmitting capability. You can poll terminals, send a block of just-received data to a terminal or printer, or perform bit error rate tests (BERT). Not many monitors can do that.

In fact, you won't find any monitor that does everything the 802A does. Get the full story from your Halcyon sales engineer. Then get ready to plug in and power up.



HALCYON

1 Halcyon Plaza
2121 Zanker Road
San Jose, California 95131
(408) 293-9970
TWX 910-338-0562

A Torotel Company

DOMESTIC SALES and SERVICE CENTERS: Los Gatos, CA, 408/356-6136, TWX 910-597-5390. Irvine, CA, 714/851-1057. Fort Worth, TX, 817/732-1851, TWX 910-893-4036. Oak Brook, IL, 312/325-8171. TWX 910-651-2141. Piscataway, NJ, 201/981-0650, TWX 710-997-9671. Atlanta, GA, 404/394-3730. TWX 810-757-0133. **GOVERNMENT SALES:** Wilmington, DE, 302/654-2611, TWX 510-666-2099. **INTERNATIONAL SALES:** Direct all inquiries other than Europe to Company Headquarters. **EUROPEAN OFFICE:** Rosenheimerstrasse 34, 8000 Munich, West Germany. Phone: 089 482083, TLX: 523915. **REPRESENTATIVE OFFICES WORLDWIDE.**

A user tries to get his malfunctioning new microcomputer system to work, but falls between two vendors.

DIARY OF A MULTI-VENDOR PURCHASER

by Ronald S. Lemos

July 2, 1978

The School of Business received a Motorola 6800 microcomputer system today. It has 32K of memory, a dual floppy disk, and a printer. The entire system can fit on one desk and supports not only BASIC, but FORTRAN and COBOL as well. It was acquired in connection with some governmental contract work, but we teachers have been encouraged to use it for instructional purposes. Since students will be using these systems in the future, it makes sense to incorporate microcomputer systems into our programs. I'll look into this further.

Sept. 2, 1978

After using the microcomputer in my classes during the past quarter, I am convinced it is an effective instructional tool. Students deal with the actual hardware, work directly with the system software, are directly involved in computer operations, and learn maintenance responsibility. The biggest problem is that a single-user microcomputer is not enough to handle the volume of students in our course (1,200 students per year in our introductory computer courses alone). We need more microcomputer systems, preferably with multi-user access capabilities. These resources could also be used to handle some of the instructional workload of the almost saturated minicomputer.

Oct. 18, 1978

After some heated discussion, the department has decided to use 1978/1979 equipment allocations to purchase another microcomputer system. About \$15,000 is available. The opponents of this decision felt that the money would be better spent buying additional terminals to hang on the current minicomputer. They also felt the department was inviting trouble by "going into the computer center business." While these are valid points, I have become partial to the microcomputer. In any event, I have been given the responsibility of developing the proposal.

Jan. 3, 1979

What a hectic winter quarter! Writing the proposal was tough—revision after revision. After evaluating seven microcomputer systems, I found only one that had multi-user capabilities and could be configured with four crts and a printer for around \$15,000. However, just as the proposal was completed, it was brought to my attention that requests for microcomputer purchases could be expedited if the cost estimates were under \$10,000. Some quick rewriting resulted in two proposals. One proposal was for the microcomputer system with 128K and dual floppy disk drive—\$8,900. The other proposal was for the four crt terminals and printer estimated at \$6,465. I hope both proposals are approved.

May 27, 1979

Both proposals approved. Invitation For Bids have been sent out.

June 7, 1979

Found out (Vendor A called me) that the bids have been awarded—to two different vendors. Vendor A will supply microcomputer system and Vendor B will supply the four crts and the printer. I am pleased. I might get the chance to use this equipment this summer and then in my classes this fall.

June 14, 1979

The purchase order for the four crts

and the printer have been sent to Vendor B.

June 25, 1979

The crts and the printer have arrived. They look just great. I can hardly wait to get them hooked up.

June 27, 1979

The purchase order for the microcomputer system has been sent to Vendor A. Soon the system will be ready to go.

Sept. 25, 1979

The microcomputer system has finally arrived. It would have arrived earlier if there hadn't been a misunderstanding on the purchase order which necessitated redoing the memory configuration. However, after the field engineer set the system up he could not get the printer to work. He has promised to get a more experienced hardware and software person to come out and solve the problem.

Oct. 3, 1979.

The field engineer returned with the maintenance contractor used by Vendor A. He then ran the maintenance checks on the printer that are described in the manual. He could find nothing obviously wrong with the printer. Then he started in on the microcomputer system. For several hours he made changes to the system files and the microcom-

After the field engineer set the system up, he could not get the printer to work.

puter hardware (clipping leads, changing cables, taking meter readings, etc.). I tried to keep out of the way. All combinations of adjustments were to no avail. He finally got the printer to work by adjusting the system software and the hardware switches to run the printer at 300 baud. I had been told that the printer would be able to run at 2,400 baud; this is what we need. After more attempts to get the printer to run at higher baud rates, the technician concluded the problem had to be in the printer since the microcomputer had been checked out by Vendor A, and in rechecking it he could find nothing wrong. The "official" line was that the printer was not handshaking with the computer.

Oct. 4, 1979

Called Vendor B about the printer problem. It checked its records and told me that while there was a 90-day warranty from the peripherals manufacturer, the warranty from the vendor (a different firm) was for 30 days. Since we had received the equipment on June 25, the warranty period had expired and service requests were to be directed to the manufacturer.

I understood his position, but told him that our particular circumstance precluded testing the equipment when it arrived since we did not receive the microcomputer until four months later. My argument of keeping with the spirit of the warranty instead of the letter was not successful. However, he did offer to troubleshoot for me over the telephone. After directing me through several hardware tests of the printer, he concluded that the problem was not in the printer but in the computer system (hardware and/or software).

Oct. 5, 1979

Vendor A reaffirmed its belief that the problem was with the printer, but did invite me to bring the computer and printer to its store (about 10 miles away) for further testing. I declined for the time, deciding to learn more about the system so I could communicate effectively with both vendors.

Oct. 18, 1979

After working with the system for almost two weeks, I learned quite a bit but could not get the system to work properly. To settle the question once and for all, I decided to take the printer to Vendor A to see if the printer would work on its computer system. (The system was running the exact printer we had purchased.)

I was positive the printer was going to work perfectly on Vendor A's system. However, when we set it up, it refused to work. Vendor A conceded something might still be wrong with our microcomputer system, but suggested that we get the printer fixed as a first step.

A request for service on the printer was then initiated and sent through the necessary administrative channels.

Oct. 30, 1979.

The service order was finally approved and the manufacturer of the printer contacted.

Nov. 1, 1979.

The service man came out to look at our printer. After several tests he concluded that nothing was wrong with the printer. He emphasized that if the printer worked at 300 baud, it should also work at 1,200 or 2,400 baud. Although he was unfamiliar with our computer system, he felt the problem was probably in our interface port. After telling him I had been assured by Vendor A that the computer system had been set up correctly, he telephoned his main office to describe our problem.

After talking with them and rechecking our computer, he said that in addition to having the wrong lead cut on the computer's I/O board (by Vendor A), the problem was that we did not have an option known as a "buffer board." According to him, this buffer board allowed the printer to work at higher baud rates. It cost \$205.

The next order of business was to find out why we didn't receive this important option. It did not make sense that a high performance printer would be sold (\$1,791) to operate at only 300 baud.

The following question was asked: Should we have received the buffer board from Vendor B? Here are the responses:

Printer Manufacturer: We don't know. It is hard to keep track of how all the distributors of our products conduct their business.

Vendor A: All we know is that when we sell that exact printer model, we make no modifications to it and it always works perfectly. It appears to come from the manufacturer ready to go.

Vendor B: If it wasn't specifically mentioned in the purchase order, then it was not sent. (It wasn't, since I hadn't heard of it before and it is not even mentioned in the manufacturer's sale literature.)

Nov. 10, 1979.

Resigned to the fact that we had a high-priced, 300 baud printer, I decided to carry the microcomputer back to Vendor A to set it up for operation at the slower baud rate (it had initially been set up for 2,400 baud) until I resolved the problem of the buffer board. In addition, my familiarity with the system indicated that the configuration of the 128K of memory was not ideal for our needs. Therefore, I asked that it be reconfigured to my specifications (a very nontrivial task). It would be ready in a week.

Nov. 17, 1979.

The computer is not ready. Vendor A is having trouble reconfiguring the system. The printer manufacturer is being very helpful and following up on my problems.

Nov. 19, 1979.

A technician from the printer manufacturer gave me a call. The problem is not the buffer board. The buffer board is only necessary for another vendor's equipment.

What is the problem? Is it the computer hardware, computer software, printer, or some combination of these three? At this point, I can just hear my colleagues who were not in favor of purchasing a microcomputer reemphasize the dangers of going into the "computer center" business.

Nov. 20, 1979.

Called the computer manufacturer to remind it of our problems. It will call Vendor A and try to resolve the problems.

Nov. 26, 1979.

The computer manufacturer's systems analyst can't get a hold of Vendor A's technician, so he called me. He knows what the problem is. To get our printer to work properly, the correct leads on the I/O port cables need to be cut and a jumper on a circuit board in the printer has to be positioned correctly. Its conclusion is that there was never anything wrong with either the computer or the printer. The system had just not been set up right.

Nov. 27, 1979.

Contacted Vendor A to relate my conversation with the computer manufacturer. The technician appeared to be surprised about the directions for clipping the I/O port cable leads, indicating that things must have been changed. He agreed to do the work.

Nov. 29, 1979.

Went to Vendor A to pick up the computer. I asked to see the work that had been done, since I was somewhat knowledgeable. I observed that the ports were still set up wrong. After I called this to the attention of the technicians, they set them up correctly.

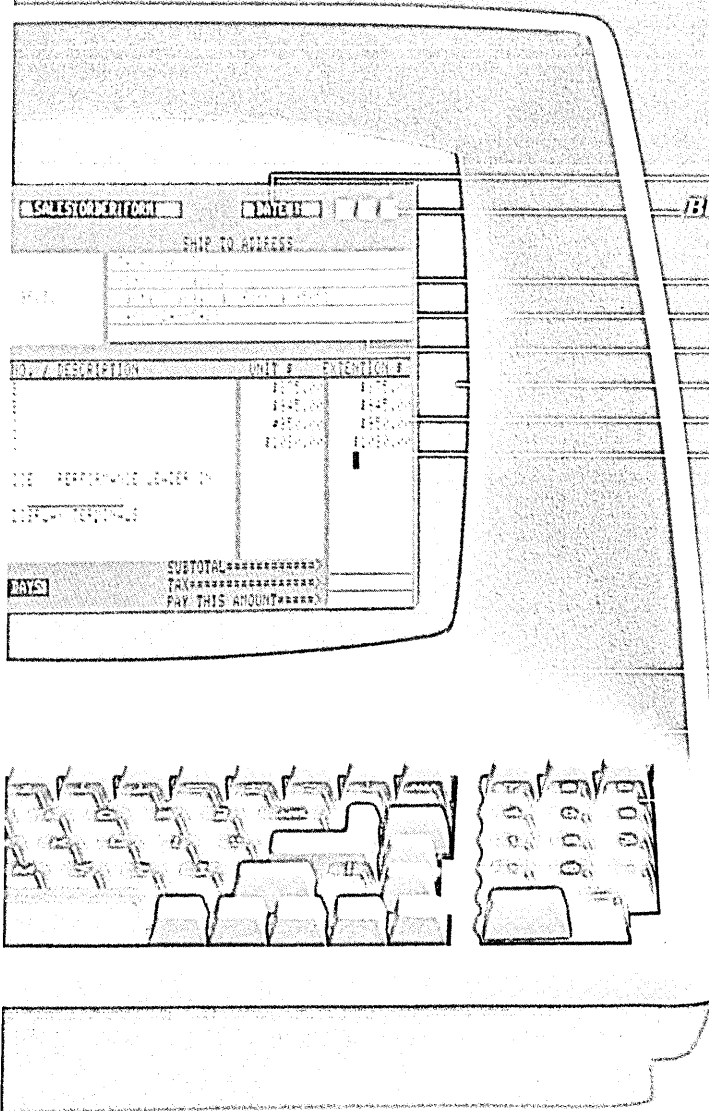
I took the computer back to school and set it up (2,400 baud), held my breath, and initiated a PRINT command. The system worked perfectly. At last, the "turnkey system" was working.

Nov. 31, 1979.

After the jubilant feeling of seeing the printer actually work, I decided to figure out exactly what had gone wrong.

The printer has several strappable options for the processor board. For example, the EIA (serial data) interface, the DNB (data terminal not busy) function is selectable. The position of a jumper determines if the DNB function is ON LINE or ON LINE AND NOT BUSY.

COMPARE SMARTS.



Reverse video
Blinking/blank fields

Upper/lower
case char.

Protected fields

Underlining

Non-glare screen

12 x 10 char. res.

Blinking cursor

9 Baud rates
(75-9600 Baud)

Self test

Auxiliary port

Monitor self keys

Hydrocarbon/MSX
keyboards

Smartcarts and

video-cassette storage

Feature-for-feature our smart CRT terminals cost less than *their* dumb ones. Much less. Compare smarts. Then compare price. You'll pick TeleVideo.

Four different models to choose from. Each with features you'd expect to pay extra for. But with TeleVideo, they're standard.

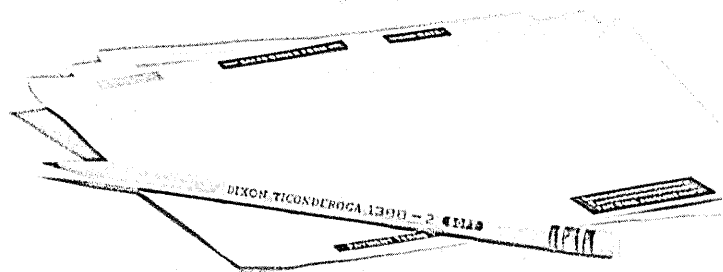
We put a lot of engineering savvy into our CRTs. Their modular design means high reliability. It also lets us build in high volume. And sell to you at low prices.

Find out how you can make your next CRT buy a smart one. Contact TeleVideo today for information.

Nationwide Field Service is available from General Electric Co., Westinghouse Electric and Communications Department Service shops.



TeleVideo, Inc., 3510 Commodore St., Santa Clara, California 95051
Phone (415) 728-5020



COMPARE PRICE.

CALIFORNIA Costa Mesa (714) 557-6095 • ILLINOIS Oak Grove Village (312) 981-1706 • MASSACHUSETTS Boston (617) 668-6891
NEW YORK/NEW JERSEY Paramus (201) 265-1321 • TEXAS Dallas (214) 980-9978

CIRCLE 117 ON READER CARD

See Us At NCC
Booths 1264, 65

The vendor said the problem was not in the printer but in the computer system.

When we received the printer, the jumper was in the ON LINE position. However, the jumper must be placed in the other position for the printer to function at 2,400 baud; otherwise, the printer will only work at 300 baud.

In addition, the serial interface signals are defined so that two pin numbers, Reverse Channel (Pin 11) and Data Terminal Ready (Pin 20), need to be coordinated with the jumper. Vendor A had set up the microcomputer hardware and software system as if handshaking was being done through Pin 11, while in reality Pin 20 was involved. Unfortunately, it had made two errors—one of omission and one of commission. It had not checked the jumper and had clipped the wrong lead (for Pin 11). When questioned further, Vendor A said that all its systems were shipped the way ours had been initially set up and it had never had problems before.

In any event, there was never anything physically wrong with the computer system or the printer. The system had not been interfaced correctly. It seems that Vendor A and/or Vendor B should have been able to correct our problems from the start. A lot of inconvenience and frustration was caused and the system could not be used as planned for

the entire quarter.

At least this experience can serve as firsthand lecture material on the problems of dealing with two vendors. In case there is difficulty, each will have a tendency to point to the other, and it is very difficult to determine the problem.

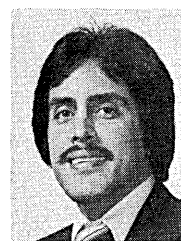
Is there any solution? Yes. Just do as Vendor A suggested—deal with only one vendor. This is sometimes easier said than done. In a university situation, the department doesn't have any control over the vendor that is awarded the contract. The award, based on price competitiveness, is made by a centralized procurement group. Yet price is not the most important factor to the end user, especially when dealing with small firms. Service should be a main consideration. In addition, the potential problems of dealing with multiple vendors should be acknowledged. While service contracts can be purchased, they are usually very expensive and hard to justify to budget-minded administrators. However, experience may show this to be the best approach to the problem.

Dec. 1, 1979.

I give up! Today I hooked up all four

terminals. Crts 1, 2, and 3 came up perfectly. Crt 4, however, failed to come up. It appears to be communicating with the microcomputer but the video screen remains dark. It is of course out of warranty. This time, however, I am sure the problem is that Vendor B sent us a defective terminal. Of course, there is still the possibility. . . . *

RONALD S. LEMOS



Dr. Lemos is an associate professor of business information systems at California State Univ., Los Angeles. His

computing interests include programming language learning, system design, and microcomputers, and he has written articles on these subjects for major computing periodicals.

A New Reader from Intermec

* BAR CODE *

All Codes in One Package

The new Intermec Model 9300 Bar Code Reader lets you read all common bar codes with speed and accuracy. Easily accessible program switches let you select between 8 different codes.

Smallest On-Line Reader Available Today

The 9300 saves valuable work-space. Overall reader size is only 9"x6"x1". Mount virtually anywhere on your existing equipment or workstation.



Code 39®

Codabar
UPC
EAN
Code 11
2 of 5
Interleaved 2 of 5
Ames

Intermec Quality and Reliability

The 9300 will provide years of reliable and virtually maintenance-free service, thanks to the quality design and construction you've come to expect from Intermec.

Broad Interface Features

And, the 9300 is loaded with interface features. Dual RS-232-C asynchronous, ASCII interface; full/half duplex, block transfer and more... the 9300 may be attached to an Intermec multiplexer, allowing up to 16 readers on one RS-232 port.

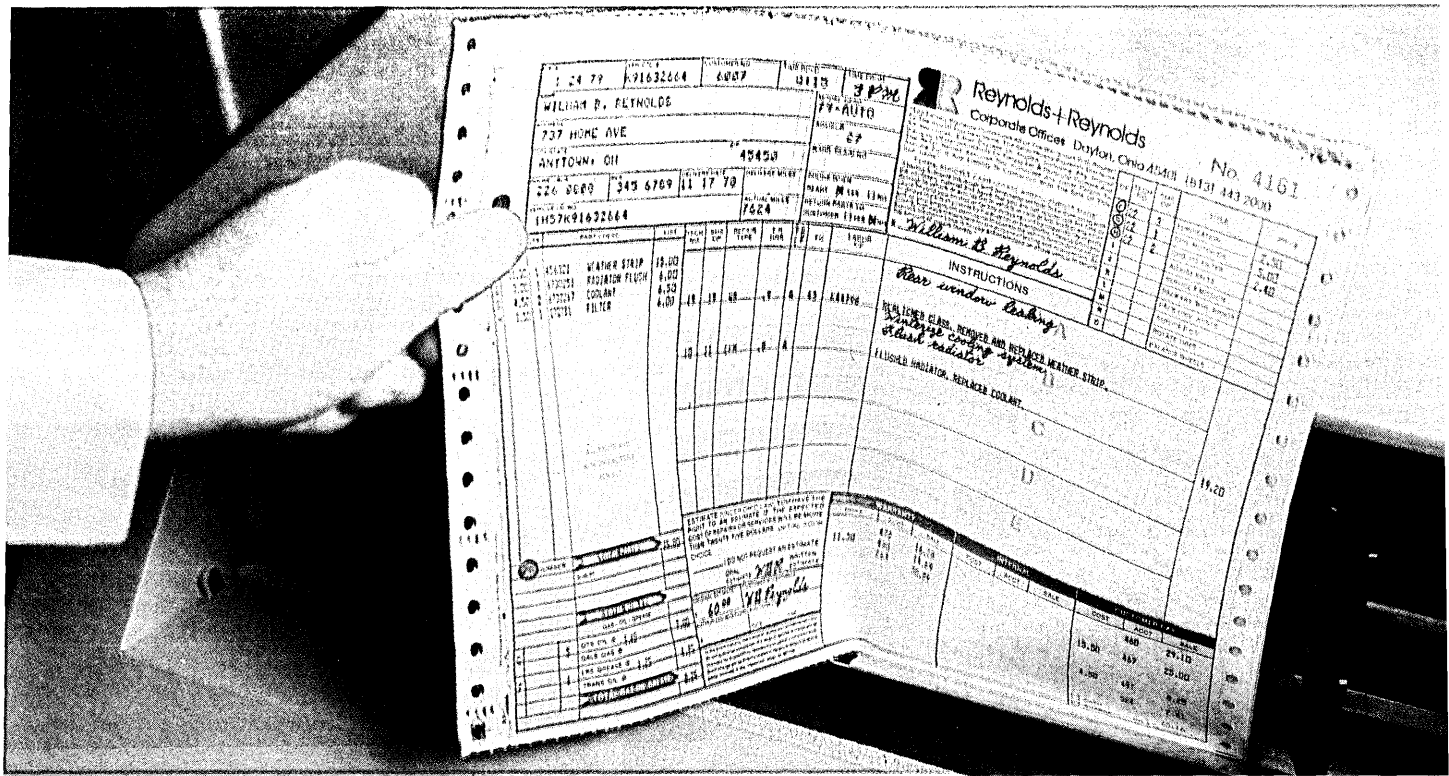
For prices and additional information, contact:

 **INTERMEC®**

THE BAR CODE EXPERTS

Interface Mechanisms, Inc.
P.O. Box N
Lynnwood, WA 98036
Phone (206) 743-7036
TWX (910) 449-0870

CIRCLE 118 ON READER CARD



Push-n-pull tractors, adjustable tear bar and 1-to-9 part forms handling: all in one printer.

Finally, real-time forms access plus continuous forms output in one printer. Perfect for such applications as airline ticketing, invoicing, order preparation and more. And another example of the expanding TermiNet 200 printer family's application versatility.

No-waste, flexible forms control

One reason: an adjustable tear bar that lets you use standard forms with different header lengths. For precise alignment, no paper waste and clean paper tear. Every time.

More reasons: servo-driven tractors that allow infinite manual adjustment in both forward and reverse. A non-volatile electronic VFU that makes forms set-up easy and permits storage of up to 8 vertical formats. A down-line loading option enabling you to load formats directly from your data source. Plus straight-through paper path and push-n-pull tractors that give you perfect first-to-last-copy registration. As well as smoother paper handling for all types of forms, including single-part paper.

More features add up to more application versatility

With TermiNet 200 printers, you can also get a 9 x 9 printhead for exceptionally legible underlining and lower-case descenders. Two complete 96-character switchable print fonts for ASCII/APL use or your own special needs. A choice of Magnetic Tape or Edit Buffer Accessory. Plus a 100% duty cycle capability, excellent print quality at speeds up to 200 cps and low cost of ownership. All of which help make TermiNet 200 teleprinters and line printers the industry workhorses.

Immediate delivery instead of piecemeal allocation

Why wait months for other printers when TermiNet 200 printers are available now? When you need them. Mail the coupon today and find out how the expanding TermiNet 200 printer family can meet your range of application needs and generate real cost savings.

**Great
rip-offs:
Just one way
TermiNet[®] 200
printers give
you no-waste
forms access**

Quality that will make a lasting impression

GENERAL  ELECTRIC

CIRCLE 119 ON READER CARD

Mail today to:
J. Walsh,
General Electric
Company,
TermiNet 794-49
Waynesboro, VA 22980.
Telephone: (703) 949-1474.

Send me more information about the expanding TermiNet 200 printer family.

Have a sales representative contact me.

I'm also interested in a TermiNet 200 printer demonstration.

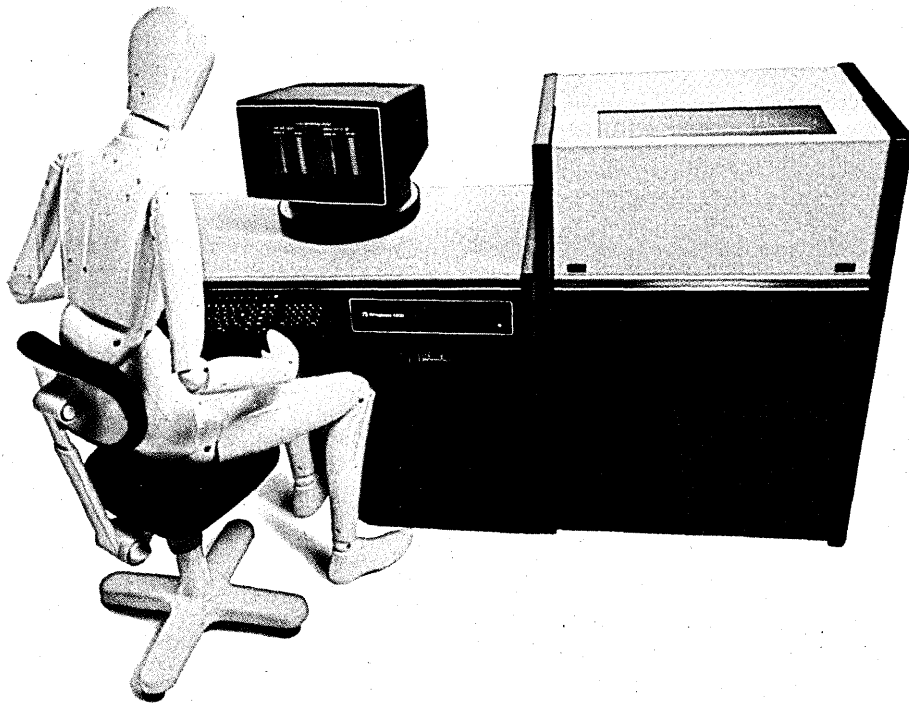
Name

Title

Company

City State Zip

Telephone



A solution to a human problem in information management.

The Bell System knows that information management works best when it's people-oriented. After all, that's been the basis of our business for years.

So our Dataspeed® 4540 data communications terminal is human engineered.

It has a display unit with a tilting screen to eliminate glare and eye fatigue. Plus simplified controls on the console. And you get a choice of keyboards with numeric cluster arrangement.

Of course, the terminal is every inch an information management problem-solver that transmits at speeds from 2400 to 9600 bps efficiently and has built-in diagnostics and greater hardware flexibility.

Its microprocessor-based controller interconnects with up to 32 devices. Eight of them can be printers which can be located up to 2000 feet away from the controller. Keyboard displays can be up to a mile away.

The Dataspeed 4540 data communications terminal. You can expect it to add efficiency and economy to business applications involving inquiry response, data entry and retrieval.

With our knowledge, our advanced communications technology, our thousands of experienced information management specialists—and with service that is superb—we can help your business. A call to your Bell Account Executive will put our knowledge to work for you.

The knowledge business



Using this method, a manager can get an accurate picture of how his shop measures up in terms of management effectiveness.

TAKING MANAGEMENT'S MEASURE

by Jack Ewers

Some dp shops seem to have everything under control. Work is done logically, at the proper time and in the right sequence. In other shops, everything seems to be going on at once. Nothing is planned or integrated, and users and dp personnel are equally frustrated.

Managers usually make some comparisons of their shops against other shops. The comparisons provide a hazy idea of strengths and weaknesses but are not a formal evaluation technique. A better measure of the effectiveness of dp management is required. A method is needed to produce a documented measure of current performance and a means to plan and track improvements. Finally, the method should allow a manager to measure his own effectiveness and plan for his own improvements independent of assistance from internal or external auditors.

The effectiveness of dp management can be measured against the following major functions:

- Organization
How well are people resources organized and managed?
- Management planning and control
How well is the *work* of the department managed?
- Accountability
How well are the results geared to the needs of the organization?
- Security
How well are physical assets managed?

The first major management function is organization. This function is made up of the following elements:

- Mission statement
Does the department understand what its role is?
- Department structure
Are people correctly organized to carry out the department's assigned missions?
- Personnel management
How well are the people managed?

Mission Statement. The first requirement of organization is a clear understanding of the

organizational role of the dp department. This understanding is expressed in a mission statement. The mission of the dp department should be written and clearly defined. It must be approved by higher management (does management agree?) and it should be well understood by all users and dp department personnel (is department authority/responsibility clear to all employees?). In addition, the mission should be reviewed periodically to determine if it should be changed.

Agreement among all interested parties on the mission of the department is critical so that management and users know what to expect from the department, dp has a clear understanding of its role in the organization, and meaningful audits can be conducted to determine if the mission is being accomplished.

Department Structure. Second is a well-defined department structure. Limits of authority and responsibility within the department should be evident so that dp personnel are aware of the authority and responsibility of their position, understand their reporting relationships, and are able to work with the rest of the department.

Clear lines of authority and responsibility help management and users to understand the department and work effectively with it.

An organization chart is a good vehicle for displaying the department structure. It should be complete and current. The department must have a structure appropriate to its defined mission.

Personnel Management. The third requirement of proper organization is personnel management. Here are some of the indicators of the quality of that management.

Job descriptions. A job description should be written and approved for each position in the department. Well-developed sets of job descriptions offer the following advantages:

- Allow dp personnel to understand the content of their job.
- Outline a step-by-step advancement

process, recognizing that there are degrees of knowledge, authority and responsibility that must be traversed. The employee then knows that he is not expected to comprehend all facets of dp in the early years of his career.

- Provide career paths so that employees can look forward to recognized advancement steps.
- Allow jobs to be slotted into a salary scale consistent with the organization and dp market.

PERFORMANCE REVIEWS

A manager must know the quality of the resources available to perform the department's mission. Periodic performance reviews provide a formal, rational, structured method for making that assessment. Informal appraisals are often based more on emotion and personality than on a careful analysis of the facts.

Performance reviews also make employees aware of how their performance is viewed. They provide a basis for equating pay and performance, and provide an opportunity for managers to help employees improve their performance and career development.

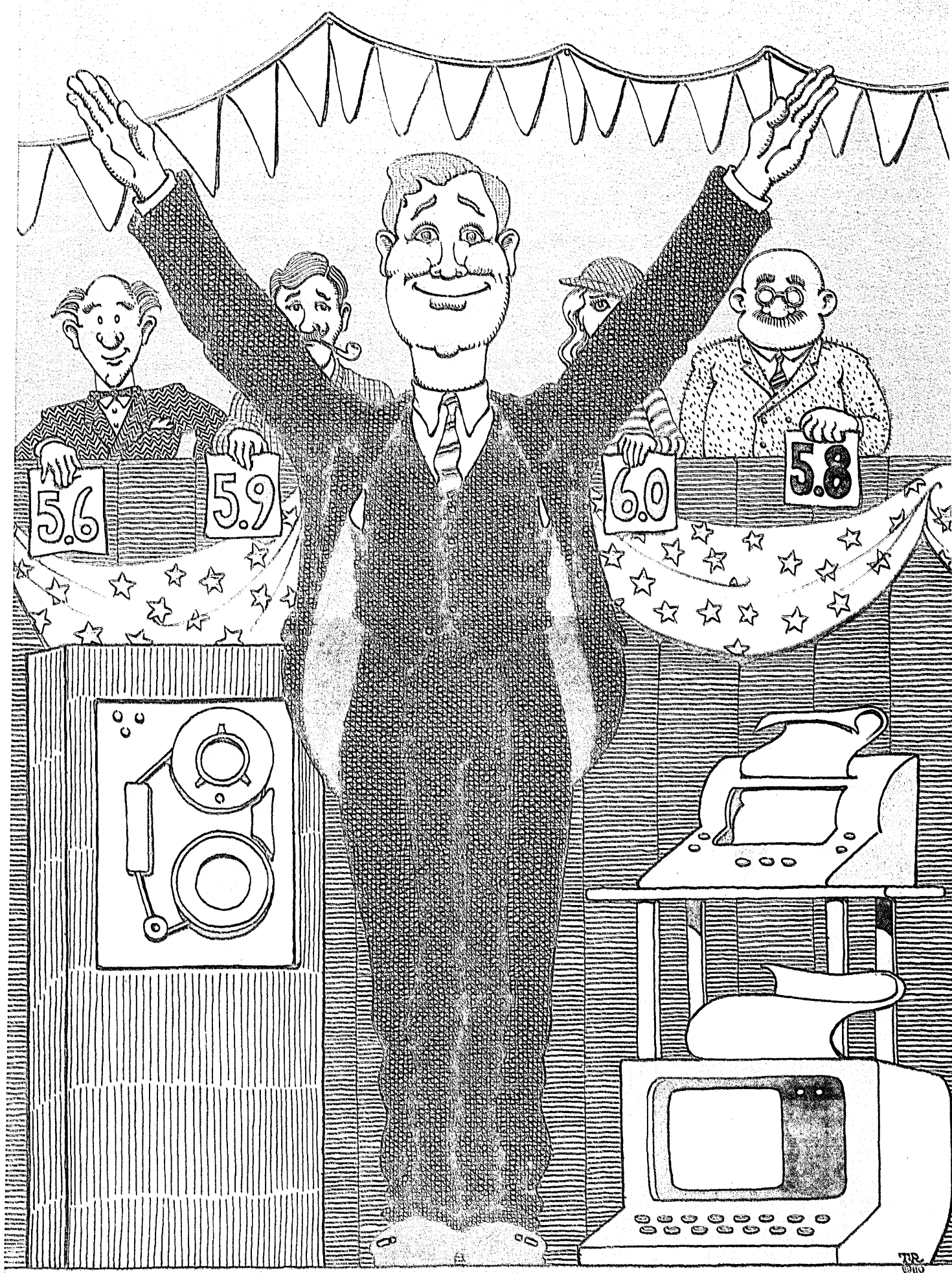
Finally, reviews establish a documented history of performance for use by appropriate organizational managers.

Short-term objectives. Short-term direction is needed to ensure that sufficient effort is applied to stated goals. Short-term objectives are continual reminders of what is important and keep the department on track.

Quarterly reviews are appropriate for managers and supervisory personnel. Analysts and programmers should have a monthly review of objectives since their jobs tend to last less than a month. Certain situations may dictate weekly reviews.

Short-term objective reviews establish agreement on what can be accomplished in the time frame under consideration, answer the question "Are people working on the right things?" and keep managers informed

ILLUSTRATION BY TIM RAGLIN



A manager must know the quality of the resources available to perform the department's mission.

of progress, slippages and problems.

Training. A training program should be developed yearly and kept current with ongoing project requirements. It should support the technical needs of projects and personnel needs identified in the long-range plan. A training history by employee and subject should be maintained. Proper training also ensures that new, effective technology is introduced into the organization and that costly redesigns, reprogramming, extensive debugging, testing, and inefficient systems do not come about because of a lack of technical knowledge.

Training is also needed to introduce more efficient methods, e.g., on-line program development, structured analysis and programming, into the dp department.

Turnover. Turnover can be an indicator of the quality of management. An excessively high turnover may indicate poor personnel management. High turnover is costly because of the retraining required and lessens productive effort while training is taking place.

Contract employees. The number of contract employees may be another indicator of the quality of department personnel management. A consistently high level may mean that more attention should be paid to increasing head count. The hourly rate for contract people is usually higher than in-house rates, and contract people charge a premium rate for overtime. In-house overtime is available at a lesser rate.

Technological and application experience gained by contract people is lost when their work is completed. In-house people must learn how the new system operates.

No use of contract resources, how-

ever, may indicate a lack of flexibility; i.e., head count is kept high to accommodate project peaks.

MANAGEMENT PLANNING

The second major function against which management effectiveness is measured is management planning and control. This function is concerned with how the work of the department is managed.

Dp Long-Range Plan. The first element of management planning and control is a long-range plan. A long-range (three-year) plan should be developed and updated yearly. Any complex, meaningful action requires a plan, and the direction of an dp department is no exception. A formal, approved plan is necessary to ensure that department efforts will support organizational goals (how do I coordinate departmental goals and organizational goals?) and to ensure that resources will be available when needed. (What resources are needed and when?)

An effective plan helps to guarantee that scarce resources will be committed to the most productive actions. (What are the most productive actions? Why? What resources do they require?)

A long-range dp plan should be developed in concert with user department plans so that it will support user plans and also aid user participation in decisions regarding the allocation of dp resources. (What are user department plans/goals? How can dp help?)

The plan must be approved by management so that it agrees with the allocation of resources. (What does management expect dp to be doing?)

It must be rewritten, or updated, year-

ly to adapt to changing requirements and interface with yearly budget planning (will the dp budget support the plan?) and it must indicate how transitions to new technology will be made. (When will the upgrade occur? How long will it take? What will it cost? What is the best way to do it?)

The long-range plan should include the following elements:

- Organizational and user department goals and strategies
- Strategy for transition to new equipment
- Master event schedule for all major projects
- Forecasted operating costs
- Forecasted personnel requirements
- Hardware inventory, present and planned
- Software and operating system requirements
- Data transmission requirements
- Forecast of educational requirements
- Resources required to change computer facilities
- Personnel requirements by application
- Personnel requirements summary

The long-range plan should also report current year actual accomplishment against last year's plan.

Management Control. Management control means that a manager is in control of the resources at his disposal and can measure their performance. Control of the resources implies that the manager is aware of how the resources are being consumed (what are the people and machines doing?) and that the work of the department is directed towards departmental goals (are they doing the right things?).

Control also implies that plan can be compared to actual (are we on schedule?) and that plans and resources can be shifted prior to disaster (should I put more people on project X?). Finally, control means that the effect of resource shifts can be predicted. (Should I move employee A or B to project X? What will be the effect of either move?)

Project control, the first requirement of management control, implies that projects are properly selected, developed and managed. Projects should be selected and given priorities in a rational, formal, documented manner. They should support organizational and user department goals. The project selection process answers the following question: "How do I know that the right project and priorities are selected?"

An independent evaluation of the relative and absolute value of projects by those who benefit from and pay for the projects is an excellent method of selection. The group must be able to make informed decisions. Establishing the group at a high level can be risky.

"In most large organizations, top management, top user management, steering



Software AG is making unbelievable claims about

NATURAL

Software AG's new NATURAL database environment is the most powerful and flexible database environment ever. It's the only one that can be used by non-programmers. It's the only one that can be used by programmers. It's the only one that can be used by both.

NATURAL makes the database program development time by up to 80%! NATURAL is used in conjunction with ADONIS to eliminate all the time-consuming, tedious, and expensive mechanics of conventional languages. Yet NATURAL is a structured language that provides a comprehensive alternative to COBOL and PL/I, along with the unique added advantage of line-for-line syntax checking.

NATURAL creates its own mapping! NATURAL lets you create the database any way you want. You can create your own database structure, or you can use the standard structure of your DB/DC environment. NATURAL creates its own mapping between the database structure and the application programs. This means you can create the database any way you want, and the application programs will work just the same.

You don't even have to be a programmer to use NATURAL! That's the truth! With 2 to 3 days training, anyone with limited programming exposure can learn to make full use of NATURAL's capabilities.

NATURAL can actually read your Data Dictionary! And with NATURAL you can readily store programs in your Data Dictionary for subsequent execution or modification either in source or object code.


NATURAL automatically facilitates the relational database environment! Now, you can form logical relationships from information in several different files, or information from the same file, but viewed in a variety of different ways. Quickly and easily with NATURAL.

Frankly, we hope you have trouble swallowing these very ambitious claims we're making about NATURAL. Because Software AG wants the chance to show you that everything we claim about NATURAL is absolutely true! We'd like

to set up a one-on-one demonstration of NATURAL as soon as possible. Your terminal is ours. Call us directly at (703) 800-6050.

Once you see for yourself how simple NATURAL is to use, how quickly it lets you communicate with your database, how much it can save you in time, mechanics, and cost, we think you'll want to make NATURAL an important part of your DB/DC environment.

Because then, you'll be a believer — in NATURAL.

 **SOFTWARE AG**
OF NORTH AMERICA, INC.
The International Center
11600 Sunrise Valley Drive
Reston, Virginia 22091 D-5

we'll make you a believer

CIRCLE 121 ON READER CARD

Projects should be selected and given priorities in a rational, formal, documented manner.

committees, and such groups are so far removed, in sheer organizational distance, from the specifics of any proposed project or operation that they are effectively prohibited from applying analytical criteria to the edp decisions they must make.

"The sheer technical merits of the project have little relevance at this point, since neither time nor expertise is ordinarily available at these levels for such considerations. This clearly suggests that the guts of the resource-allocation process cannot be managed just by assigning responsibility for it to decision-making groups at the top of a company.

"But it does suggest that these groups must pay attention to the process by which new project ideas are generated at the technical levels of the organization. They should carefully consider this question respecting lower organizational levels.

"Does the planning process adequately involve the people who have sufficient understanding and credibility to both develop a new dp application idea and evaluate its worth?"¹

The council should meet often enough to deal with new projects and changing requirements.

OTHER METHODS

Other methods of project selection make use of cost/benefit criteria. Whatever method is used, no project should proceed until it has written user approval.

Project development process. Each project should proceed through an orderly development process. A standard development process should be in place so that efforts can be concentrated on the problem, not on the method. The development process should include a formal project request. The request should include objectives, benefits and user signature.

A phased approach to development is essential. Responsibilities and documentation for each phase should be spelled out, review points should be established, written user approval should be required before each major phase is started, and costs and schedules should be recalculated at the end of each major phase. Programming and documentation standards and an abbreviated process for small and/or maintenance projects also should be established.

Project planning and control system. A major part of the mission of the dp department is the development and enhancement of application systems. The dp manager must know how this responsibility is being carried out.

Systems development and enhancement also represents a major commitment of

edp resource. These resources need to be planned, monitored, and controlled. A project planning and control system is a vehicle for evaluating dp's performance in application development and for planning, monitoring and controlling the resources committed to this function.

The project planning and control system should ease the matching of requirements and available resources.

The system should simplify shifting of resources and development of new plans. (What would happen if I moved analyst A and programmers C and D to project X in February? What is the completion date for project X if I assign only programmer E based on his current assignments? What other resources are available in February?)

A project planning and control system should enhance the planning, scheduling, and monitoring of numerous activities within one project (what are the dependencies? What is the critical path? If activity A is delayed one month, what effect will it have on the rest of the project?) and should assist in the measurement of cost vs. plan, and milestone accomplishment vs. schedule. It should also contribute positively to project reviews and critiques, and finally, should identify expected resources. The project control system should be integrated with the time reporting and computer utilization systems.

Operational control, the second requirement of management control, is part of the dp mission and is the stewardship of the production environment, i.e., the timely, accurate, and efficient handling of those systems in a production status. User operations depend on these systems and so the dp manager must have effective control of this environment.

Operational control includes application maintenance, computer operations, data entry, and output distribution. These activities should be controlled through standard instructions, run books, etc. (How does the operator initiate/run this job? What input does it require? Who should receive the output? What control totals should be logged/analyzed? What should be done if the job aborts?)

Weekly and daily schedules should be a standard operational tool. (When should this job be run? What are the relationships to other systems? What is the data entry cutoff time? What is the effect of a rerun?)

Another requirement of good operational control is an ongoing analysis of schedule vs. capacity (will everything get done on-time? If not, what schedule adjustments must be made? Do we need more capacity? When? How much?) as well as a forecast of load vs. capacity.

Operational control also implies an analysis of machine downtime (should some

hardware be replaced/repaired? Is downtime excessive? Should maintenance policies be revised?) and measurement of operations performance (are schedules met? Are reports delivered on time? How productive is the operations environment? What standards are used to measure productivity?).

The following operational questions should be asked:

"Is there a concise, objective performance reporting system that embraces turnaround time, rerun time, hardware-software component utilization, and user complaints in such a way as to permit both senior dp management and top management, itself, to quantitatively monitor performance?

"Have the scheduling and control procedures been modified to become consistent with the technical options made possible by the most recent generation of machines acquired by the department?

"Does the manager of computer operations have commensurate salary, management, and technical background with the manager of systems and programming?

"Is there a managerial career path with an opportunity for advancement in operations which is commensurate with that in systems and programming?"²

Budget, another measure of control within the edp department, is a formal method of planning and controlling costs. Good control over costs is indicated by adherence to budget. Budget reports should:

- accurately reflect costs
- measure actual vs. planned costs
- be published at least monthly

ACCOUNTABILITY

The dp manager is responsible for a large expenditure of funds. He should account for the use of those funds. Accountability has two basic elements: identification of expenditures by source, e.g., manufacturing or order entry, and allocation of those expenditures according to some rational basis.

Chargeout system. A chargeout system is a key element in establishing accountability for the dp function.

"Concern for the 'chargeout issue' signals the transition from informal to formal data processing management control. Chargeout usually spearheads the data processing management control program, and is used to bring users/managers into the control realm. Since it introduces user/manager to formal accountability for data processing, it is often met with volatile reactions."³

In another view,⁴ "If one compares the arguments for overhead accounting and

1. McFarlan, Warren F., "Management Audit of the EDP Department, *Harvard Business Review*, May-June 1973.

2. McFarlan, op. cit.

3. Nolan, Richard L., *Management Accounting and Control of Data Processing*, July 1976.

4. McFarlan, op. cit.

HOW TO GRADE THE MANAGEMENT TEST

The scorecard below can be used to compute a reasonable estimate of dp management effectiveness and to plan and track improvements. A rough "grade" can be calculated by using the formula:

TOTAL YES ANSWERS 67 (total possible answers)

Percentage

93 - 100	= EXCELLENT	- don't mess with it
85 - 92	= ABOVE AVERAGE	- improvement needed but not critical
77 - 84	= AVERAGE	- allocate resources for improvement in next year's budget
69 - 76	= BELOW AVERAGE	- lay out improvement plans now
below 69	= NOT ADEQUATE	- improvement plan should start with a new manager

DP MANAGEMENT EFFECTIVENESS SCORECARD

Organization

Mission Statement			
• written	YES	NO	
• approved	YES	NO	
• understood	YES	NO	
• reviewed	YES	NO	
Department Structure			
• organization chart			
• complete	YES	NO	
• current	YES	NO	
• appropriate for mission	YES	NO	
Personnel Management			
Job Descriptions			
• written	YES	NO	
• approved	YES	NO	
• complete set	YES	NO	
Performance Reviews			
• periodic	YES	NO	
• formal	YES	NO	
• documented	YES	NO	
Short-term objectives			
• M.B.O. for managers and supervisory	YES	NO	
• monthly objectives for analysts and programmers	YES	NO	
Training			
• yearly forecast	YES	NO	
• support planned projects	YES	NO	
• history by subject and employee	YES	NO	
Turnover			
• appropriate (10%)	YES	NO	
Contract Employees			
• moderate usage	YES	NO	

Management Planning and Control

Dp Long Range Plan			
• yearly	YES	NO	
• support organizational/user dept. goals	YES	NO	
• approved	YES	NO	
• feedback on last year's plan	YES	NO	
• complete	YES	NO	
Management Control			
Project Control			
Project Selection			
User/Management Council			
• appropriate management level	YES	NO	
• timely meetings	YES	NO	
Other Selection Methods	YES	NO	
Project Development Process			
• standard development process	YES	NO	
• project request	YES	NO	
• phased approach	YES	NO	
• review points	YES	NO	
• phased user approval	YES	NO	
• phased cost/schedule calculations	YES	NO	
• program and documentation standards	YES	NO	
• appropriated for small projects	YES	NO	
• maintenance projects	YES	NO	
Project Planning and Control System			
• match requirements and resources	YES	NO	
• shift resources and develop new plans	YES	NO	
• coordinate project activities	YES	NO	
• predict problems	YES	NO	
• measure	YES	NO	
- cost vs. plan	YES	NO	
- accomplishment vs. schedule	YES	NO	
• project reviews/critiques	YES	NO	
• identification of resources expended	YES	NO	
Operational Control			
• standard instructions, run books	YES	NO	
• weekly/daily schedules	YES	NO	
• analysis of schedule vs. capacity	YES	NO	
• forecast of load vs. capacity	YES	NO	
• analysis of machine downtime	YES	NO	
• measurement of operational performance	YES	NO	
Budget			
• accurate	YES	NO	
• actual vs. planned	YES	NO	
• monthly	YES	NO	
Accountability			
Chargeout System			
• accurate accumulation	YES	NO	
• rational allocation basis	YES	NO	
• accurate allocation	YES	NO	
• understood by users	YES	NO	
• allows acquisition of new hardware	YES	NO	
User Requirements			
• user satisfaction	YES	NO	
• project backlog	YES	NO	
Security			
• policy statement	YES	NO	
• risk analysis	YES	NO	
• responsibility assigned	YES	NO	
• contingency plan	YES	NO	
• physical/logical security	YES	NO	
• off-site storage	YES	NO	
TOTAL YES ANSWERS ÷ 67 = SCORE			

A measure of accountability for dp expenditures is how well user requirements are being met.

those for chargeout accounting, it is clear that chargeout frequently offers the more significant advantages where management is vigorous or the edp department is becoming mature."

A chargeout system should accurately accumulate all resources consumed; e.g., disk space, core, programmer time, data entry time, and have a rational basis for allocation of costs. The system may be changed to pro-

mote different objectives. For example, production, maintenance, or new systems development can be encouraged or discouraged through adjustments in the chargeout system. New systems development may be partly or wholly subsidized, charged on a fixed cost basis, or charged for resources consumed.

The chargeout system must accurately allocate costs according to an approved

method, be understood by users, and adequately provide for the acquisition of new hardware.

User requirements. Another measure of accountability for dp expenditures is how well user requirements are being met. The dp department exists to service users. If user requirements are not being met, the dp department is not fulfilling its mission.

Here are some indicators of how well users are being served:

- User satisfaction. How do major users rate dp service in terms of cost (production systems, new development), time performance (production systems, new development) and quality (maintenance, new development)?

"Are users satisfied with speed and quality of service? If not, why not? If they are, have operations procedures and capacities been studied to ensure that this is not being achieved through highly inefficient procedures which are hidden by the existence of excessive computer manpower and machine resources?"⁵

- Project backlog

Security. The dp department is responsible for the security of the hardware and information entrusted to it. This program should include a general policy statement outlining the objectives and scope of the security program and an analysis of risks and exposures to determine the position of the dp facility regarding security. Overall responsibility for the security program should be assigned to one person.

Development of a contingency plan on how to respond to and recover from emergency situations should also be a part of the security program. *

5. Ibid.

JACK EWERS



Mr. Ewers is a senior staff specialist and application consultant in Honeywell's Corporate Computer Operations in

Minneapolis, Minn. He provides consulting services for Honeywell on data processing technology and management and office automation. He is currently chairman of a special interest group on programmer productivity at the University of Minnesota Management Information Systems Research Center.

Will your Statistical Multiplexer meet tomorrow's network requirements?

...If it's an ENA STAT MUX — it will!

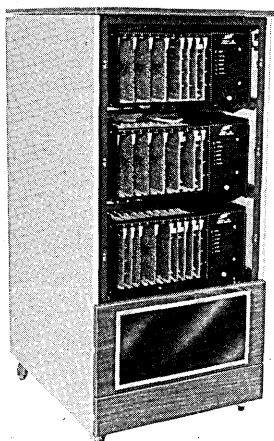
X.25 — Multiplexers to Micronodes — Protocol Converters

While others are talking about the cost effectiveness of X.25 packet switching, ENA DATASYSTEMS has been installing X.25 Statistical Multiplexers for over two years. Operating in the Canadian packet switching networks, the ENA STAT MUX has been field proven in performance and reliability. With X.25 becoming a world standard for telecommunications, your company can't afford to have equipment that does not operate in both the packet and non-packet environment.

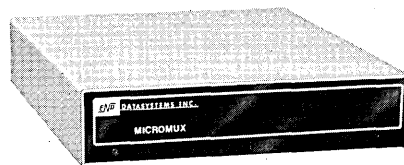
ENA DATASYSTEMS manufactures a complete line of Statistical Multiplexers that provides you with the building blocks necessary to design a flexible system that can be expanded to meet an ever-increasing volume of traffic in a cost-effective manner. Whether you need our MICROMUX, a four-channel statistical multiplexer that actually reports line utilization statistics, or our MAXIMUX which is expandable to 64 channels and can be configured into a MICRONODE for your own packet switching network, ENA has the equipment you need.

For details, write to:
ENA DATASYSTEMS, INC.,
268 Galaxy Blvd., Rexdale, Ontario,
Canada M9W 5R8 (416) 675-3304.

See you at DATA COMM,
Geneva, Switzerland.



MAXIMUX



MICROMUX



DATASYSTEMS INC.

The data communication specialists ...

CIRCLE 122 ON READER CARD

BEYOND THE COMPUTER

Codex now offers a communications front-end processor (FEP) which supports multiple IBM 360/370/303X CPU's. It's the 6520 FEP, a plug compatible replacement for IBM 270X/370X featuring enhanced networking capabilities under emulation mode operation.

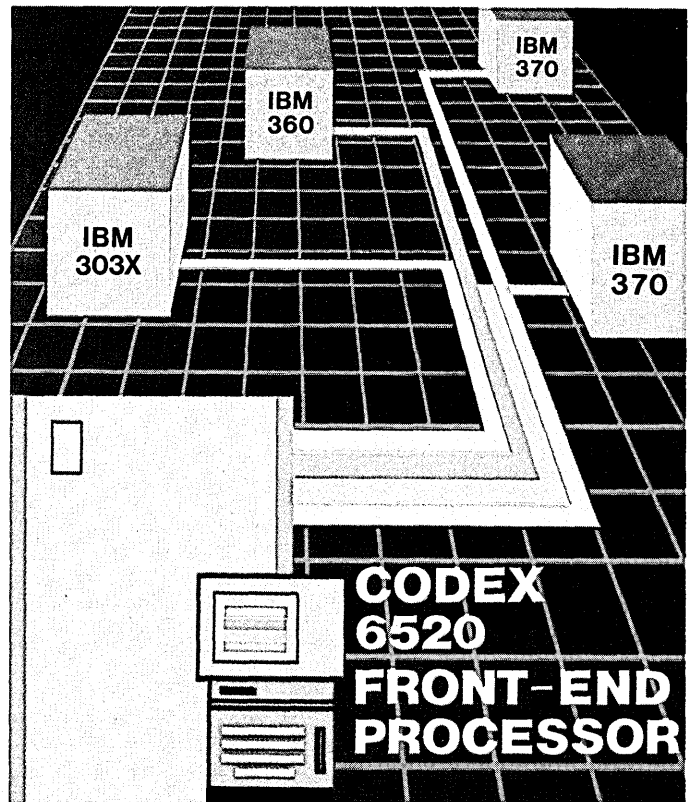
The 6520 supports various terminals and line disciplines and allows selection of host and application by the terminal user. It operates with a floppy or hard disk and provides for partial redundancy configurations that offer improved system availability at a modest cost.

The 6520 makes extensive network management capabilities available to the system operator. Control and monitoring are coordinated from a color CRT console. And multi-node networking is achieved and controlled through a unique multiplexed interface to Codex 6000 Intelligent Network Processors.

The Codex 6520 FEP not only offers high throughput, but also presents a cost saving solution that will efficiently handle future network expansion.

Codex offers the broadest line of data communications systems and products provided

by a single source: the whole universe of equipment that extends beyond your computer. Call or write today for more information.



codex



A Subsidiary of
MOTOROLA INC.

We'll get you through

The IBM compatible communications processor from the communications experts.

member of IDCMA Codex Corporation, 20 Cabot Blvd., Mansfield, MA 02048 • Tel: (617) 364-2000 • Telex: 92-2443
Codex Corporation, 2-8, 1-Chome, Yotsuya, Shinjuku-ku, Tokyo 160, Japan • Tel: (03) 355-0432
Codex Europe S.A., Av de Tervuren 158, B-1150 Brussels, Belgium • Tel: (322) 762.23.51
ESE Limited, 1780 Albion Rd., Rexdale, Ontario, Canada M9V 1C1 • Tel: (416) 749-2271
Offices and distributors in major cities throughout the world.

Now the best way to use IBM



"We need the order-entry tracking system by the 1st. The budget consolidation in two weeks. The sales forecast next week. And the seating arrangement for my daughter's wedding by tomorrow."

computers inside may be to go outside.

Your in-house equipment is IBM compatible. You need to distribute your data processing to many locations. Your production processing needs keep growing.

Your best solution may be to step outside and come to us. General Electric Information Services Company. We have a way to help you handle your company's data processing needs.

All from a single source

Our MARK 3000SM Service is an IBM based, remote computing service. It's one single source for just about everything you need.

- The latest state-of-the-art IBM hardware.
- Driven by some of the most up-to-date software.
- Linked to the world's largest commercially available teleprocessing network.
- Serviced by experts in IBM computers.
- With a 24-hour, seven-day-a-week customer service desk.

Production processing where and when you need it

Where you need it. With MARK 3000 Service, distributing your production processing is usually as easy as making a local phone call. That's because the world's largest commercially available teleprocessing network becomes, in effect, your network.

So you can tie your information processing together over five continents, 24 countries, 600 cities, and 21 time zones.

The network is accessible via low speed ASCII terminals operating up to 1200 baud. And high speed 2780/3780 compatible terminals operating up to 4800 baud.

When you need it. If you have production problems caused by peak and valley workloads, rush

jobs or special requests, MARK 3000 Service probably has everything you need.

It starts with a central processor, the IBM 3033, operating under MVS.

It has a wide range of disk and tape storage facilities.

In short, it has all the capacity you're likely ever to need. So you can extend your resources, without making costly up-front capital commitments.

Use what you need. MARK 3000 Service has software packages ready to use for a wide variety of industry and functional applications, from financial management to mechanical design. So you don't have to start from scratch.

We also have trained experts in IBM technology and business data processing who can build new applications, or tailor existing ones, to fit your needs.

Easier systems development, too

Fully integrated TSO lets you develop and test new programs interactively and submit them to run in batch. You also get the latest utilities for sorting, editing and managing data.

Also available are useful development tools like file management and data base management software.

We also give you a full complement of languages, including ASSEMBLER, COBOL, PL/1, and VS BASIC; all with interactive and symbolic debug capability.

Our people back up your people

Not only is our customer service desk at your beck and call 24 hours a day, seven-days-a-week, we can also train your people and provide documentation to help

them get full measure out of MARK 3000 Service.

Safeguards and back-up power

Your data is protected with our tight security safeguards. And even during a black-out, we have back-up power designed to provide continued access to your data processing.

Who we are

We're General Electric Information Services Company. One of the world's leading companies in computing services.

We help make business more effective, more efficient and more profitable for our customers, over 5,000 of them around the world.

If you'd like to know more about how MARK 3000 Service can help you use IBM computers best, fill in the coupon below, and we'll send you our brochure. Or, if you prefer, one of our representatives will give you a call.

General Electric Information Services is how to use computers best.

General Electric Information Services Company	D-580
401 N. Washington Street Rockville, Maryland 20850 Attention: C. Bryars	
Please send me more information on using IBM computers best.	
<input type="checkbox"/> Please send me your booklet.	
<input type="checkbox"/> Please have your representative call.	
Name _____	
Title _____	
Street _____	
City _____ State _____ Zip _____	
Company _____	
Type of business _____	
Do you have a specific application in mind? If so, please specify.	

GENERAL  ELECTRIC

Innovation has Packed a Modem Rack

**Up to eight channels of data;
Up to 4800 bps in speed —
now in 7½" of vertical space**

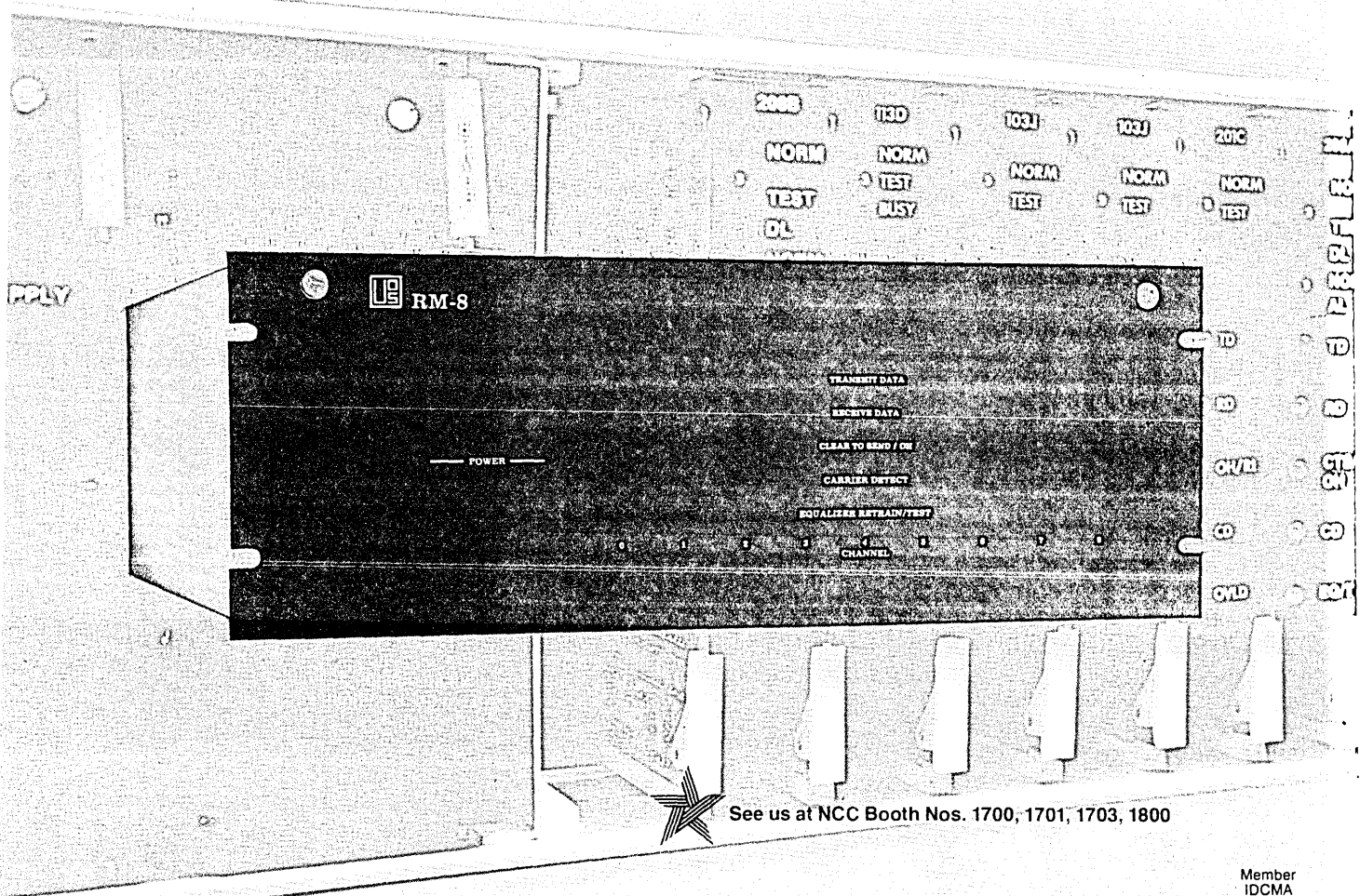
UDS engineering skill has produced the most densely packed rack-mounted modem assembly available.

Our RM-8 lets you sandwich eight channels of data communications traffic into only 7½" of standard

rack space. Single power supply is standard; redundant power supplies are optional.

Channel speeds can be anywhere from 300 to 4800 bps, and speeds may be mixed. You can select UDS modems that are Bell-compatible for either public or private telephone networks. Switched-network modems are FCC certified.

Conserve rack space by specifying the innovative modem rack. Phone your UDS representative or contact Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35805. Telephone: 205/837-8100.



See us at NCC Booth Nos. 1700, 1701, 1703, 1800

Member
IDCMA

"Confidence in Communications"
Universal Data Systems



DISTRICT OFFICES: Summit, N. J., 201/522-0025 • Blue Bell, PA, 215/643-2336 • Atlanta, 404/952-3463 • Chicago, 312/441-7450 • Dallas, 214/385-0426 • Santa Ana, 714/972-4619 • Sunnyvale, 408/738-0433.

End users and dp professionals must understand each other's responsibilities to achieve successful application development projects.

NARROWING THE GAP

by Dave Mollen

Not too long ago, my wife and I decided to remodel the kitchen in our home and went to a firm specializing in this work. The salesman there is paid when he has made a sale, not for any suggested plans he draws up. So, after many months—my wife and I do not make remodeling decisions easily—he gave up on us.

We started with another salesman, and it was 15 months before we indicated we were satisfied with his final proposal. He drew a final "picture" of the proposed job, a detailed schematic, added two straight lines under these drawings, and asked both my wife and me to sign, with these words: "That's exactly what you're going to get, for the cost we've agreed on, and the time of completion. If you want to make any changes, they will affect the cost and the time of completion."

He made it clear that if we failed to sign, there would be no agreement. In short, he was prepared to see 15 months' effort go down the drain—because he knew from experience that if he did not get our signed agreement, the potential problems could outweigh any benefits the job would bring.

There is an analogy here to a dp professional, representing his department on an application development project, and an end user. The dp professional is the salesperson and the end user the customer. Note, however, what usually happens when the "salesman" asks the "customer" to sign on the dotted line: the end user refuses, for any number of reasons, including the simple fact that the end user sees no purpose to it and refuses to be tied down.

The result is predictable. System designers need quantities of information that appear endless to the end user, who doesn't understand why such detail is required. Without advance agreement on the level of detail needed, dp people do not get the information they need; without such detail, the designer's system does not work as it should and the end user is dissatisfied. His propensity to make changes after a basic design is agreed on, without understanding why the changes

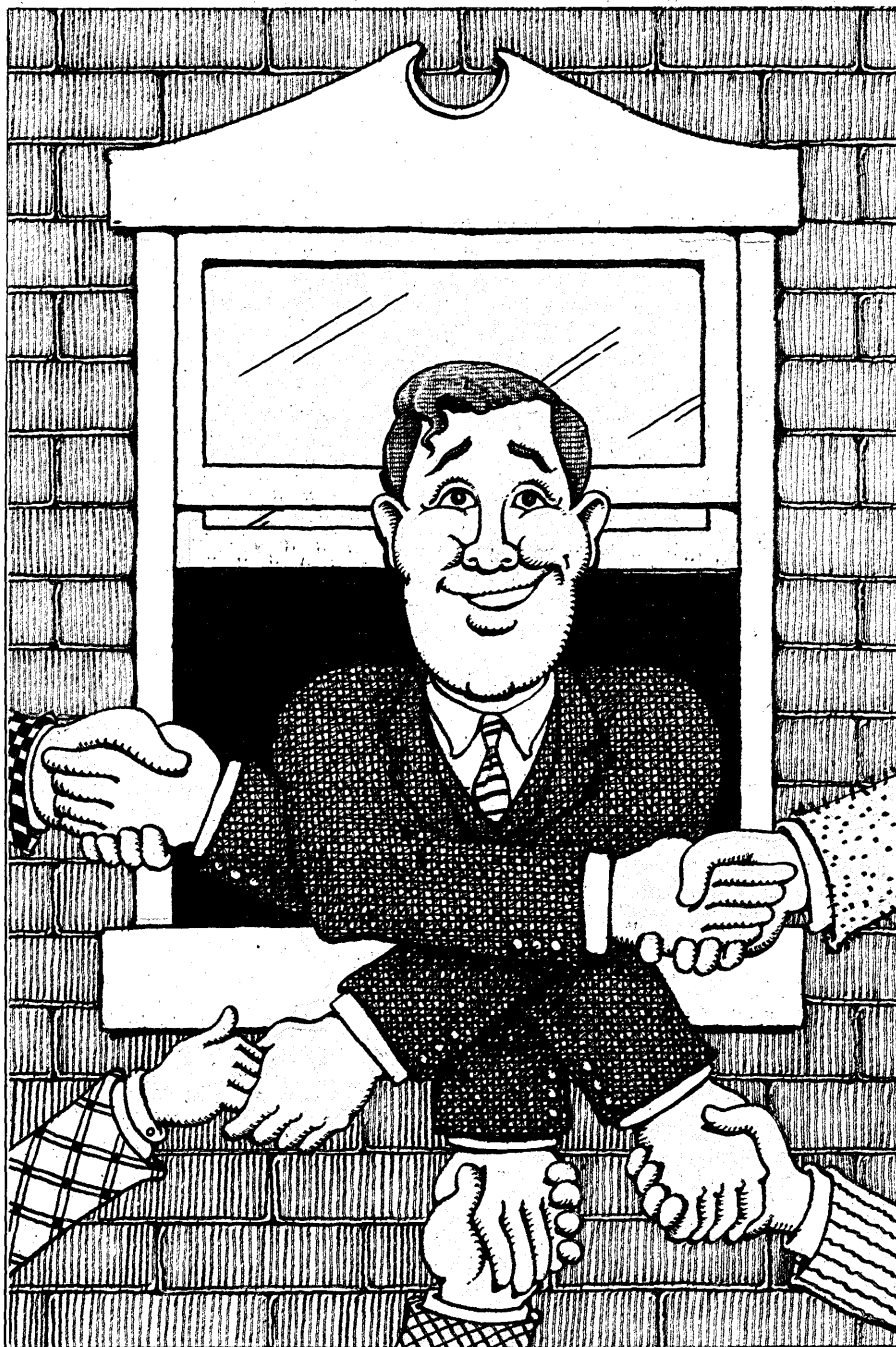


ILLUSTRATION BY TIM RAGLIN

should create any great difficulties, increases the potential for complications.

A "signed and sealed" agreement could prevent much of this, but the dp representative finds it difficult to convince the user that such an agreement (and the considerable work for the user that it implies) is necessary, and that it is reasonable for the dp professional to expect to have one.

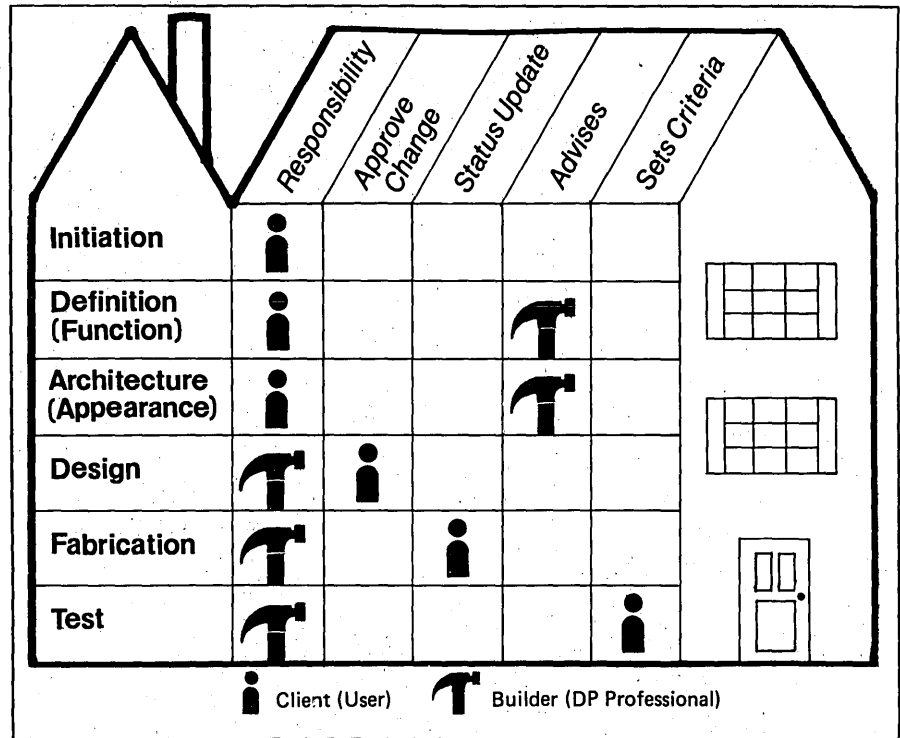
I am convinced, on the basis of many years' experience with end users and dp professionals, that the dynamics described here are behind some of the most important criticisms of dp commonly held today by users and dp professionals alike: first, we in dp are able to implement only a small fraction of the applications users want, and, second, when the applications are implemented, they frequently do not meet users' needs, necessitating a great deal of rework and upheaval to the business while the reworking is being done and the resulting bugs are straightened out. The shortage of dp professionals is serious and is expected to remain so for years to come. This is a compelling reason to improve the quality of applications development so that end-user projects do not have to be redone, and dp time is used at maximum productivity levels.

One IBM study suggests that improved dp and end user interaction can boost dp productivity by as much as 400%, getting the application up and running to the end user's specifications that much faster. So, while we are unquestionably dealing with a shortage of trained people, it is equally evident that narrowing the communications gap between dp professional and end user can go far toward easing current backlogs.

DP A MYSTERY TO USERS

Basically, this communications gap goes back to the earliest days of the computer. Unfortunately, dp has been seen by end users as a forbidding mass of difficult-to-understand technology, which could be made to serve their business needs solely through the efforts of a "new breed" of person, the dp professional, who was somehow magically imbued with all the requisite knowledge. Equally unfortunate, dp professionals themselves tended to believe this image. From one point of view, therefore, it might be said we're just dealing with the same old problem, but that would be a dangerous simplification—dangerous in that it could keep dp and end user management from appreciating the true dimensions of the current problem, and the steps that must be taken to solve it.

In the typical commercial establishment of 25 years ago, the person in charge of the computer operation was the financial officer, perhaps the controller. The dp manager reported to the controller. Whatever their



backgrounds, they could achieve a meeting of minds without too much difficulty. The dp manager was running a set of well-defined applications, narrow in scope, applied to a narrow segment of the business. The company's customer, whether another business organization or a consumer, had superficial contact with the new technology, perhaps only through an invoice or an accounts receivable statement. When something went wrong, however embarrassing it may have been, it was easily resolved.

Today, we are dealing with end users who rely on terminals to interact directly with customers; with end users who rely on the system to assure that their customers' requirements can be met; in short, end users rely on systems to support people on the "firing line," those who are judged by the customers they gain or lose, or by customer complaints.

Now, when the end user's system doesn't function properly, the reverberations can be heard all the way up in the ceo's office. There is a great deal more at stake, and if "blame" is to be apportioned there is plenty to go around for everyone.

Let's start with some basic definitions. The end user is the person—actually the only person—who can perceive, or confirm, that a given application will lead to certain benefits which can be defined and usually measured. He, or she, alone can make ultimate decisions concerning a given application, because that person alone has the immediate responsibility and the experience that can lead to sound judgments.

By definition, therefore, the end user must have the critical role in the decision to invest in the application, in its design, and in its implementation. The dp manager is a purveyor of technology, supplying a service for the money the end user will pay. He, or she, should be a consultant on the most effective use of dp technology in helping find solutions

to business problems and needs, and the governing authority on such matters as data security and system recoverability. The dp manager should never be the person to decide the next application to be implemented; making implementation decisions is the function of the ceo. To the extent that the dp manager does make implementation decisions, it is usually by default.

In discussion after discussion we have found the issue is not what dp is all about, but what the business is about. The end user is not bothered by the cost of application development but by application effectiveness—the extent to which it delivers, or fails to deliver, the services that in turn impact customer relationships. The assumption, implied in the late 1950s, was that technicians "drove" the new dp technology. Today, that is not enough. Neither dp professionals nor the financial department "owns" end-user data; to the extent that both utilize it they are custodians. The "driver" today is the end user, and there can be no satisfactory services without successful dp-end user relationships.

SUCCESS STORIES CITED

The proof of this basic fact can be seen in successful application development projects. Among the heaviest early dp users were insurance companies, and perhaps it's no accident they were among the earliest to adopt the project team approach to applications development, with heavy end user involvement.

Until recently, even insurance companies with extensive dp experience shied away from "automating" group medical and dental claims handling. The data required is vast, each group contract written with an individual customer is separate and distinct, and the claims processing operation itself is complex. A medium-size insurance company based on the East Coast was among

To all large-scale IBM users.

Congratulations, you now have another large-scale IBM.

It all happened because of the threat of disaster.

The Sungard Center. Established as a highly advanced disaster/recovery service. Utilizing IBM's largest computer.

We're glad to report that response to this service has been overwhelming. We're also glad to report that no one has yet had a disaster.

So now we find our 3031 and 3033 have a lot of spare time on their hands.

As a result, you now have second center capability. For batch processing. Or systems

development, without interruption to existing programs. Or as an interim capability until IBM introduces its new package.

We offer this spare time at extremely attractive rates. Because it's pre-emptible. In case the center is ever needed for disaster recovery.

More information is just a coupon away.

Whatever the need, remember, you now have another computer to count on.

Sun Information Services Company
Sungard Headquarters
656 E. Swedesford Road
Wayne, PA 19087 (215) 972-4776.

I want to know more about:

- Systems development and testing.
 Software conversions. Remote batch processing.
 Timesharing. Other _____
 Please send me more information. Please call.

Name _____ Title _____

Company _____ Phone _____

Address _____

City _____ State _____ Zip _____

A Sun Company Subsidiary

Sun INFORMATION SERVICES COMPANY

DM - 580

System designers need quantities of information; end users don't understand why such detail is required.

the first to break through the difficulties and develop a distributed claims processing application. The project leader was a headquarters claims manager, with working field experience; the majority of the project team members were actual claims administrators; a working relationship was established with the dp department that enabled this first-time, highly customer-sensitive application to be installed on time with a level of success that saw end users eager to cooperate in follow-on applications.

An end user manager for a Southern newspaper utilizing an advanced computerized classified advertising system credits a good part of its success to his people's involvement in the system design. Testing an application system can take up to one-half of the dp organizations's development resources, and a significant portion of that time is in redesign and retesting of user specs that were poorly communicated to begin with. Prevent the need for such rework, and you will make a significant impact on total productivity.

An end user coordinator in a manufacturing company found that so-called dp "overruns" were something quite different: they were actually the costs, in time and money, that resulted from the difference between the information the end user provided the dp department in the system proposal stage, and what the end user demanded of dp prior to considering the project complete. With a better understanding of dp requirements, and improved people interaction, the coordinator's end user systems did come in on time and within acceptable cost limits.

Similarly, managers at a New En-

gland bank that had upwards of 65 new applications in development every year found that increased analysis time devoted to the design phase of a project before actual coding resulted in much less test time and signoff difficulties at the end, with project dates being met. More and more, bank end users and dp people are speaking the same language.

Any number of additional examples could be cited. From long experience with both dp professionals and end users, I am absolutely convinced the most important single factor affecting applications development is how well the participants fulfill their roles. When dp managers are asked what problems they've experienced with development projects, they overwhelmingly (70% to 80%) respond: lack of proper user involvement. Statistics reveal the bulk of programmer/analyst time is spent on design, which is largely a matter of getting a good spec from the user—or, more importantly, getting it into test. "Test time" is largely redesign and recoding made necessary when user requirements are inadequately stated at the beginning of the project.

HOW TO NARROW THE GAP

The "bottom line" question is: what can be done to narrow the communications gap between dp professionals and end users?

Dp professionals should view and treat end users as clients who want services performed. They must focus on solving their client's real business problems.

Dp people should not discuss technical subjects with their user-clients. Most dp professionals simply take it for granted the

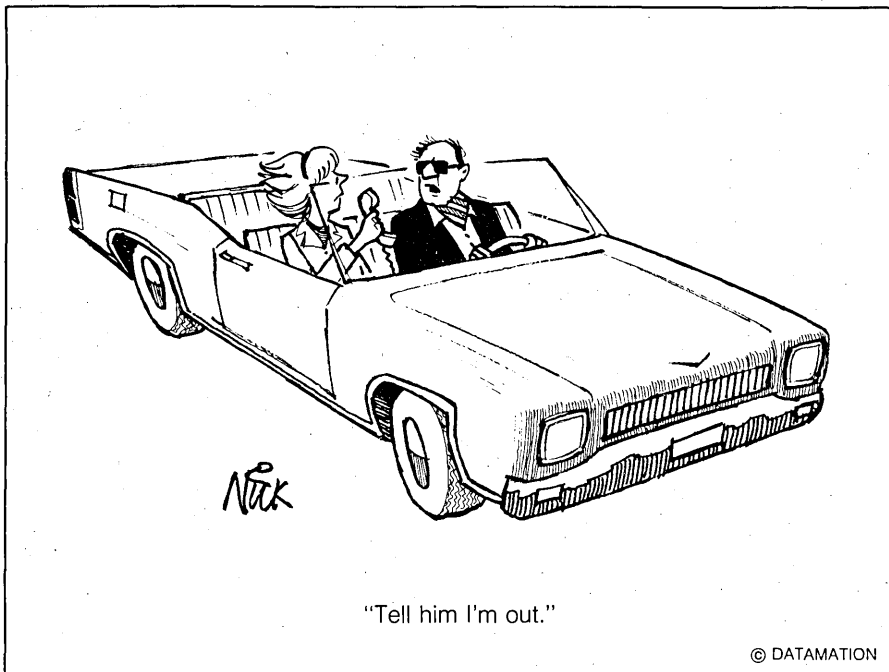
end user must know about access methods, programming languages, operating systems, etc. Not true. The dp professional does not have to go beyond a few technical terms such as character, field, record, file, code, bug, debug. The end user wants to be told in basic English the same things any client must know: when the end product will be ready, its cost, quantity, and quality. In dp terms, quantity is capacity, i.e., the number of transactions in a given time frame, and quality concerns reliability and related factors.

End users should understand their project development roles in terms that are meaningful to them. Dp professionals should be viewed by themselves and their users as project members, not as antagonists dealing in an arcane art, capable of solving all problems with a wave of the hand or seeking to ride roughshod over the end users' operations.

To help both dp professionals and end users understand their roles, I have found an excellent device is using the analogy of building a house—or remodeling a kitchen, which really did happen. The house analogy is essentially foolproof. End users grasp their roles instantly; they understand they must specify, in the required detail, just exactly how they want the house built and what they want it to contain. Similarly, dp professionals understand their roles in providing guidance, advising on the practicability of different approaches, and the various tradeoffs.

Both groups understand it's only right and proper that a prospective home owner be required to sign a contract with the builder before the house is built, and only right that any changes will entail reopening the contract. It's also only right that the builder be held to the promised completion date, built-in features, quality and cost.

The house analogy works. End users and dp professionals understand it. It is successful in the effort to improve communications between dp professionals and end user clients. *



© DATAMATION

DAVE MOLLEN



Mr. Mollen is a senior instructor at IBM's Systems Science Institute, responsible for "Project Planning and Control for Users," a course designed to solve

the end user, dp professional communications gap. Mr. Mollen was also a systems engineering manager at IBM, managing the implementation of many software contracts for IBM's customers.

CARTOON BY NICK HOBART

"Protection is my business... My ISOREGTM Computer Power Modules PUT AN END TO POWER-RELATED COMPUTER PROBLEMS"

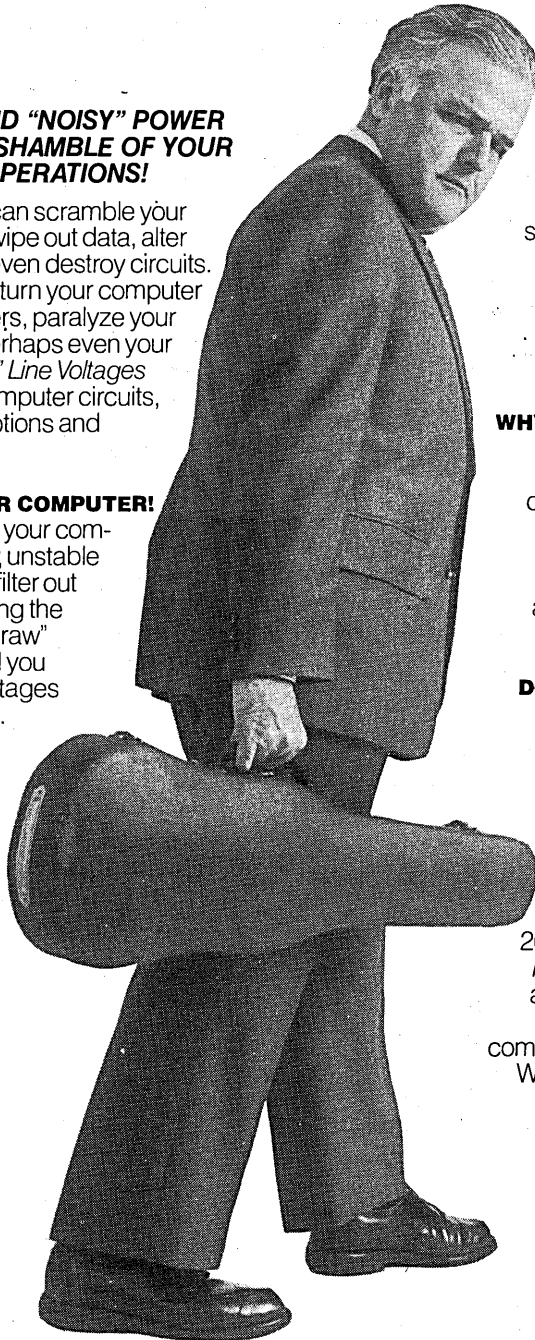
Says Emil Rechsteiner, President of Frequency Technology, Inc.

UNSTABLE AND "NOISY" POWER CAN MAKE A SHAMBLE OF YOUR COMPUTER OPERATIONS!

Voltage Spikes can scramble your computations, wipe out data, alter programs and even destroy circuits. *Brown-outs* can turn your computer runs into disasters, paralyze your equipment—perhaps even your business! *"High" Line Voltages* can burn out computer circuits, causing interruptions and costly repairs.

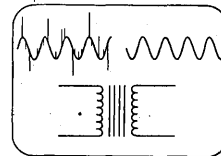
PROTECT YOUR COMPUTER!

You can protect your computer from noisy, unstable power. You can filter out spikes by isolating the computer from "raw" utility power and you can regulate voltages within tight limits.

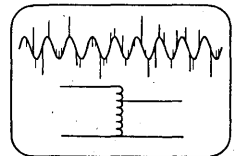


WHY ISOLATE?

With an isolation transformer you can electrically separate the computer from the utility power and filter out voltage spikes that scramble computations, wipe out data, even destroy circuits.



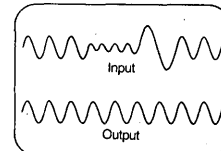
Line-to-load isolation shields computer from sharp, destructive voltage spikes.



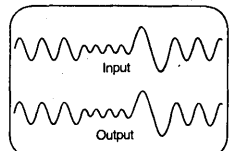
Without isolation computer is exposed to spikes even when power is supplied by voltage regulator.

WHY REGULATE?

With a voltage regulator you can power your computer with stable voltage *automatically* and *indefinitely*



Voltage regulation ensures stable voltage during brown-outs or voltage surges.



Without regulation, voltages sag and surge even when power is supplied by isolation transformer.

even when utility voltages drop to brown-out levels.

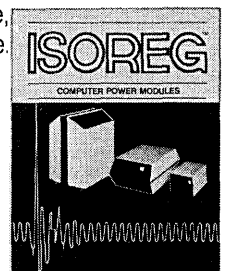
DON'T SETTLE FOR HALF PROTECTION!

An isolation transformer filters out spikes but does NOT regulate voltages; a voltage regulator stabilizes voltages but does NOT filter out voltage spikes. Don't spend a penny on half-protection! Be prudent, get full protection!

ISOREG = ISOLATION + REGULATION

ISOREG Computer Power Modules put an end to power related computer problems! Let me send you our new 26-page brochure, *ISOREG COMPUTER POWER MODULES PUT AN END TO COMPUTER POWER PROBLEMS*. It tells all about ISOREG Modules from 250VA to 25kVA, single-phase, 7½ to 75kVA three-phase, 60 Hz and 50 Hz and voltage combinations that ensure plug-in convenience around the world! Write me, or call our toll free number, or use the Reader Service Card of this magazine to obtain our new

brochure,
free.



Emil Rechsteiner, President
Frequency Technology, Inc.
TDC Division

410 Great Road, Littleton, MA 01460
Toll-free Number: 1-800-225-5078
In Massachusetts Call: 617-486-3539
TWX 710-347-6974

Many dp managers seemed to intensify other departments' resentment and apprehension by using technical jargon whenever possible.

EFFECTIVE IN-HOUSE TIME-SHARING

by Dan Walkovitz

Managers have recently begun to recognize the value of time-sharing as a conversational problem-solving tool as evidenced by the growing stature and recognition of the decision support system that has interactive computing as its foundation. At the same time as managers begin to understand the concept of DSS and to achieve the benefits from its proper application, outside time-sharing is becoming more expensive.

In response to the concern over rapidly increasing outside time-sharing costs, many organizations have installed time-sharing facilities in-house, and hired people to support them. Unfortunately, in most of these organizations, users will still select outside time-sharing vendors in lieu of an in-house service, and frequently will pay premium prices for work not necessarily superior.

To understand this circumstance, it is helpful to look at the history of non-dp managers and their relationship to the world of data processing.

Having no basis for comprehending most aspects of dp 20 years ago, but unable to deny its potential benefits, most managers accepted computers begrudgingly. Where they controlled their own domain, they now were forced to rely on an information source they did not understand. This early suspicion was amplified by credibility losses suffered in the early days of dp due to failures in developing accurate, comprehensive, and useful systems on a reasonable schedule. Managers accustomed to living with budgets and complying with time schedules witnessed consistent failures by dp organizations, yet the function seemed to become more dominant. Before

long, dp organizations functioned not as staff operations but as the department in control of all others—the tail wagged the dog. This growing importance fueled the resentment and apprehension of other departments.

Rather than attempting to reduce this concern, many dp managers and employees seemed to intensify it, using technical jargon whenever possible. (So prevalent is this attitude that it was the subject of satirical treatment in DATAMATION, April 1979, p. 135, where Dr. Oscar P. Babel says, "Boy, oh boy, do you owe me. Who do you think it is that's been keeping you in your job all along, helping you convince those suckers outside the industry that you really know what you're doing down there in the computer room?") Because of this, a lack of rapport between dp and other managers remains. Even younger managers not involved in the evolutionary development of this gap have been affected by it.

TIME-SHARING'S APPEAL

In the face of this situation, it is easy to understand why time-sharing appeals to managers. Aside from offering the opportunity to satisfy dp needs, it enables the manager to retain control. Through time-sharing, the manager is, once again, the master. He need not wait months for a project to be developed; he can do it at his own pace and even design it to his own specifications without constraints imposed by dp.

In response to the new freedom and control offered to managers in the early 1970s, time-sharing blossomed in business. Then, when managers began recognizing the conversational problem-solving value of

time-sharing and its usefulness for interactive evaluation of alternative situations time-sharing use surged, and outside time-sharing costs skyrocketed.

Aided by declining hardware costs, many organizations retained time-sharing dollars by installing in-house time-sharing operations. Foolishly, most of these organizations simply folded the new computers into existing dp operations, used dp professionals to support the new systems, and awaited the savings.

Yet this seemingly simple solution neglected the major source of the problem—the attitude of managers. Through the use of time-sharing, managers had freed themselves of the dependency on dp and improved the responsiveness of systems at the same time. They were by no means interested in relinquishing control by placing the source of their independence in the hands of the people from whom they finally had wrested it. As should have been expected, in-house time-sharing was tarnished immediately by association with in-house batch processing.

Given this state of affairs, it is difficult to understand why managers even attempted to use in-house time-sharing offered under the auspices of data processing. For a number of reasons, however, including a sincere desire to cooperate in cutting costs as well as corporate pressures, they did. And, as a result of such attempts, they usually convinced themselves of the sheer absurdity of the idea; the response resembled that of a batch operation and differed dramatically from the approach employed by outside time-sharing vendors.

To present the difference in approach, let's assume that the director of planning

Graphic Controls can now supply paper

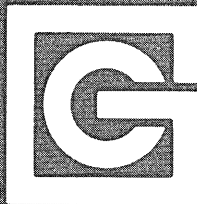
that's pre-tested by Texas Instruments

We offer paper which has successfully passed T.I.'s inspection for residue and abrasion requirements, necessary for use in Texas Instruments' thermal printing terminals.

□ We also manufacture thermal papers used in equipment made by . . .

Anderson Jacobson, Computer Devices Inc., Computer Transceiver Systems Inc., Hazeltine and others.

Buy direct from the company [®]



GRAPHIC CONTROLS

Coated Products Division

which coats and converts its own thermal paper and reduce your costs while improving your service. □ Investigate our annual supply agreements, our combination purchase discounts and our exclusive G. C. Autoshop Plan. □ Dial one of our toll free numbers, Outside NYS, 800-828-7978, Inside NYS, 800-462-7332, In Canada 613-382-4733, or simply write us at P.O. Box 1309, Buffalo, N.Y. 14240 and you'll see why the "Single Source" is the sensible way to handle your data communications paper needs.

The Single Source.

CIRCLE 128 ON READER CARD

In-house time-sharing was tarnished immediately by association with in-house batch processing.

needs a system for financial forecasting. He contacts his in-house time-sharing organization on Monday. He probably will be scheduled to meet with his in-house time-sharing representative on Thursday or Friday.

During this meeting, the director of planning will convey his desires to a computer technical representative, possibly going into detail to explain to this in-house analyst the basics of the financial statements he wants to forecast, the relationships between the statements, the reason why depreciation appears as a cash inflow on the cash statement but as an expense item on the income statement, and other fundamentals of finance and accounting with which the systems analyst may have little or no experience.

Following this half-day meeting, the systems analyst will return in perhaps three weeks with a schedule of two to three months for completion, including a number of additional meetings with planning people, and a cost for development of about \$35,000. The director of planning is faced with a one-month delay from the point of his interest before he even knows whether the application is feasible from a cost or time standpoint, and then an additional two or three months before he will be able to use the system. (And this assumes realistic estimates by the systems analyst, a source which the director of planning already considers suspect, based on previous experience.)

Compare this with the approach followed by a reputable time-sharing vendor. The call placed on Monday would probably elicit a visit by the analyst no later than Tuesday. The analyst would probably have at least a basic familiarity with finance and planning and, quite possibly, would be able to offer a strong background with varied experience in the area. As a result of this, the manager can shorten his initial meeting to maybe two hours and reduce the need for additional training of the analyst to a minimum.

Most likely, the analyst will call the director of planning by the end of the week to indicate that the system can be developed and available for preliminary use in about 10 days at a cost of around \$3,000 to \$7,000.

Now, truly, this will not be the same system which would have been developed by the in-house time-sharing group; it will, however, serve the needs of the manager just as well. And, while it may cost more to run on a monthly basis, the costs of development are lower. But, most importantly, *the director of planning will receive a usable system two or three weeks after his realization of the problem, quickly enough so that it complies with the immediacy of his need.* Furthermore, he knows that he can trust the ability of the outside analyst to perform, since he will not be in business in the competitive time-sharing market if he does not.

IS THERE REALLY A CHOICE?

Now, is there really any choice? In the face of an existing concern by management about dp, the in-house time-sharing organization performs just as management predicted. And, as an alternative, the manager has the outside vendor who performs exactly as he would like. No contest.

This is not to say the systems analyst is to blame. He is accustomed to designing, developing, and implementing large scale, integrated systems; he simply applies this familiar approach to interactive applications without any knowledge of management expectations. Here, the responsibility rests with the individual who assumes that an effective batch operation provides the ingredients for a successful time-sharing operation. The fact is *batch processing is as different from interactive computing as marketing is from accounting.* The functions are different, the computer hardware and operating systems are different, the attributes of the support representatives are different, and the user needs are different.

In true batch applications dp experts are essential; managers do not have the expertise nor the access to requisite facilities. Not so with interactive computing; if managers do not already have the knowledge required, time-sharing companies will gladly provide it or teach it, on the manager's terms. Typical dp professionals are not only expendable for these applications, they are not desired.

The parameters describing the typical interactive computing project are entirely different from those underlying the batch project. First of all, precision is usually of no consequence in interactive applications inasmuch as the product is used to provide improved information in anticipation of a decision, and much of the input is estimated anyway.

Typical interactive systems may run on a regular basis, but they just as likely will run quarterly, annually, or irregularly, as needed. A system may be developed for one specific project and may never be run again. Or, significant modifications to the system may be required each time it is utilized.

For the most part, these applications are not well defined in advance since the capabilities of interactive computing broaden the spectrum beyond what may have been done before. Frequently, turnarounds of more than a few hours are totally unacceptable in the interactive environment because by that time the decision point will have passed. (Consider, for example, a last-minute change in the approach to an acquisition to be presented to the board of directors for approval in two hours.)

The systems are usually straightforward, oriented to a specific task, and do not

require the interrelationships and complexities inherent in large batch processing systems. And, when the need for a system arises, lengthy development times will neither satisfy the immediacy of the need nor be financially justifiable in light of potential infrequent use and potential for change.

Obviously, this environment requires an entirely different approach. At this point, the solution is obvious. When designing an in-house time-sharing organization, do not incorporate it into the in-house batch processing organization; do not model it after the in-house dp organization; do not select people that would be successful in a batch environment, either as systems analysts or managers; and, do not address the community of users as you would address those using in-house batch processing services.

A LESSON FROM WINNERS

Instead, style the in-house time-sharing organization after those who are now successfully capturing the preponderance of time-sharing expenditures—the time-sharing companies themselves. Anyone anxious to become a great artist will study under a master. In the same way, to establish an effective time-sharing operation, take a lesson from those who have shown themselves to be winners.

For the most part, successful time-sharing companies attempt to incorporate the following ingredients:

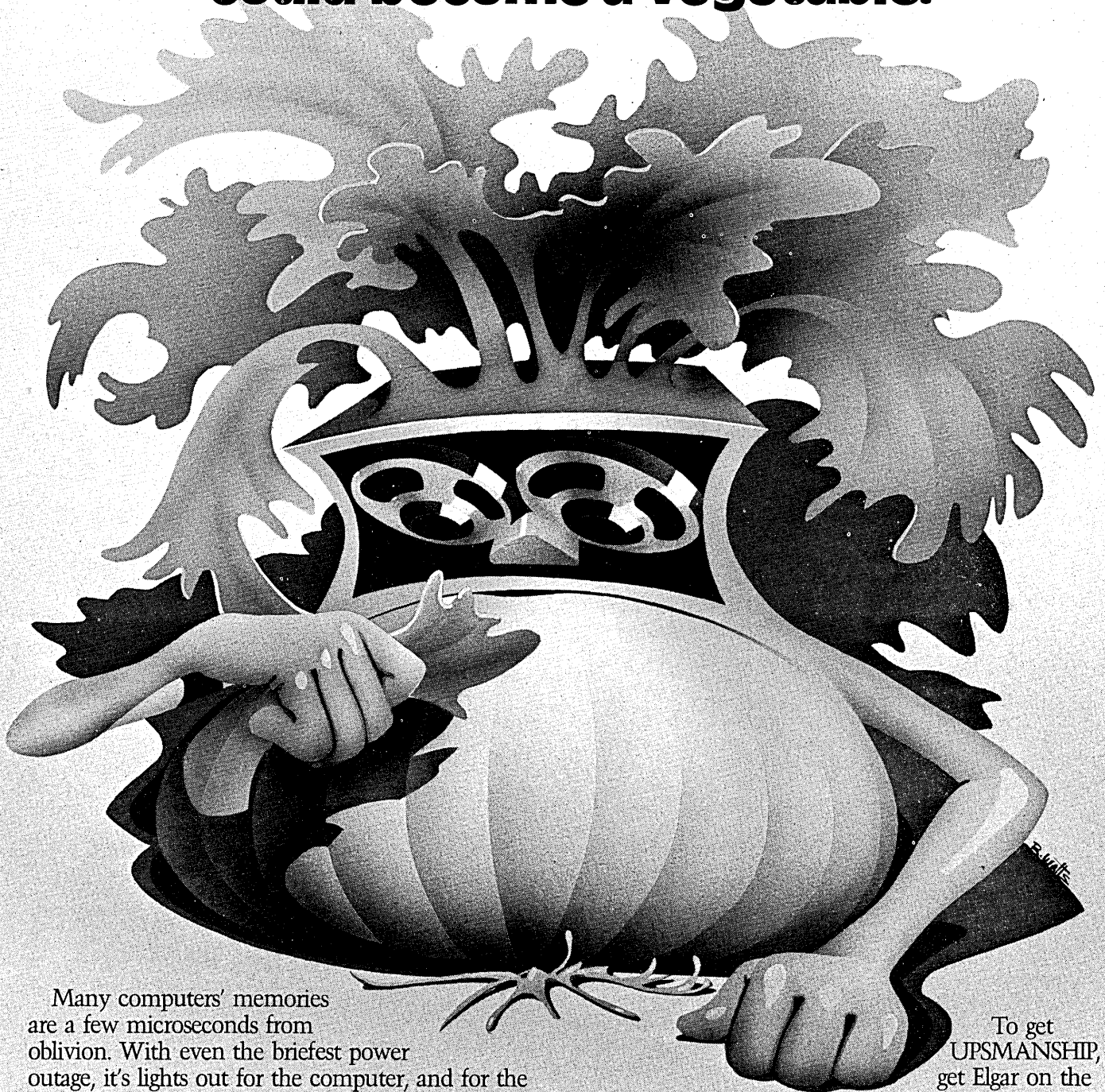
1) *Proper personnel selection and orientation.* Individuals who are able to relate to the management environment, the decision-making process, and the interpersonal relationships impacting managers; individuals with solid understanding of the conceptual areas to which they respond; individuals who are marketing oriented and profit motivated; individuals with sufficient knowledge of interactive computing to understand its application to management problems and to utilize the tool in developing and supporting such applications; in sum, individuals with the ability to bridge the gap between management's needs and the capabilities of interactive systems, and to implement the applications within this overall scheme.

2) *Incentive compensation.* Includes an approach designed to reward salespeople and support analysts based on the business they generate and support, and managers based on the profits they earn; stock ownership and bonuses for performance.

3) *User-oriented philosophy.* A basic orientation toward easy to use systems and assistance in complete and successful implementation of systems.

4) *Quality product.* Offers responsive hardware and flexible software designed specifically for time-sharing, user-oriented application packages designed to en-

UPSMANSHIP. Without it, your computer could become a vegetable.



Many computers' memories are a few microseconds from oblivion. With even the briefest power outage, it's lights out for the computer, and for the people depending on the data.

But the right amount of UPSMANSHIP can get any computer through a blackout with all its marbles intact. The right amount? From 0.5 KVA to 45 KVA, depending on your needs.

The same Elgar Uninterruptible Power System (UPS) also protects your computer from life's smaller ups and downs—the momentary spikes and transients on your AC line.

"See us at NCC Booth #1856/1858."

To get UPSMANSHIP, get Elgar on the phone, then get Elgar on the line. 8225 Mercury Ct., San Diego, California 92111. In California, call (714) 565-1155. Out of state, call 800-854-2213 toll free.

Elgar is also a leading producer of High Isolation Transformers, AC Line Conditioners, and AC Power Sources.

 **ELGAR**

an **Onon**® power systems company
CIRCLE 129 ON READER CARD

Batch processing is as different from interactive computing as marketing is from accounting.

able novices to learn the system quickly and to allow trained users to implement applications rapidly and with ease.

5) *Autonomy*. Independently managed subsidiaries of major organizations or publicly owned companies.

In light of current conditions, the only constraints inhibiting creation of an in-house time-sharing organization in the image of these successful time-sharing companies are those engendered by the organization itself—its policies, attitudes, and philosophies. Techniques and organizations exist to assist in selection of appropriate personnel to fill management, marketing, and support positions; outstanding application packages and languages are available for installation on in-house systems at very reasonable prices.

Through a unique new approach now being offered, in-house time-sharing organizations can begin operating without the initial expense of their own hardware and yet offer time-sharing to in-house users at competitive rates, retain 50% of revenue internally, and be able to upgrade to an in-house system when the time is right. There is really nothing external to a corporation spending \$20,000 to \$25,000 a month or more in outside time-sharing which would prevent them from instituting an effective in-house time-sharing operation.

In order to proceed, the first step is to determine more about who within the organization is doing time-sharing, with whom it is being done, what applications are being performed, and on what vendor-proprietary packages. The end result should be an inventory of how much outside time-sharing is susceptible to conversion to an in-house system and what will be required to support the various applications.

Where users are involved, all aspects of the survey must be handled with sensitivity to avoid inducing the dp threat; under no conditions should the in-house batch processing organizations be involved in this research. As a matter of fact, it might be wise to use an outside firm with background in time-sharing to conduct the investigation.

PREPARE COMPLETE PLAN

Based on the results of this survey, an evaluation should be made to determine whether in-house time-sharing is realistic. If it appears reasonable, a complete business plan should be prepared to consider competition, opportunities, strategies, policies and philosophies of the organization. Facilities should be defined, prices established, and a forecast of anticipated results prepared. The plan should be designed just as if the organization were totally independent and profit motivated since it must be if it is to provide the proper atmosphere for employees and users alike. The or-

ganization should be structured as an independent subsidiary, if reasonable, or, at the very least, a profit center. Employees must see themselves as employees of a time-sharing company competing in a restricted market for the maximum profits; only in this way will the concept be effective.

Next, an appropriate manager for the organization should be selected. Most importantly, this person should have experience in management, if possible in a variety of operations, and have the ability to relate to managers, understand their environment, and be aware of the pressures which are imposed upon them so that he can structure his organization to respond to this environment. He should also have knowledge of interactive computing, perhaps as a user. Ideally, this individual will have been employed by an outside time-sharing company in a managerial capacity so that he can understand the way these companies operate. Finally, he should be humanistic, be able to understand users as well as employees, and be capable of selecting wisely those people who will most aptly fill the required roles.

Once a manager is selected, a decision must be made regarding the method of providing time-sharing resources. As an example, the associates plan offered by some time-sharing vendors provides a way for companies to evolve into an in-house time-sharing operation with little risk. For about \$10,000, the vendor offers time-sharing to in-house organizations at 50% of competitive retail rates. Once the in-house organization becomes established, gains confidence and attains a monthly revenue figure sufficient to justify it, the vendor's system can be licensed in-house, enabling instant conversion to an in-house computer with no retraining of users.

Not only does this approach limit risk, but it also offers the opportunity to benefit from the high incremental margins available in time-sharing once the risk is no longer a factor. In addition, it eliminates many typical expenses of in-house operations since the vendor accepts all responsibility for maintenance and enhancement of the operating system—thus no system programmers or expenses are required.

The next step is to develop a compensation scheme designed to attract aggressive sales and support people, most likely from outside time-sharing companies. The best people are those who are most likely making substantial incentive income working for an outside vendor. In order to attract them, competitive incentive compensation is necessary.

There is no need to institute a large staff immediately. Certainly an associates plan enables the in-house organization to satisfy demand with far fewer people, but no matter what approach is used for acquisition

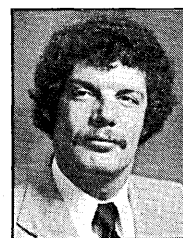
of resources, it makes the most sense to build slowly, establishing credibility with users first with a select number of qualified people and then adding personnel as business expands. The need is for quality, not quantity. As Michael Scott Morton and Peter Keen say in the book *Decision Support Systems: An Organizational Perspective*, the need is for a "system designer who is currently hard to find, one who is technically competent but views her or his role as supporting the manager and understanding the manager's world." It is the ability to find and retain this person that will determine the success of the in-house approach.

The organization should have an extremely aggressive user-oriented marketing approach. Salespeople should actively solicit business from in-house users, support representatives should respond vigorously to appropriate requests from users and attempt to encourage additional use of the system, and user orientation and documentation should be provided with each application.

Of course, it is mandatory that system response be maintained at a high level, that user-oriented application languages are provided so that all hardware and software aspects will be competitive where this is desirable.

Now is the time to implement in-house time-sharing. We know the traditional approach does not work. In the face of its failure, however, time-sharing companies continue to generate increasing amounts of business, even in organizations with unsuccessful time-sharing operations. To the extent possible, new in-house time-sharing organizations should follow the lead of time-sharing vendors and apply the approach they employ. The payoffs are high and the risks are low. *

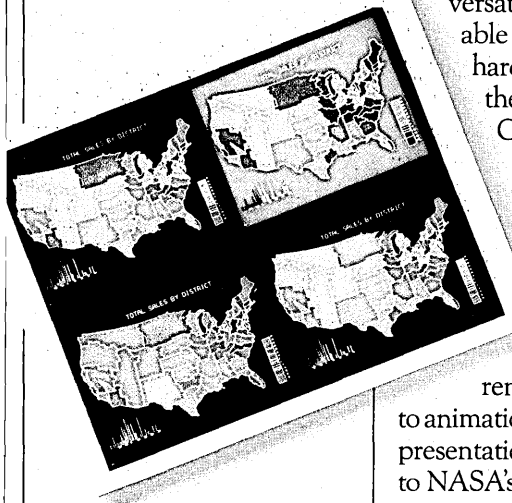
DAN WALKOVITZ



Mr. Walkovitz is president of Corporate Management Systems, Inc., Englewood, Colo., management consultants specializing in the development and implementation of decision support systems. He was previously a marketing vp of Computer Sharing Services, a national time-sharing service vendor. Mr. Walkovitz has an MBA in finance from Stanford Univ. and spent eight years in corporate finance.

Color it Dunn.

Communicate with Color Hard Copy from the 631 System



Exciting computer images, digitally processed or original graphics, should not be confined to your color terminal. Their communication value is wasted. That's why Dunn

Instruments invented versatile, affordable photographic hard copy. Made by the 631 Color Camera System.

For over a year now, 631 Systems have been at work in applications ranging from remote sensing to animation, from business presentation graphics to NASA's Saturn mission.

Media versatility
Instant 8x10 prints on Polaroid® Type 808 film, overhead transparencies, 35mm slides and animated 16mm film — all are within the capabilities of a single system. Their incredible resolution, chromatic vividness and accuracy will astonish you. So, too, will the speed, ease and assurance with which you

produce them, thanks to microprocessor-automated camera operation and exposure control.

Multi-imaging power
Recording images side by side aids in comparative analysis and presentation planning. It also reduces film cost. Our software-based format selection means the freedom to tailor the



configuration of images to your needs. It's a Dunn Instruments exclusive.

THE 631 COLOR CAMERA SYSTEM

Interfacing ease

The 631 System interfaces with ease to every kind of computer system and color terminal. It is sold complete, and installed worldwide by an experienced sales and service force.

Call 415/957-1600 and we'll put you in touch with your nearest Dunn Instruments representative. Or write us at 544 Second Street, P.O. Box 77172, San Francisco, CA 94107.



"Polaroid" is a registered trademark of Polaroid Corporation

Outside the U.S., the 631 System is distributed by CalComp International.

DUNN INSTRUMENTS

Commitment.

It's one of those over-used words in danger of losing all meaning.

Not so for system houses and computer system manufacturers. To you, commitment is the difference between a supplier who leaves you in the lurch. And one who doesn't.

At Century Data, we understand that our success depends entirely on your success. And that broken shipment promises can mean a lot more to you than delayed drives.

Clearly we're in this together. You'll see that attitude reflected in everything we do.

Take our products. No one offers a broader selection of rotating disk drives. Our Trident has earned a reputation as the industry's most reliable removable-pack drive, in capacities from 25 to 600 MB.

Marksman is making a hit as the Winchester with built-in intelligence. It gets you to market quickly, without time wasted on controller development. It's available now — hard-tooled — in 10, 20 and 40 MB capacities, with or without built-in controller.

Hunter is gaining attention as the superior split-pack cartridge drive, combining 16 MB removable and up to 80 MB fixed. And the same reliability and maintainability proven in thousands of Tridents.

We've made the commitment to pump new life into Diablo cartridge drives. We couldn't be more delighted with Xerox's assignment to us of Diablo drive marketing. You can count on us as an eager, dependable source of supply.

The future looks even brighter as we listen to you. And the results are starting to show. The need for lower costs per megabyte led to development of this 600 MB Trident. Priorities have been made out of your need for more self-diagnostics and built-in intelligence. An intelligent Hunter is on the way. And more capacity for the Marksman.

Unlike few other disk drive manufacturers, we are able to draw on the resources of Xerox research to keep us — and you — on the leading edge of storage technologies as they develop.

Customers come to us for our products, then come back because we perform. With service. Support. Dependable delivery. And extra effort.

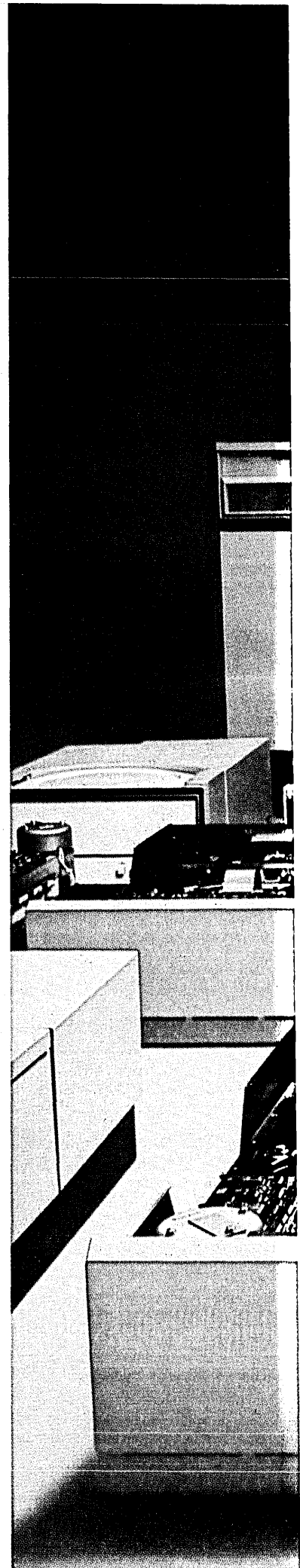
What it comes down to is this: Commitment may be just a word. We expect you to judge us on our actions. Then see if you can find a better word to describe our approach to this business.

Call or write Century Data Systems, A Xerox Company, 1270 North Kraemer Blvd., Anaheim, CA 92806. (714) 632-7500.

 **Century Data Systems**
A Xerox Company

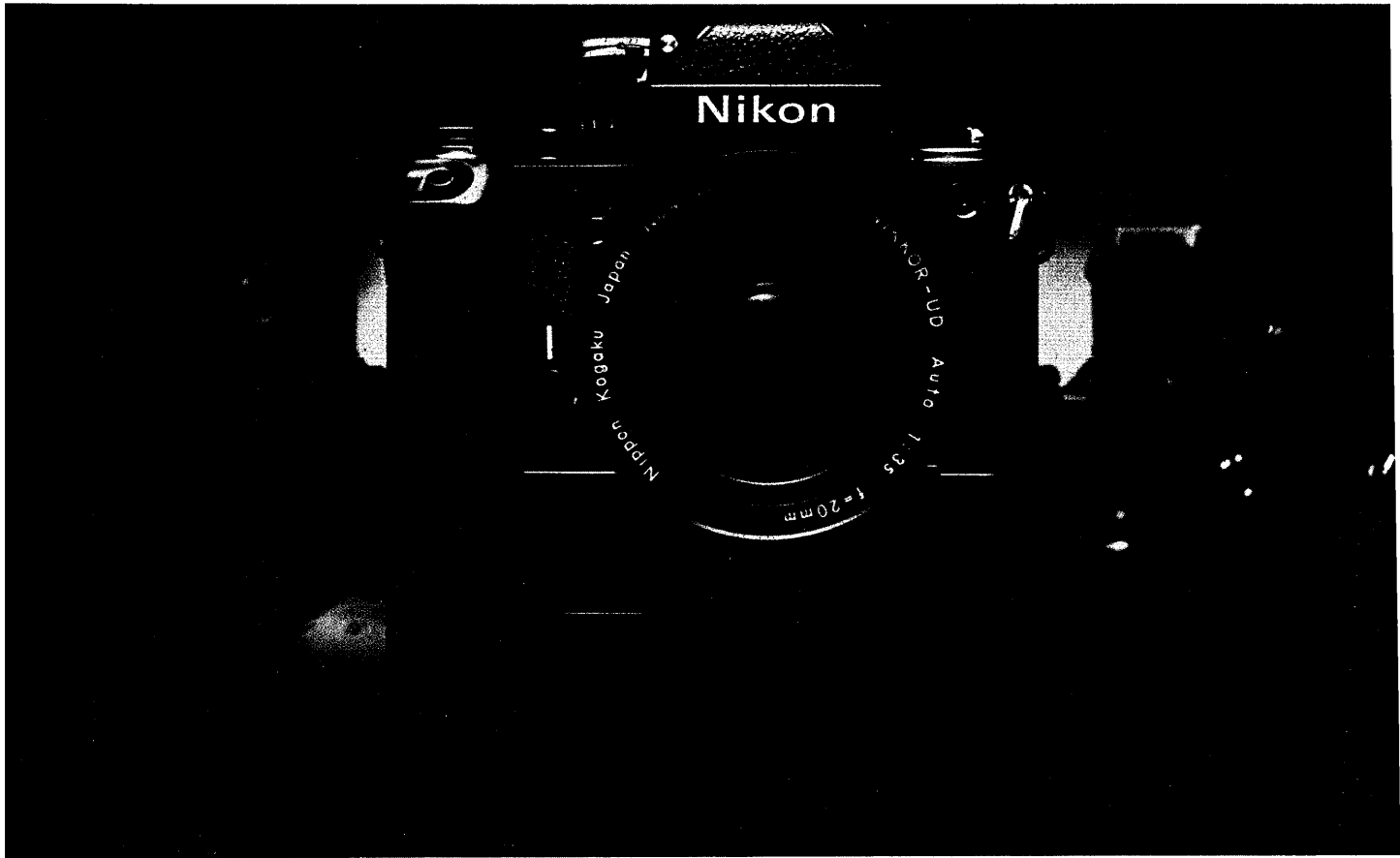
CIRCLE 131 ON READER CARD

SEE US AT NCC
BOOTH 4401-4411



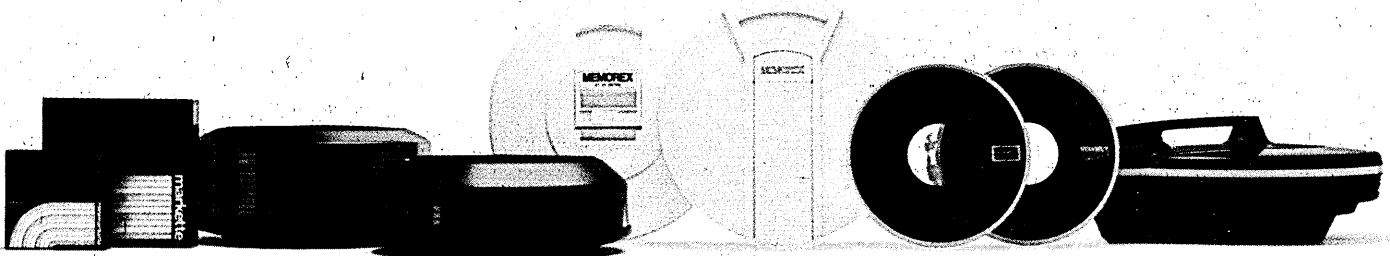
**YOU CAN COUNT ON US
FOR THE ENTIRE CENTURY.**





In all the world, in all classes of things,
there is always one in a class by itself.

And in assuring data availability, it's us.



© 1979 MEMOREX CORPORATION
MEMOREX IS A REGISTERED TRADEMARK OF MEMOREX CORPORATION

MEMOREX Computer Media Products

See us at NCC, Booth 2363 and the Personal Computing Festival, Booth 67.

CIRCLE 132 ON READER CARD

An executive support system achieves the coupling of an individual's intellectual resources with those of the machine.

OPTIMIZING DECISION SUPPORT SYSTEMS

by G.R. Wagner

Certain tools are commonly used as extensions of the human mind. An architect's ideas take shape on a sheet of drawing paper. An engineer works out a design with a sketch as his fingers fly over the keys of a calculator. Such tools can become as much a part of the mind as a tennis racket can become an extension of the body.

Computer-based decision support systems have been rather slow to arrive in the world of business management. The approach represents a radical departure from traditional business applications of computers, as executives are indeed augmenting mental powers in ways reminiscent of computer-aided design and interactive data analysis. In some cases, a manager sits at a terminal, although more often the same effect is achieved through an intermediate staff assistant. The process is not merely data compilation and reporting as in traditional mainstream applications; neither do users serve essentially as operators directing the system. Executive support is more—it is a system that achieves a coupling of an individual's intellectual resources with those of the machine.

The recession of 1973-74 was the most important single stimulus in recognizing a manager's need for fast information updates and fast answers. By contrast with our former relative stability, it is now essential that business managers anticipate probable changes, detect change as it occurs, and take appropriate action—all very quickly. Managers also think strategically, using change and uncertainty to their advantage by planning to influence the future instead of performing reactively. The cycles of product life, competitive action, and other business realities are too short to allow the manager to have a wait-and-see attitude; the natural process is often too slow for business survival.

Decision support systems for executives can be categorized as corresponding loosely to the faculties of memory and reasoning. For example, certain data base management systems, providing the ability to retrieve information in such a way that meaningful patterns and correlations may be discerned, augment the memory. Simulation-based systems can be seen as extensions of an executive's reasoning powers. Models of the business environment help an executive envi-

sion possibilities for the future, foresee consequences, and identify and select alternative solutions. Most decision support systems contain elements of both data base management and modeling, but typically one element is dominant in a particular situation.

Most important innovations in computer-based modeling are financial planning languages—programming languages that enable non-dp people to become competent in building and solving models in an

interactive, exploratory manner. For purposes of example, we will refer to one such language, called IFPS (Interactive Financial Planning System); however, most of what we will say applies to other languages of this type. The ways in which such a planning language are used are indicated by a survey of clients.¹ Among the results was the finding

1. Wagner, G.R., "Enhancing Creativity in Strategic Planning Through Computer Systems," *Managerial Planning*, July-August 1979.

TABLE I

10	COLUMNS 1980HALF1,1980HALF2,1981HALF1,1981HALF2
20	* THIS MODEL IS FOR SIX MONTH PERIODS
30	* EXPENSE SECTION
40	PAYROLL=19000*NUMBER OF SALESPERSONS, PREVIOUS*1.05
50	NUMBER OF SALESPERSONS=4
60	TRAVEL AND ENTERTAINMENT=15000 * NUMBER OF SALESPERSONS
70	PROMO SUPPORT=11000 * NUMBER OF SALESPERSONS
80	ADMINISTRATIVE SUPPORT=53000,PREVIOUS*1.05
90	COMMISSIONS=15%*SALES REVENUE
100	TOTAL EXPENSES=SUM(PAYROLL THRU COMMISSIONS)
110	* REVENUE SECTION
120	SALES REVENUE=NUMBER OF SALES*SALES PRICE
130	NUMBER OF SALES=5*6*NUMBER OF SALESPERSONS
140	SALES PRICE=4350 FOR 2,4695
150	* SUMMARY SECTION
160	GROSS CONTRIBUTION MARGIN=SALES REVENUE-TOTAL EXPENSES
170	EXPENSE RATIO=TOTAL EXPENSES/SALES REVENUE

TABLE II

?SOLVE	1980HALF1	1980HALF2	1981HALF1	1981HALF2
ENTER SOLVE OPTIONS				
?ALL				
EXPENSE SECTION				
PAYROLL	76000	79800	83790	87980
NUMBER OF SALESPERSONS	4	4	4	4
TRAVEL AND ENTERTAINMENT	60000	60000	60000	60000
PROMO SUPPORT	44000	44000	44000	44000
ADMINISTRATIVE SUPPORT	53000	55650	58433	61354
COMMISSIONS	78300	78300	84510	84510
TOTAL EXPENSES	311304	317754	330737	337848
REVENUE SECTION				
SALES REVENUE	522000	522000	563400	563400
NUMBER OF SALES	120	120	120	120
SALES PRICE	4350	4350	4695	4695
SUMMARY SECTION				
GROSS CONTRIBUTION MARGIN	210696	204246	232664	225552
EXPENSE RATIO	.5964	.6087	.5870	.5997

that 44% of the models were actually built by middle- or upper-level managers. By contrast, middle- and upper-level managers, performed only 21% and 9%, respectively, of the "what-if" analyses. Apparently, managers want to be involved in the building of their models—but once a model has credibility, they turn the mechanics of using a terminal over to a staff assistant. The key persons actually performing "what-if" analyses tend to be intermediaries such as secretaries and MBA assistants—after the model has been aligned with the thinking processes of the executive.

For a model to provide true decision support, its statements must resemble the business person's vocabulary and track unstructured and continually changing thought processes. Furthermore, the model must react in real time, while the person's attention remains focused on the subject. Decision support is further promoted by permitting the model statements to appear in any order—to this extent, the language is "nonprocedural." This example is not intended to be complete or even realistic, but it does demonstrate that anyone who understands English or any other natural language can understand our model. Building a real model for a real company involves a more thorough description but not any more complex programming.

The model as it would appear after being typed into the terminal in interactive fashion appears in Table I.

To get an automatic report the user need only type the command SOLVE, and receive the report depicted in Table II.

To answer "what-if" questions, the user types in the command WHAT IF along with the questions he wants to consider, as shown in Table III.

What sales price would result in an expense ratio of .57? To answer this type of question, the user can use the GOAL SEEKING command (see Table IV).

USING RISK ANALYSIS

One particularly noteworthy aspect of decision support is that Monte Carlo risk analysis is being applied to business models through the modeling language. Although the classic paper on the Monte Carlo method was published in 1964,² this technique has been slow to reach its potential in routine planning. To see how the Monte Carlo technique is implemented in IFPS, the foregoing model has been modified to include the uncertainties shown in Table V.

Now the decision-maker can express intuitive patterns of uncertainty and immediately gain insight into how much various outcomes might swing. For example, with the

TABLE III

```
?WHAT IF
WHAT IF CASE 1
ENTER STATEMENTS
?COMMISSIONS = 16%*SALES REVENUE
?SALES PRICE=4450 FOR 2,4750
?SOLVE
ENTER SOLVE OPTIONS
?SALES REVENUE THRU EXPENSE RATIO
WHAT IF CASE 1
2 WHAT IF STATEMENTS PROCESSED
SALES REVENUE      1980HALF1  1980HALF2  1981HALF1  1981HALF2
NUMBER OF SALES    534000    534000    570000    570000
SALES PRICE        120        120        120        120
SALES PRICE        4450        4450        4750        4750
SUMMARY SECTION
GROSS CONTRIBUTION
MARGIN              215556     209106     232574     225462
EXPENSE RATIO       .5963      .6084      .5920      .6045
```

TABLE IV

```
ENTER SOLVE OPTIONS
?GOAL SEEKING
GOAL SEEKING CASE 1
ENTER NAME OF VARIABLE TO BE ADJUSTED TO ACHIEVE PERFORMANCE
?SALES PRICE
ENTER COMPUTATIONAL STATEMENT FOR PERFORMANCE
?EXPENSE RATIO = .57
GOAL SEEKING CASE 1
1980HALF1  1980HALF2  1981HALF1  1981HALF2
SALES PRICE    4623      4751      4885      5026
EXPENSE RATIO  .57        .57        .57        .57
```

TABLE V

	Low Value	Most Likely Value	High Value
TRAVEL AND ENTERTAINMENT	\$12,000	\$15,000	\$18,000
PROMO SUPPORT	9,500	11,000	13,000
ADMINISTRATIVE SUPPORT	45,000	53,000	62,000
NUMBER OF SALES	4	5	5.5

Each of these variables will be represented by a triangular statistical distribution which in a picture looks like the following:

```
PROBABILITY
PESSIMISTIC VALUE
MOST LIKELY VALUE
OPTIMISTIC VALUE
```

The IFPS word to represent the triangular distribution is TRIRAND. It is used as follows:

VARIABLE NAME = TRIRAND (LOW VALUE, MOST LIKELY VALUE, HIGH VALUE)

All that's needed is to replace lines 60, 70, 80, and 130 in the IFPS model with the following:

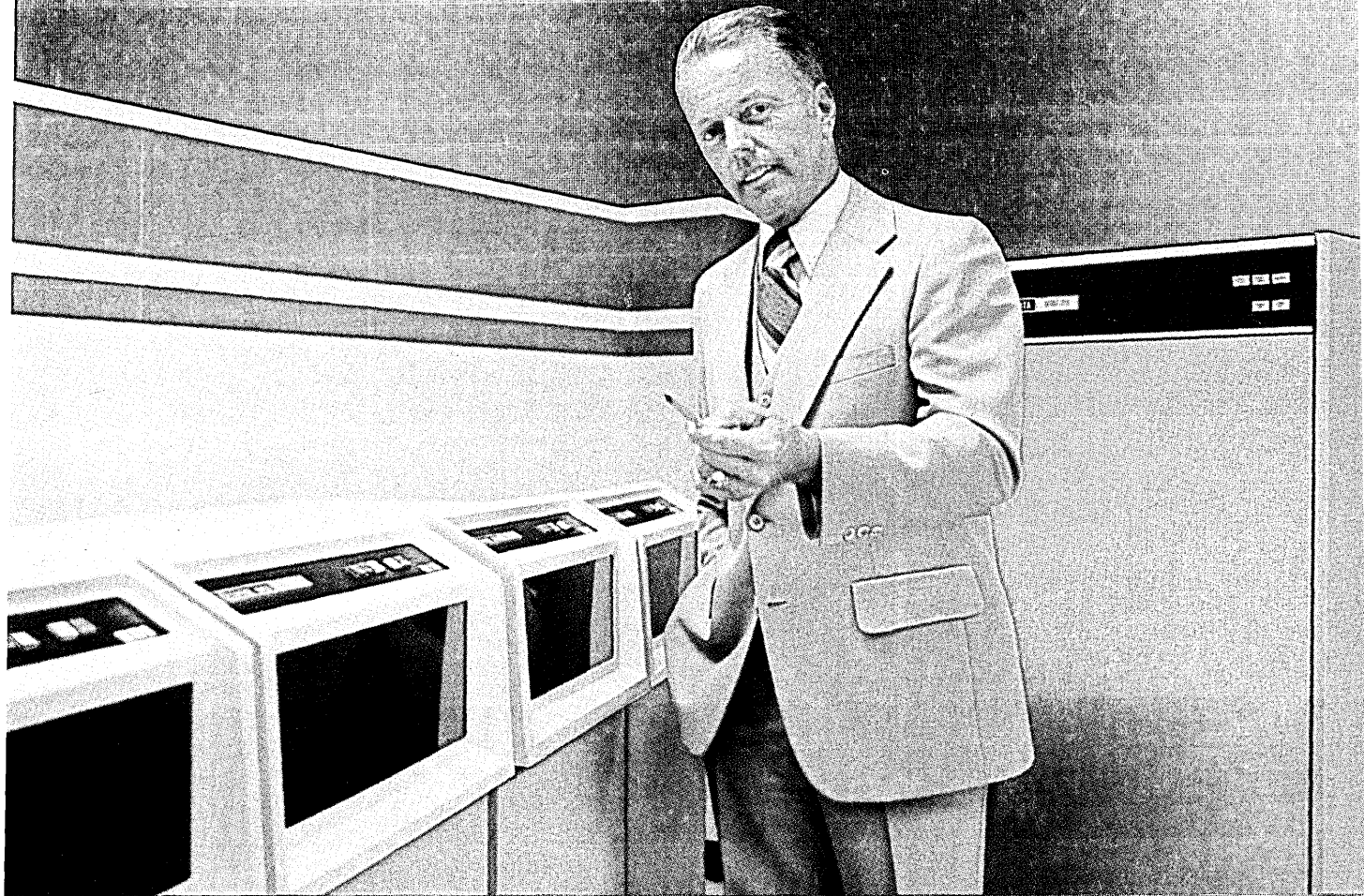
```
60 TRAVEL AND ENTERTAINMENT = TRIRAND (12000, 15000, 18000)*
NUMBER OF SALESPERSONS
70 PROMO SUPPORT = TRIRAND (9500, 11000, 13000)* NUMBER OF
SALESPERSONS
80 ADMINISTRATIVE SUPPORT = TRIRAND (45000, 53000, 62000), PREVIOUS
*1.05
130 NUMBER OF SALES = TRIRAND (4, 5, 5.5) *6* NUMBER OF
SALESPERSONS
```

The user gets probabilistic answers by typing the command MONTE CARLO:

```
?MONTE CARLO
ENTER MONTE CARLO OPTIONS
?ALL GROSS CONTRIBUTION MARGIN, ALL EXPENSE RATIO
ENTER MONTE CARLO OPTIONS
?NONE
```

2. Hertz, David B., "Risk Analysis in Capital Investment," *Harvard Business Review*, January-February 1964.

**"Our 33502, with 635 megabyte capacity,
is the better business decision."**



Jim Cron, General Sales Manager, Peripheral Systems Marketing

"Our 33502 has twice the capacity of an IBM 3350. So you can save dollars and floor space. And the improved technology behind our new 33502 data module offers other advantages.

"Better performance, for example. Track-to-track access time is faster than the 3330/3350 technology can offer. Average access time is faster too—19 milliseconds per 317.5 Mbyte logical volume. And you get more optional fixed head storage—1.72 Mbytes instead of only 1.14 Mbytes.

"Another technological innovation is our dynamic dual access. It gives you up to 25% greater throughput over a comparable switch configuration. And if you have a multiple CPU installation, we can offer you both string switch and dual access to provide four data paths to each spindle.

"And when you choose Control Data's 33502, you needn't worry about conversion or com-

patibility problems. It is totally compatible with all IBM 3330/3350 disks and controllers. Our Storage Controller lets you intermix 100MB, 200MB, 317.5MB, 400MB, 635MB— even Mass Storage all on the same unit.

"Besides technical considerations, there are many other reasons that make the 33502 a better business decision. Control Data's reputation is for reliability, service support and broad product experience. And there are more reasons. For the full story contact your local representative, or call 612/553-4158."

**GD CONTROL DATA
CORPORATION**

Addressing society's major needs

CIRCLE 133 ON READER CARD

FREQUENCY TABLE

PROBABILITY OF VALUE BEING GREATER THAN INDICATED

90 80 70 60 50 40 30 20 10

GROSS CONTRIBUTION MARGIN

1980HALF1	152753	165740	179519	190729	196567	203796	211951	220087	230485
1980HALF2	146302	159248	173053	184261	190067	197160	205534	213886	224032
1981HALF1	170571	184433	198993	211024	217528	225132	234254	242984	253822
1981HALF2	163526	177291	191806	203841	210500	217800	227201	235877	246707

EXPENSE RATIO

1980HALF1	.576	.586	.596	.604	.613	.621	.632	.649	.688
1980HALF2	.588	.598	.608	.617	.625	.634	.646	.662	.682
1981HALF1	.567	.577	.586	.595	.603	.611	.622	.638	.657
1981HALF2	.579	.589	.598	.607	.616	.624	.636	.652	.671

given assumptions, it is reasonable that the expense ratio in the last period could swing between 57.9% and 67.1%. Probably the most important tool in the operations research/management science kit is optimization. Optimization is now available; it may be applied interactively to an IFPS model through an optimization system called IFPOS.

The following example is simple but realistic. It represents a project or activity module that could be included in an overall corporate planning model. This particular module entertains possible expansions of a company's field sales force and its customer support group (consultants). First, IFPS is used to describe expenses, revenues, billing ratios, fees, and other variables, as shown in Table VI.

For the present example, this separate and standalone model will be optimized. However, in practice this would be just another activity added to the total corporate planning model and the total model would be optimized. The point of the demonstration is to show how easy it can be to use optimization without the hindrance of complexity, jargon, and other distractions.

After building the IFPS description of the business the user accesses IFPOS, and using its language he constructs a set of "directives" or rules. The objective of the exercise is to maximize cumulative corporate contribution as defined in the IFPS model. This is indicated as follows:

10 MAXIMIZE CUM CORP CONTRIBUTION (1981HALF2)

This means we want to maximize the cumulative contribution in the last period. This is a resource-allocation problem, where we want decisions for (1) when and how many new salespersons to add, and (2) when and how many new consultants to add. These decisions and their limits are expressed as follows, where the total number of new salespersons over the two-year period cannot exceed 10 and the total number of consultants over the two-year period cannot exceed 15.

15 DECISIONS

20 SALES HIRINGS (ALL) BETWEEN 0 AND 5

25 CONSULTANT HIRINGS (ALL) BETWEEN 0 AND 5

The management constraints on the decisions are:

(1) Financial contribution in any period cannot be negative;

(2) No more than five new consultants per period, where a period is six months;

(3) No more than five new salespersons per period, where a period is six months.

These limitations or constraints are expressed as follows:

30 CONSTRAINTS

35 NUMBER OF SALESPEOPLE (1981HALF2) .LE. 10

TABLE VI

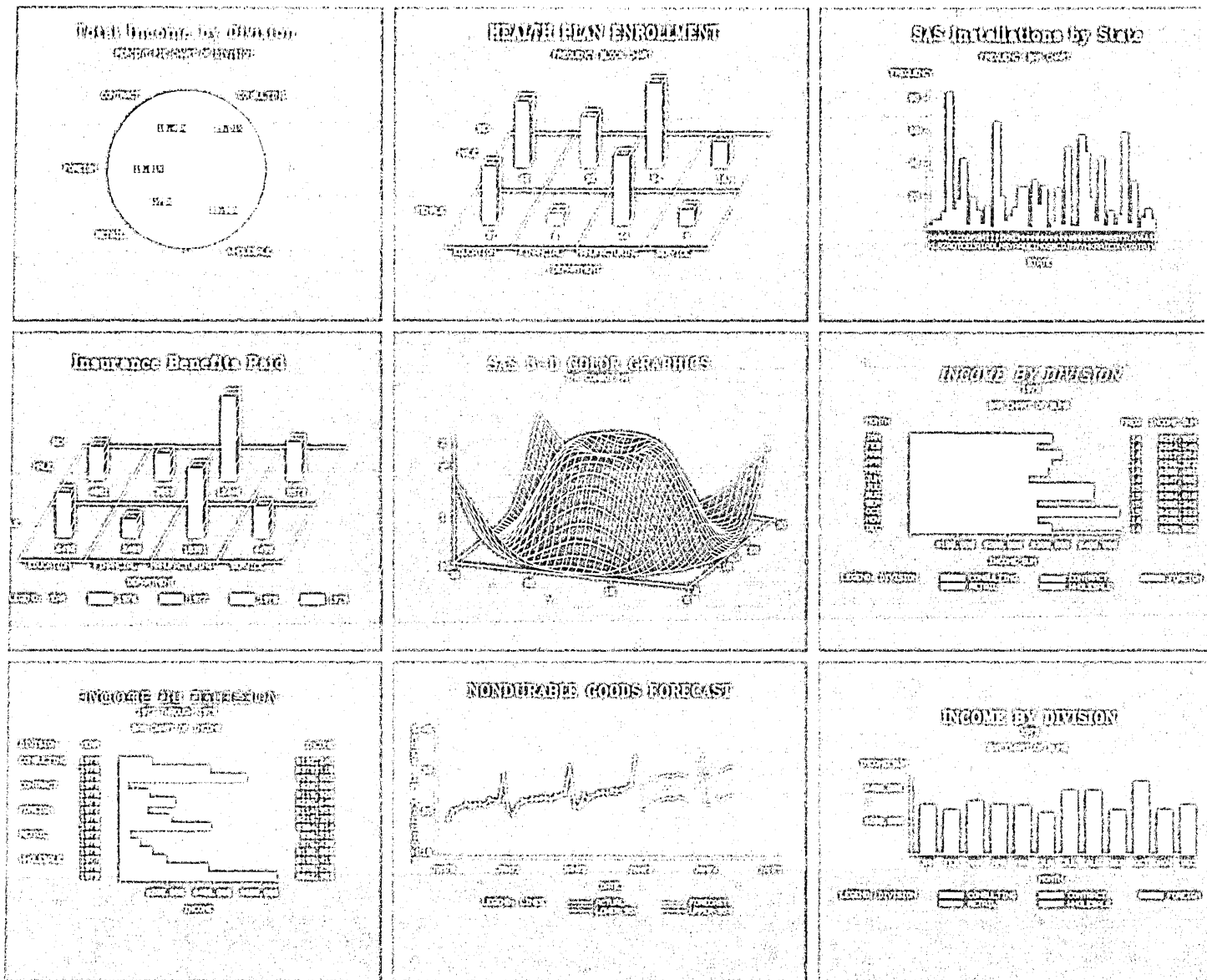
10 COLUMNS 1980HALF1,1980HALF2,1981HALF1,1981HALF2
 20 * PROPOSAL FOR NEW SALES PEOPLE
 30 SALES HIRINGS=5,0
 40 SALARY=19000,PREVIOUS*1.05
 50 FIELD OFFICE EXPENSE PER PERSON=22000,PREVIOUS*1.05
 60 NUMBER OF SALESPEOPLE=PREVIOUS+SALES HIRINGS
 70 PAYROLL=NUMBER OF SALESPEOPLE*SALARY
 80 FIELD OFFICE EXPENSE=NUMBER OF SALESPEOPLE*FIELD OFFICE EXPENSE PER PERSON
 90 COMMISSION=18%*TOTAL REVENUE
 100 TRAVEL AND ENT=L60*10000
 110 OTHER EXPENSES=L60*6000
 120 TOTAL SALES EXPENSES=SUM(PAYROLL THRU OTHER EXPENSES)
 130 INITIAL SALES QUOTA=50000
 140 SUBSEQUENT SALES QUOTA=120000
 150 TOTAL REVENUE=SALES HIRINGS*INITIAL SALES QUOTA+ PREVIOUS NUMBER OF SALESPEOPLE*SUBSEQUENT SALES QUOTA
 170 CONTRIBUTION MARGIN NEW SALES FORCE=TOTAL REVENUE-TOTAL SALES EXPENSES
 180 CUM CONTR MARGIN SALES=L170,PREVIOUS+L170
 190 EXPENSE RATIO SALES=TOTAL SALES EXPENSES/TOTAL REVENUE
 200 * PROPOSALS FOR NEW CONSULTANTS
 210 CONSULTANT HIRINGS=10,0
 220 CONSULTANT SALARY=19500, PREVIOUS*1.07
 230 FIRST PERIOD BILLING RATIO=0.45
 240 SECOND PERIOD BILLING RATIO=0.48
 250 THIRD PERIOD BILLING RATIO=0.52
 260 FOURTH PERIOD BILLING RATIO=0.54
 270 FIRST PERIOD PER DAY RATE=600
 280 SECOND PERIOD PER DAY RATE=650
 290 THIRD PERIOD PER DAY RATE=700
 300 FOURTH PERIOD PER DAY RATE=750
 310 NUMBER CONSULTANTS=PREVIOUS+CONSULTANT HIRINGS
 320 PAYROLL CONSULTANTS = NUMBER CONSULTANTS*CONSULTANT SALARY
 330 TRAVEL AND ENT CONSULTANTS=NUMBER CONSULTANTS*5000
 340 MISC EXPENSE=NUMBER CONSULTANTS*3000
 350 ADMIN SUPPORT CONSULTANTS=22000,PREVIOUS*1.05
 360 CONSULTANT REVENUE=CONSULTANT HIRINGS*L390*FIRST PERIOD BILLING RATIO* FIRST PERIOD PER DAY RATE+PREVIOUS L210*L390*L240*L280+ PREVIOUS 2 L210*L390*L250*L290+PREVIOUS 3 L210*L390*L260*L300
 390 DAYS AVAILABLE FOR CONSULTING=120
 400 TOTAL EXPENSES=SUM (L320 THRU L350)
 410 CONTRIBUTION MARGIN CONSULTANTS=CONSULTANT REVENUE-TOTAL EXPENSES
 420 CUM CONTR MARGIN CONSULTANTS=PREVIOUS+L410
 430 CORPORATE CONTRIBUTION=L170+L410
 440 CUM CORP CONTRIBUTION=PREVIOUS+L430

40 NUMBER OF CONSULTANTS (1981HALF2) .LE. 15

45 CORPORATE CONTRIBUTION (ALL) .GE. 0

Once again, these natural language

"directives" were built using the IFPOS language, and the user is now on-line using IFPOS. He retrieves the stored IFPS model and simply types in the command SOLVE, thereupon receiving from IFPOS the standard re-



Designing software to save time is a SAS tradition. And we've packed our years of experience into a new product, SAS/GRAPH.

SAS/GRAPH pioneers a new direction for graphics software.

Old software systems came into being before hardware had much in the way of time-saving features. And because the software had to do most of the work it was designed to be device-independent.

But SAS/GRAPH is device-intelligent. It's designed to use the time-saving features built into most modern hardware.

For example, look at the blue slice of the pie chart above. SAS/GRAPH used one "pie" command to color it. A device-independent system would require hundreds of "move and draw" commands. With SAS/GRAPH you save computer time and drawing time.

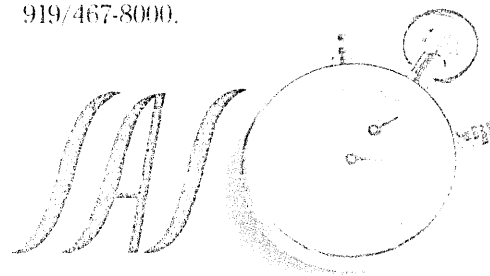
And you'll save user time. Because SAS/GRAPH produces most displays with two or three simple statements.

But best of all SAS/GRAPH is integrated into SAS, so you'll get the benefits of the total SAS system — a system now saving time in report writing, statistical analysis, data management and as a higher-level programming language at more than 1,200 OS, OS/VS and VM/CMS sites.

And you can add SAS (including SAS/GRAPH) to your dp staff for less than half the cost of a new programmer.

Call or write today. We'll provide more information on a very graphic time-saver.

SAS Institute Inc., PO Box 8000, Cary, NC 27511.
919/467-8000.



Financial planning languages enable non-dp people to become competent in building and solving models in an interactive, exploratory manner.

ports that he is accustomed to seeing from IFPS, as depicted in Table VII.

Thus the optimal strategy is no new salespeople in the first and last six months, two in the second period, and five in the third period. The optimal strategy for consultants is to add five in each of the first three periods and none in the last period.

The constraints are typical of those which might be suggested by management. An important aspect of mind support in this example was the intuitive or subjective constraints expressed in the IFPOS language, yielding immediate answers that reside within these constraints. This can be especially useful if nonobvious answers lead to more insight to the problem. For example, an interesting "what-if" question or sensitivity analysis might be to permit a negative corporate contribution of up to \$100,000, but not change any other constraints. This would be done as shown in Table VIII.

This relaxation to allow a negative contribution of up to \$100,000 significantly changes the optimal strategy. Instead of making only one pass to get "best" answers, the manager can see the results of multiple scenarios and gain more confidence and knowledge to support decision processes.

Of course, interactive optimization within the scope of a planning language will not necessarily supersede classical large scale optimization systems such as those applied to complex distribution problems and allocation of production capacity. These and similar historical uses have usually been for the optimal utilization of already-committed plant and people resources. On the other hand, optimization in decision support has its greatest potential in the allocation of resources among a diverse variety of alternative futures—that is, strategic planning: doing the right things as opposed to doing things right. After all, the strategic issues are where executive minds excel, and it is there that support will be the most fruitful. *

G. R. WAGNER



Dr. Wagner is president of Execucóm Systems Corp. in Austin, Texas. He has been professor of operations research at the University of Texas, vice president of MRI Systems Corp. and corporate director of operations research for Swift & Co. He is founder and a board member of Planners League, a professional planners group.

TABLE VII

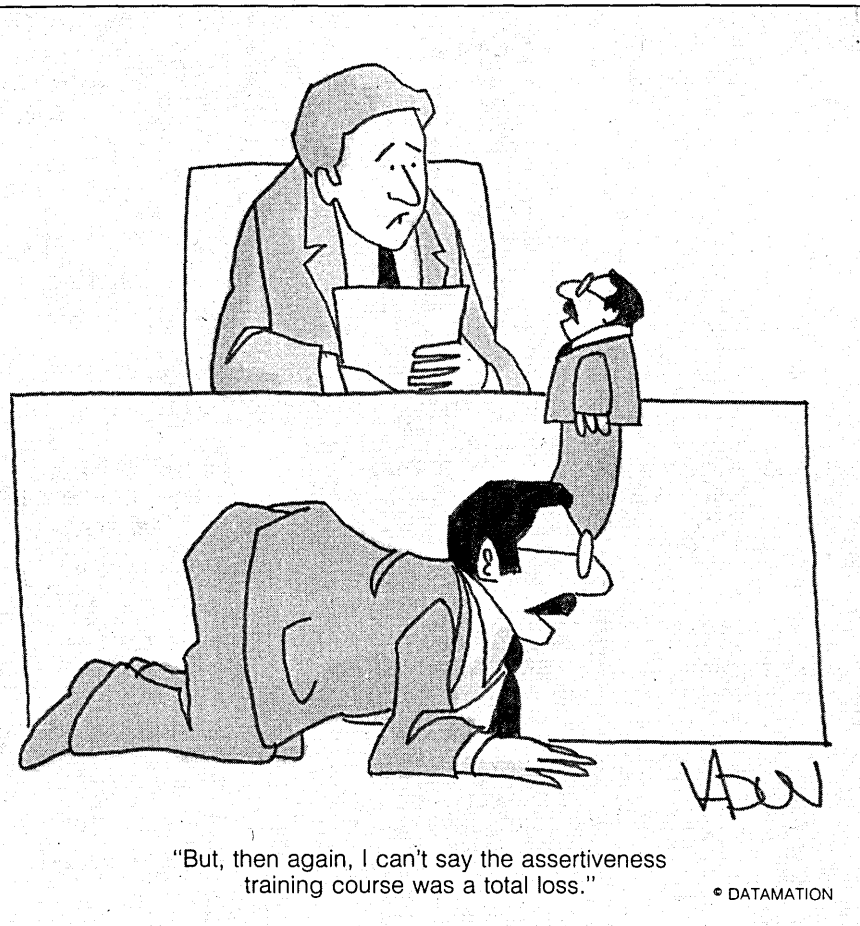
```
?SOLVE
ENTER SOLUTION OPTIONS
?OPTIMAL
ENTER SOLVE OPTIONS
?SALES HIRINGS, CONSULTANT HIRINGS, CUM CORP CONTRIBUTION
```

	1980HALF1	1980HALF2	1981HALF1	1981HALF2
SALES HIRINGS	0	2	5	0
CONSULTANT HIRINGS	5	5	5	0
CUM CORP CONTRIBUTION	2500	3850	65694	455063

TABLE VIII

```
?WHAT IF
WHAT IF CASE 1
ENTER STATEMENTS
?LIMIT CORPORATE CONTRIBUTION .GE. -100000
?SOLVE
ENTER SOLUTION OPTIONS
?OPTIMAL
ENTER SOLVE OPTIONS
?SALES HIRINGS, CONSULTANT HIRINGS, CUM CORP CONTRIBUTION
```

	WHAT IF CASE 1			
	1980HALF1	1980HALF2	1981HALF1	1981HALF2
SALES HIRINGS	5	5	0	0
CONSULTANT HIRINGS	5	5	5	0
CUM CORP CONTRIBUTION	-77500	66450	526887	1021068



CARTOON BY CHUCK VADUN

The Computer-Assisted Instruction System of the 80's:



**“When Phoenix goes up,
CPU costs go down.”**

(By 60 to 75%)

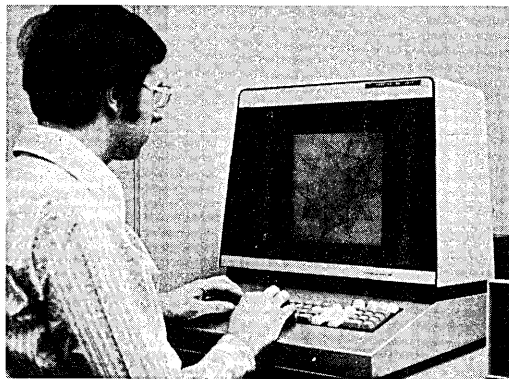
A pretty heavy claim, you'll have to admit.

Heavier still is that it's more than a claim: it's a proven *fact*. And a direct quote from a Phoenix customer.

Another user said that after the installation of Phoenix in his 100,000-student school district “it was like getting half my CPU back.”

And that's just the tip of the Phoenix iceberg. Where existing computer aided instruction (CAI) systems are in effect, Phoenix can replace them and be running in *two days*.

And just so you don't get the idea that Phoenix is a step in the direction of controlling the lives of our students with a computer, let us point out that Phoenix users assert over and over that Phoenix provides *better* rapport between instructor and student, thanks to the instructor's increased ability to know the students' weaknesses and strengths, and the students' instant, favorable reaction



to their new learning tool.

Phoenix also has helped solve problems that exist in nearly every educational system: inflation, higher administrative costs and pressure from citizen groups, *because it allows users to do more on existing hardware*, delaying by incredible lengths of time the need to add more hardware and personnel.

Phoenix will run under VS1, SVS and MVS on any IBM 370 or compatible computer. It currently interfaces with BTAM, VTAM, TCAM, CICS and TSO. Interfaces for DOS, CMS and IMS soon will be announced. One copy of Phoenix can interact simultaneously with any combination of interfaces listed. Installation of Phoenix and new releases require *no system generation*.

Why not get Phoenix up in *your* system, and watch your CPU costs go down. All it takes is a phone call or a note.

Goal Systems Corp:  **The Goal-Getters.**

1865 Fountain Square/PO Box 29481/Columbus, OH 43229/(614) 268-1775

CIRCLE 135 ON READER CARD

Photo courtesy of NASA/JPL



The only limitations are

Computer Sciences Corporation believes that any problem humans can conceive of, they can eventually solve. The only limitation is the sophistication of their science. That belief has involved us in many of the world's most difficult problems and in some of its most astonishing accomplishments.

It has also made CSC the world's largest

information services company. That may surprise you. Almost everyone knows what we've done, but hardly anyone knows that CSC has done it.

As NASA's computing partner, CSC has developed programs and systems and handled data processing for the missions that have orbited the earth and explored the solar system.



the ones you bring with you.

By integrating the technologies of software, communications and hardware, we are continuously advancing the techniques of problem solving.

CSC is developing the capacity of history's most profound tool, the computer, to change man's relationship with everything he has ever known.

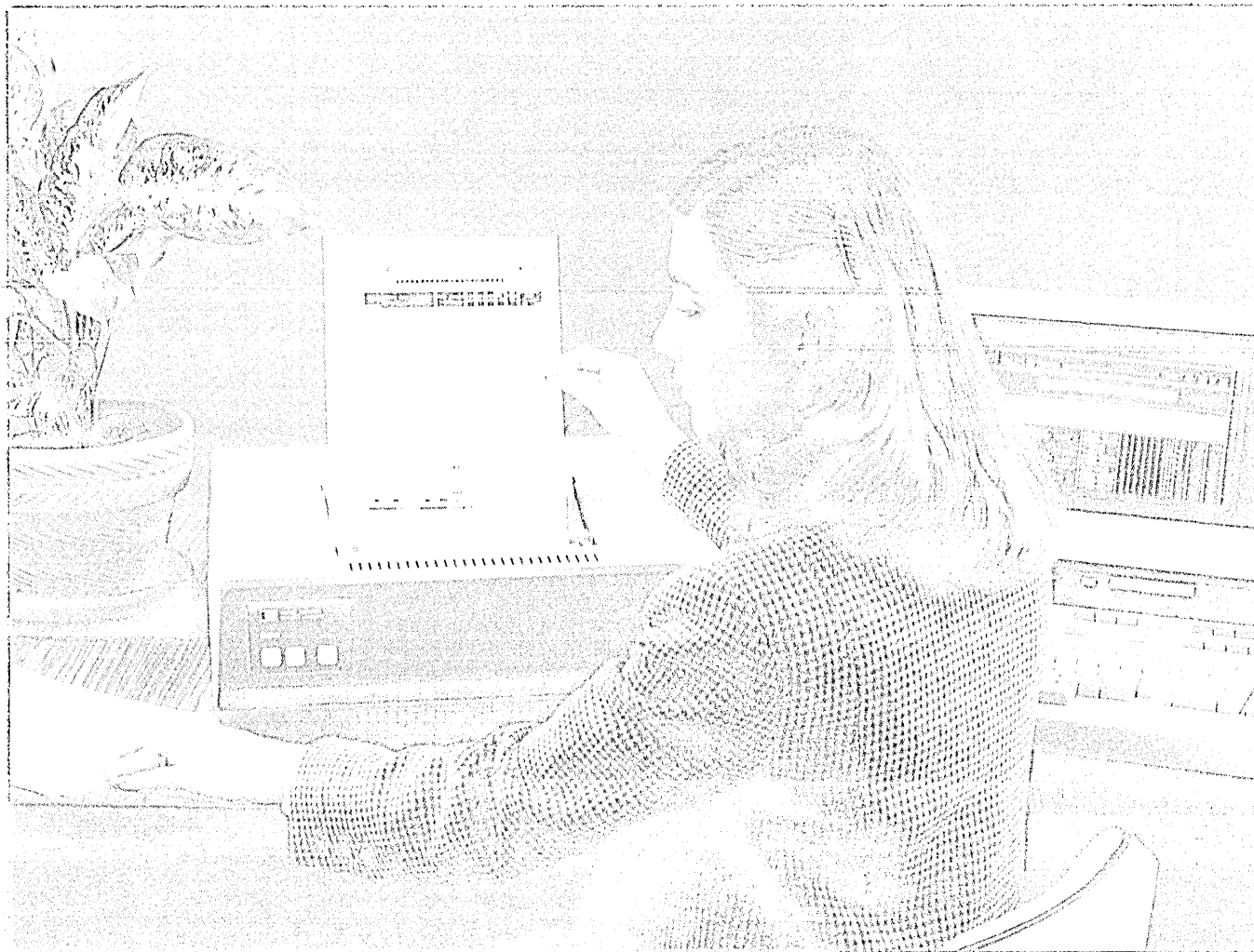
It's the ultimate challenge. Maybe you'd

like to help us. If you think you're good, and you're not afraid to find out how good you really are, you should be in touch with Computer Sciences Corporation. We're looking for people who are not afraid to try anything.

CSC

COMPUTER SCIENCES CORPORATION

Corporate Offices: 670 N. Sepulveda Blvd., El Segundo, CA 90245 • An Equal Opportunity Employer



HP introduces forms and graphics to desktop printing.

HP's new 7300A Graphics Printer mixes forms, text and graphics in any arrangement you need. And it prints text up to 500 lines per minute.

On demand from your terminal, the 7300A prints off your forms, and what goes on them at the same time. Work orders, assembly information, material lists, accounting reports, employee records, and all other forms with data are printed and then

sized to your needs by an automatic paper cutter and page stacker.

Besides being fast and versatile, one of the printer's finest qualities is just how printing quality. Readability can be enhanced with proportionally spaced type, reverse printing, and underlining. And programmable character height allows you to produce bold face headlines or titles in characters up to twice normal height.

In addition to supporting HP terminals and computers, four different interfaces let you adapt the 7300A to many other terminals and computers. For complete information, including OEM discounts, contact your local Hewlett-Packard sales office or write to Hewlett-Packard, Attn: Bill Palmer, 16300 West Bernardo Drive, San Diego, CA 92120. (714) 487-4910.



HEWLETT
PACKARD

Circle 19 on Reader Card

The perceptive computer professional's very early summer guide to literary one-upmanship.

THE RIGHT BOOKS

by Robert Hard

It must be conceded by even the worst Pollyanna amongst us that our time on this planet is limited, and that our time is intellectually squandered by inhaling technical manuals for the new micro this and the high speed that. What few remaining moments we have the unspeakable audacity to call our own are relentlessly assaulted by business magazines, trade journals, and revised mil specs.

Given this incursion by the Grim Reader into the outposts of our private life, it is never too early to start composing one's summer reading list. Although now, in the dead of early spring, some of the more small-minded may equate such a composition with dressing before retiring for the evening, the fact remains that a well-chosen book list can avert the folly of reading the Wrong Books.

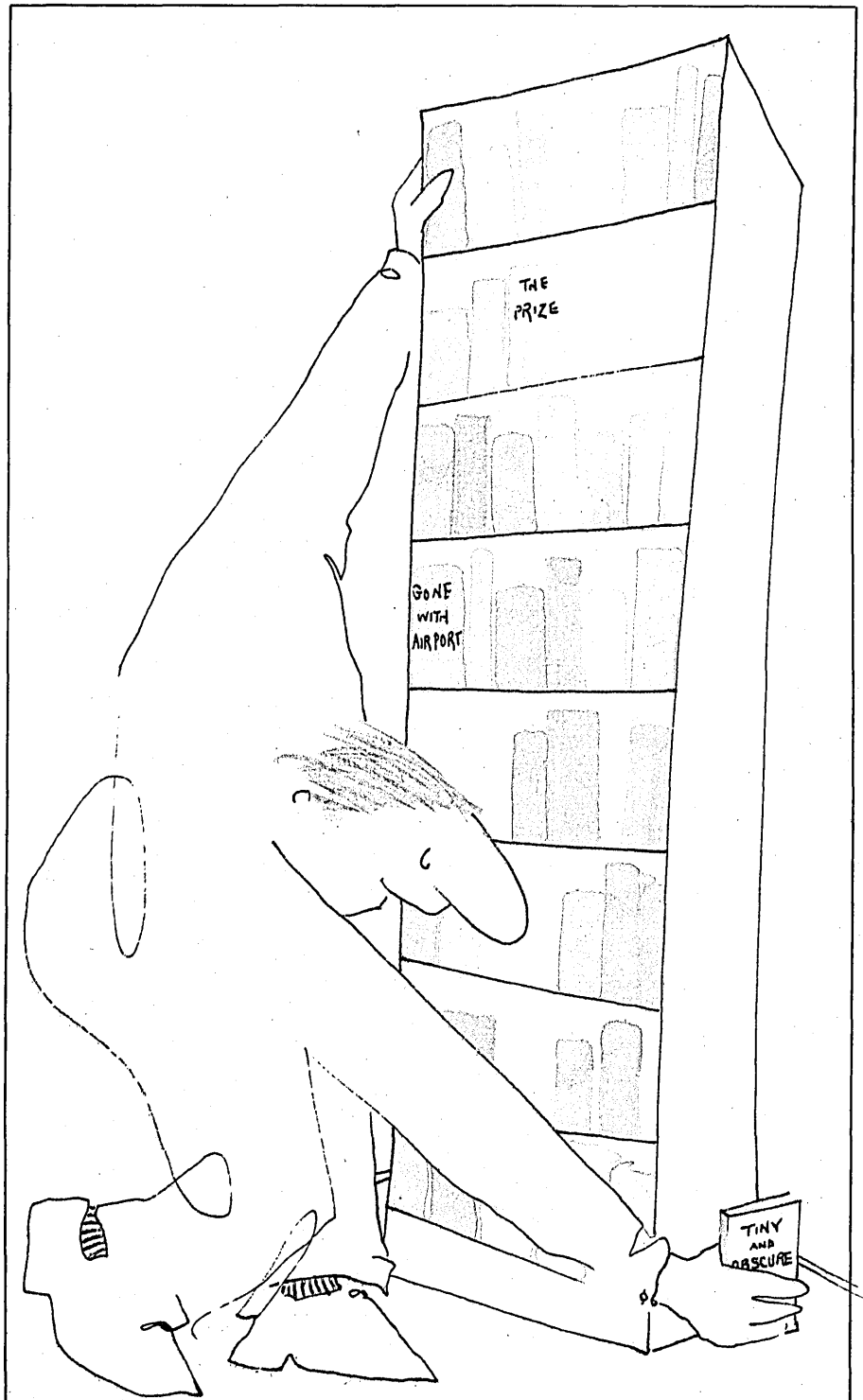
Confronted with the reality that some 100,000 works of fiction are published every year, the uninitiated may blanch at the Herculean task awaiting them. That anxiety may be swiftly dispelled, however, if it is borne in mind that virtually all the recent offerings are without even the pretense of artistic merit, and the rest, like fine wines, are better left to mellow.

Before drawing up a compendium of the Right Books, consider the nature of the Wrong Books. Beautiful, expensive, four-color, cloth-bound editions extolling fusty architectural triumphs are plainly out of the question. While the accompanying photographs are diverting, the *delict* here lies not in the generally callow text, but rather in the volume, as it were, of the volume.

Unless a reader intends to spend an inordinate span of the summer indoors, kneeling like a supplicant at the feet of the coffee table, books of this kind should continue their role as tasteful graft in the form of Christmas presents for business associates.

Another class of so-called literature that may be profitably eschewed is the entire family of whopping tomes with two-syllable titles (such as *Shogun*, *Thorn Birds*, *Airport*). The only comment that can be made with pride upon reading one of these piles of cotton candy is that you finished it in only 10 days. Such a remark is tantamount to letting drop you have just completed painting the garage—a worthy task, but not perhaps of more than passing interest.

As a further test, if the book in ques-



ILLUSTRATIONS BY BRUCE CAYARD

One must know how to insert one's literary accomplishment into the pompous discussions of apostate English graduates.

tion was easily converted into a blockbuster motion picture with no apparent dilution of quality, chances are excellent it was not of the Right sort.

The garnering of a polished reputation, however, is a necessary but not a sufficient condition for the august status of Right Bookdom. For example, we may ask ourselves, rhetorically, what *War and Peace* and *Finnegan's Wake* have in common. Are they classics? Undoubtedly. Are they timeless? Without question. Are they memorable? Who can forget the months invested in even a superficial gloss of their major themes? And here, we heave nigh to the point: the aforementioned works are of such staggering length as to require not only a vacation, but a protracted sabbatical just to dust them off.

The truth, gentle reader, is that a Right Book is a Short Book. The proper attitude to strike when the boorish humanities graduate seated next to you prattles on about the cetacean imagery of *Moby Dick* should be akin to the smile of kindly pity bestowed on an investor who dumped his gold last year. Keep firmly in mind that simply because an author was too obsessed to shut off his roaring hydrant of a mouth is no reason to dally slavishly over his every gushing phrase. A little appreciated fact is that most writers spend the same amount of time on every book—large, medium, or small—and consequently, the short book is more likely to have received the careful honing and buffing that makes every clause a burnished gem.

Whether or not the pseudo-cognoscenti on the Perrier circuit care to admit it, high-sounding small talk about books remains the most ubiquitous fixture in our tatty

inventory of social chatter. Now, imagine the awkwardness of those unfortunates who have put all their leisure reading eggs in the *Ulysses* basket; five minutes of mixed attention is their only reward. Moreover, in answer to the oft-repeated and always tedious "Read any good books lately?" there will be a depressing uniformity of response.

THE TURN OF THE CAITIFF

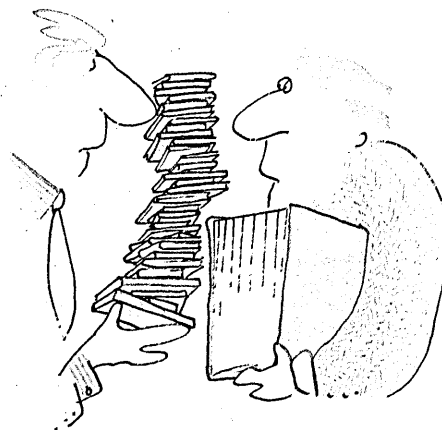
Thus, feeling himself a conversational ne'er-do-well, the literary Sisyphus sinks deeper into despair as our master of short books ticks off the list of six or eight titles consumed in the last week.

Purists may protest it is impossible to know an author's concerns unless a number of his (or her) works are studied and compared. These are the same people who imbibe an entire bottle of Chateau Yquem before deciding whether or not to send it back.

Most writers, of course, address the same themes over and over from transparently similar points of view. Therefore, it is bootless to subject oneself to the unremitting trip-hammer of one author when the same effort could be expended in a considerably more seemly sampling from the smorgasbord of published works.

A useful guideline in composing an appropriate reading list is concentration on fine writers; while many of the Right Books are also well known, most are the lesser hailed writings of deservedly famous authors.

A superior example is *Seize the Day*, by Saul Bellow. As in *Henderson the Rain King*, and the Nobel Prize-winning *Humboldt's Gift*, *Seize the Day* illustrates Bellow's preoccupation with the pathos of the innocent individual confronted by his own inadequacy in an indifferent world. However, the 128 paperbound pages of *Seize the*



Day contain more than enough pathos for even the most earnest of dabblers.

Critical here, also, is the effective implementation of the theory of Right Books; it is not only imperative to spend the brief moments required to read them, but one must also know how to insert this accomplishment into the pompous discussions of apostate English graduates (AEG) who assume a systems analyst (SA) has read nothing beyond Weinberg. The scenario to master is as follows: AEG: Bellow's maturity from *Augie March* to *Humboldt* is apparent in the subtleties of characterization, don't you agree?

SA: I've always thought the crux of Bellow's humanistic philosophy was best defined in *Seize the Day*.

AEG: *Seize the Day*?

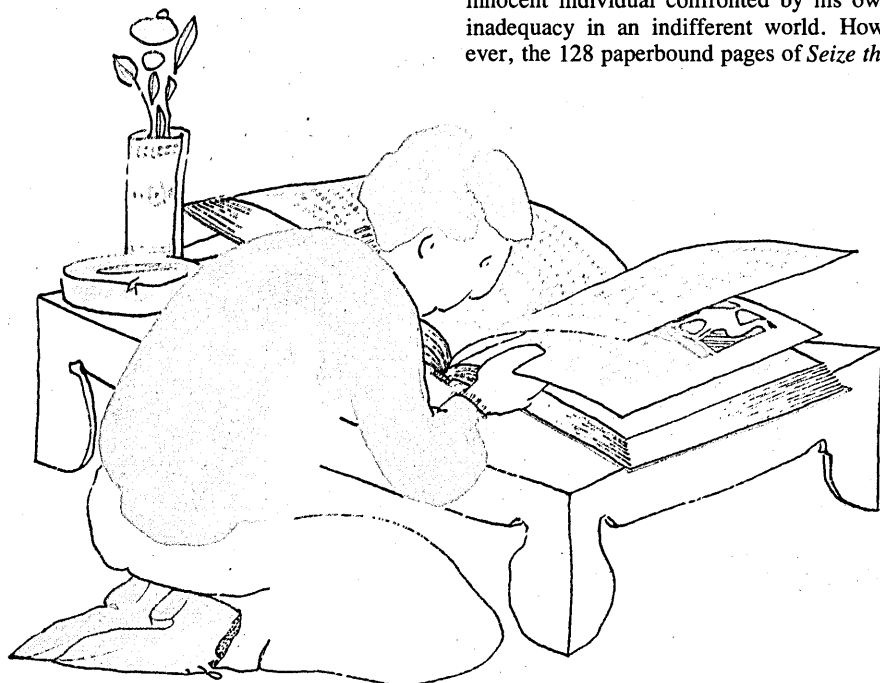
SA: Oh, you're not familiar with it? Perhaps its intensity was the reason for its lack of commercial popularity.

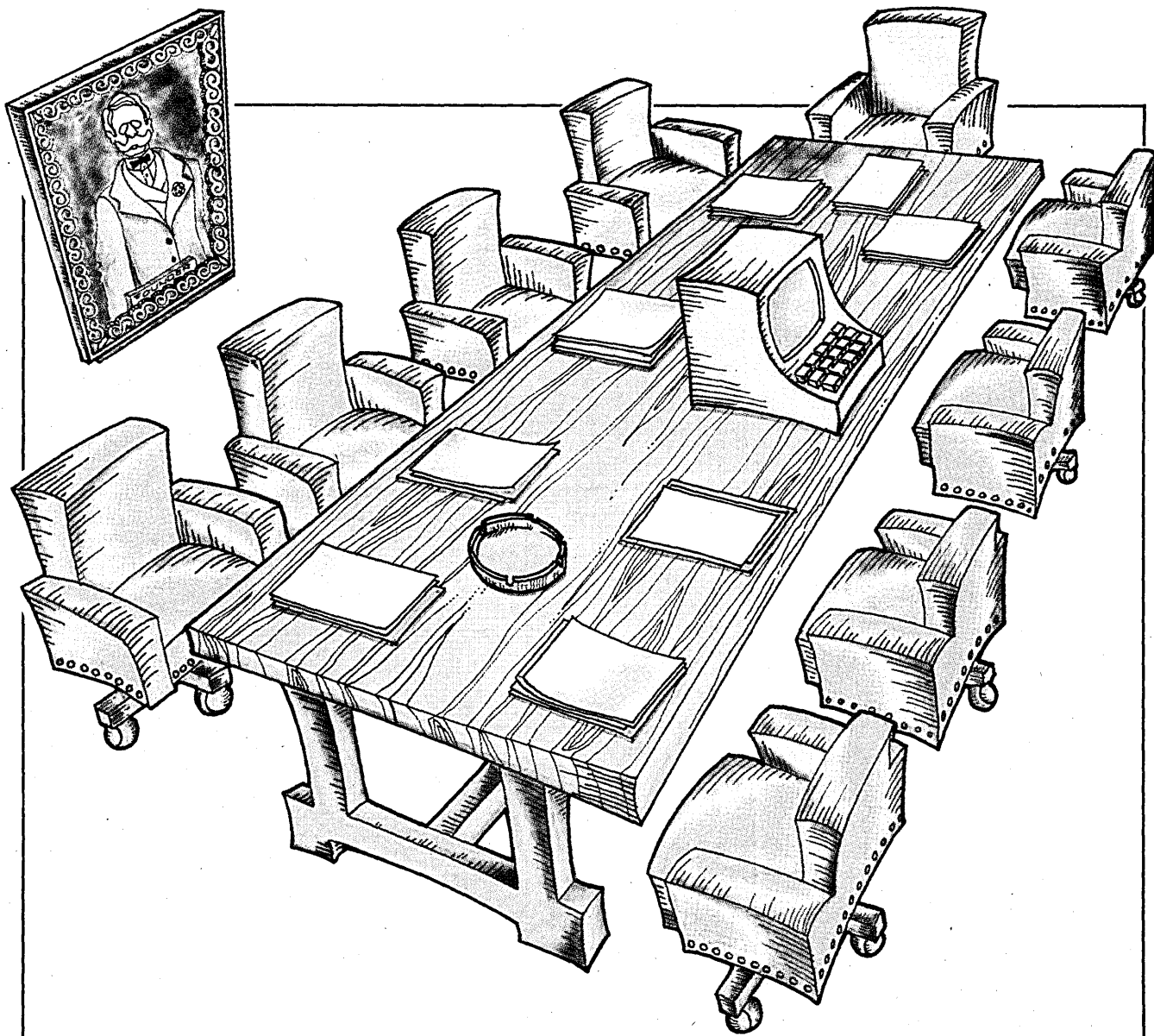
USE THE OBSCURE

As illustrated, a basic ploy in the reading of short books is also to read obscure books, thereby exploiting the assumption of your opponent in colloquy that *if you have read the obscure works, it is a certainty you have read the celebrated ones.*

Another appetizer plucked from the usual menu of entrees is Joseph Conrad's *Heart of Darkness* (111 pages), which, despite its forbidding title, is a truly funny book by the Dalai Lama of cosmic comedy. Conrad's principal preoccupation with the conflict between good and evil can be even more efficiently encountered by perusing *Typhoon*, which at 95 pages is not only shorter than *Heart of Darkness* but has the distinction of having recently escaped cinematic bowdlerization by Francis Ford Coppola.

The bizarre universal concepts of Thomas Pynchon can stun even the most pretentious of literary conversants, and, while the 492 pages of *V* and the 887 pages of *Gravity's Rainbow* are widely acclaimed, all one really needs of Pynchon's contagious paranoia can be found in the 138 pages of *The*



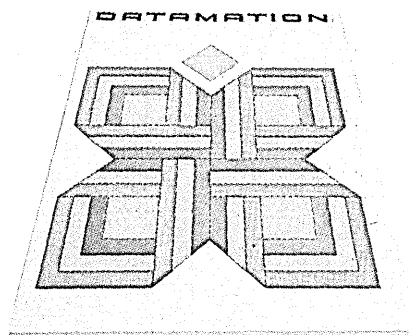


THE ROLE OF THE DP PROFESSIONAL IS CHANGING.

He may have started as a systems analyst. Or she may have been an engineer. But now they're wearing long pants and have carpet under their feet.

As word processing, data communications and data processing merge it's the DP professionals who have the knowledge and background to put all these things together ... they're the ones who are wiring up the office of tomorrow ... today.

Because of their unique position they're the ones who are setting the standards, selecting the systems, controlling the budgets ... more and



more they're being called upon to shape management decisions and set company policies.

These people are the DP professionals of today. And they've grown up reading DATAMATION magazine. We count 129,000 of them around the world who count on the magazine and its advertisers to help them grow in the world's fastest growing industry.

Technical Publishing

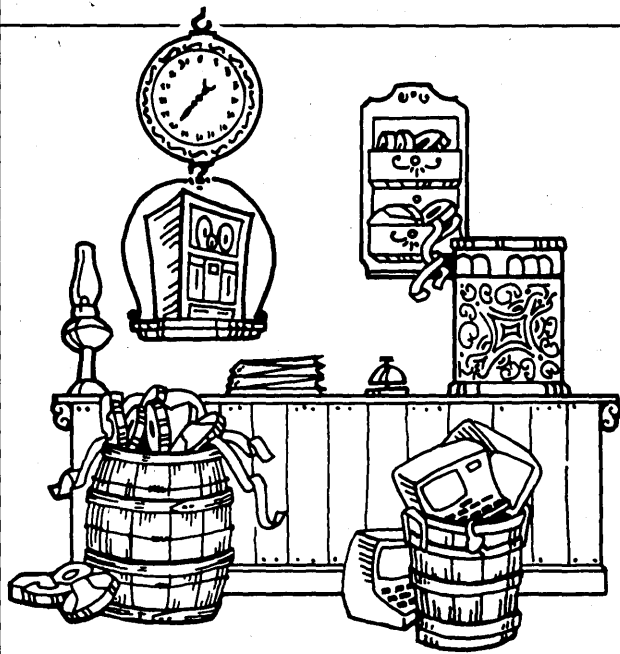
TB a company of
The Dun & Bradstreet Corporation

666 Fifth Ave. • New York, NY 10019 • (212) 489-2200

DATAMATION®

magazine

MOVE THE GOODS.



USE THE DATAMATION MARKETPLACE ADVERTISING SECTION

CALL FRANCIÉ:
(212) 489-2200

Crying of Lot 49.

Continuing the list of authors seldom read voluntarily is Fyodor Dostoyevsky. Following the force-feeding of *Crime and Punishment* in high school, where the crime was waiting until the last minute, and the punishment was trying to cram it all in before the exam, few of us are tempted by the lugubrious prospect of more of the same. We are pleased to recommend, therefore, *Notes from Underground*, well worth a cursory glance, and, at 116 pages, takes only a cursory glance to reduce by one your list of unread authors.

Further required to achieve an impressive stock of acknowledged masters is a swig of Nabokov. Although the suggested *Pnin* and the longer *Lolita* (190 pages and 288 pages, respectively) are slightly more bulky than other mentioned selections, both can be read so rapidly as to hardly dent an otherwise indolent weekend. And while *Lolita* (a book written in French by a Russian who was best known in America before dying in Switzerland—a series of facts easily memorized) is probably the more enjoyable of the two, *Lolita*'s theme of masculine vanity shines clearly through the much shorter *Pnin*.

Nathanael West is a rare, cherished writer known exclusively for short works; if his *Miss Lonelyhearts* (78 pages), a bitter pill of a book ornamented by some of the most hilarious passages ever committed to paper, is insufficiently massive for consideration, content yourself with the knowledge that the 87-page *Day of the Locusts* is considered by some critics to be the most perfect novel ever written in English. (Still, one hardly needs to be reminded that a quest for perfection usually leads to a paralysis of action.)

For a philosophical turn of mind, Russell's protégé Ludwig Wittgenstein should not be placed guiltlessly on the shelf. *Remarks on the Foundation of Mathematics* is not only the shortest (204 pages) but also the most accessible of his works.

Completing the panoply, and included under protest for those with an incurable modernist orientation or a dedicated pursuit of Lost Hip (are you continually playing catch-up ball with the post-adolescent publications everyone else read while you were learning COBOL?), there is Richard Brautigan's *Trout Fishing in America* (112 pages). Although Brautigan's central contribution to the art of the novel is a multivolume demonstration that an author with the gall to write like a 10-year-old can sell several hundred thousand copies, none of his books are ill-treated by being skimmed in the milliseconds one spends waiting for the terminal to respond.

Additional listings of eminent works would dilute the vital thrust of the theory. Suffice it to say, the theory can be easily extended to all of Western culture; we dedicated dilettantes have endured for decades on the natural corollaries of small paintings and the *Minute Waltz* standard of music appreciation.

Mr. Hard is an editor with the Matthew Bender Co., New York City.

"TWO WORDS TURNED OUR MANAGEMENT'S ATTENTION TO IN-HOUSE COMPUTER OUTPUT MICROFILM."

DP Officer, Mr. William Mengel of Guarantee Bank in Atlantic City, N.J., met with DatagraphiX recently and spoke about his role in convincing upper management to acquire an in-house COM system.

DATAGRAPHIX: "Those two words management listened to must have been fairly strong."

MENGEL: "When you talk to management about new equipment that gets the job done efficiently, easily and quickly, two words immediately come to mind—*time* and *money*. A DatagraphiX Computer Output Microfilm system saves plenty of both."

DATAGRAPHIX: "How do time and money relate to an in-house DatagraphiX system?"

MENGEL: "When you use an outside service, your performance depends on their ability to ferry your microfiche and tapes back and forth, day after day. When your COM system is in-house, you've got a lot more control. You don't miss deadlines or waste money because of lost time."

DATAGRAPHIX: "Was the cost of the equipment a major factor?"

MENGEL: "Sure, but we hit the break-even point almost immediately. And with growth projected over the next five years, in-house Computer Output Microfilm will not only pay for itself, but save us a lot of money. After mapping out the past, present and future, it's definitely cost-effective."

DATAGRAPHIX: "What were the other advantages?"



MENGEL: "First, the system was very simple to incorporate into our DP operation.

DatagraphiX offers a wide variety of hardware and software to suit our particular needs. We had a choice between off-line recorders, minicomputer controllers and on-line recorders which let us match our recorder to our specific COM requirements."

DATAGRAPHIX: "Was your decision to go with a DatagraphiX system also based on reliability?"

MENGEL: "We only heard good things about DatagraphiX equipment. It has a fine reputation for reliability. One-vendor service for preventative and on-call maintenance programs was also a major factor."

DATAGRAPHIX: "So you're pleased with your move to in-house COM with DatagraphiX?"

MENGEL: "For us, bringing COM in-house was the only way to keep our data processing costs in check."

For further information on how DatagraphiX' COM systems can help, call or write for our free brochure.

*P.O. Box 82449, San Diego, CA 92138 (714) 291-9960,
Ext. 581, TWX (910) 335-2058.*

DatagraphiX®

a General Dynamics subsidiary

DatagraphiX® is a registered trademark of DatagraphiX, Inc.

CIRCLE 140 ON READER CARD



Going to OS without UCC-2 takes a year or two ... and a great sense of humor.

Because you'll need it. It will usually take the average DOS shop from 18 to 24 months to laboriously — and expensively — convert its two-thousand programs to OS.

But, let's face it: your objective is to get to OS, *not* to convert programs. And the UCC-2 DOS to OS Transition System takes you there the easy way.

UCC-2 can get the average DOS shop to OS in about six months, including pre-planning. It allows DOS programs to run under OS or OS/VS systems *without program conversion*. UCC-2 has already expedited over 800 conversions — without a hitch.

And, with UCC-2, you'll start getting the benefits of an OS operation a full year earlier. And isn't that the reason you started the conversion in the first place?

UCC-2: It's the easy way to OS. In fact, when you stop and think about it, it's the only way. Call us at 1-800-527-5012 (in Texas, call 214-353-7312) or circle 141

And, why not ask us about:

A Tape Management System that protects data from loss or destruction (UCC-1). Circle 142

A Disk Management System that can save the cost of new disk drives (UCC-3). Circle 143

A PDS Space Management System that eliminates PDS compres-

sion (UCC-6). Circle 144

A Production Control System that makes scheduling systems obsolete (UCC-7). Circle 145

A Data Dictionary/Management that really gets IMS under control (UCC-10). Circle 146

An Automated Re-run and Tracking System that solves your re-run problems (UCC-11). Circle 147

A Hardware Vendor Accountability package that gives you the facts on reliability (UCC Reliability Plus). Circle 148

General Accounting software packages. Circle 149

Application software for the Banking and Thrift industries. Circle 150

UCC

SOFTWARE AND COMPUTING SERVICES

UNIVERSITY COMPUTING COMPANY • DALLAS • LONDON • TORONTO • ZURICH

UCC is a subsidiary of Wvy Corporation (NYSE)
For information and an Annual Report, write 1000 UCC Tower, Exchange Park, Dallas, Texas 75235



Corporate Directors.

The DS990 Models 20 and 30. TI's most powerful business systems yet.

If you've been looking for a large minicomputer system for a wide assortment of demanding business data processing loads, look at TI's DS990 Models 20 and 30.

They're equipped with the business software you need—COBOL, Sort/Merge, a Data Base Management System with query and report features, and TI's unique, time-saving screen formatting language, TIFORM. Other

powerful business software languages, like RPG II, BASIC, Pascal and FORTRAN, are also available as well as IBM-compatible communications. And all are enhanced by the proven DX10 Operating System.

The new, high-performance 990/12 CPU provides the throughput you need. In many applications, the Models 20 and 30 can handle 20 or more different jobs at speeds up to three times faster than the

proven mid-range members of the DS990 computer family. And the compatibility of the DS990 com-



puter family enables you to upgrade your existing hardware and software to the more powerful Models 20 and 30 easily, at minimal expense.

When it comes to dependable commercial computing worldwide, look to Texas Instruments, the company that has been appointed the official computer and calculator supplier of the 1980 Olympic Winter Games.



For more information, call
800-257-7850.
(In N.J. call 1-800-322-8650)

Copyright © 1980, Texas Instruments Incorporated

TEXAS INSTRUMENTS

We put computing within everyone's reach.

CIRCLE 151 ON READER CARD

Statistical techniques can help dp managers and systems analysts determine the success or failure of a system.

PREDICTING RESULTS WITH STATISTICS

by Richard T. Dué

"Statisticks—That part of municipal philosophy which states and defines the situation, strength, and resources of a nation. This work is of very recent date in our language."—*A Dictionary of the English Language* by Samuel Johnson, 1756.

The initial application of statistical techniques was made when governments realized that anything that could be counted could be taxed. During the last 200 years the gathering and analyzing of statistics has become important in all of the sciences and most of the arts of man.

The subject of statistical analysis arouses emotions ranging from suspicion to dread in most dp personnel. Yet understanding statistical techniques is of fundamental importance for dp managers and systems analysts, who must be able to describe and to control, to forecast trends and to assign the probability of success or failure to the systems they design or manage. The Institute for Certification of Computer Professionals, recognizing the importance of mathematical statistics, has included a section on statistics in its Certificate in Data Processing examination. It is unlikely that all dp personnel will become expert statisticians, but at least it is possible for the majority of managers and analysts to become aware of how to use statistical techniques effectively.

There are four levels of data measurement: nominal, ordinal, interval, and ratio. Nominal measurement means that the data (a number or symbol) is used for identification purposes only. An example of the nominal level of measurement is a social security number. It is used to identify a specific account; no one number is any better or worse than any other number.

The ordinal level of measurement is used when the data values can be ranked in some order of preference. An example of ordinal measurement is the horse race. Horses crossing an arbitrary finish line can be ranked in the order of their finishing. How-

ever, no standard scale of measurement is used. It would be impossible to say, for instance, the horse that placed first was twice as good as the horse that finished second. Also, it would not matter if the horse coming in second was behind by a nose or by a furlong; it would still be the second-place horse.

The interval level of measurement is reached when the data values can be ranked in order on a standard scale. An example is the measurement of temperature on a thermometer. Each degree on the scale represents a uniform unit of measurement. For example, 5 degrees C is warmer than 1 degree C by four equal degrees. However, there is no absolute scale of measurement used—it is not possible to say that 5 degrees C is five times warmer than 1 degree C.

The ratio level of measurement is attained when the data can be ranked on a standard scale with a true zero point. An example is the measurement of mass in pounds. An item can not weigh less than zero pounds. An item weighing 5 pounds is heavier than an item weighing 1 pound by 4 equal pounds. The first item is also five times heavier than the second item.

The importance of the four levels of measurement is that the same type of mathematical statistics cannot be used to analyze data measured at different levels. Data recorded on nominal or ordinal measurement scales (including opinion polls) must be analyzed by the nonparametric family of statistical techniques. To analyze data recorded on interval and ratio measurement scales, the parametric family of statistical techniques should be used.

Parametric statistical techniques, such as the t test or the F test, are used when the researcher knows certain facts about the group of data from which a sample has been taken. Basically, the researcher must be working with data that has been taken independently and without bias from a group of items. The data must come from normally distributed populations which have the same variance, and the data must be measured at

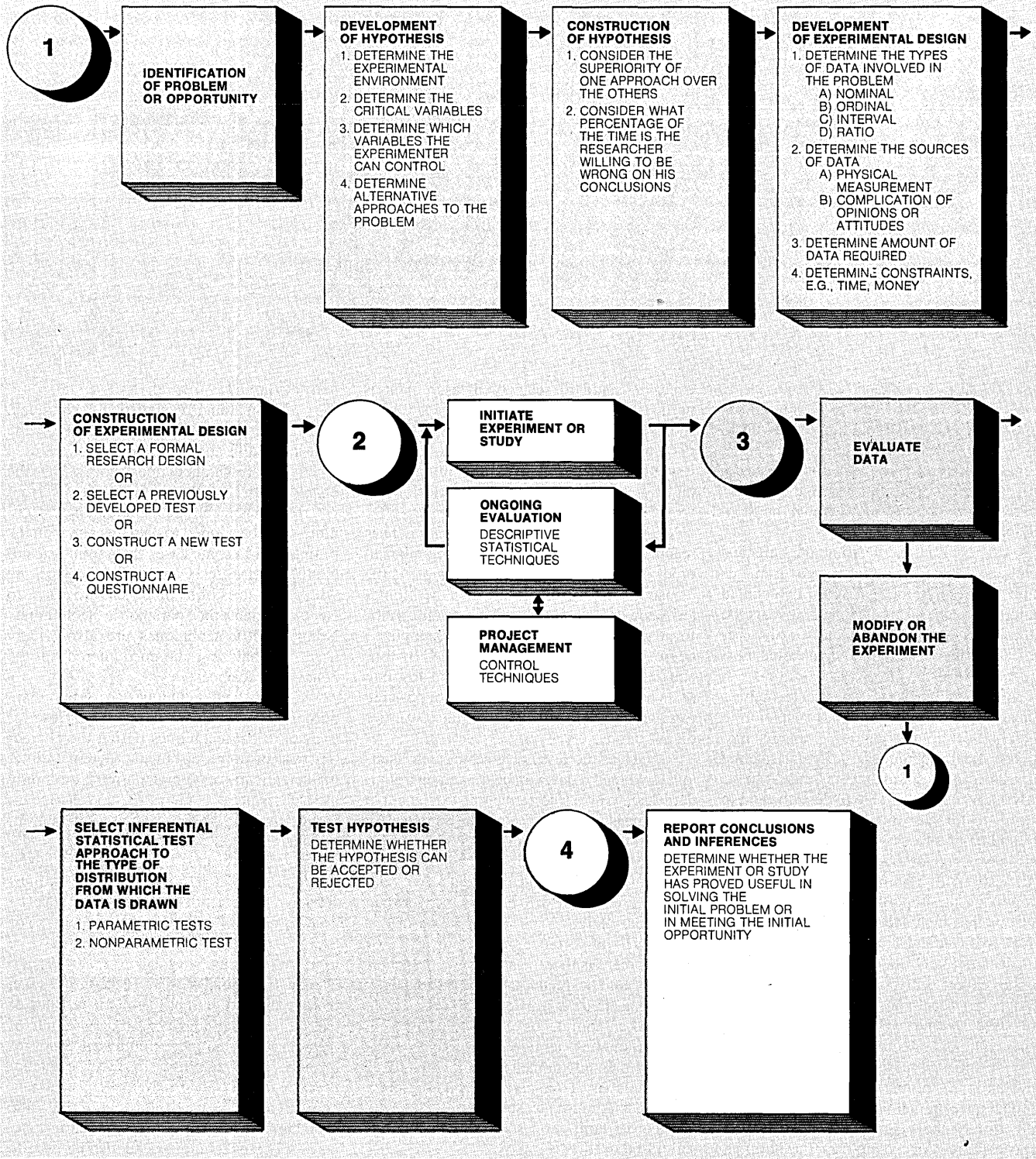
least at the interval level.

Nonparametric statistical techniques, such as the Mann-Whitney U test or the Kruskal-Wallis analysis of variance, are used when the researcher does not know the characteristics of the group of items from which he has taken his sample. These techniques can be applied to data measured on the ordinal and in some cases the nominal scale. Nonparametric tests are useful for working with small sizes of samples and are easier to calculate than the parametric techniques. Nonparametric techniques are also widely used to analyze data encountered in the behavioral sciences.

Statistical techniques serve two main purposes, description and inference. Descriptive statistical techniques define the characteristics of a group of data items either mathematically or graphically. Commonly used descriptive statistics include the mean, mode, median, range, standard deviation, variance, and skewness. Examples of descriptive graphical techniques are Cluster Analysis and leaf and stem analysis. At times a known pattern of distribution can also be used to describe a group of data items. For example, the Poisson distribution may be used to describe the occurrence of rare events. Inferential statistical techniques can then be used to predict the characteristics of the total group of items based on a sample of the items. Inferential techniques are used, for instance, in conducting a survey. The characteristics of a small group, collected at random, can be used to determine the characteristics of the entire population.

These techniques can also be used to determine the probability that two or more samples came from groups having similar characteristics. Examples of this situation are found when a group receiving treatment is compared to a control or untreated group before and after treatment. Commonly used inferential techniques include the standard error of a difference, t test, Mann-Whitney U test, analysis of variance, regression, and analysis of covariance.

STATISTICAL RESEARCH METHODOLOGY FLOW CHART



FOUR-PHASE STUDY METHOD

The flow chart shown here depicts a structure that can be used either as a framework for designing new statistical studies or as a checklist to evaluate whether ongoing or completed studies have been appropriate or effective.

The setup phase includes the operations of problem identification, hypothesis

development, hypothesis construction, development of experimental design, and the construction of the experimental design. The setup phase is the most important of the four phases. It is also the phase most often either overlooked or poorly carried out, perhaps because it requires a balanced application of creativity, experience, and technical ability. In this phase the answers must be determined

to the basic questions of why the study is being done, how the study could best be accomplished, how accurate it must be, what kind of data measurement is involved, where the data is coming from, and how the data is to be captured.

The second phase of the method involves the monitoring of the study or experiment throughout its duration. The study must



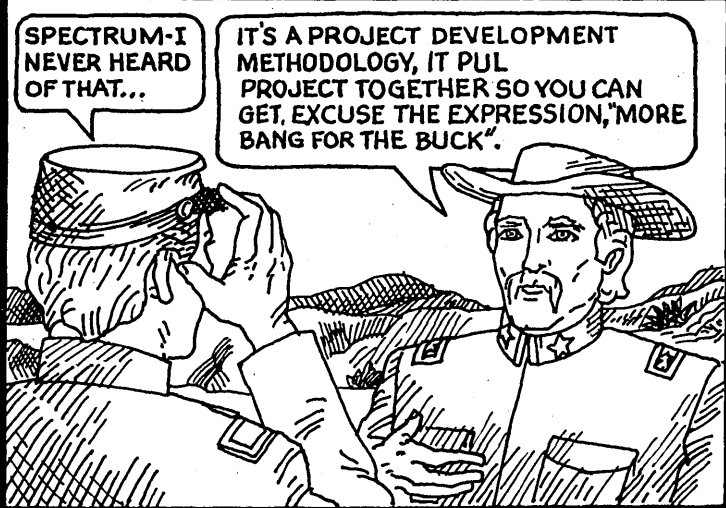
NICE LITTLE HILL
HERE, MAJOR.

YES, GENERAL CUSTER,
YOU COULD STAND OFF THE
WHOLE INDIAN NATION
FROM HERE!



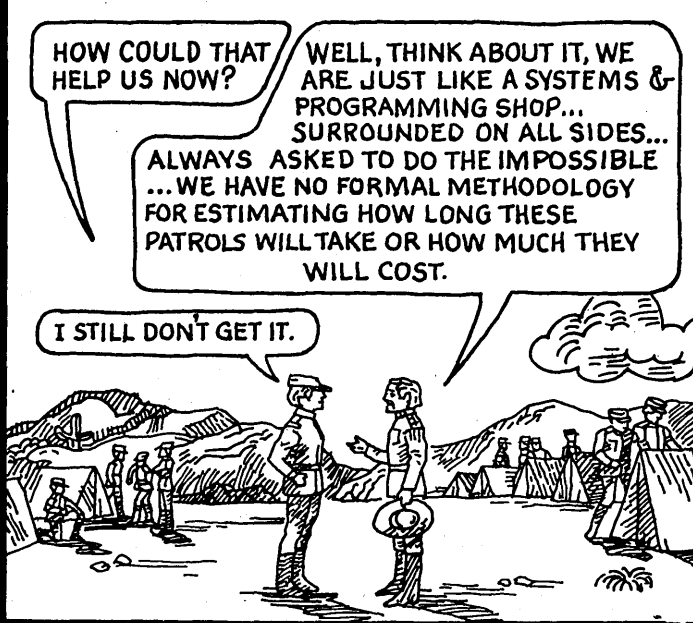
IT'S OBVIOUS THERE
AREN'T ANY INDIANS
AROUND HERE.

O.K. IF YOU THINK
SO... BUT I SURE WISH
I HAD SPECTRUM-I
PLANNING THIS
PATROL.



SPECTRUM-I
NEVER HEARD
OF THAT...

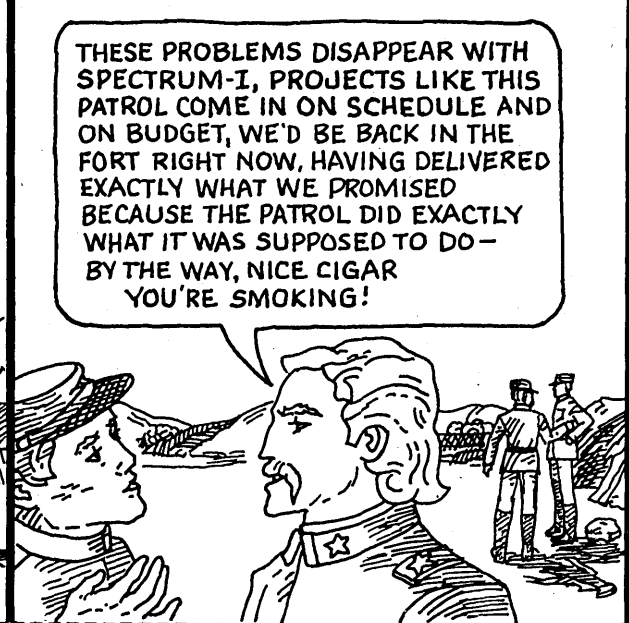
IT'S A PROJECT DEVELOPMENT
METHODOLOGY, IT PUL
PROJECT TOGETHER SO YOU CAN
GET, EXCUSE THE EXPRESSION, "MORE
BANG FOR THE BUCK".



HOW COULD THAT
HELP US NOW?

WELL, THINK ABOUT IT, WE
ARE JUST LIKE A SYSTEMS &
PROGRAMMING SHOP...
SURROUNDED ON ALL SIDES...
ALWAYS ASKED TO DO THE IMPOSSIBLE
... WE HAVE NO FORMAL METHODOLOGY
FOR ESTIMATING HOW LONG THESE
PATROLS WILL TAKE OR HOW MUCH THEY
WILL COST.

I STILL DON'T GET IT.



THESE PROBLEMS DISAPPEAR WITH
SPECTRUM-I, PROJECTS LIKE THIS
PATROL COME IN ON SCHEDULE AND
ON BUDGET, WE'D BE BACK IN THE
FORT RIGHT NOW, HAVING DELIVERED
EXACTLY WHAT WE PROMISED
BECAUSE THE PATROL DID EXACTLY
WHAT IT WAS SUPPOSED TO DO -
BY THE WAY, NICE CIGAR
YOU'RE SMOKING!



I'M NOT SMOKING...
YOU SMELL SMOKE?

©1980 SPECTRUM INTL. INC.

SPECTRUM INTERNATIONAL INCORPORATED
4311 WILSHIRE BLVD. STE. 312
LOS ANGELES, CA 90010 · (213) 931-1127

GENTLEMEN: PLEASE SEND ME FURTHER
INFORMATION ON SPECTRUM-I ALONG
WITH A FREE POSTER REPRODUCTION
OF THIS EPISODE

NAME _____
TITLE _____
COMPANY _____
STREET _____
CITY _____ STATE _____ ZIP _____

DAC

**PASCAL
FORTRAN
ADA
HAL/S
SPL/I
SDL
PL/M6800**

Since 1970 Intermetrics has been building compilers for demanding applications where code efficiency and reliability are primary requirements.

Call us with your compiler needs.

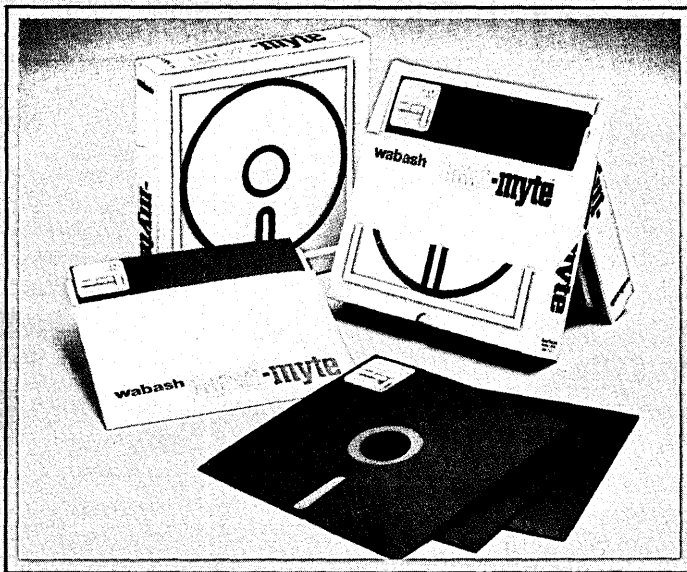


**Intermetrics, Inc.
Marketing Department
701 Concord Ave.
Cambridge, MA 02138
617/661-1840**

COMPILERS BY INTERMETRICS

CIRCLE 153 ON READER CARD

wabash[®]



Quality, Service and Availability

You can count on all three from Wabash Tape Corporation. Our toll-free number will put you instantly in touch with your local Wabash Distributor . . . and the finest diskettes money can buy!

800-323-9868

Wabash Tape Corporation 2700 Des Plaines Rd., Des Plaines, IL 60018 • 312-298-8585

CIRCLE 154 ON READER CARD

be monitored to ascertain whether the data is being collected according to plan.

The third phase, the evaluation of the data, starts with the decision to either statistically test the results of the study or to modify or abandon the study. When factors uncovered during the study show the original design to be unworkable or when there have been major unforeseen changes in the study environment, the study must be modified or abandoned. If the decision is made to continue and to test the hypothesis, the appropriate statistical test or tests are applied to determine if the hypothesis can be accepted or rejected. Usually, researchers say their results are significant if they can accept their hypothesis with 95% accuracy. Results can be considered highly significant if the hypothesis can be accepted with 99% accuracy.

The final phase involves writing a report describing the researcher's activities and findings for each step of the method. The report then presents the conclusions arrived at in light of the original purpose of the study. A well-documented report is necessary so that other people working on similar problems can attempt to replicate or expand upon the study.

A dp manager or systems analyst who uses this framework and who knowledgeably seeks out the advice and assistance of a consulting statistician should be able to carry out or at least evaluate the reliability of a statistical study. As a checklist, the framework can be used to find out why studies are (or are not) being carried out, what kinds of controls and monitoring procedures are being used, and what deviations are being encountered in the data collection processes. The manager should be able to ascertain from the researcher what the reasons are for using a specific type of statistical analysis and what the probability is of obtaining accurate results. Further, the researcher should be able to explain to the manager why any of the steps in the method were modified or omitted.

When evaluating statistical studies, even using this method, it is probably best to always keep in mind this warning from Benjamin Disraeli: "There are three sorts of lies—lies, damned lies and statistics." *

RICHARD T. DUÉ

Head of the systems design and data analysis branch of the Alberta, Canada, Department of Agriculture for 11 years, Mr. Dué is presently supervisor of management consulting services with the accounting firm Ernst & Whinney. He also teaches at the University of Alberta in the computing certificate course, a two-year adult program.

FREE CATALOG

For a free government catalog listing more than 200 helpful booklets, write:
Consumer Information
Center, Dept. A, Pueblo,
Colorado 81009.

ABCDEFGHI

JKLMNOPQR

STUVWXYZ

IS OUR BUSINESS.



We are Micom and Word Processing is our business. We didn't start out as a computer company. Or as a copier company. Or even as a general office equipment company. We started out and built our name solely on our ability to arrange the printed word quickly and efficiently. We are Word Processing.

And Word Processing is so many things in the office today. Word Processing is writing, editing, revising, storing, filing and sorting your written documents in a fraction of the time they're taking now.

It's printed communication of uncompromising quality without

spending valuable time and money doing it. It's a principle that creates a productive environment freeing you and your staff from tedious tasks. So that they can get on with their work, leaving you to get on with yours.

Word Processing is so many things. But its true value and what it can do for you is best seen in a live demonstration. We'd like to arrange that demonstration for you, free and without obligation. Just mail the coupon alongside or call us toll-free.

It makes no difference how big or how small your company is, Word Processing can make you a more productive company. From A to Z.

Mail to: Micom, Box 1122, Radio City Station, N.Y., N.Y. 10019. Tel.: 800-223-2100. In N.Y. call 212-765-4300.

- Please send me more information on Micom Word Processing Equipment.
- We'd like to see a live demonstration of Micom Word Processing Equipment.

NAME _____
 TITLE _____
 COMPANY _____
 ADDRESS _____
 CITY _____ STATE _____
 ZIP CODE _____ TEL. NO. _____

DATA 580

MICOM

We are Word Processing.

PHILIPS 

Micom is backed worldwide by Philips N.V.

YESTERDAY SPERRY UNIVAC THE COMPUTER SYSTEM



The New Sperry Univac System 80.

On April 22, in 40 cities across the country, the computer people who listen introduced the computer system of tomorrow. THE SPERRY UNIVAC SYSTEM 80.

The result of four years of research and careful listening to the needs of the small and medium-scale computer user, the System 80 cannot be overlooked by any company whose expanded operations and growth have demanded a larger computer system with increased capabilities.

Consider the following plus factors the System 80 can provide:

- *Easy to use because you can talk to the System 80 in the English language. System 80 brings the computer power to all levels of people within your organization.*

RDAY, INTRODUCED TEM OF TOMORROW.

- Innovative technology including emitter coupled logic and multiple bus architecture delivers new standards of system performance and increased productivity. Multiple microprocessors make it the most reliable computer on the market.
- Computer growth potential is built into the System 80 because of its modular architecture and the widest range of peripheral choices Sperry Univac has ever produced.
- Multipurpose design was engineered into the System 80 from the ground up. System 80 can be used with equal efficiency in a stand-alone environment or as part of a communications network.
- Extensive training and support are provided at 22 strategically located Advanced Centers for Customer Education Support and Service (ACCESS). These ACCESS Centers serve as the hub of educational and service activities.


These factors touch briefly on the far-reaching benefits of the System 80. For an in-depth look, we'll be holding seminars every third Thursday of the month to familiarize you with all phases of the System 80.

To attend, simply call the toll free 800 number or fill in the coupon.

The system of the future is here today. The Sperry Univac System 80.

Call 800-523-2496.

Sperry Univac, P. O. Box 500—Dept. 100, Blue Bell, PA 19424.		
Yes, I'm interested in listening to one of your seminars. Please send me a confirmation of my reservation.		
Computer system now in operation _____		
I would like to bring _____ guests	(Specify #)	
Name _____		
Title _____		
Company _____		
Street _____		
City _____	State _____	Zip _____
Phone _____	DM-2	

SPERRY  UNIVAC

The computer people who listen.

An eminent Chinese sociologist attributes the great changes in the U.S. in the past 35 years to the high level of electronic technology.

GLIMPSES OF AMERICA

by Fei Xiaotong

This article is based on excerpts from articles by Professor Fei Xiaotong in Dagongbao, a Hong Kong newspaper, and in Shanghai's Wenhuibao newspaper. Professor Fei Xiaotong is the president of the Chinese Sociological Research Association. His impressions of America have been formed by comparisons between his visit in the spring of 1979 and his last visit to America in 1944. The translation of his articles was done by Professor Martin Whyte of the sociology department at the University of Michigan, Ann Arbor.

There is a saying, "If you visit a place for a day you can talk of it forever; but if you live in a place forever, you can't say a word about it." People love to see and hear unfamiliar things; it is a common experience for people coming back from abroad to use new impressions to try to reach new explanations. So a person who has no intention to write a travelogue can be urged to do so and not be able to refuse—or at least that is the motivation behind my presentation, "Glimpses from America."

I call them "glimpses" because my observations of America were brief, and my understanding superficial. Boarding planes and disembarking from planes is like a dragonfly skimming across the water.

In all, our group traveled for a little over a month, beginning on America's East Coast, at Washington, D.C., moving around the Northeast, into the middle, and then to the West Coast. We stopped in Hawaii, and then traveled via Tokyo back to Peking. The delegation in which I was participating was sponsored by the Chinese Academy of Social Sciences, and by the American Council of Learned Societies, the Social Science Research Council, and the American Academy of Sciences.

I can compare the changes I saw between my two visits to America in terms of

the development of automobiles and highways. This comparison can help us understand many phenomena. For example, if there were no popularization of automobiles and no high-speed highways spreading out, of course there would not be a large number of people who originally lived in the cities moving out to the suburbs, and therefore, there would not be the current style of residential areas and supermarkets, and such things that typify the new face of America. But automobiles and superhighways, in the scale of American history, were already known to the previous generation. How is it then that suddenly in the last decades these things have developed such functions and have led to such great changes?

In originally looking into this question, I noticed that some new things, not too visible on the surface, play a great role here. These are automatic control systems that electronically transmit information—or for short, electronic systems. If you have them, then many complex relationships between objects, between men and objects, and among people which earlier people had no means of controlling, can be under human control, at man's beck and call.

HIGH SPEED SOCIETY

Everyone who has visited America has to admit that it is a high velocity, high efficiency society. High velocity means that people and objects are in rapid motion. High efficiency means that events are completed quickly. The higher the speed of activities, and the broader the connections among people and objects, then the more complex organizational work must be.

American airports constantly have planes landing and taking off, with thousands and tens of thousands of passengers going in and out and up and down. Carrying out such complex activity in an orderly manner is not an easy matter. The central pivot where this airport activity is controlled is not visible to the ordinary traveller. Here, there is an elec-

tronic system called a computer which helps human minds to control things.

Let me give an example from my personal experience. Another member of the delegation and I went to visit the University of Pittsburgh. We agreed that after our separate activities we would rejoin and fly to New York. The airplane tickets had been reserved long in advance, but specific seat assignments are made at the entrance just before you get on the plane. That day I got there early, and had already received my seat number, and my friend got there 10 minutes later. When he went to get his seat assignment, he said to the attendant that the two of us wanted to sit together. When the attendant heard this, she instantly typed up some symbols on a fluorescent screen right next to her; on the screen, the answer came glowing out, and she took my seat number back and gave us two seats together. The whole procedure took less than a minute; there were no arguments and it was not necessary to get angry, as the attendant smilingly satisfied our request. It was not that we had entered a "country of gentlemen." It was that through this electronic system, the attendant could, in an orderly way, find out that the plane still had these adjacent seats, and it was very easy for her to assign them to us. It really was not that these attendants are especially capable, but that they have the help of a computer, so their efficiency is high, and the matter was arranged quickly and orderly. It is therefore easy for people to enjoy and present a good service attitude.

As another example, every hotel wants as much as possible to fully utilize its space so that when somebody leaves, someone else arrives, and people don't have to wait with no room, and also rooms don't remain empty. In Honolulu every day there are about 50,000 tourists arriving and leaving. These 50,000 people are not organized like an army; they come from the five lakes and the four seas, strangers meeting like patches of duck weed, and every place's hotel management is in perfect order, with coming and

ILLUSTRATION BY DANIEL MAFFIA



W. H. H. H.

F E I X I A O T O N G

The computer has greatly increased man's control over complex activities, making possible America's modernized society.

going freely. This looks simple because there is an information system which includes telephones and computers that help attendants carry out their work.

The airport we saw was the epitome of the entire American society, since tasks involving countless high speed elements united together are a characteristic feature of a modern society. Due to the constant improvement of electronic systems, the speed of human activities and the efficiency of work are constantly being raised, and as more and more people are engaged in mutual relationships, their relationships are constantly tightened.

Now, the whole world's people are increasingly being absorbed into closer and closer contact, brought into a big network, and formed into a large society. The American airport I mentioned is one corner of this large society. There, each person and each airplane does not rely on its own customs to operate, but each behaves according to advance agreements. The method of their agreed relationships can also be altered due to the change in any single element, so it is not inflexible and static, but can be constantly changed, and so is a dynamic system.

In this system, if the activity of each element is rapidly increased, the mutually agreed and adjusted organization of activity can also become more complicated. If you want to carry out things promptly, when the things get to a certain level, one cannot manage well by relying on human brains. The human brain cannot remember so many elements in rapid motion which are constantly changing, and so there is not time to consider their mutual relationships and implications. The results are that things can't be controlled, management is poor, accidents are common, efficiency low, and activities may even cease completely. The invention and popularization of the computer has greatly increased man's control and management over complex activities, and this is what makes possible a modernized society like America's to come into being.

When one talks about the changes in American society now, one unavoidably has to talk of the electronic technology. I am quite ignorant of this technology, and, as an illiterate in regard to modern science and technology, I am vexed. Not to talk about it is to miss the central part, but if I talk about it, I am like a blind person groping for an elephant.

I was told that the large and increasing use of electronics to organize, control, and raise levels of efficiency stems from the needs of technical and scientific research itself. In 1957, when America discovered that the Soviet Union had flown in space first—and that this was a major problem for national security—it resolved to catch up with and surpass the Soviet Union, and raised the goal of landing on the moon.

CHANGING MOON MYTH

America diligently changed our myth about the goddess flying to the moon into a reality; it didn't do what we do—let the goddess go off and not return, to live a lonely life away in the moon palace. After America sent man to the moon, it also wanted to get him back to earth. This was a very tall order, and there were countless technical questions to solve, and if even one of them was solved, the moon goddess might not fly to the moon, or, flying there, might not be able to get back. Each problem was interrelated with the other; for example, how heavy the "moon goddess" is, how long it will stay there, how much of the various food items have to be prepared—these all play a role in deciding the weight of the moon ships, and the size of the rocket that sends it into space.

These are all elements that are interconnected and can change. If any single element is changed slightly, the others all have to be adjusted accordingly. You have to do experiments to discover the laws governing the changes in each element, and the research that is conducted separately on each element has to be related to the research results on the other elements. Thus, this huge research plan itself led to an extremely complex exchange of information and a need for close coordination. The all-around management work could certainly not have been done using only human brain power. In the reality of carrying out research, electronic systems of communication were fully utilized. And out of this developed systems engineering—involving the constant arrangement and coordination of many constantly changing elements. The completion and realization of America's plan to land on the moon was not only a symbol that America had caught up with the Soviet Union, but, in terms of scientific, technological, and organizational methods, it was a great leap forward.

The new scientific field of systems engineering was rapidly used in other productive processes, and greatly increased the efficiency of production. Computers became a living treasure. This unavoidably led to marvel, and to the boast that a magical mechanized human had appeared and that computers can replace brain power. These are, of course, exaggerations, but we should definitely not underestimate this new tool. Modern production cannot do without it. It is not a tool for manufacturing a particular product, but a tool that is needed in the management systems of all complex production processes—to control an airport, to control a guided missile. It is helping humans' brains arrange things all over, reorganizing the activity of men and of things to produce the possibility of a fast, high efficiency society.

There are people who use the quality

and quantity of computers in a country to judge that country's strength. Now, among the American authorities there are people who in regard to the conflict between the U.S. and the U.S.S.R. have a confident attitude. This is because they believe that in the quality and quantity of computers, the U.S. is far ahead of the U.S.S.R., and that in science and technology, the Soviet Union will be left behind.

Some people say that in the past you compared production enterprises in terms of their capital and size; if their capital was large and they had many workers, they were powerful, and a big fish could eat a small fish. Now, it is different. You compare innovations and compare knowledge, and whoever occupies the lead in technology can break through obstacles, and produce new things and eliminate the old.

COMPUTER HAS SHRUNK

In regard to the computer itself, we in our country have, in recent years, seen the type that occupies several rooms, but in America, this type has long ago become an antique. The body of a computer has gotten smaller and smaller, and there are changes with each passing day.

Once, when I was talking with a famous professor who does research on the relationship between technology and society, he said to me, "Now is an era of constant technical innovation. In history, when technology made a breakthrough, there have been a series of other new changes, followed by a period of stability. But it seems that now we have overcome this rule. We are having constant breakthroughs and constant innovations. In this situation, to catch up to the advanced technological levels, it is not enough to rely only on borrowing from abroad, since from the time of borrowing to the time of putting things into operation requires some period of time, and by then, the technical things are already outmoded. It would be better to use some small-scale, multiple experimental borrowing, and, in the process of borrowing, establish your own corps of scientific and technical people who can produce constant innovation. When you have such a corps of people, you will then be able to talk about entering the ranks of advanced countries."

When I heard these words, I was much aroused. Scientific and technical knowledge must be acquired to become self-reliant; otherwise, if we talk of borrowing from behind the masses of other people, we cannot avoid selecting outmoded trash. We cannot solely blame other people for ill will toward us; we don't make a good showing. If we want to make a good showing, we still have to rely on our own efforts.

The different between the weak and

Booth 4231 at NCC



It's color. It's a self-contained computer. It's only \$3300.* And it's as close as a phone call.

That's all it takes for a demonstration of this versatile, affordable 13" desktop — one that can answer practically all of your systems management needs.

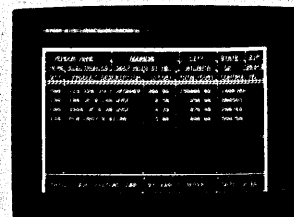
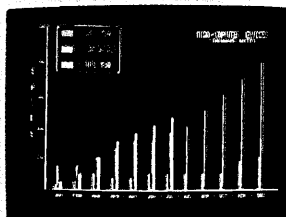
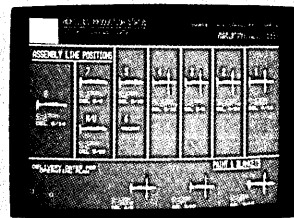
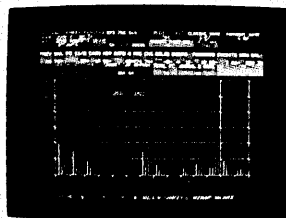
The 3621 is ideally suited for distributed processing. Standing alone or used on-line with another system, it can provide up-to-the-minute data on everything from inventory to personnel. In 8 dynamic colors that speed comprehension and increase user efficiency.

The system includes 32K RAM for user workspace, and a built-in micro-disk drive that uses specially formatted Sof-Disks™ with 51.2K bytes of storage per side. Optional separate disk drives can add up to 26M bytes of memory. Also available is an X-bus interface for any number of peripherals.

A BASIC interpreter and FORTRAN compiler, both standard, give a choice of two powerful languages. As an option, users may specify special graphic characters of their design.

Intecolor's 3621 is made for maximum flexibility — from its unique file handling capabilities to the deluxe built-in keyboard with color and numeric clusters.

See for yourself how it can address complex applications and improve your operation. Contact your ISC sales rep today, and put color to work for you. **Color Communicates Better**



Unretouched photo of screen.

*U.S. domestic price.

ISC SALES REPRESENTATIVES: AL: 205/883-9660, AZ: 602/994-5400, AR: (TX) 214/661-9633, CA: Alhambra 213/281-2280, Goleta 805/964-8751, Irvine 714/557-4460, Los Angeles 213/476-1241, Los Altos 415/948-4563, San Diego 714/292-8525, CO: 303/355-2363, CT: 203/624-7800, DE: (PA) 215/542-9876, DC: (VA) 703/569-1502, FL: Ft. Lauderdale 305/776-4800, Melbourne 305/723-0766, Orlando 305/425-5505, Tallahassee 904/878-6642, GA: Atlanta 404/455-1035, HI: 808/524-8633, ID: (UT) 801/292-8145, IL: (No.) 312/564-5440, (So. MO) 816/765-3337, IN: (IL) 312/564-5440, IA: (Scott County Only) 312/564-5440, (MO) 816/765-3337, KS: (MO) 816/765-3337, KY: 606/273-3771, LA: 504/626-9701, ME: (MA) 617/729-5770, MD: (VA) 703/569-1502, MA: 617/729-5770, MI: Brighton 313/227-7067, Grand Rapids 616/393-9839, MN: 612/645-5816, MS: (AL) 205/883-8660, MO: 816/765-3337, MT: (CO) 303/355-2363, NB: (MO) 816/765-3337, NH: (MA) 617/729-5770, NJ: (No.) 201/224-6911, (So.) 215/542-9876, NV: (AZ) 602/994-5400, NM: 505/292-1212, NY: Metro/LI(NJ) 201/224-6911, N. Syracuse 315/699-2651, Fairport 716/223-4490, Utica 315/732-1801, NC: 919/682-2383, ND: (MN) 612/645-5816, OH: Cleveland 216/398-0506, Dayton 513/435-7684, OK: (TX) 214/661-9633, OR: 503/644-5900, PA: (E) 215/542-9876, (W) 412/922-5110, RI: (MA) 617/729-5770, SC: 803/798-8070, SD: (MN) 612/645-5816, TN: 615/482-5761, TX: Austin 512/454-3579, Dallas 214/661-9633, El Paso Area (Las Cruces, NM) 505/524-9693, Houston Only 713/681-0200, UT: 801/292-8145, VT: (MA) 617/729-5770, VA: 703/569-1502, WA: 206/455-9180, WV: (PA) 412/922-5110, WI: (IL) 312/564-5440, WY: (CO) 303/355-2363.

EUROPEAN EXPORT SALES: EUROPE: (MA) 617/661-9424, BELGIUM: Brussels 02-242-36-04, DENMARK: 02-913255, FRANCE: Rueil Malmaison 749-47-65, Paris 33-1-306-4606, GREECE: Athens 642-1368, ITALY: Milano 02600733, THE NETHERLANDS: Poeldijk 01749-47640, Amsterdam 020-360904, SPAIN: Barcelona 204-17-43, SWEDEN: Vallingby 08-380-370, SWITZERLAND: Mutschellen 057-546-55, UNITED KINGDOM: Bournemouth 0201671181, WEST GERMANY: Koblenz 01149-310256, AUSTRALIA & NEW ZEALAND: Auckland 876-570, Canberra 58-1811, Chermide 59-6436, Christchurch 796-210, Melbourne 03-543-2077, Sydney 02-808-1444, Wellington 644-585, CANADA: Dorval 514/636-9774, Ottawa 613/224-1391, Toronto 416/787-1208, Vancouver 604/684-8625, CENTRAL AND SOUTH AMERICA & CARIBBEAN: (GA) 404/394-9603, MEXICO: Monterrey 564-876, FAR EAST: (CA) 213/382-1107, HONG KONG: 5-742211, JAPAN: (Tokyo) (03) 463-9921, TAIWAN: (Taipei) 02-7026284, MIDDLE EAST: (GA) 404/691-0249, EGYPT: 809933, ISRAEL: Ramat Gan 03725749, KUWAIT: Kuwait 438-1801/2, LEBANON: Beirut 221731/260110, SAUDI ARABIA: Jeddah 27730, Riyadh 25083-39732.

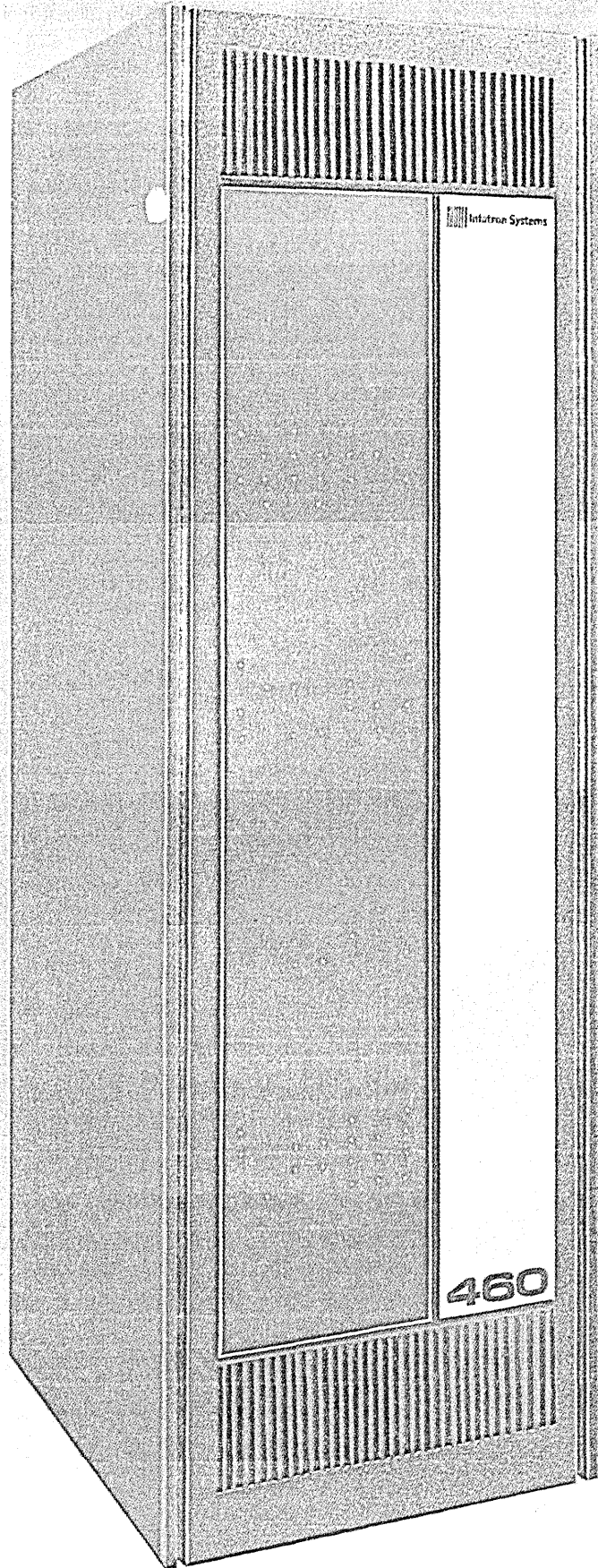
For sales and service in other countries contact ISC headquarters in Norcross, GA., U.S.A.



Intelligent Systems Corp.

Intecolor Drive □ 225 Technology Park/Atlanta □ Norcross, Georgia 30092 □ Telephone 404/449-5961 □ TWX 810-766-1581

CIRCLE 157 ON READER CARD



SUPERSTAR

Infotron's New Data PBX

Top performance in any data network! To the user it means quick connection to any resource with no hassles. To the network manager it means system flexibility and control. Infotron's new TL460 easily meets the demands of both.

The TL460 allows terminal users to access any port or any computer. If no port is available the TL460 queues the callers. It even tells them why they weren't connected and their place in line. The hassle of having to redial—a complaint when ports are busy—is eliminated.

The network manager will find the TL460 flexible enough to meet ever-changing conditions. It handles up to 2000 simultaneous connections, even if all are operating at 9600 bps, and provides 256 different classes of service. System parameters, such as class assignments, busy messages, connect criteria and disconnect criteria, all can be changed from the console!

The TL460 is not limited to certain data types or speeds either. Any combination of synchronous and asynchronous inputs from 30 to 19,200 bps is perfectly okay. To help guarantee good service, the TL460 provides a wealth of statistics such as successful and unsuccessful access attempts, line port and user CPU time in queue, etc.

The modular TL460 is economical enough for the smallest installation and yet powerful enough for the largest PBX application.

For more information, contact Infotron Systems, Inc., 10000 Wilshire Blvd., Suite 1000, Beverly Hills, CA 90210. Tel: (310) 206-1000. Telex: 152000. Fax: (310) 206-1001.

The TL460 is available in a rack-mountable version. For more information, contact Infotron Systems, Inc., 10000 Wilshire Blvd., Suite 1000, Beverly Hills, CA 90210. Tel: (310) 206-1000.

The computer is helping humans' brains arrange things all over.

had read in what book, which volume, and in what chapter, and all without making a mistake. Everyone swore that this was an incredible effort, and that very few people could match him.

When I was meeting at the University of Pittsburgh sociology department, they demonstrated for me how they use the computer to find documents and materials. They knew I had researched Chinese rural society, so they requested the computer to say how many important articles there had been on the Chinese rural society in the last three years. The computer's fluorescent screen showed one by one the authors and topics of such articles, what journal they were published in, in which issue, and on which pages. And then I asked it to supply me with an abstract of a particular article, and the screen immediately displayed the abstract. After reading this, if you think the article would be worth examining, you push a button and the computer prints a copy of the abstract which you can take home.

You can also go on and ask the computer for some data on the Chinese rural family, for example, the average size over a number of years, or for some figures on peas-

ant family income. As long as the data on a topic is stored away, you can get it displayed on the screen in an instant, and, if needed, you can get it immediately copied.

This demonstration opened my eyes, and aroused deep feelings. Just think, if I want to write an article myself, just using the materials that I have clear memory of, I have to go to the library and borrow various books, and I don't know how much explaining and time that will take. Sometimes I lose my temper, and the article falls through. If we had such a convenience as American scholars have, think of how much effort we could save! And I am old, my memory gets weaker and weaker, and sometimes when I try to think of a person's name, or a particular year, I have to ransack my brain, and can't find where they are hiding. People's brains can get decrepit, but computers do not suffer from the maladies of age.

Computers, of course, are not some sacred thing in life. They don't produce knowledge, and what they can display depends on what people have stored in them. The computer is a docile tool, one which is loyal but cannot be creative.

If it takes only encyclopedic knowl-

edge to contribute to learning, then we could use the computer to do academic work for us. In regard to the encyclopedic part, there is no human brain that can store up the materials from a whole nation, and in the future, from the whole world. And for the memory part, where is there a human brain that cannot forget? But human knowledge is constantly having the old weeded out and replaced by the new. The computer can only store things and cannot create things, and in this respect, the human brain and the computer are basically different.

In learning it is always a matter of breaking through the old and creating the new to push the development of knowledge forward. Relying on encyclopedic memory will not do, even though encyclopedic knowledge is a vital prerequisite for scholarship.

The computer greatly helps the development of mankind's knowledge, and it liberates one from the limits of human memory, so that human brains can concentrate on creative activity. To underestimate the computer, and say "garbage in, garbage out" is incorrect, but to have superstitious faith in computers and believe that mankind's thought can use machines to replace labor is also in error.*

A gripping computer espionage thriller

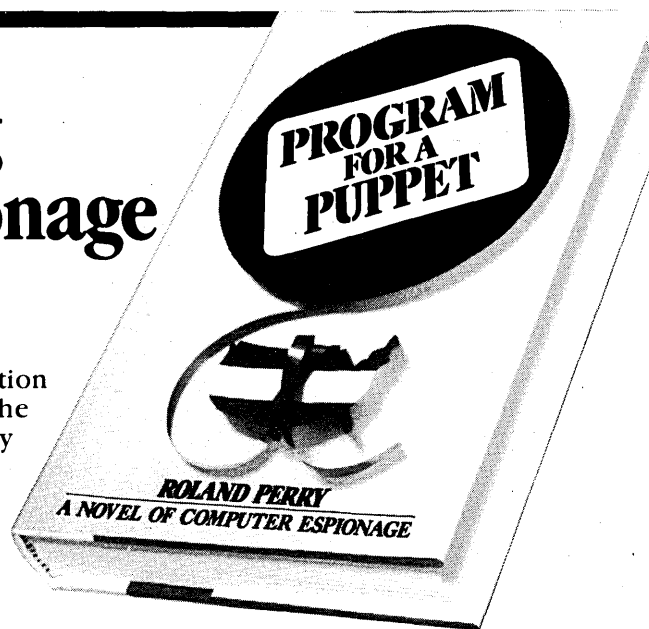
Imagine — a giant American corporation smuggling strategic computers to the KGB — a move that could drastically alter the balance of world power.

Imagine — that this major super-corporation secretly selects their own man for the U.S. presidency and uses computer power to secure his election.

From beginning to end, Roland Perry's brilliantly researched novel will leave you utterly convinced by its all-too-fearful credibility.

"The story of the century...incorporating presidential assassination, corporate blackmail, terrorism, love, sex, and death. A little bit of Forsyth, a dash of Arthur Hailey...a good read."
—*Playboy* (Australia)

"Slick, convincing...Perry melds high-tech with espionage."
—*Publishers Weekly*



PROGRAM FOR A PUPPET

a novel by
ROLAND PERRY

\$9.95, now at your bookstore

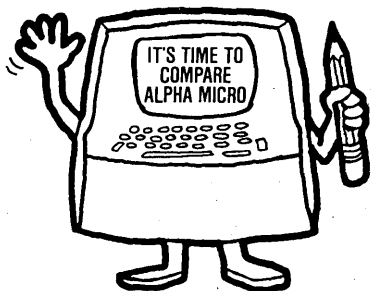
CROWN

CIRCLE 159 ON READER CARD

THE MICROCOMPUTER WITH BIG SYSTEM SOFTWARE

Compare the Alpha Micro Computer
with anything else on the market

	Alpha Micro	Others
1. Multi-user	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Multi-tasking	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Multi-processor	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. Time sharing	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5. Batch processing	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6. Data communications	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. Up to 1024K memory	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. Big system peripherals	<input checked="" type="checkbox"/>	<input type="checkbox"/>
• 10, 90, 280 MB hard disks	<input checked="" type="checkbox"/>	<input type="checkbox"/>
• 300, 600, 900 lpm printers	<input checked="" type="checkbox"/>	<input type="checkbox"/>
• 9 track 800/1600 bpi magnetic tape units	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9. Eight-inch Winchester disk (new for NCC)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. Dual-sided, double-density floppy disks	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11. Configuration flexibility	<input checked="" type="checkbox"/>	<input type="checkbox"/>
• Up to 2400 MB hard disk storage on a single CPU	<input checked="" type="checkbox"/>	<input type="checkbox"/>
• Up to 24 terminals or printers on a single CPU	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12. Configuration expandable by-linking CPUs	<input checked="" type="checkbox"/>	<input type="checkbox"/>
13. User-defined memory management	<input checked="" type="checkbox"/>	<input type="checkbox"/>
14. Sequential, ISAM, random access file handling	<input checked="" type="checkbox"/>	<input type="checkbox"/>
15. AlphaBASIC™, AlphaPASCAL™, AlphaLISP™ and assembly languages standard	<input checked="" type="checkbox"/>	<input type="checkbox"/>
16. Word processing/text formatting standard	<input checked="" type="checkbox"/>	<input type="checkbox"/>
17. Multiple printer spooling and over 100 utilities standard	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18. Delivery off-the-shelf for most systems	<input checked="" type="checkbox"/>	<input type="checkbox"/>
19. Hardware and software support and factory training of authorized dealers	<input checked="" type="checkbox"/>	<input type="checkbox"/>
20. Versatility to perform many kinds of business appli- cations (see electronic mail demo at Booth 4021)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
21. Unequalled performance-to-cost ratio	<input checked="" type="checkbox"/>	<input type="checkbox"/>



No other small business system
compares with the Alpha Micro Computer.



17881 Sky Park North
P. O. Box 18347
Irvine, California 92713
(714) 641-0386, TWX 910-595-2666

COME SEE ALPHIE AT BOOTH 4021

CIRCLE 160 ON READER CARD

Good news for Word People.

In business, there are basically two kinds of people.

Word People. And Numbers People.

If you're a Word Person, this ad is for you.

And so is this new machine: The Xerox 860 Information Processing System.

It can rearrange paragraphs, change margins, correct misspellings and type out a virtually endless series of text revisions at the speed of hundreds of words a minute.

And it remembers everything it's done for future reference. Or additional changes.

But it also does something you might not expect from a word processing system.

It processes numbers.

Because in business today, Word People have to manage numbers. And Numbers People have to manage words.

And everyone, but everyone, has to manage information.

XEROX



Good news for Numbers People.

In business, there are basically two kinds of people.

Word People. And Numbers People.

If you're a Numbers Person, this ad is for you.

And so is this new machine: The Xerox 860 Information Processing System.

It can compute, do statistics and perform the routine work that's essential in managing records, measuring work performance and so on.

And it remembers everything it's done for future reference. Or additional changes.

But it also does something you might not expect from a numbers processing system.

It processes words.

Because in business today, Numbers People have to manage words. And Word People have to manage numbers.

And everyone, but everyone, has to manage information.

"I give it a 10."



XEROX

CIRCLE 161 ON READER CARD

PEOPLE

AUDITORS NEEDED

"Internal audit procedures as they relate to computer operations are probably the most rapidly expanding facet of the accounting field," said George W. Turkull, vice president and corporate auditor for Los Angeles Federal Savings, Los Angeles.

Turkull, a longtime accountant and internal auditor, has been close to edp auditing since the late '60s. In 1968 he was one of the founding members of what is today the EDP Auditors Assn. It was then but a handful of Los Angeles area edp auditors organized on a local basis.

Turkull was elected president of the Los Angeles chapter at the association's national conference last summer in Denver. He set about to increase membership participation in the chapter's activities. Meetings now, he said, are attracting up to 85 attendees, whereas attendance last year was running at 30 to 35.

He has done this, he said, by working with his program chairman to attract top speakers on relevant topics. A recent speaker was Dick Richards of Arthur Anderson, who talked on "EDP Technological Advances and their Impact on the EDP Auditor's Profession."

"There are enough fully qualified edp auditors to go around," said Turkull. "Technology is advancing so rapidly that quite a few of us who came from the ranks of internal auditors are finding our technical knowledge is lacking."

He feels the EDP Auditors Foundation, the publishing and educational arm of the EDP Auditors Assn., is doing a good job of tackling this problem. He himself has taken a number of the foundation's courses in addition to courses on edp given by the Institute of Internal Auditors.

The EDP Auditors Assn. has grown from a small nucleus in Los Angeles to a 4,500 member organization with chapters



GEORGE W. TURKULL—"Technology is advancing so rapidly . . ."

in a number of countries. Turkull believes the profession is growing even faster than the association.

"All kinds of regulatory requirements are forcing all different types of companies to hire edp auditors as such." He feels that while the earliest edp auditors came from auditing ranks, there has been a shift to the point where they are now 60% from edp and 40% from auditing.

A native of Warsaw, Poland, Turkull received a BA degree in accounting from the University of Warsaw. "Fortunately," he said, "accounting is accounting, but none of my other courses have done me any good."

He came to the U.S. 29 years ago, moving first to Michigan, where he worked for six years as an accountant for a retail store.

Weather lured him to California 23 years ago. He worked first for Home Savings & Loan as an internal accountant and 18 years ago went to Los Angeles Federal Savings. He was a general accountant for the first three years and then moved into internal audit.

20,000 MOVIES

When D. Richard Baer, 34, was an undergraduate student in business administration at UCLA, he had to complete a production and operations management simulation problem for one of his classes.

Unlikely as it seems, this was the first step toward the most ambitious compilation of information on movies and the motion picture industry every undertaken.

"I had the best score of the 90 students who did the problem," he recalled. He likes to add that the second-best score went to tennis star Arthur Ashe. "I'm a frustrated athlete." His best athletic achievements were in pole vaulting.

Baer had written a FORTRAN program to complete the simulation problem. He didn't immediately become enamored with the things a computer can do. "I sold my FORTRAN manual back to the book store and later regretted it."

He began to envision other applications for computer simulation, particularly some related to his own interests. First it was sports, then horse racing, and later politics. Politics and government were his greatest interests in the mid-'60s, he said. "All my lower division electives were in political science." Now, he says, "I guess I've lost some of my early idealism."

Even before he was graduated from UCLA in June 1967 with a degree in business administration, he had embarked on a number of personal computer-related projects. He wanted to learn more about data processing. He worked for three major Los Angeles area firms as a programmer analyst, the last being Columbia Pictures.

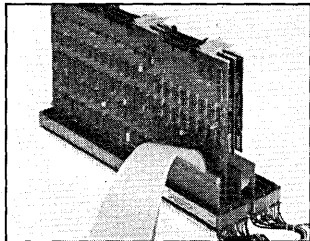
A longtime movie enthusiast, he became perplexed in the late '60s at the lack of comprehensive information about the older movies which appeared on television and began compiling a computerized list of movies for his personal use. By 1972, he

A Cut Above the Other

Able comes up with a 16-line DV11 replacement that puts the PDP-11 user back in control.

You don't have to be stuck again with fixed sync/async line controller configurations in your PDP-11. Our DV/16 puts you back in control with a unique microprocessor-derived flexibility that lets you mix sync and async lines in any combination of four or eight while maintaining modem control and compatibility with established DV11-related software. You get 16 channels on only four boards compared to a filled up nine-slot mounting module required by the DEC equivalent. Expansion to 32 lines takes up only 7 standard SPC slots in your PDP-11 compared to the addition of two full 9-slot backplanes for the DV11's.

We use word transfer instead of byte DMA to either gain a two to one speed advantage (76,800 characters per second) or let you operate in one half the bandwidth required by DV11 data transfers. Power requirements are more than fifty percent lower, too. The DV/16 is a cut above the other all right, but the price doesn't show it. Ours is a very cost effective alternative. We've made the cut. Now it's your deal! Your order will receive our immediate response. Write for details. We'll show you why our customers



call us the leader among manufacturers of DEC enhancements. Able Computer. 1751 Langley Avenue. Irvine, California 92714 (714) 979-7030. TWX 910-595-1729.

Able, the computer experts.

DEC and PDP are registered trademarks of Digital Equipment Corporation.

CIRCLE 162 ON READER CARD



PEOPLE

become convinced that publication of his list was commercially feasible. He founded Hollywood Film Archive and published its first book, *The Film Buff's Bible* (1915-1972). This was phototypeset with a monospace typeface. Despite aesthetic drawbacks, said Baer, the initial hardcover printing of the book sold out, and the book went into a second print run.

Baer said letters he received from people who had purchased the book convinced him that much additional information was needed and that more sophisticated typesetting was necessary. He set about designing a new system that would include provision for virtually every conceivable kind of film reference information.

It took three years just to get the system tested and operational, he said. "In addition to needing the capacity to handle 20,000 or more films kept in alphabetical order, it was essential to be able to add, delete, or change information for any existing film as well as new films, and the system had to be capable of producing a cross-reference of actors and major production personnel.

Baer said the final program had to have the capability of excluding any specified type of information from being printed. The idea, he explained, was to be able to produce editions with different degrees of completeness, at different selling prices.

"We figured that an extremely complete book with casts, production credits and plots for thousands of films might seem a real bargain to libraries and film buffs, but a lot of casual moviegoers don't want to spend the better part of a day's pay for any movie book, so we'll eventually publish a less expensive edition with less information in it."

As a first step toward publication of a complete motion picture reference to be published, hopefully, some time next year, Baer has published *The Film Buff's Checklist of Motion Pictures (1912-1979)*, an alphabetized list of some 19,000 film titles from the early silent days through the end of 1979. The majority of the films are U.S. and British theatrical features, but the book also lists many foreign films, documentaries and tv movies. Information includes leading actors, year of release, running time, studio, color or black and white, country of origin, and alternate titles.

Baer said the publication of the *Checklist* marked the first time any film reference book has contained a list of seemingly or actually defunct film companies and what happened to the film properties they owned.

"If a movie of the 1920s was released by Fox Film Co., most people familiar with the movie industry know that it's probably still owned by Twentieth Century-

Fox. And almost as many people know that Famous Players-Lasky Corp. became Paramount. But what about Monogram, a company which produced hundreds of 'B' pictures in the 1930s and 1940s? And what happened to Republic Studios?"

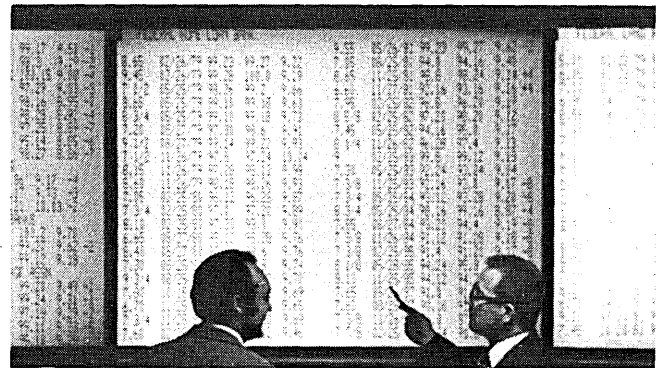
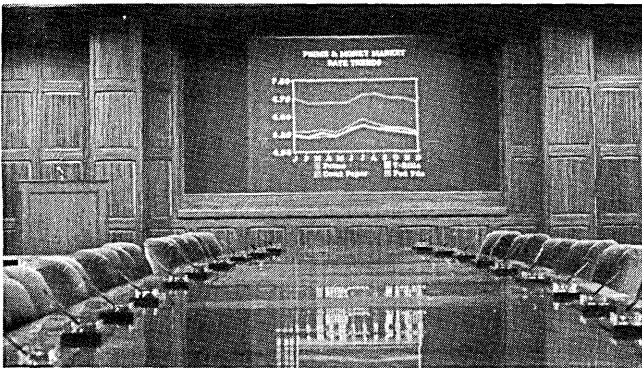
Baer is not alone in his efforts. First to join him, in 1973, was Mark A. French, then a premed student at the University of California at Irvine. French is now a senior editor with Hollywood Film Archive, viewing films and summarizing plots. Following French came Jack D. Bowman, who is in charge of computer processing.

Baer explained that his original system was card based. Then he went to OCR scanning. As his research became more complex, he said, it became obvious the system had to be completely rewritten. So he advertised for a programmer anayst via a UCLA bulletin board and got Bowman.

Last to join was the film's research editor, Bill Warren, who had done motion picture research for other publications.

Baer's data base is on an IBM 360 on the UCLA campus. He has a small word processing unit in his cluttered bedroom/office in Hollywood, which he uses experimentally.

The *Checklist* sells for \$19.95 plus \$1.75 for shipping from Hollywood Film Archive, 8344 Melrose Ave., Hollywood, CA 90069. *

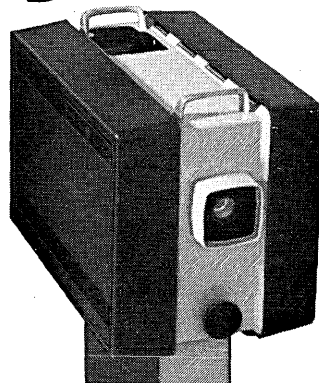


General Electric Professional Large Screen TV Projection

It earns your interest

Whether you're trading government securities or presenting financial reports, General Electric Professional Large Screen Television Projectors provide a good return on your investment: big, bright, clear television pictures—available in either monochrome or full color—up to 25 feet wide, in either front or rear screen projection.

At Mellon Bank, N.A., Pittsburgh (above left), easily produced video presentations provide visibility to the entire board. At Merrill Lynch, New York, (above right), real time securities data is projected far faster than wall board displays. In virtually any application, General Electric Professional



CIRCLE 163 ON READER CARD

Large Screen Television Projectors bring new dimensions of effectiveness and efficiency to modern commercial and business information display.

Get the video system that earns your interest—General Electric Professional Large Screen Television Projectors. Call J.P. Gundersen at (315) 456-2562 today. Or write General Electric Company (VDEO), Electronics Park 6-206, Syracuse, N.Y. 13221.

GENERAL  ELECTRIC

Our new display terminal has a great supporting cast.



The AJ 510 display terminal with AJ 460 Micro Diskette System, AJ 832/RO receive-only printer, and AJ 1234 acoustic data coupler/modem.

The AJ 510, the most versatile CRT terminal in its class, excels at interactive timesharing and a lot of other jobs. And with the addition of these supporting AJ products, you can greatly expand your application flexibility.

Start with the AJ 510

As a stand-alone device, the AJ 510 is ideal for jobs such as data entry, text editing, order entry, and graphics. It includes such features as ASCII, Graphics, and optional APL character sets; a bright 15-inch screen; 16 video enhancements; editing capability; a format mode with protected fields; and communications rates up to 9600 bps.

Now add data storage

For convenient, low-cost data storage and retrieval, the AJ 460 Micro Diskette System offers you local data manipulation and high-speed on-line communications. Combined with the AJ 510, the AJ 460 helps you reduce telephone charges and computer connect time, while further increasing application flexibility.

And top quality printing

Connect an AJ 832/RO receive-only printer and you get letter-quality hard copy output. Features include selectable data rates up to 45 cps, dual pitch selection,

vertical forms control, and more—even interchangeable “daisy” wheel printing elements so you can customize the type face to the application. Now you have a system that’s ideal for form letters, contracts, and camera-ready art of all kinds.

And communications

Finally, from the wide range of AJ couplers and modems, select the one that best fits your application. The AJ 1234 coupler/modem, for example, lets you take advantage of full duplex 1200 bps communications over dial-up or two-wire leased lines.

The final act

We not only build all this equipment, we also lease, sell, and service it. We’ll take care of it throughout its lifetime. Which makes life easier for you.

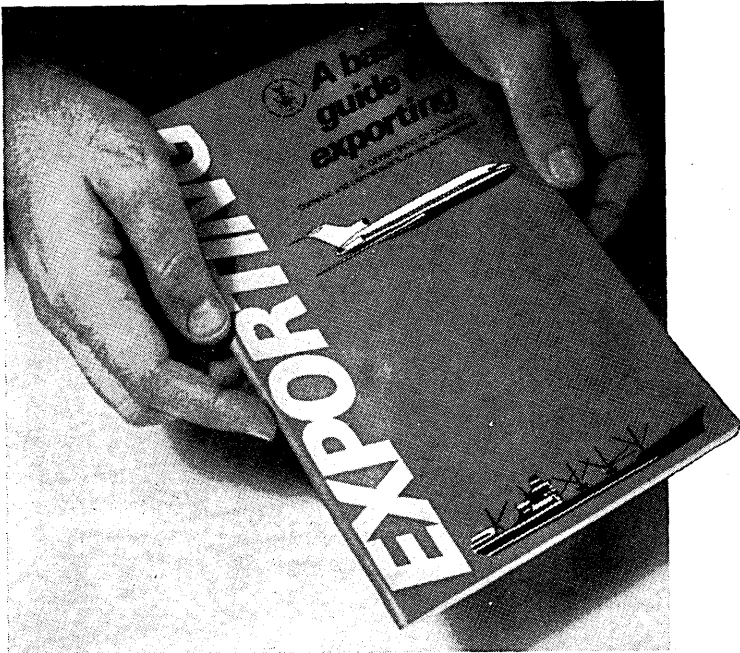
So whether you need a stand-alone terminal or one with a strong supporting cast, AJ has the answer. Get in touch with the AJ regional office nearest you: San Jose (408) 946-2900; Chicago (312) 671-7155; Hackensack (201) 488-2525. Or write Anderson Jacobson, Inc., 521 Charcot Avenue, San Jose, California 95131.

Also available through AJ subsidiaries in Ottawa, Ontario; Paris, France; Shepperton, Middlesex, U.K.; and distributors throughout Europe.

 **ANDERSON
JACOBSON**

CIRCLE 164 ON READER CARD

The book that turns businessmen into best sellers.



Many who've read it are now reaping the rewards. Because they've found that U.S. exports are a more than \$100 billion a year business, that exporting creates both company profits and company growth, that U.S. goods have never been more competitive in international markets. Above all, they've found that, with the help available from the U.S. Commerce Department, selling overseas is no more difficult than selling at home. And this fact-filled book can prove the same to you. Write The Secretary of Commerce, U.S. Dept. of Commerce, BED 8B, Washington, D.C. 20230.

U.S. Department of Commerce

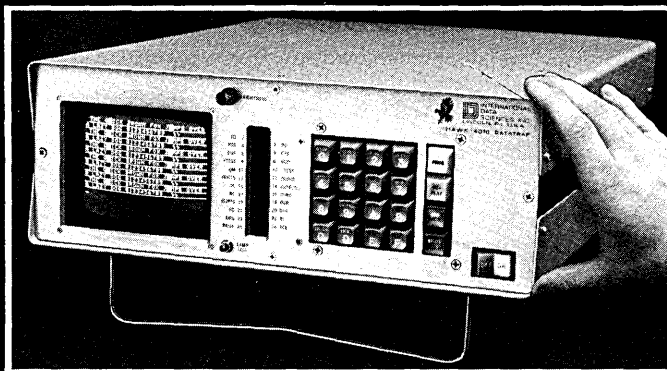
A Public Service of This Magazine
& The Advertising Council



The Hawk's little brother weighs in at 21 lbs.

Does everything Hawk Data Trap does ... in a smaller package. Ideal for field service.

The IDS Hawk 4010. A new, light-weight, advanced microprocessor based data trap that you can take with you. It's easy to understand. Easy to use. Highly reliable. It handles a large variety of codes and a wide choice of protocols. The Hawk 4010 lets you monitor, transmit and receive data between a modem and a terminal on a 5 inch, 512 character screen. There's a built-in tape interface. LEDs and test jacks monitor and access all signals in the EIA interface. A printer output is standard. The Hawk 4010: built to do the job right - the first time.



**THE HAWK 4010
MAKES SOLVING
DATA COMMUNICATIONS
PROBLEMS EASY.**

- Captures and stores up to 4096 characters for later analysis.
- Searches for and traps on independent TD and RD data streams up to 126 characters long, including "don't cares."
- Operates with Bisync, SDLC, HDLC, ADCCP, X.25, and other synchronous and asynchronous protocols.
- Asynchronous and synchronous data rates from 50 to 19,200 bps.
- ASCII, EBCDIC, Hex, Octal, Baudot, EBCD, IBM Selectric, PARS/IPARS and Transcode formats are standard.
- Automatic CRC generation and checking

**INTERNATIONAL
DATA
SCIENCES, INC.**

7 Wellington Rd., Lincoln, RI 02865 Tel: 401-333-6200 TWX: 710-384-1911
Export: EMEC, Box 1285, Hallandale, Florida 33009

CIRCLE 165 ON READER CARD

Model 204 DBMS

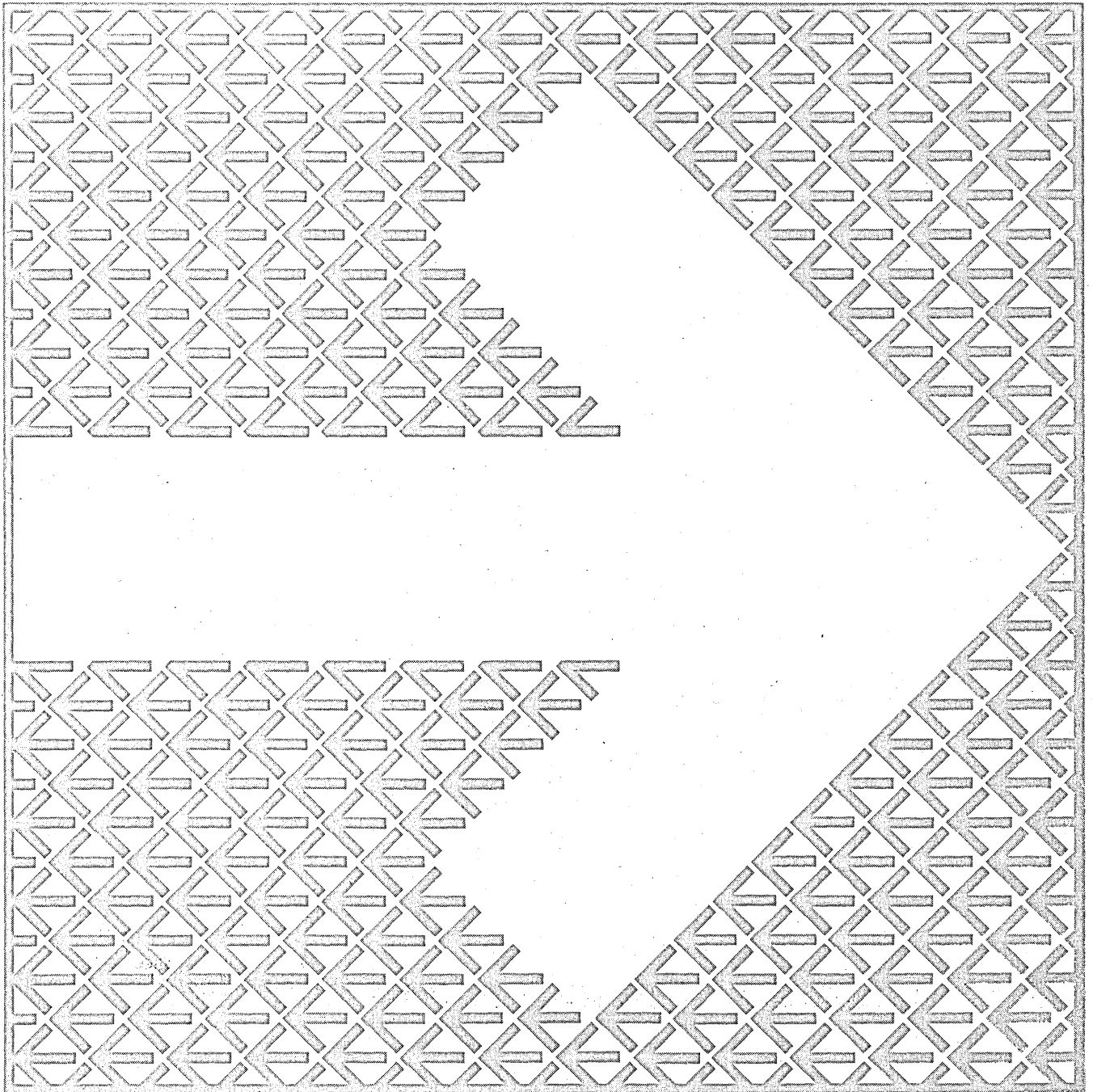
What happens when you need to change your existing database to meet new information requirements—new data, new reports, new structures?

With CCAs interactive Model 204 database management system,

it's easy.

Our unequalled data independence makes any modification quick and simple. And our high-level user language holds your development time to a minimum.

For a complete system description, with case histories, clip your business card to this ad and send to Computer Corporation of America, 575 Technology Square, Cambridge, MA 02139. 617-491-3670.



BECAUSE MANAGING DATA MEANS MANAGING CHANGE

Computer Corporation of America

CIRCLE 285 ON READER CARD

HARDWARE

OFF-LINE

The market for portable terminals has increased by more than a factor of 10 in the past decade, and can be expected to increase at a similar rate over the next decade, according to International Resource Development, Inc., the Norwalk, Conn., market research firm. In a 168-page report, the firm projects 1980 shipments in excess of \$200 million and 1990 shipments worth more than \$3 billion. Greater microprocessor-based intelligence, higher production volumes (with incumbent price erosion), and new distribution channels will result in the market changing towards the consumer.

If portable terminals, including the handheld and radio units covered in IRD's aforementioned report, do indeed become major consumer products, then it's time to begin speculation on possible societal impacts of a wired society.

Computer/Communications Networks of the Future, a report from Strategic Business Services, of San Jose, Calif., takes a look at the merging of computers and communications over the next 20 years. The report covers not only data communications, but message, voice, audio and video land mobile, and tv broadcast communications. The report discusses (including economic details) the formation of a nationwide network comprising numerous community networks. The government's role also receives attention, with the report pointing out that the feds (for better or worse) "will continue to be a predominant factor in either network development.

Editor's note: Several of the products in this section will be on hand at the NCC. Unfortunately, the information reached us after our deadline for the product preview (see pp. 131-138). Chances are that if you recognize any of these vendors as NCC exhibitors, you'll be able to see the described products on the show floor.

COLOR COMPUTER

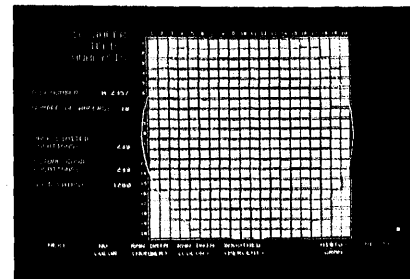
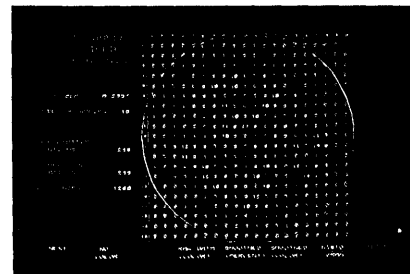
From this vendor's Fort Collins, Colo., Desktop Computer Div. comes the Series 9800 System 45, the new top of the line in the vendor's desktop family. Third in the System 45 line (inaugurated in the fall of 1977), the 45C features color graphics and a light pen to increase the efficiency of the user/machine interface. In its standard configuration, the BASIC-speaking computer provides 187KB of user RAM, 152KB of ROM containing system software, color crt and associated color graphics firmware, light pen, two 217KB cartridge tape drives, and an 80-column, 480-lpm thermal printer that can reproduce grey-tone graphics.

Just as the addition of graphics can increase comprehension over tables of numbers, the addition of color can help a user more readily visualize solutions. Imagine this first image (of chip yields in a semiconductor fabrication plant) on a monochrome display; chances are that the color speeds you on the way to identifying high and low yield areas. This second display, created by reprocessing the data in the original display, even more vividly shows yields at a glance.

The 45C's color display and graphics firmware provide the programmer with 4,913 displayable colors (that's 17 cubed; there are 17 steps between the three primary colors). The programmer can choose colors using either a cube or cylinder color model; both require specifying three values. The cube model maps directly onto the hardware, requiring the user to specify values for each of the three color guns. The cylinder model maps hue onto height, saturation onto radius, and luminosity onto angle; these variables are independent, and can be linearly interpolated. The light pen can be used for menu selection and real-time tracking (actual drawing on the screen). Firmware allows the system to color-fill a region drawn by the user with the light pen; language extensions include RECTANGLE and POLYGON statements.

To attain the display quality desired,

the vendor uses a derivative of a standard television picture tube. The derivation is incompatible with standard color tvs (unfortunate for those wanting to use a video projector), and has smaller dot spacing (about four times denser than broadcast television's), and 60Hz refresh (to avoid flicker). If you've noticed the tendency for



movie credits on your home tv to show a bit of a rainbow fringe around the characters at the corners of the screen, you'll appreciate the 45C's convergence electronics and magnetic shielding. The machine will prompt the user through convergence adjustments (setting the guns so all three converge on the same point) on 13 screen points, including the center and four corners. Once the convergence is set, magnetic shielding is said to make recalibration an infrequent job.

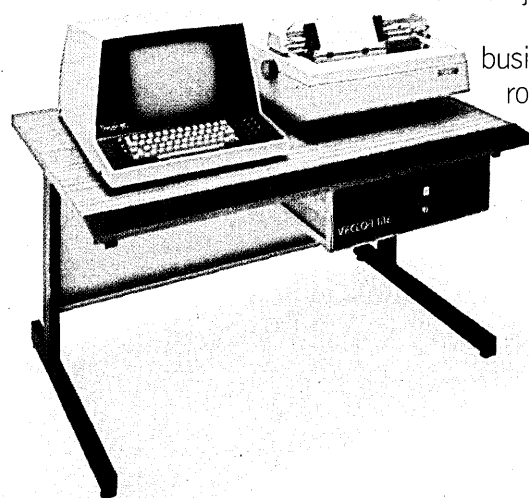
The 45C is upward-compatible from the monochrome 45B (still offered). The 45C uses the IEEE-488 standard bus for attaching to peripherals and instrumentation. Additional system software ROMs support mass storage, data communications, and assembly language programming. User memory can grow to 449KB. The standard 187KB 45C configuration sells for \$39,500. A stripped version, with 56KB of user memory, one tape, no light pen, and no integral printer, sells for \$31,500. HEWLETT-PACKARD CO., Palo Alto, Calif.

FOR DATA CIRCLE 344 ON READER CARD

Economy Sized Computers™ don't need their own offices.

The way we figure it, our computers don't take up much space, so why should our ads?

With Economy Sized Computers, you get data and word processing capabilities you only expect from much larger computers. All for the price of a new copying machine—just \$10,463 suggested retail price.



There's no longer any reason for a small business computer to be kept in a computer room. All by itself. Now you can keep it on a desk top.

Visit your nearest computer dealer and ask to see the Economy Sized Computers from Vector.

Especially if you don't think your computer's office should be larger than yours.

VECTOR
VECTOR GRAPHIC INC.

Economy Sized Computers

31364 Via Colinas, Westlake Village, CA 91361, 213/991-2302

CIRCLE 167 ON READER CARD

HARDWARE

COMMUNICATIONS CONTROLLER

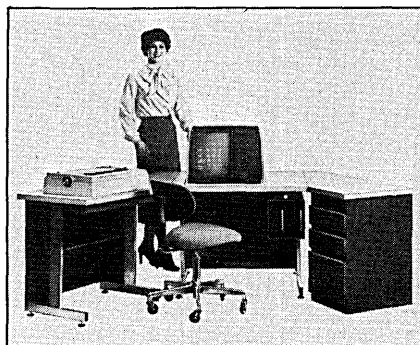
An intelligent communications controller, DIOS (DMA I/O Subsystem) provides direct memory access between the main memory in the vendor's line of 32 bit processors and its hardware communications adaptors. DIOS allows data transfers without processor intervention, and it is said to enhance the vendor's recently announced Reliance data management and transaction processing package. The communications controller is offered in two versions. The first, an asynchronous protocol version supporting Reliance applications, sells for \$6,000. The second version, priced at \$7,500, handles asynchronous, character synchronous, and bit-oriented protocols, such as SDLC, HDLC, and ADCCP. Bisync is supported by DIOS, making the hardware transparent to the vendor's 2780/3780, RJE emulation, and HASP software packages. Data rates can run to 56Kbps per line, with a peak throughput rate of 100Kbps. PERKIN-ELMER, Computer Systems Div., Oceanport, N.J.

FOR DATA CIRCLE 347 ON READER CARD

WORD PROCESSING

Designed for the needs of customers in businesses of all sizes, the 1800 standalone word processor features a full page display, dual diskettes, and a daisywheel printer. The microprocessor-based 1800 is said to have extensive software support in the form of the vendor's Information Management System. The software system comprises four major modules: the Document Formatting Package, the Records Processing Package, the Document Assembly Package, and the Mathematics Package. Formatting capabilities include repagination, page numbering, and justification. The Records Processing Package allows the user to maintain a data base, and retrieve records through a new "selection by criteria" process. The Document Assembly Package lets the operator build new documents using previously stored paragraphs or documents. The Math Package handles extension calculations and basic arithmetic. The 1800 supports communications with other 1800s, mainframes, and the Telex system. The 1800 sells for \$13,700. VYDEC INC., Florham Park, N.J.

FOR DATA CIRCLE 345 ON READER CARD



DESKTOP COMPUTER

The desktop computer line IBM inaugurated in 1974 with the 5100 has entered its third iteration with the introduction of the 5120 computing system. The 5120 system uses a new 5110 processor, the model 3, with two integrated diskette drives, each capable of packing 1.2MB of data on an 8 inch floppy. The new processor features a larger, 9 inch crt display, and the same choice of language processors in firmware as earlier units: BASIC, APL, or both. Existing 5103 models 11 and 12 bidirectional matrix printers (80 cps and 120 cps) are supported, as is the 5114 diskette unit. Six licensed programs and an Atlanta-based Installation Support Center (for telephone access to support) were announced in conjunction with the 5120.

The new system is compatible with earlier versions; 5120 options include a ROM-based diskette sort accessible from either supported programming language, a serial I/O adaptor, and bisync and asynchronous communications adaptors. The licensed programs include general ledger, accounts payable, payroll, billing, inventory reporting, and accounts receivable. Pricing for the 5120 ranges from \$9,340 to

\$23,990, with a typical configuration of a 32KB BASIC-speaking processor and 120 cps printer, priced under \$13,500. Off-the-shelf availability is planned for customers shopping at any of the company's 50 Business Computer Centers. INTERNATIONAL BUSINESS MACHINES CORP., General Systems Div., Atlanta, Ga.

FOR DATA CIRCLE 348 ON READER CARD

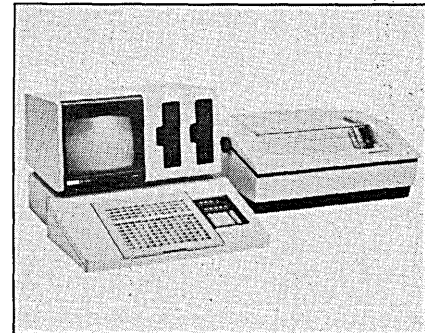


HARDWARE SPOTLIGHT

SMALL COMPUTER

The BC-5000, already in use in Japan where it was developed, bears careful consideration for applications in small businesses and distributed processing networks where relatively untrained users need a machine that's easy to use. Once it's been programmed (still a job for a professional), the BC-5000 can be operated by just about anyone who can read. It features a unique, program-definable keyboard that allows a single keystroke to generate a character, word, line, or page of information. This keyboard consists of 48 function keys with status lights and 96 item keys. An exchangeable cartridge (with machine-readable identification) contains 24 pages of legends on plastic sheets resembling pull-down window shades. Under program control, the keys are defined, and the proper sheet of legends pops into position (the physical movement of legend pages takes less than a second). A fixed numeric pad, with several other fixed function keys including "yes" and "no" keys, is provided to enter numeric data.

We saw an order entry demo where the user could touch one item key identifying the customer and the machine filled in the customer info. The item keys were then redefined so the salesman could be entered, again with one keystroke. Then another page popped into place with inventory items. Again, one keystroke displayed the item name and price, the user went to the numeric pad to enter quantity, and the ma-



chine handled the extension. Yes/no keys were used to indicate if the order form was complete. Throughout the demo, the programmer anticipated and trapped erroneous entries; the operator couldn't credit a San Francisco salesman with a sale to a customer in Hoboken.

The BC-5000 is a desktop unit with dual integral, double-density, double-sided floppies. Additional diskette drives and a printer can be added. The computer has two RS232 interfaces, allowing asynchronous or synchronous communications at speeds ranging from 110bps to 9600bps. Software includes an operating system, assembler, and a compiler called MUST. The vendor currently is in the process of setting up a network of distributors; the BC-5000, with 120cps dot matrix printer, has a targeted end-user price in the neighborhood of \$15,000. PANASONIC, Secaucus, N.J.

FOR DATA CIRCLE 322 ON READER CARD

Business graphics sell your story better

You can create exciting, effective business graphics on-the-spot with your computer or computer service and the new EXECUPORT® 4000G portable terminal.

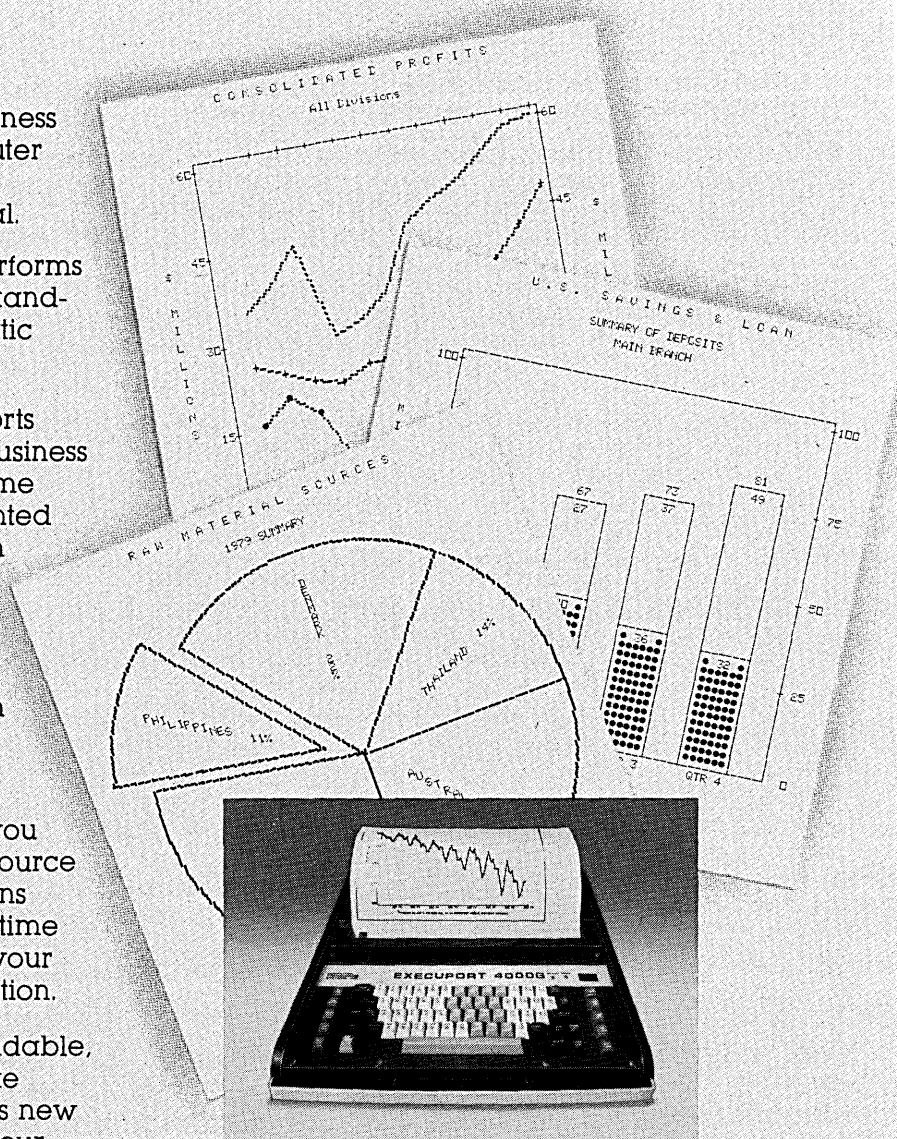
The 17 lb. EXECUPORT® 4000G performs like a heavyweight. It functions as a standard terminal, and it can draw dramatic pictures with precision and speed.

For the first time, wide format reports (up to 136 characters per line) and business graphics can be produced on the same portable terminal. Output can be printed either on paper or on transparent film for projection. The charts shown here were produced from The Service Bureau Company's PICTURE-PAC via telephone in less than three minutes each. You can tailor your own in-house software to create similar graphs.

With the EXECUPORT® 4000G all you need are a telephone and a power source to:

- Prepare customized presentations
- Demonstrate your services
- Save time by preparing reports and graphs in your office, at home or at any remote location.

The EXECUPORT® 4000G is dependable, versatile and quiet. Let us demonstrate how business graphics created on this new portable terminal can help you sell your story better.



Execuport 4000G

CTS Computer Transceiver Systems Inc.
Manufacturers of Execuport® Terminals

P.O. Box 15 • East 66 Midland Avenue • Paramus, NJ 07652 • Phone: (201) 261-6800

CIRCLE 168 ON READER CARD

HARDWARE

COMMUNICATIONS PROCESSORS

Intended to link remote processing operations between similar network nodes or upwards to a large host, this vendor's CP Series of communications processors provides a communications path to equipment from other vendors. The series initially consists of two members: the CP 9400 and the CP 9500. The 9500 uses four independent processing elements: one provides operating control, another manages data files, a third compiles and executes user application programs, while the fourth is assigned to data communications. All four processors operate concurrently for maximum throughput.

Both the CP 9400 and CP 9500 can function in networks of this vendor's systems, or with systems from other sources; both support local peripherals and processing. Either can function off the network in a standalone mode. Both run a system software package known as the Transaction Control System (TCS), which ties together the Master Control Program (MCP), Network Definition Language (NDL) for generating communications control programs, Generalized Message Control System (GEMCOS) for message handling, and Message Programming Language (MPL) for communications applications programming. Current users of the Communications Management Systems (CMS) application software and Computer Management Distributed Information Software can move these programs without change from current B 80, B 90, B 800, B 1800, and B 1900 systems.

CP Series systems range in main memory sizes from 96KB to 640KB, support disk storage capacities ranging from 6MB to 520MB, and handle two to 32 communications lines. A typical CP 9400 with 96KB of memory, a 1MB Super Minidisk (floppy media) drive, 18MB of cartridge disk, two data communications lines and an operator's console, sells for \$26,500. The same system leases for \$736 per month on a three-year term. A CP 9500 with 384KB of main memory, 6MB of flexible disk storage, 77MB of fixed disk, four communications lines, and a console sells for \$36,029; this system leases for \$1,092 per month over three years. BURROUGHS CORP., Detroit, Mich.

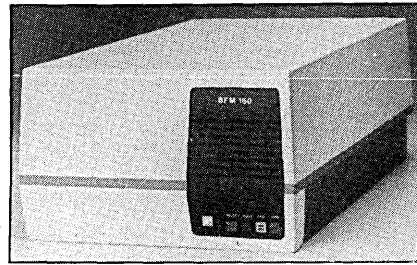
FOR DATA CIRCLE 346 ON READER CARD

WINCHESTER DISKS

This vendor's Centennial series of 14 inch Winchester disk drives come in 90MB and 158MB capacities. The sealed, fixed head/disk assemblies have either three or four disks. Five printed circuit boards contain all electronics, including power supply, LED fault display, and SMD interface (enhanced with a "set sector" tag for rotational position sensing). Bytes-per-sector and sectors-per-track are selected by DIP switches on the interface card. The Centennial BFM 90

(90MB) sells for \$6,000, and the BFM 160 (158MB) is \$7,500; oem discounts are offered. BALL COMPUTER PRODUCTS, Sunnyvale, Calif.

FOR DATA CIRCLE 329 ON READER CARD

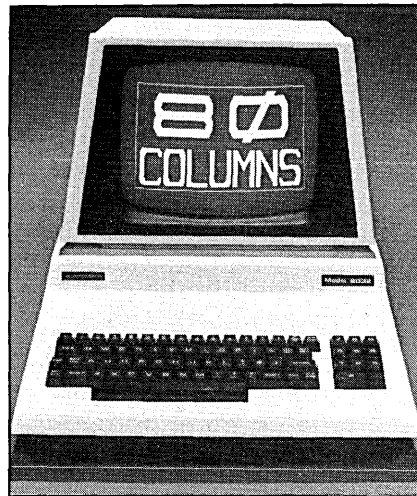


DESKTOP COMPUTER

One of the early and most popular entrants in the personal computer market, this vendor has come out with a refined version of its PET computer with features making it more attractive to the business user. The 8000 series business computer has an 80-column by 25-line display, typewriter-like keyboard (the early PETs received criticism for their small keyboards), and numeric keypad. Like earlier PETs, the 8000 series speak BASIC and use the IEEE-488 general purpose instrument bus. The 8000 series can display 64 ASCII characters and 64 graphics characters. Screen editing is supported by full cursor control, with character insert and delete, overstriking, and reverse video fields; hitting "return" sends the entire line, regardless of cursor position. The 8000 series consists of the 16KB 8016 (\$1,495) and the 32KB 8032 (\$1,795).

Dual 5 1/4 inch floppy and a modem were announced with the 8000 series. The dual floppy CBM 8050 has a capacity of nearly 1MB and sells for \$1,695. The modem, which interfaces to the IEEE-488 bus is compatible with Bell 103 and 113 modems; it operates at 300bps in full- or half-duplex. CCITT compatibility is also available in the \$395 modem. COMMODORE BUSINESS MACHINES, INC., Santa Clara, Calif.

FOR DATA CIRCLE 326 ON READER CARD



MODEM

Need a low-speed (up to 300bps) modem at a low price (\$195)? Then check out this vendor's model 103 LP, a pint-sized Bell 103-compatible modem that provides full-duplex operation over an ordinary two-wire telephone circuit. The originate-only modem is FCC approved for direct connection to the phone network. It has RS232 and current loop interfaces for your terminal equipment. And here's the kicker: it hasn't got an AC power cord, because it gets its juice directly from the phone line. A front-panel rocker-switch allows the phone to be



used for voice communications or data; an indicator LED lights when the unit is in data communications mode. UNIVERSAL DATA SYSTEMS, Huntsville, Ala.

FOR DATA CIRCLE 324 ON READER CARD

TERMINALS AND DISK

A pair of crt terminals and a 20MB Winchester disk are the latest offerings from this vendor. The Emulator crt can emulate the terminal control codes of four popular crts: Lear Siegler's ADM-3A, DEC's VT-52, Hazeltine's 1500 series, and Soroc's IQ-120. It features a 12-inch screen, auxiliary RS232 printer port, and numeric keypad. The Emulator displays 24 lines of 80 characters, and communicates at data rates ranging from 50bps to 9600bps. It is priced at \$895.

The Superbrain QD is an enhanced version of the vendor's Superbrain smart terminal. Like the Superbrain, the QD has dual Z80 microprocessors, a 12 inch screen, ASCII keyboard with numeric pad, and the same packaging. It goes beyond, in having dual-density, dual-sided mini floppy drives (good for 715KB of formatted data, as opposed to the Superbrain's 320KB) and 64KB of RAM (opposed to 32KB). The popular CP/M disk operating system is provided to support the \$3,995 terminal.

The Compustar 20 is a 20MB Winchester disk for use with the Superbrain family. It mounts in a terminal stand, and with an optional multiplexor, can be shared by up to 32 independent users. The basic Compustar sells for \$5,000, and the multiplexor adaptor is \$1,500. INTERTEC DATA SYSTEMS CORP., Columbia, S.C.

FOR DATA CIRCLE 321 ON READER CARD

TALK TO YOUR COMPUTER FROM ANYWHERE—BY PHONE!



Nixdorf's amazing, new, portable terminal is designed for the person who needs quick, accurate communications with a computer from a variety of locations.



Ingenious microtechnology has packed all the features of a standard terminal into a battery/AC-operated unit the size of a book. With full computer telecommunications capability, it weighs just three pounds. And it's so inexpensive, you can buy one for every member of your team for far less than it would cost to lease!

The compact unit communicates via its acoustic coupler over standard telephone lines with any computer system, using standard RS 232 telecommunications (used on most mainframes). No special programming is needed.

To operate, just dial your computer or computer operator. Place your telephone handset into the acoustic coupler and you're ready to go! Just key in a line (up to 80 char-

acters), review on the 16-character display via scroll keys, then transmit. The speed of computer response is easily set for your own viewing pace.

EXECUTIVES: From home, road, or out-of-town, you can still have access to the vital information you require. Check operational data, sales figures, even pick up electronic mail. With automatic telephone pickup, you can call when it's convenient for you, regardless of time zones.



FINANCE: Dial from a client's or prospect's office to access complex programs on the spot. Enter client's data, and get results immediately. All the portability of a pocket calculator with the total capability of your home-base computer.

FIELD SERVICE: On the road, use any phone—even a pay station—to log hours, parts, with complete accuracy; then receive messages and schedule changes. Easy-to-read display eliminates handwritten or verbal errors.



SALES: Now you can check inventories from your customer's office. No need to guess on supply availability. Plus, you can place your orders directly with your central computer to speed shipment.

PROGRAMMING: You can scan or modify software from any telephone. Full-feature keyboard allows you to debug or even write short routines for fast response to urgent needs. At three pounds, you won't mind carrying it everywhere!

Rechargeable batteries give up to four hours life; charger/adaptor included. Baud rate and parity set from keyboard. 16-character LED display scrolls to show full 80-character buffer.

I would like to order the following:

Quantity	Model	Price	Total Price
_____	Nixdorf #LK3000 keyboard	\$139.95	_____
_____	Nixdorf computer module #LK2010	\$195.00	_____
_____	Nixdorf telephone coupler #LKCouplr	\$175.00	_____
_____	INS., SHIPPING And Handling Charge	\$3.50	_____
TOTAL	(Mass. Residents add 5% Sales tax.)	_____	_____

Payment: Visa MC Check Corporate P.O. No.: _____
 Card Number: _____ Expiration Date: _____
 Signature: _____

Name _____
 Company Name _____
 Address _____
 City _____ State _____ Zip Code _____

Phone No. () _____
 Send all orders to our address or call
 1-800-225-8493
 1-800-225-8390 In Mass. 1-617-891-6495

Write to: **MARKLINE**
 P.O. Box 171
 Department ABCD
 Belmont, MA 02178

HARDWARE

VOICE INPUT

Designed specifically for use with Lear Siegler's ADM-3A crt terminal, the Vocon 5000 is a limited vocabulary, isolated utterance voice recognition device. It consists of a noise-canceling microphone and a user-installable printed circuit board that is plug-compatible with the ADM-3A and fits within the terminal's cabinet. The unit allows voice control of any application being run on a computer with input from the ADM-3A. The microprocessor-based Vocon 5000 can recognize up to 64 speaker-trained isolated words or phrases; additional vocabulary can be stored at the computer and down-line loaded under the user's control. The Vocon must be trained before use. During training mode, the vocabulary specific to the given application is displayed on the crt screen, along with instructions to the user. The Vocon 5000 sells for \$2,000 (ADM-3A's go for less than \$900 in singles). HEURISTICS, INC., Sunnyvale, Calif.

FOR DATA CIRCLE 331 ON READER CARD

MULTIPLEXOR

The Sprint multiplexor accepts four asynchronous data streams and multiplexes them onto a synchronous composite channel operating at up to 19.2Kbps. The four asynchronous channels all operate at one quarter the composite channel speed.

Terminal idle time is used to sync the composite channel. RS232 interfacing is used all around, and the Sprint accommodates virtually any character size on the asynchronous input channels because multiplexing is performed on a bit-by-bit basis, as opposed to character-by-character. The Sprint sells for \$975. COMPRE COMM, INC., Champaign, IL.

FOR DATA CIRCLE 327 ON READER CARD

DEMULPLEXOR

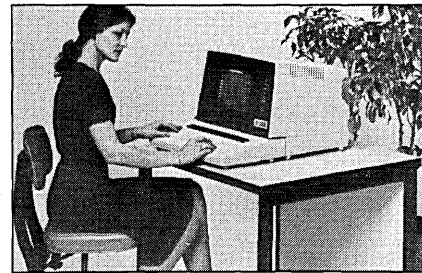
Instead of requiring the user to spring for a 19.2Kbps line, this vendor's Lineplexer splits high-speed traffic into two streams which are then sent over two voice-grade phone lines. A Lineplexer Transmission System (LTS) consists of a Lineplexer II unit, M9600 modems, cables, and enclosures. An LTS is required at each end of the circuit, and provides operation at data rates of 19.2Kbps, 14.4Kbps, 9600bps, and 4800bps. Line degradation causes the system to automatically fall back to a slower data rate; if one line fails, the system can drop back to single line operation. Where high reliability is required at data rates of 9600bps or less, the system can send identical data streams over two independent channels, providing redundant communications. The system is priced at \$15,500, quantity one. TIMEPLEX, INC., Rochelle Park, N.J.

FOR DATA CIRCLE 323 ON READER CARD

TERMINAL

The Micro 4400—offered to both oems and end users—emulates Burroughs TD 700/800 series terminals. For the oem, the terminal offers the capability to support special application-dependent protocols and variations of existing protocols. An extension to the vendor's DM-series of smart terminals, the Micro 4400 comes with 16KB of RAM, expandable to 32KB. This memory allows the user to scroll through up to 120 lines of text. The 4400 supports both serial and parallel printer interfaces; the printer address can be shared or independent of the terminal group address in a polled environment. Features include background printing, line drawing capabilities, programmable function keys, and a numeric keypad. The Micro 4400 has a list price of \$3,295. BEEHIVE INTERNATIONAL, Salt Lake City, Utah.

FOR DATA CIRCLE 325 ON READER CARD



TERMINALS

FROM TRANSNET

PURCHASE FULL OWNERSHIP AND LEASE PLANS

DESCRIPTION	PURCHASE PRICE	PER MONTH		
		12 MOS.	24 MOS.	36 MOS.
LA36 DECwriter II	\$1,695	\$162	\$ 90	\$ 61
LA34 DECwriter IV	1,295	124	69	47
LA120 DECwriter III KSR ...	2,495	239	140	90
LA180 DECprinter I	2,095	200	117	75
VT100 CRT DECscope	1,895	182	101	68
VT132 CRT DECscope	2,295	220	122	83
DT80/1 DATAMEDIA CRT	1,895	182	101	68
T1745 Portable Terminal	1,595	153	85	57
T1765 Bubble Memory Terminal	2,795	268	149	101
T1810 RO Printer	1,895	182	101	68
T1820 KSR Printer	2,195	210	117	79
T1825 KSR Printer	1,695	162	90	61
ADM3A CRT Terminal	875	84	47	32
QUME Letter Quality KSR ...	3,195	306	170	115
QUME Letter Quality RO	2,795	268	149	101
HAZELTINE 1410 CRT	875	84	47	32
HAZELTINE 1500 CRT	1,195	115	64	43
HAZELTINE 1552 CRT	1,295	124	69	47
DataProducts 2230 Printer ..	7,900	757	421	284
DATAMATE Mini Floppy	1,750	168	93	63

FULL OWNERSHIP AFTER 12 OR 24 MONTHS • 10% PURCHASE OPTION AFTER 36 MONTHS

ACCESSORIES AND PERIPHERAL EQUIPMENT

ACOUSTIC COUPLERS • MODEMS • THERMAL PAPER RIBBONS • INTERFACE MODULES • FLOPPY DISK UNITS

PROMPT DELIVERY • EFFICIENT SERVICE



TRANSNET CORPORATION

1945 ROUTE 22, UNION, N.J. 07083

201-688-7800

TWX 710-985-5485

CIRCLE 170 ON READER CARD

RENT • LEASE BUY

GENERAL

DATA COMM

MODEMS	PURCHASE	36 MONTH LEASE RATE
212A DataSet	\$ 850	\$ 35
208B/A DataSet	\$3,275	\$110
201C DataSet	\$1,150	\$ 40
202S/T DataSet	\$ 565	\$ 20

DECwriterIII LA120	\$2,295	\$ 80
DECwriterIV LA34	\$1,295	\$ 45
DECwriterII LA36	\$1,895	\$ 65

DEC COMPATIBLE VIDEO DISPLAYS

VT100 Compatible	Datagraphix	CALL	\$ 75
VT52 Compatible	Hazeltine 1552	CALL	\$ 45

COMPUTER EQUIPMENT MAGNETIC MEDIA-ACCESSORIES

"DEC" Compatible Magnetic Media by NASHUA-RP06
RL01-RM03-RK05
ACOUSTIC HOODS-XEROX 1750-TI SILENT 700 PORTABLE

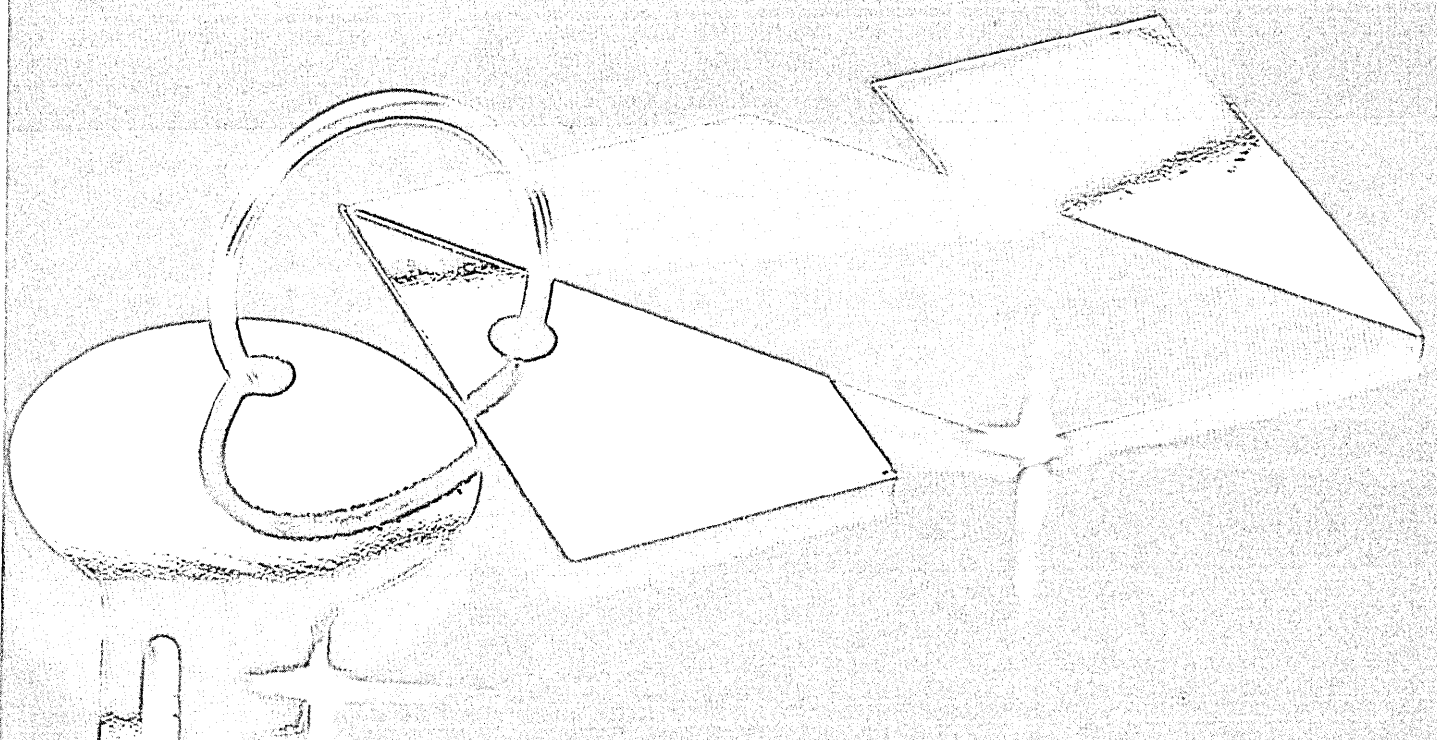
**CALL NOW • TOLL FREE
800-223-1696**

Qytel® 285 Madison Avenue
New York, N.Y. 10017
212-889-3888

CIRCLE 171 ON READER CARD

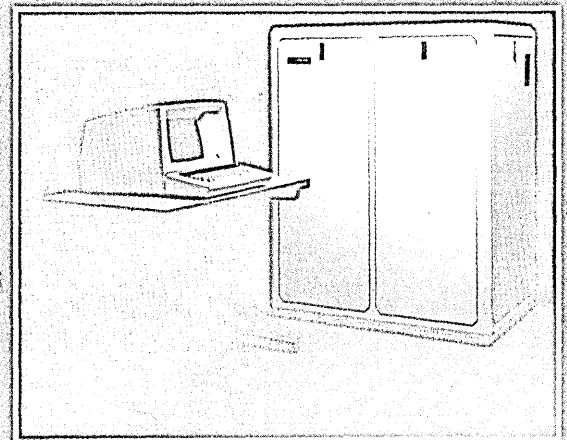
Nanodata QMX 6300

Your Key to Price/Performance in the 80's



- The Nanodata Key
unlocks the door to:
- Cost-effective Computing
 - Superior Performance
 - (EIM) 660/670 Compatibility
 - High Reliability
 - Non-Obsolescence
 - Immediate Availability

See the QMX 6300 computer at
the NCC in Anaheim May 19th
thru 22nd 1980, Booths 8015,
8017, 8019 and 8021.



Nanodata Computer Corporation



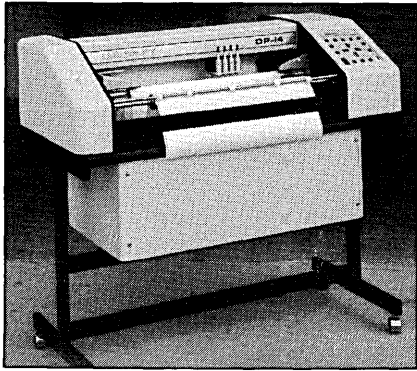
One Computer Park
Buffalo, New York 14203
716-845-6000

CIRCLE 172 ON READER CARD

HARDWARE

PLOTTERS

The CPS 14/15 is this vendor's latest line of plotting systems. The four-pen plotters come in two widths: 22 inches (CPS 14) and 34 inches (CPS 15). The microprocessor-based digital plotters can operate on-line or in a time-sharing environment; they accept serial data at speeds to 9600bps through either an RS232 or 20mA current loop interface. The CPS 14 and CPS 15 each are offered in two versions. Those suffixed 5 include firmware to generate 64 characters, circles, and standard 90° rotations; models with 6 suffixes have additional firmware for generating a 172 character set, rotations at arbitrary angles, and an enhanced vector format. Plotting speeds are switch-selectable at 10ips or 15ips, and a thumb-wheel



selector allows the operator to scale the plot size up to nine times the original. All models have self-test capabilities and buffers of 1,536 bytes. A CPS 14/5 sells for \$9,950, and a CPS 14/6 is \$10,450. The CPS 15/5 is \$12,950, while the CPS 15/6 goes for \$13,450. HOUSTON INSTRUMENT, Austin, Texas.

FOR DATA CIRCLE 333 ON READER CARD

VAX DISK SYSTEM

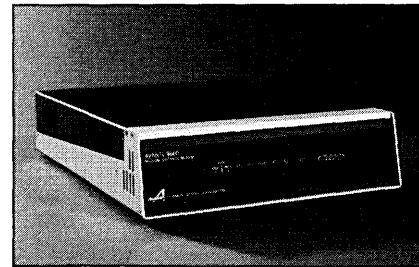
Emulating DEC's RH780 hardware (and compatible with RM03 software at the operating system level), this vendor's large-scale disk system for VAX 11/780 operating system level, this vendor's large-scale disk system for VAX 11/780 computers provides a 50% increase (per spindle) in capacity over DEC's offering. Each spindle accommodates up to 300MB of data. The system comprises a model 9400 controller, up to eight 300MB SMD-type disk drives, a synchronous backplane interconnect (SBI) adaptor, and all connecting cables and hardware. The controller also offers a multiple cpu option, allowing up to four VAX 11/780s, PDP-11/34s, or 11/70s (in any combination) to share a large data base of up to 2,400MB. A single drive system lists at \$36,500, a dual drive system at \$53,600. SYSTEM INDUSTRIES, Sunnyvale, Calif.

FOR DATA CIRCLE 330 ON READER CARD

MODEM

Intended for local and medium distance (up to 100 miles) communications, this vendor's model 9600 provides synchronous 9600bps operation over voice-grade telephone lines. The dual-microprocessor-based modem features CCITT V.29 compatible modulation, fall-back rates of 7200bps and 4800bps, local and remote loopback, a built-in eye pattern generator (for troubleshooting communications with an oscilloscope), and a line quality display. The 9600 is packaged on a single card that can be housed in a desktop cabinet or a rack-mountable card frame. Provision is made for connecting a multiplexor, and a four-channel mux is expected later this year. A desktop 9600 modem sells for \$3,250 in singles, and the board alone is priced at \$2,900. AVANTI COMMUNICATIONS CORP., Newport, R.I.

FOR DATA CIRCLE 332 ON READER CARD



Even Webster's Knows About QUEST

QUEST (kwest). v. 1. To make a search; to go on a quest.

QUEST SYSTEMS, INC. n. 1. Founded in 1968. 2. Among the largest professional recruitment firms in the U.S. functioning solely in the computer sciences; its client companies pay all employment fees, interviewing and relocation expenses. Quest is known for its deep personal commitment to relate to each candidate as an individual with individual goals. 3. Its professional staff averages over 6 years of experience in EDP recruiting (additionally, staff members have direct hands-on experience in programming, systems, hardware, sales, etc.). 4. Quest is presently searching for programmers and analysts (commercial, scientific, systems software) for over 3,500 client companies in the U.S. *Quest has openings in over 700 U.S. towns and cities; salaries to \$38,000.* 5. Methodology - see Questsystem.

QUESTSYSTEM (kwest sis'tem). n.i. Discussing with an individual what he/she would like to be doing in light of what he/she has been doing. 2. Analyzing the realities of his/her objectives as they relate to the current job marketplace. 3. Contacting client companies and other Quest staff personnel to identify positions of possible interest. 4. Introducing the job candidate to prospective employers by providing complete details to each about the other, ensuring the efficacious use of everyone's time. 5. Arranging interviews. 6. If employment offers are extended, Quest assists in evaluating the responsibilities, compensation and opportunities (and relates those to the initially stated objectives). The Questsystem has been working for thousands of professionals at no expense, whatsoever. Ask your friends of their past dealings with Quest. Then, put the Questsystem to work for you. For additional information on this subject, please inquire directly to Quest Systems, Inc. (All inquiries/resumes received will be responded to immediately and in confidence.)



Call Toll Free
(800) 821-7700, Ext. 114
QUEST SYSTEMS INC.

6400 Goldsboro Road
Washington, D.C. 20034 (301) 229-4200

Baltimore: (301) 788-3500 • Philadelphia: (215) 285-8100

CIRCLE 173 ON READER CARD



1979 DATAPRO HONOR ROLL SOFTWARE FROM WESTINGHOUSE DOS, DOS/VSE



WESTI—TP MONITOR

SELECTED FOR THE FIFTH CONSECUTIVE YEAR!

- Complete multi-thread/multi-tasking monitor
- Fully automated access method controller
- Multiple data-base interface
- Designed for user growth
- Most cost effective TP monitor



SCEPTER and SCEPTER-PLUS

**A COMPLETE ON-LINE PROGRAMMING SYSTEM
NAMED IN ITS FIRST YEAR OF AVAILABILITY TO
THE HONOR ROLL**

- Improves programmer productivity 20-40%
- Interfaces with multiple libraries
- Improves implementation time
- Interfaces with multiple spoolers
- Reduces programming costs



DISK UTILITY

SEVEN TIME MEMBER, DATAPRO HONOR ROLL

- Complete back-up/restore/copy facilities
- Library condense/merge facilities
- Complete file support: ie; VSAM, ISAM, SAM, DAM
- Stand-alone SYSRES recovery
- Most widely used disk utility system in the world



DISK SPACE MANAGER

ANOTHER MEMBER, DATAPRO HONOR ROLL

- Reduce disk space planning and scheduling
- Automatic file truncation and secondary allocation
- Eliminates partition dependency
- Eliminates JCL conversions
- Maximizes usage of your existing resources

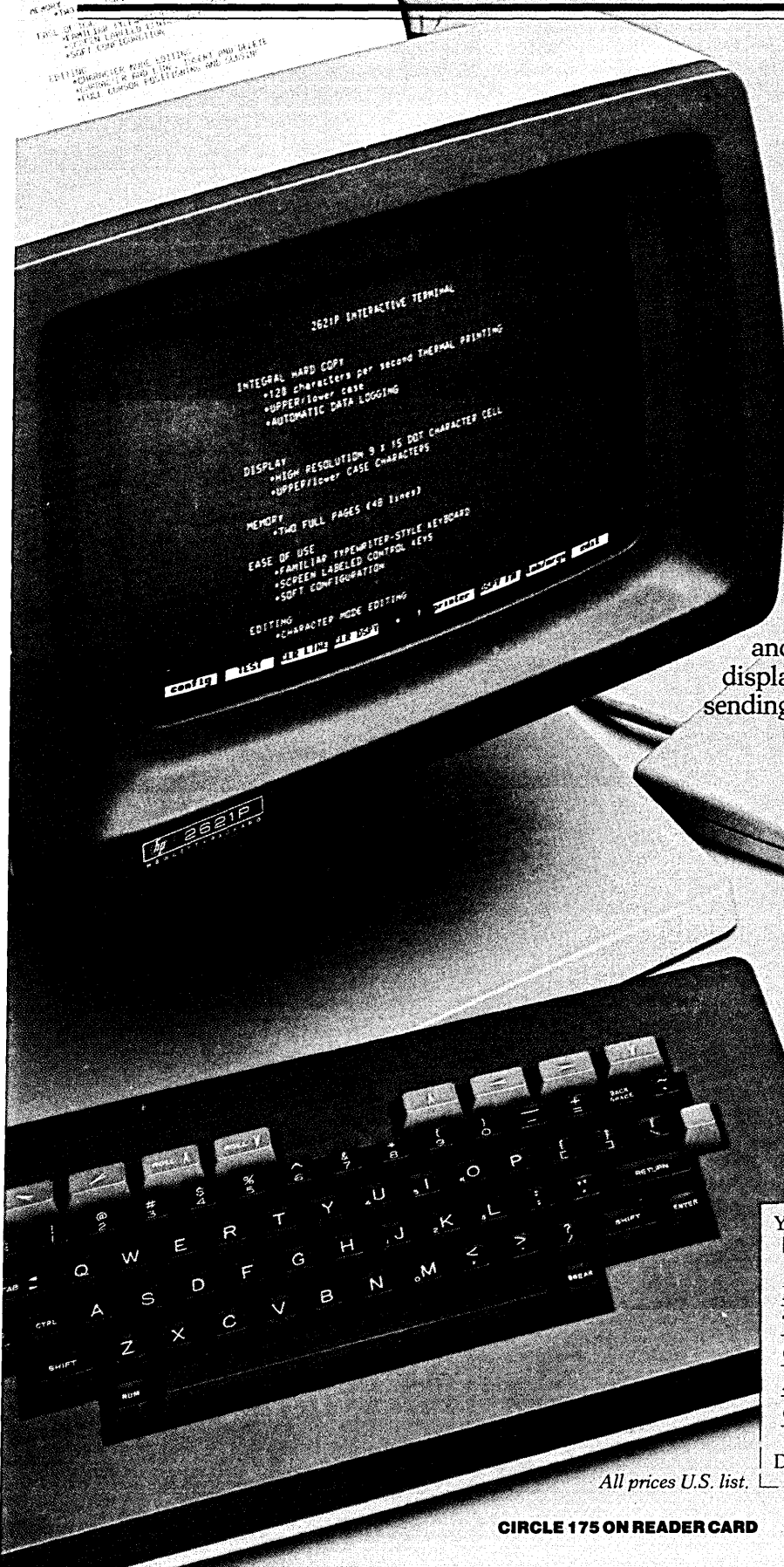


For additional information call or write:

WESTINGHOUSE ELECTRIC CORPORATION
COMPUTER AND INSTRUMENTATION DIV. OPERATING SOFTWARE PRODUCTS
2040 ARDMORE BLVD., PITTSBURGH, PA 15221 (412) 256-5583

CIRCLE 174 ON READER CARD

What you see is what you get.



When you like what you see on the screen, simply press a key and presto! you've got it all on paper.

But the HP 2621P's built-in printer is only one of many reasons for the success of our low-cost terminals. With or without hard copy, they offer a surprising degree of sophistication.

A very smart simple terminal.

We built in eight function keys to control cursor movement and scrolling. (It has two full pages of scrolling memory.) These are labeled on the screen for self-test, soft configuration, printing and editing.

That's right: editing. Even with prices starting at \$1,495 for the basic 2621A (without printer) and \$2,650 for the 2621P, we still included character and line insert and delete, clear line and clear display. And you can edit a line of data before sending it to the computer—without writing any system software.

Recently, we've made a good thing even better with the addition of international character set options and a current loop interface.

(Shown here.)

So contact your nearest HP office listed in the White Pages or attend our "Productivity '80" seminars. You'll soon see how much you can get in a low-cost terminal.



Yes, I'd like to see more of the low-cost HP 2621 terminal.

Contact me to arrange a demonstration. Send literature.

Name _____

Title _____

Phone _____

Company _____

Address _____

City/State/Zip _____

Mail to: Hewlett-Packard, Attn: Ed Hayes
Dept. 468, 19400 Homestead Rd., Cupertino, CA 95014

42001 HPT16

All prices U.S. list.

CIRCLE 175 ON READER CARD

SOFTWARE AND SERVICES

UPDATES

Apple Computer, the Cupertino, Calif., personal computer maker, has given more than \$120,000 worth of hardware and software to researchers developing medical and general education materials using micros. The awards, made under the aegis of the Apple Education Foundation, include six systems -- valued in the neighborhood of \$28,000 -- for medical education and training. An additional 17 grants were made for general education research. The foundation was set up to further organizations and individuals exploring the use of microcomputers in education (one of the corporation's early target markets). The Cupertino-based foundation's board of directors consists of Dr. Gail Fullerton, president of San Jose (Calif.) State Univ.; Dr. Joseph I. Lipson of NSF; James M. Miscoll, senior vp of Bank of America; Dr. Robert N. Noyce of Intel; and Apple executives A. C. Markkula and Dr. Thomas M. Whitney; executive director is G. Gregory Smith. The Foundation has an advisory board of computer scientists and educators from across the nation.

Arbat Systems, Ltd., the international firm that develops minicomputer-based money transfer systems for banking, will install the firm's SWIFT interface package and intellex message switching system for use in several branches of the Hong Kong and Shanghai Banking Corp. Arbat has offices in London, Hong Kong, and New York, and a customer base spread through the U.S., United Kingdom, Europe, and the Far East.

MICROCOMPUTER OS

For 8080, 8085, and Z80-based microcomputers, the I/OS Disk Operating System is said to be a "greatly enhanced" version of the vendor's TSA/OS Disk Operating System. I/OS is said to be compatible with Cromemco's CDOS operating system, as well as the well-known CP/M system (versions 2.0 and earlier). The vendor says I/OS supports a broader range of hardware and handles more files than competing microcomputer operating systems. Users can mix both hard and floppy disks in their configurations; I/OS has a total file capacity of more than 268MB. I/OS supports up to 15 disk units; the file directory is structured for better access, using "system" buffers to speed disk access. I/OS also has a print spooler, allowing printing of a disk file concurrently with other processing. The operating system also has autostart capabilities and a number of utilities, including a symbolic debugger, text editor, disk copy and file transfer programs, diagnostics, and a print-out formatting facility. The package will be marketed through microcomputer dealers for a retail price of \$150 plus a nominal dealer configuration fee. INFOSOFT SYSTEMS, INC., Westport, Conn.

FOR DATA CIRCLE 356 ON READER CARD

COMMUNICATIONS FACILITY

Any teleprocessing monitor can be used with any (unmodified) applications program using this vendor's IDMS data base management system and the newly announced Universal Communications Facility (UCF). The vendor says UCF users can expect better performance, backup recovery, and ease of development when using UCF, while at the same time protecting the installation's investment in a teleprocessing monitor such as CICS, Taskmaster, Intercomm, and Shadow. Programs using UCF are said to execute faster because data base service requests are handled directly by the IDMS Central Version, bypassing interrogation communications with the TP monitor except for terminal I/O. UCF uses COBOL-like verbs for both data base manipulation and terminal operations, simplifying programming. UCF has a license fee of \$40,000, with a 10% annual renewal fee. CULLINANE CORP., Wellesley, Mass.

FOR DATA CIRCLE 355 ON READER CARD

MICROCOMPUTER COMPILERS

This well-known microcomputer software house has developed TRSDOS-compatible COBOL and BASIC compilers for Radio Shack's TRS-80 Model II (not to be confused with Level II) microcomputers. Intended for in-house or commercial software development projects, both compilers come with the vendor's standard macro assembler and linking loader.

COBOL-80 is based on ANSI-74 COBOL, and features interactive screen handling via ACCEPT and DISPLAY verbs. Indexed and relative files are supported, as is an optional packed decimal format said to "significantly" reduce mass storage requirements. Also supported are COMPUTE, INSPECT, STRING, UNSTRING, and SEARCH verbs, three-dimensional arrays, and a full COPY facility. COBOL-80 has a single copy price of \$750.

The BASIC compiler generates optimized object code that executes from three to 10 times faster than interpreted BASIC. WHILE constructs are supported, assembly language subroutines may be CALLED, long variable names and variable length disk records are allowed. User error trapping, PEEK and POKE, and nested IF-THEN-ELSE statements also are supported. THE BASIC compiler sells for \$395. MICROSOFT, Bellevue, Wash.

FOR DATA CIRCLE 349 ON READER CARD

PERFORMANCE MODELING

Best/1, the capacity planning tool originally released for IBM mainframes, now is offered for Univac 1100 EXEC systems. Best/1 for 1100 EXEC systems with batch, demand, and transaction processing, collects input data from SIP/PAR, and, optionally, commercial hardware and software monitors. Based on queueing network theory, Best/1 can model priorities at the cpu, memory queues for timesharing and transaction processing applications, and I/O delays caused by missed RPS reconnects or dual channel switching. The user builds models based on workloads, transaction volume, and I/O channels or devices; the mathematical details of the model are used internally by Best/1 and need not concern the user further. Best/1 is a modeling package for capacity planning, and can be used to predict the effect of altering system parameters.

Here are three money-saving reasons why companies like Exxon, Hughes Aircraft, Standard Oil of Indiana, and Hydro-Quebec are using ASI/INQUIRY to process their IMS data bases.



1. ASI/INQUIRY Is Easy To Learn and Easy To Use.

Because inquiries are stated in simple English, nonprogrammers can learn to use ASI/INQUIRY quickly. DL/1 structures are completely transparent to the user. You need not understand the complexities of multipathing or multiple data base access. Comprehensive diagnostic messages simplify error correction. ASI/INQUIRY automatically displays data in the appropriate format—horizontal, vertical, or overflow. Or you can specify any desired screen format. Repetitively executed queries can be saved in an on-line catalog. New release 5 features include the ability to defer query execution to batch and a powerful user exit facility.

2. ASI/INQUIRY Assures Faster Access and Response Time.

ASI/INQUIRY lets you access your DL/1 data bases through IMS or TSO faster and more efficiently. That's because it eliminates need to write and debug those highly procedural programs usually required to access data bases. ASI/INQUIRY operates as an IMS message processing program executed from any IMS DB/DC-supported terminal. Execution priority is dynamically controlled through automatic program message switching. High initial priority assignment assures fast response. Priority is then automatically adjusted to the rate that to-be-displayed data is encountered, which optimizes *load leveling* of IMS DB/DC resources.

3. ASI/INQUIRY Provides Complete Security.

Built-in safeguards protect data at the system, terminal, and data base levels. Data base administrators define the data bases users can access, their passwords, and the terminals from which individual data bases can be accessed.

Learn why ASI/INQUIRY is more heavily used than any competing product. Call or write—today!

Applications Software, Inc.
21515 Hawthorne Boulevard
Torrance, CA 90503
(213) 540-0111

Member SIA  Software Industry Association

SOFTWARE AND SERVICES

Fifteen reports are available listing throughput, response times, utilizations, and other relevant factors for capacity planning. The 1100 EXEC Best/1 package is priced at \$24,500. BGS SYSTEMS, INC., Lincoln, Mass.

FOR DATA CIRCLE 350 ON READER CARD

LANGUAGE PROCESSOR

The string processing language SNOBOL4 has been implemented in native mode for the VAX 11/780; the translator, dubbed VAX/SPITBOL, is said to exploit the extended addressing and virtual memory capabilities of the VAX. The source language reportedly is strictly compatible with other implementations of MACRO SPITBOL (including those running on CDC 6600 and Cybers, PDP-11s, and other computers). Most SNOBOL4 and SPITBOL programs written for IBM 370s will be accepted without modification. Versions of VAX/SPITBOL are offered for both VMS and UNIX operating systems. A perpetual license goes for \$1,195 (or \$795 for educational and nonprofit organizations). DISC, Oak Park, Ill.

FOR DATA CIRCLE 351 ON READER CARD

DEBUGGER

This vendor's Applebug is a debugging aid for checking out code at the machine language-level on Apple Computer Co.'s Apple II personal computers. The package can operate standalone, or with other offerings from this vendor, such as its six-character label editor/ assembler. Applebug has three operational modes: STEP, TRACE, and RUN. It also has I/O commands to save or load the label table to or from disk or tape. The user can single-step through a program in STEP mode. Each executed instruction and the contents of associated registers will be displayed. User-specified memory locations (either hexadecimal addresses or label names) also can be displayed. Breakpoints can be specified. TRACE mode also displays each instruction and register; subroutine calls and returns are logged, with the TRACE terminating with the final subroutine return (or when the user halts the TRACE). RUN mode simply allows program execution without displaying any instructions or data. Applebug is provided on diskette for \$29.95. MICROPRODUCTS, Redondo Beach, Calif.

FOR DATA CIRCLE 353 ON READER CARD

WORD PROCESSING

Written in Business BASIC for Data General computers (from the micronOVA up through the Eclipse line), THE Word Processing System is a multiple workstation version of this vendor's existing single-user word processing package. Capable of supporting up to four simultaneous users, the package can be used as a standalone system, or in conjunction with other processing activities. English-based commands and standard office terminology simplify the operator inter-

face. An overlay is provided to label the function keys of a Data General 6053 workstation; the overlay also provides a legend of the single-character commands used by the system for such functions as overprinting, centering, and setting tab stops. Function keys allow insertion or deletion of characters or lines, roll up or down, and other functions. The multistation word processing package is priced at \$2,950, with discounts offered to OEMs. TECHNICAL ANALYSIS CORP., Atlanta, Ga.

FOR DATA CIRCLE 352 ON READER CARD

POS COMMUNICATIONS

The Advanced Point of Sale Communications System allows an IBM mainframe to communicate with remote IBM 5260 Retail Systems. The software package has the ability to both send and receive data on the diskette contained in a store's 5265 shared media terminal (a controller in the 5260 system). The host can pick up data gathered by the 5265 from satellite 5266 POS terminals during the course of a day's business. The host also can send data, generally price lookup and negative credit information, to the 5265.

The communications software is a multiline BTAM program that can run under DOS, DOS/VS, DOS/VSE, OS, OS/VS1, and OS/VS2. The multiline feature allows the host to communicate with multiple 5260 systems concurrently. A communications controller (270X, 370X, or an ICA) is required at the

host. Communications run at 2400bps. Transmissions can be made to unattended remote POS systems, and the 5260 can be powered down after the communications have taken place, allowing after-hours operation. The Advanced POS Communications System is priced at \$8,000. COMPUTER DYNAMICS, INC., New York, N.Y.

FOR DATA CIRCLE 341 ON READER CARD

PROGRAM MAINTENANCE

Currently written to run as an application under the Westinghouse WESTI teleprocessing system, Prompt is an interactive terminal-oriented product for program development, library maintenance, data entry, and job submission. A CICS version reportedly is under development.

Prompt includes an editor supporting full screen editing and variable split screen formats. Commands may be strung together, and a Prompt procedure facility is available. The package also has a POWER/VS interface that lets the user submit jobs, examine output, and alter or delete jobs. Prompt can maintain any source, relocatable, procedure, or core-image library. Functions can be protected by passwords. Terminal support covers any 3270/80 character screen size from 960 to 3,440. For DOS/VS WESTI installations, Prompt leases for \$60 per month; permanent license goes for \$1,944. GOAL SYSTEMS CORP., Columbus, Ohio.

FOR DATA CIRCLE 354 ON READER CARD

SOFTWARE SPOTLIGHT

3270 COMMUNICATIONS

When this vendor announced its Attached Resource Computer (ARC) system several years ago, it made a distinction between "applications processors" and "file processors" connected along the ARC interprocessor co-ax bus. With the introduction of ARCCOM, a family of software communications facilities, a new distinction arises: processors using ARCCOM to link up with remote mainframes become "communications processors," essentially pseudo file processors sans disk.

The first ARCCOM package, ARCCOM 3270, allows applications processors to communicate with 3270 applications on remote IBM mainframes. The ARCCOM software turns an applications processor into a communications processor with which other applications processors communicate using the same protocols as for interacting with a file processor. This makes ARCCOM compatible with the high-level languages (COBOL, DATABUS, RPGPLUS, and BASICPLUS) already available to ARC system users. ARCCOM 3270 allows users to develop new applications for local processing, with operator-transparent mainframe inquiry. The software also permits users to run existing 3270 applications without

mainframe hardware or software modification.

ARCCOM software runs on a 6000-series applications processor; the 3270 package makes the 6000 emulate an IBM 3271 control unit. This communications processor talks to the rest of the ARC system over the co-ax interprocessor bus, and to the mainframe via a communications adaptor, synchronous modem, and leased line. ARCCOM to mainframe communications use EBCDIC character codes, bisync protocol, and communications speeds to 9600bps.

A local printer (emulating an IBM 328X printer) can be attached to the communications processor; a model 6020 communications processor can emulate up to 32 3277/328X devices, while a 6010 can emulate up to eight such devices.

Applications processors use a utility program (part of ARCCOM) to access 3270 applications via the communications processor. Applications processors also can support satellite printers emulating 328Xs.

The software is available without charge to new customers at the time of order; existing customers pay \$500. There is a monthly maintenance fee of \$15. DATA-POINT CORP., San Antonio, Texas.

FOR DATA CIRCLE 334 ON READER CARD

Meet Computer Task Group



the thinkers and doers

Education is expensive. But Computer Task Group believes it's money well spent.

When you become a member of our professional staff, we invest in you and capitalize on your talents.

We've got the best in state-of-the-art data base management systems and on-line communications training programs. We led the industry in education expenditures last year.

We put a lot of stock in intellectual versatility. Computer Task Group's mission to provide superior,

personalized systems design and programming services depends on you. And your ability.

Do your homework and you'll be one of 600 professionals in Chicago, Philadelphia, Baltimore, Buffalo, Rochester, Syracuse, Pittsburgh and New York City serving Fortune 500 clients.

We think a lot of our technical staff. Why not do some serious thinking about us? Call us at any of the numbers below and we'll tell you more.

CTG is an Equal Opportunity Employer M/F.



Computer Task Group inc.

CORPORATE OFFICES / 800 DELAWARE AVENUE / BUFFALO, NEW YORK 14209 / 716-882-8000

CHICAGO
312-648-1084

PHILADELPHIA
215-964-0430

BALTIMORE
301-796-7010

BUFFALO
716-882-8000

ROCHESTER
716-325-4220

SYRACUSE
315-463-6276

PITTSBURGH
412-323-8600

NEW YORK
212-398-1600

CIRCLE 169 ON READER CARD

SOFTWARE AND SERVICES

LANGUAGE PROCESSOR

THE TERMINAL PROGRAMMING LANGUAGE (TPL), currently in use on this vendor's small business systems, is now available for the vendor's larger, disk-based DS990 computer family (models 4 through 30). This allows small users to migrate more gracefully into larger DS990 systems, protecting their current investment in software. Conversely, it allows large DS990 users to develop and down-load TPL programs into small systems in the field. Both versions support the same forms development (TPL FORMS) and dp capabilities (TPL Procedures). The new implementation, known as DX10 TPL, provides a large library of functional subroutines and supports an indexed file management system. It also has a general purpose communications interface for RS232 compatible devices. DX10 TPL operates as a task in a DX10 multiuser, multitask environment. A software license for DX10 TPL (supplied on DS10 disk) is \$2,000. First year support is included in the license fee, with renewals priced at \$750 per year. TEXAS INSTRUMENTS INC., Digital Div., Houston, Texas.

FOR DATA CIRCLE 336 ON READER CARD

DATA BASE ACCESS METHOD

Operating in conjunction with Total on this vendor's V-8000 series mainframes, Tran-

Quest simplifies accessing a data base for both non-dp personnel and applications programmers (subject to security constraints, of course). The system comprises a data dictionary, a data manager, and a query processor. The data dictionary can take either an active or a passive role. In a passive role, it serves as a documentation tool describing hardware and software, data base schema, data items, and the like; in this mode it operates as a standalone batch-oriented package. In an active role, the data dictionary provides the data manager and query modules with information about the data base. The data manager provides a high-level language interface to the data base. It locates the data requested by an application, and handles any necessary reformatting of the data. The query processor module operates under the vendor's Tran-Pro transaction processing software (see last month's Software & Services section), and allows the user to make ad hoc free-formatted requests, or to use predefined inquiry procedures. Tran-Quest can be had for a one-time license fee of \$13,000, or a monthly license of \$325. NCR CORP., Dayton, Ohio.

FOR DATA CIRCLE 340 ON READER CARD

C CROSS-COMPILER

The vendor actually calls this PDP-11-based package "cross-software," since it com-

prises a compiler for the C programming language, a code optimizer, a target machine (in this case, the vendor's 16-bit Z8000 micro) assembler, a linker, and an up-load/down-load program compatible with the Z8000 development module. The package runs under the seventh release of the UNIX time-sharing operating system on PDP-11/45s and 11/70s.

Noting that many Z8000 customers also use PDP-11s and have familiarity with C, a company spokesman says that the cross-software will let users "take advantage of the tools of a larger computer system to develop software for their own Z8000-based products." The cross-software package, combined with the UNIX operating system's editors, file system, and software tools, the spokesman said, will provide "an ideal software development environment for the Z8000."

The C programming language, developed at Bell Labs, is a rich, powerful, block-oriented structured programming language with a terse syntax (blocks begin and end with left and right brackets, instead of BEGIN and END keywords; expressions can contain imbedded assignment statements, etc.). Most of the UNIX operating system is reportedly written in C. The cross-software package is priced at \$10,000. ZILOG, Cupertino, Calif.

FOR DATA CIRCLE 338 ON READER CARD

RENT • LEASE BUY

IBM 3101 TERMINALS

Model Number & Type	Purchase	Monthly Rates	
		36 Months	24 Months
3101-10	Display \$1,295.	\$39.	\$49.
3101-20	Display \$1,495.	\$49.	\$59.
3102	Printer \$1,295.	\$44.	\$54.

Rental Rates are based on receipt of a \$100. down payment. ON-SITE SERVICE IS AVAILABLE IN THE NEW YORK METROPOLITAN AREA.

COMPUTER EQUIPMENT

XEROX Printers • DECwriters • Texas Instruments Printers
• General DataComm Modems • 212A • 208 B/A
• 201C • 202 S/T

**CALL NOW • TOLL FREE
800-223-1696**

Qytel® 285 Madison Avenue
New York, N.Y. 10017
212-889-3888

CIRCLE 178 ON READER CARD

SOFTWARE PSYCHOLOGY

Human Factors in Computer and Information Systems
Ben Shneiderman, *University of Maryland*



New perspectives in a landmark book—the latest human factors research applied to software design.

- Interactive systems designs • Language usage • Data models • Management of programming • Data base query languages • Natural language front ends •

To: Winthrop Publishers, Inc.
17 Dunster Street, Cambridge, MA 02138
Attn: Sara Black, Dept. 2980

Please send me copies of SOFTWARE PSYCHOLOGY. Bill me at \$24.95 each, plus postage and handling. (Send payment now and we pay postage and handling. Make check payable to Winthrop Publishers, Inc.)

Name _____

Address _____

City _____

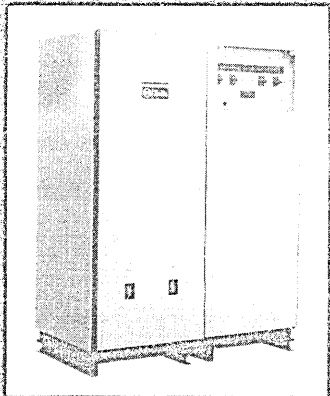
State _____

Zip _____

CIRCLE 179 ON READER CARD

EXIDE ELECTRONICS

Keep your eye on this new name. It's about to revolutionize an entire industry.



Exide Electronics UPS systems are designed for the highest efficiency and reliability. And they're backed by the world's largest UPS service team. It's all part of our commitment to keep your business going... and going... and going.

We've been a leader in UPS for years. You used to know us as Exide Power Systems. But such a big change has come over us lately that tomorrow you'll hardly recognize us.

We've been given a bold new directive by our parent corporation INCO, one of the top 500 companies on the New York Stock Exchange. Our attitude today is young and hungry. And we're not about to rest until we can bring you the very best in static power conversion and emergency lighting.

Already we're committed to putting more parts and technicians in the field by the end of 1980 than any other manufacturer of Uninterruptible Power Supply systems. These people... supported by our new multi-media training center and computer-based inventory system... will give you the best and fastest service in the world. And with our newly-expanded manufacturing capability, you'll be able to get the finest, most efficient UPS systems faster and more economically. No matter where you are.

Get to know us all over again. The change is going to be electrifying.

THE POWER PROTECTION PEOPLE

EXIDE ELECTRONICS

A Corporate Unit
of Inco Electro Energy

2 Penn Center Philadelphia, PA 19102 (215) 422-4000

CIRCLE 47 ON READER CARD

SOFTWARE AND SERVICES

DBMS

A data base management system based on the 1978 recommendations of CODASYL, an Interactive Query (IQ) facility, and a new version of the vendor's INFOS file management software have been developed by this vendor for its commercial series of Eclipse data systems running the Advanced Operating System (AOS). The data base management system manages up to 4.4 billion bytes of data on up to 16 disk subsystems. Designed for use with COBOL applications programs, the DBMS is designed to handle information in a network data structure; additional access techniques include the more common sequential, random, and multikeyed index sequential methods. The system offers data integrity mechanisms, including transaction rollback, and automatic logging/recovery functions performed along user-defined logical boundaries. The system includes a Data Definition Facility to provide data independence. Data compression is automatic, and, for the sake of efficiency, data are stored in variable length records.

The DBMS consists of two run time monitors, operating as separate AOS processes, and four standalone utilities. Together, the two run time monitors form the Data Base Control System (DBCS), handling all access to and from the physical data base and to an optional log (usually on mag

tape). The data base monitor, controlled through the operator's console, keeps track of open data bases, current users, and handles major error conditions. It also acts as an agent of the second run time monitor, known as the data base controller. This second monitor interprets and executes all data manipulation commands originating from user programs.

Four standalone utilities support data base operations. The Data Definition Facility (DDF) maintains a description of the data base, in the form of schemas and subschemas. It handles physical allocation of the data base, and provides data independence by providing access in the format desired, regardless of the format in which the data are stored. The Interactive Data Manipulation Language (IDML) is a utility allowing programmers and nonprogrammers alike to read, write, or update data base records without having to write a COBOL program. It can be used to train programmers in data base commands, as well as being used as a tool to batch bad records. A Rebuild utility is provided, allowing reconstruction of the data base from log tapes after a hard crash (such as a disk head crash); most recoveries will be handled by the DBMS's soft crash recovery mechanism. DBSCAN, the fourth standalone utility, allows authorized technical personnel to verify the integrity of the internal data base

and collect statistics.

A fifth separately priced utility, IQ gives read-only access to the data base by authorized personnel using English keyword commands. It can be used for ad hoc requests from terminal users, and to generate reports. A macro facility with parameter capabilities allows definition of frequently used query procedures.

INFOS II is an updated, extended version of the vendor's INFOS file management software. Intended for use on Eclipse C/150, C/350, and M/600 systems, INFOS II supports ISAM, multikey ISAM, and a data base access method (DBAM). It interfaces with PL/1, FORTRAN, RPG II, assembler, COBOL, and the vendor's Interactive Data Entry/Access (IDEA) languages, as well as the systems programming language, DG/L.

The DBMS package licenses for \$9,500 including two training credits, installation, and a one year software subscription service); subsequent licenses are \$6,500. IQ licenses for \$2,500 (including installation and software subscription service), with subsequent licenses going for \$1,500. INFOS II licenses for \$2,500 (with the same installation, training, and support services offered with the DBMS); subsequent licenses are \$1,500. Deliveries of all these packages are quoted at 120 days ARO. DATA GENERAL CORP., Westboro, Mass.

FOR DATA CIRCLE 337 ON READER CARD

**NOW . . . All the
benefits of
Carpeting . . .
with better
STATIC PROTECTION
than tile.**

COMPU-CARPET™

U.S. Pat. No. 4,153,749.

High Performance Anti-Static Carpeting

COMPU-CARPET permanently anti-static carpets and COMPU-MATS™ • Eliminate static problems in computer and terminal areas • Protect sensitive electronic equipment • Meet IBM recommendations • Provide comfort and acoustical advantages of high quality carpeting • Carry a 5-Year wear and static warranty.

Check your carpet dealer or call direct.

Mfd. by

**UTP UNITED
TECHNICAL
PRODUCTS, INC.**

THE STATIC CONTROL PEOPLE

DEPT. D

32 Southwest Industrial Park
Westwood, MA 02090
(617) 326-7611

CIRCLE 180 ON READER CARD

THE FIRST ANNUAL NATIONAL CONFERENCE ON ARTIFICIAL INTELLIGENCE

SPONSORED BY
**The AMERICAN ASSOCIATION
for ARTIFICIAL INTELLIGENCE**

• AAAI •

AUGUST 19, 20, 21

at Stanford University

WITH A TUTORIAL PROGRAM: MONDAY, AUGUST 18TH

TUTORIALS

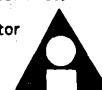
The State of the Art of Artificial Intelligence will be explored in One-day Tutorials to be held at Stanford on August 18 in conjunction with the Conference

TRADE FAIR

A selected group of leading AI research groups and manufacturers will demonstrate AI hardware and software at a Trade Fair to be held in conjunction with the Conference.

FOR MORE INFORMATION CONTACT:

Louis G. Robinson
AAAI Conference Coordinator
P.O. Box 3036
Stanford University
Stanford, CA 94305
(415) 495-8825



IN COOPERATION WITH ACM/SIGART

CIRCLE 181 ON READER CARD



*Ardell Nelson,
Director of Purchasing
and Administrative Services,
Milbank Mutual Insurance Company,
Milbank, South Dakota*

“Our Pitney Bowes Computer Output Mailing System lets one person do the work of three and gets our premium notices out in one-quarter the time. It’s a truly cost- efficient means to improved cashflow.”

“For years we’ve relied on the most advanced computer systems to generate premium and lapse notices for our customers in 10 midwestern states. But once the computers were done, the notices always went through a real obstacle course before they hit the mail.

“The forms would be taken from the third floor computer room down to the first floor mail room for bursting and trimming. Then, someone would take them over to the print shop for folding. Finally, they were brought back to the mail room for inserting and metering.

“But, now all that’s changed with the help of our new Pitney Bowes Computer Output Mailing System. One person simply takes the computer output to the mail room, loads it into one end of the Pitney Bowes system and pushes a button.

“Seconds later—fully bursted, trimmed and folded—letters are being automatically inserted, sealed and metered. As the letters emerge from the other end they’re ready to mail—they’re even presorted by zip code so that we can take easy advantage of the Postal Service’s 2¢ first class presort discount.

“It’s also a very flexible system.

We frequently have to insert special notices into certain mailings, for example when a state changes its insurance laws. Before we did it all by hand—adding a day or two to the mailing. Now we simply load the system with the special notices—several can be handled at once—and it automatically inserts the notices into the appropriate envelopes. Not a second is lost.

“Now our payments are coming back one to two days sooner. Cashflow is improved. Manpower costs are down. And it’s all thanks to the Pitney Bowes Computer Output Mailing System.”

For complete details return coupon to Pitney Bowes, 2179 Pacific Street, Stamford, CT 06926. Or

call toll free anytime (except Alaska and Hawaii) 800-621-5199 (in Illinois 800-972-5855). Over 600 sales and service points throughout the United States and Canada. Postage Meters, Mailing Systems, Copiers, Dictating, Labeling and Price Marking Systems.

Name _____

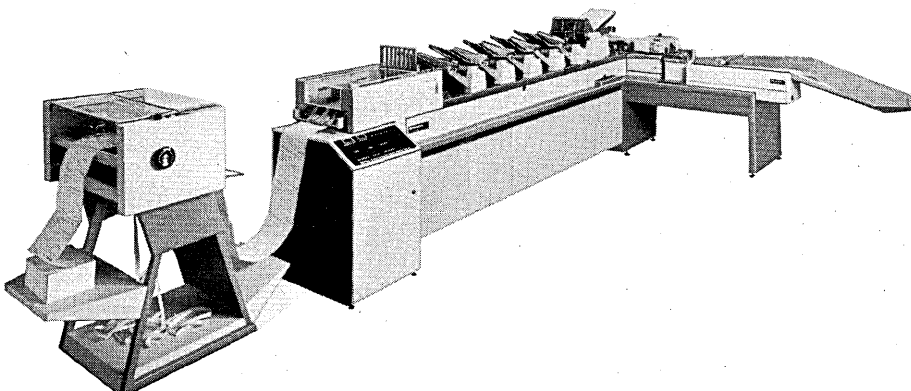
Title _____

Company _____

Address _____

City, State, Zip _____

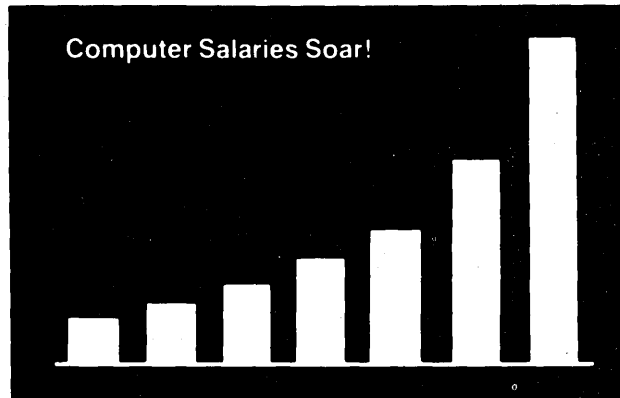
 **Pitney Bowes**



CIRCLE 182 ON READER CARD

New! 1980 Computer Salary Survey

23 New Categories Reported!
Call for your FREE copy today.



Unprecedented demand and inflation have combined to cause salaries in the computer field to rise sharply in 1980. The new Source Edp **1980 Computer Salary Survey and Career Planning Guide** will let you know if your compensation is keeping pace with this growth...and the strategies you can use if it's not.

This comprehensive free report also provides you expert advice on a variety of important career topics such as:

- When you should consider a job change;
- How to make sure you are getting the proper exposure;

- What steps you must take to break into management;
- How you can avoid career stagnation...and much more.

The **1980 Computer Salary Survey** has been compiled by Source Edp, North America's largest recruiting firm devoted exclusively to the computer profession.

Expanded, All New Position Categories Surveyed

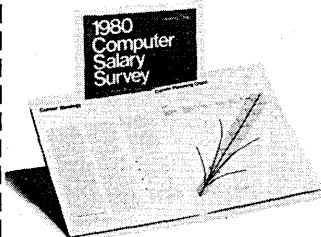
The **1980 Computer Salary Survey** has been expanded to provide specific data for twenty-three new categories. These include positions in data communications, mini-micro programming, data base administration, technical marketing support and EDP auditing in addition to our traditional categories of programming, software, systems design, management and computer marketing.



North America's largest recruiting firm devoted exclusively to the computer profession. Client organizations assume our charges.

Free Report!

For your free copy, simply phone the Source Edp office nearest you.



If unable to call, write:

Source Edp, Department D5
721 Enterprise
Oak Brook, Illinois 60521

(When writing, please be sure to indicate home address and current position title.)

United States					
Arizona					
Phoenix	602/258-9333				
California					
San Francisco	415/434-2410				
Palo Alto	415/856-0600				
Los Angeles	213/386-5500				
Van Nuys	213/781-4800				
Torrance	213/540-7500				
Irvine	714/833-1730				
San Diego	714/231-1900				
Colorado					
Denver	303/773-3700				
Englewood	303/571-4450				
Connecticut					
Hartford	203/522-6590				
Stratford	203/375-7240				
District of Columbia					
	202/466-5890				
Florida					
Miami	305/624-3536				
Georgia					
Atlanta Central	404/588-9350				
Atlanta Suburban	404/325-8370				
Illinois					
Chicago	312/782-0857				
Northfield	312/446-8395				
Oak Brook	312/986-0422				
Rolling Meadows	312/392-0244				
Indiana					
Indianapolis	317/631-2900				
Louisiana					
Baton Rouge	504/924-7183				
New Orleans	504/561-6000				
Maryland					
Baltimore	301/727-4050				
Massachusetts					
Boston	617/482-7613				
Wellesley	617/237-3120				
Michigan					
Detroit	313/963-0510				
Southfield	313/352-6520				
Minnesota					
Minneapolis	612/544-3600				
St. Paul	612/771-0544				
Missouri					
St. Louis County	314/862-3800				
St. Louis Downtown	314/231-4880				
Kansas City	816/474-3393				
New Hampshire					
Nashua	603/880-4047				
New Jersey					
Cherry Hill	609/482-2600				
Edison	201/494-2800				
Paramus	201/845-3900				
Union	201/687-8700				
New York					
Midtown	212/736-7445				
Wall Street Area	212/962-8000				
Long Island	516/364-0900				
White Plains	914/683-9300				
North Carolina					
Greensboro	919/294-6590				
Ohio					
Cincinnati	513/769-5080				
Cleveland	216/771-2070				
Oregon					
Portland	503/223-6160				
Pennsylvania					
Philadelphia	215/665-1717				
King of Prussia	215/265-7250				
Pittsburgh	412/261-6540				
Texas					
Dallas	214/387-1600				
Fort Worth	817/338-9300				
Houston Central	713/751-0100				
Houston Suburban	713/626-8705				
San Antonio	512/344-0217				
Virginia					
McLean	703/790-5610				
Washington					
Seattle	206/454-6400				
Wisconsin					
Milwaukee	414/277-0345				
Canada					
Toronto	416/364-2919				
Don Mills	416/425-5730				

SOURCE DATA

BOOKS

THE LASER EXPERIMENTER'S HANDBOOK

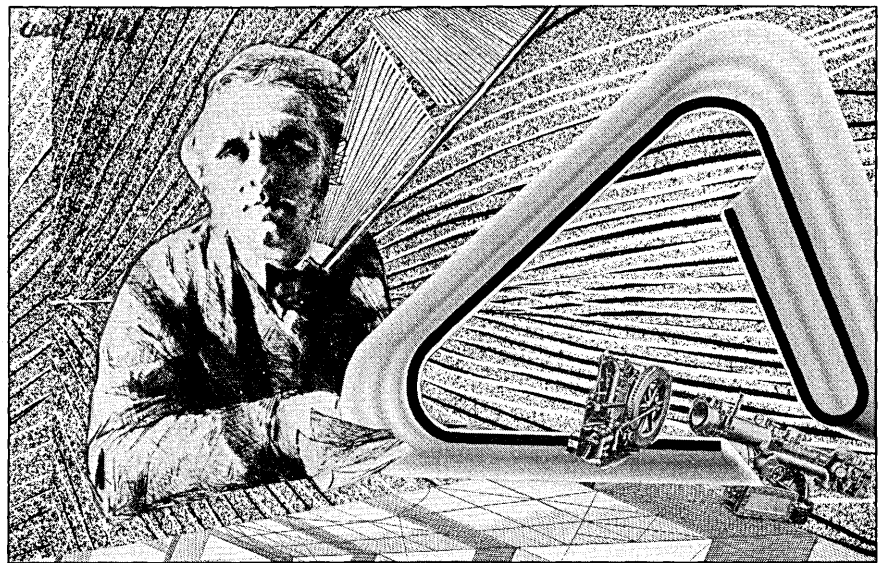
by Frank G. McAleese

Tinkerers have enjoyed a long tradition in America. In Ben Franklin's visionary experiments with turkeys and Leyden jars, in Edison's fiddling with the carbon transmitter (or his later ill-fated efforts to develop rubber latex from domestic weeds), we find all the elements we have come to extol in the experimenter: creativity, perseverance and pragmatic shrewdness. Frank G. McAleese exemplifies the tinkering breed. With the quixotic eccentricity of many earlier inventors, McAleese presents the complicated manufacture of a home laser as if it were nothing extraordinary when actually it requires a lot of time and careful calculations.

Ever since Heinrich Hertz started toying with Clerk Maxwell's electromagnetic theories, around 1886, there have been great advances in light wave theory. Einstein first postulated the likelihood of stimulated emission in 1917. Today, lasers are no longer the domain of high science. McAleese's handbook for the amateur laser experimenter effectively says: build your own. He supplies the diagrams, schematics, parts lists and instructions necessary for the construction of six varieties of lasers (two semiconductors, one Helium neon [HNE], two gas lasers, and one rubyrod). All you need do is buy the parts, clear off a work area and wear a pair of goggles. Or, as the dust-jacket enthusiastically exclaims, "If you'd like to successfully experiment with a modern and exciting technology, this book is for you." At least in theory.

McAleese's book might well be fun and interesting, but it's not all sweetness and light. There are plenty of mistakes. One only hopes he has been more accurate with his critical technical presentations than he was with other information. Charts have been reversed, incorrect addresses supplied, and a distressing number of editorial or typographical errors have remained. Ben Franklin would not have approved.

The inclusive nature of the theoretic-



cal introductory material tends to make it somewhat patronizing. It doesn't seem likely one would require all this theory to build a laser. Any reader technically capable of constructing a laser is not going to need a definition of valences or electrons. Unless the book is used as a text, the plodding theories are out of place.

But the image of the amateur technician puttering around with high voltage instruments in the basement is an appealing one. Cost need not be too high, and power modifications should be minimal. The proliferation of the laser into the American home should prove interesting. Home computers are becoming increasingly commonplace; home lasers are definitely *nouvelle vague*.

What would one use the laser for? Industrial and medical applications are not really feasible in the household. Few people find need to drill holes in diamonds or weld up damaged retinas. Practical applications such as communication, interferometry, long-range security systems, sighting and optical alignment are obvious. Because of the collimative accuracy of the laser, other uses should be considered. Esthetic demonstrations like the Photokina laser display in Cologne in 1976 or the more familiar La-

serium could be within everyone's grasp. Coherent beams of light could lace our skies. The merits of q-switching could be discussed in the corner tavern.

There are other less plausible applications. Death ray weaponry, for instance. Or holography, as a unique form of information storage. Lissajous figures and Lambdonas offer some fascinating possibilities. The LED injection pulsed laser detailed in *Laser Experimenter* has a monochrome beam with an adjustable pulse that can be "visualized" one-half mile away. This could be used, say, to frighten the neighbors. Even newer and more novel uses might be discovered by the intrepid laser experimenter. The future will move us away from the mundane science kit applications for lasers.

Then there's the popular Class IV CO₂ gas laser, which is recommended here for the advanced experimenter only, "because of its inherent power." Twelve thousand volts of direct current running through a set of automotive ignition cables in your basement is "inherent power." There should be enough crank in the CO₂ laser for the most fanatic and wild-eyed of tinkers. Preparing the gas alone would prove enough of a task for most mortals.

SOURCE DATA

The commonsensical mechanic shouldn't have any problem with safety. The Bureau of Radiological Health's Light Product section advises the use of warning indicator light (beams are not always visible) and avoidance of unnecessary contact with the beam (there might be diffusion or leakage). Accidents have occurred with the light generator by reflected radiation. Experimenters putting their arms across the beam have caught hazardous reflections from their wristwatches. However, there have been more injuries reported from the power source than from the laser.

Cost should be considered. In a moment of blithe inspiration, the author muses about the possibility of glassblowing your own spectrum tube, but is reluctantly forced to conclude that glassblowing is an art in its own right. So you have to buy one ready-made. An HNE gas laser spectrum tube LTO5R will run you \$125 FOB out of Pittsburgh. The S-G2000 (not S-6200, as McAleese has it) Series RCA gallium arsenide diodes necessary for the injection lasers come a little cheaper, selling from \$20 to \$30 apiece. A rubyrod pulsed laser does use a polished number 10 tin can as its reflector, but a 3" x 3/8" ruby should set you back around \$900. Utility bills might increase, but that shouldn't be a consideration for the laser experimenter. Would Firestone or A.G. Bell have worried about their fuel bills?

If this all seems like too much bother, or if you're frightened by any direct current voltage registering in five figures, there still remains a chance. If you still think you could develop that death ray, a commercial 0.8 mW HNE glass tube laser (ML-620) can be had for under \$200 from Metrologic Instruments, 143 Harding Ave., Bellmawr, N.J. 08031. Modifications would, of course, be your own, and would be subject to federal regulations. After a few months you should be able to move up to a high-powered laser of Promethean capabilities.

McAleese's book is a good introduction to the burgeoning field of laser and maser technology. Flaws aside, it reads like a comprehensive handbook. It takes some doing to even imagine constructing a general use gas laser in the garage, but stranger things do happen, and possibly, the flash of pulsing lasers will become a common sight in home workshops across the country. Tab Books, Blue Ridge Summit, Pa. (1979, 210pp., \$6.95).

—Lee Froehlich

BOOK BRIEFS

HOW TO COMPUTERIZE YOUR SMALL BUSINESS

by Jules A. Cohen with Catherine Scott McKinney

A "how to" guide, beginning with basic computer terminology, this book is written

in an easy-to-understand style for the person who has just realized his small business could indeed use computerization. Prentice-Hall, Inc. (1980, 171 pp., \$13.95).

FINANCIAL ANALYSIS USING CALCULATORS: TIME VALUE OF MONEY

by Elbert B. Greynolds, Jr., Julius S. Aronofsky, and Robert J. Frame

A highly technical discussion of financial analysis related to the time value of money. Textbook for economics students, and not of general interest, McGraw-Hill Books (1980, 472 pp. paperback, \$10.95).

THE REALITY OF NATIONAL COMPUTER NETWORKING FOR HIGHER EDUCATION

edited by James C. Emery

The third in a series, the book examines current computer networking in higher education and where the potential exists for progress. Includes proceedings from the 1978 EDUCOM Fall Conference. Westview Press, Boulder, CO 80301 (1979, 91pp., \$16).

REPORTS AND REFERENCES

TYMNET SUBSCRIBERS OFFER SERVICES

Tymnet, Inc., the public packet network, is offering a *Subscribers' Directory*. Over 200 data bases offered through the network are described, covering a variety of categories including medical, financial, commercial, and scientific information. Selected customer offerings of interactive computer-based services and software facilities available through TYMNET are also described. The 34-page directory is \$5. Tymnet, Inc., 20665 Valley Green Drive, Cupertino, CA 95014, (408) 446-7000.

4300 ANALYSIS

A 37-page report on the IBM 4300 series has been compiled for "data processing professionals in all segments of the industry." The report features partial listings of hardware and software prices, a general discussion of the 4300 series, a comparison between 370/138 and 4341 configurations, and discussions of hardware and software support. \$55. Applied Management Services, P.O. Box 350, Medford, NY 11763 (516) 654-5398.

SYSTEM SECURITY

A 116-page report entitled *Guide to Database Security with On-Line Systems* provides general information about data integrity and system security including suggestions for the implementation of protec-

tions. The report is intended to serve both dp and non-dp managers.

Concerns about computer-related crime, negligence, physical disasters, and privacy are all included in the opening overview's definition of security. The rest of the report focuses on techniques for strengthening system security without further distinction as to the nature of the protection intended. The next three chapters each address a physical aspect of a system—the terminal, the communications line, and the data base. Chapter four discusses administrative aspects of system security, recommending the assignment of a security officer. \$24.95—payment must accompany order. Infopac Associates, Inc., P.O. Box 591, Lynbrook, NY 11563.

BIBLIOGRAPHY

The 13th annual bibliography of computer oriented books is now available from the University of Colorado *Computing Newsletter*. The editor of the newsletter is impressed by the quality of books in the area of distributed systems and programming languages, noting the addition of the language C as well as four books on MUMPS, but dissatisfaction is seen in the management area, with only seven of the 18 news books on dp management called noteworthy. The bibliography is \$4, \$6 if an invoice is required. *Computing Newsletter*, Box 7345, Colorado Springs, CO 80933 (303) 593-3239.

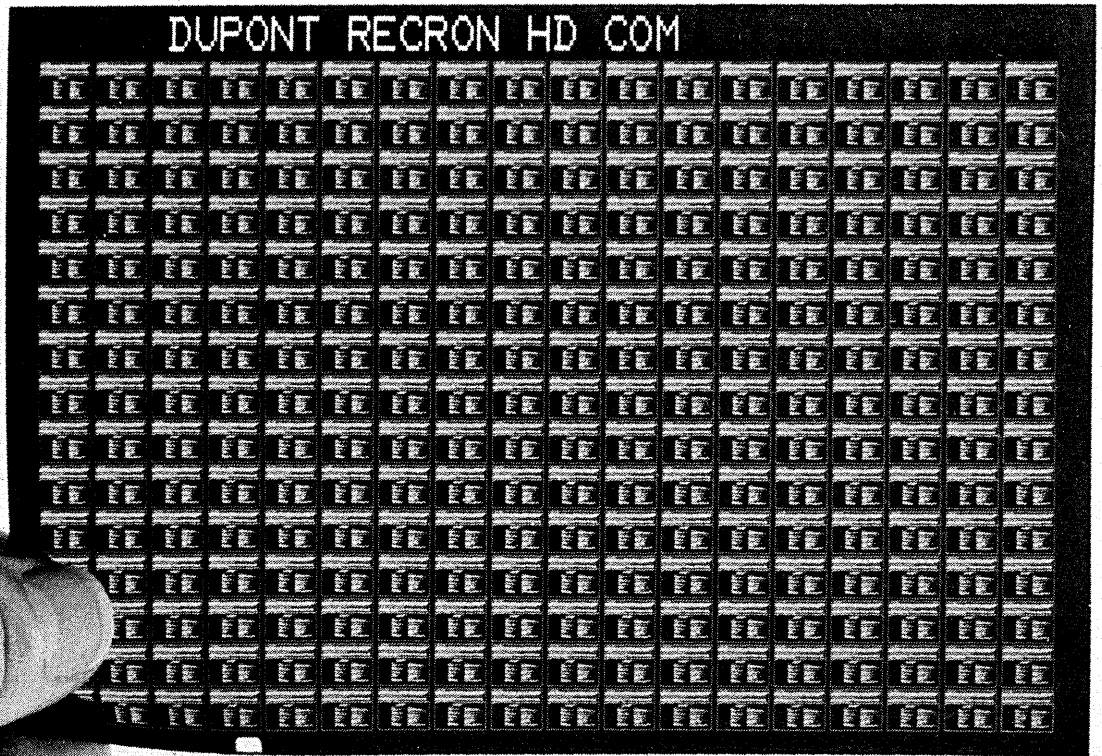
ELECTRONIC MAIL

A new 124-page report on electronic mail begins at the beginning with "What Is Electronic Mail"; it goes on to explain the ways an organization can use electronic mail and details the technology involved. The second section discusses system design, cost evaluation, security and privacy, compatibility, and how to design an electronic mail system suited to your organization. The chapter on designing a system covers survey techniques, transition strategies, and company organization. The final section of the report covers policy and regulation, vendors and potential vendors, and a prediction of how big the market will be. *Electronic Mail: User Alternatives in the 1980s* sells for \$250. Mackintosh Consultants, Inc., 2444 Moorpark Ave., Suite 211, San Jose, CA 95128 (408) 998-4312.

COMPUTER LAW

An extensive bibliography of articles about computer law has been compiled by the Center for Computer/Law, publishers of the *Computer/Law Journal*. References fall into the categories of system design, system procurement, government regulations, tort law, privacy, criminal law, constitutional law, evidence, procedure and discovery, corporate law, labor law, computer use in the legal profession, computer use in government, taxation, audits, computer use industry, jurimetrics, and international law.

Send for this fiche to see the high quality of DuPont RECRON® High Definition COM silver film.



It has brightness, clarity and sharpness that you can actually see. DuPont RECRON High Definition COM silver film has a new emulsion that produces easy-to-duplicate images in reductions of 42x, 48x and higher. That means more information in less space. Wide processing latitude assures you of excellent results under a variety of conditions.

The film comes on a CRONAR® base protected with a new anti-static treatment. The base is only .004 inch thick, up to 25% thinner than conventional acetate COM films, so you can get more film on a spool and reduce reloading time. This base is really durable and withstands repeated duplication without damage.

RECRON High Definition COM silver film comes backed up with chemicals, processor and a nationwide network of DuPont Technical Representatives to make it all work most economically for you. Send for your film sample and in-depth information about it. Mail the coupon today.

*RECRON is a DuPont registered trademark for its microfilm, microfilm processors and chemicals.

CIRCLE 184 ON READER CARD

Mail this coupon today.

DuPont Company, Room 36794
Wilmington, DE 19898
Please send me the fiche of RECRON
High Definition COM silver film. I'm
interested in high quality.

Name

Title

Company

Address

City

State

Zip

Phone ()

**Industrial
Photo Systems**



REG. U.S. PAT. & TM. OFF.

SOURCE DATA

The *Computer Law Bibliography* is \$18.50 postpaid (California residents add sales tax). Center for Computer/Law, 530 West Sixth St., 10th floor, Los Angeles, CA 90014 (213) 623-3321.

VENDOR LITERATURE

WINCHESTER DISKS

A four-page, photographically illustrated brochure presents this vendor's fixed media Winchester disk drives: Both the SA4000 series of 14.5MB and 29MB drives and the newer 8 inch SA1000 series are covered. Both families are discussed as upgrades for existing systems currently using floppy disks. Reliability is stressed; the brochure's concluding section entitled "We're headstrong about delivering quality products" discusses manufacturing and quality control. SHUGART, Sunnyvale, Calif.

FOR DATA CIRCLE 365 ON READER CARD

COM

An illustrated data sheet describes this vendor's System "715" computer output microfilmer. Font options, media compatibility (reel, cartridge, or fiche), and operator-selectable wet or dry processing are discussed. The data sheet also describes "the latest in COM technology" used in the "715." One full side of the data sheet is devoted to the characteristics of the "715,"

covering everything from character input and output rates, to fonts, to lenses, and finally power and operating requirements. 3M, Micrographic Products Div., St. Paul, Minn.

FOR DATA CIRCLE 366 ON READER CARD

SYSTEMS DEVELOPMENT METHODOLOGY

A four-color wall chart illustrates the system development life cycle from service request to postimplementation review. Shown as a 10-level pyramid, each separate phase is color coded for its primary audience: user, technical, and user & technical. Review, decision, and approval points are identified, as are the stages that should produce "fallout documents" that will be needed to develop user and operations guides. A scale to the left of the pyramid shows uncertainty decreasing as the project nears completion. (A similar scale shows how costs can be expected to increase as the project nears completion.) ATLANTIC SOFTWARE INC., Philadelphia, Pa.

FOR DATA CIRCLE 367 ON READER CARD

WORD PROCESSING

"Always Have the Last Word With AZ-TEXT Word Processing," describes this vendor's recently released word processing software for Eclipse data systems. The beautifully illustrated three-panel foldout

flyer addresses simplicity of operation, increased productivity of office staffs, and versatility. A postage-paid postcard is provided for those wishing further information or a demonstration. DATA GENERAL CORP., Westboro, Mass.

FOR DATA CIRCLE 362 ON READER CARD

TERMINAL ENHANCEMENT MICROCOMPUTERS

The Commander series of terminal enhancement computers is briefly described on a data sheet from the vendor. The data sheet proposes using Commander computers "to convert your simple terminal to a complete computer system." The hardware is described, as is the wide variety of available software, including a text editor, and a number of programming languages including assembler, PASCAL, COBOL, FORTRAN, and BASIC. Interfacing and I/O capabilities also are discussed. A brief table summarizes Commander configurations and common specs. COLUMBIA DATA PRODUCTS, INC., Computer Systems Div., Columbia, Md.

FOR DATA CIRCLE 360 ON READER CARD

VOICE CONTROL

Programming numerically controlled machines using this vendor's voice recognition equipment is explained in a 12-page, illustrated brochure. The technology of speech

Software/Hardware MIS Professionals New England/East Coast/ Nationwide

Norton, Kleven and Co., Inc. has a wide variety of positions available with some of the top companies in the Industry. Our clients are seeking professionals who are well-versed in any of the following areas: Programming, System Analysis/Design, Data Base Applications, Applications Programming, Compiler Development, Language Design, Hardware/Firmware Design. If your experience covers one or more of the following areas at the state-of-the-art level, contact us: Software Design and development; Technical Support; COBOL/IMS, Computer Sciences; Assembly or Higher Language Programming; Data Base Design; Compilers, and/or Operating Systems Design; Digital Logic Design; Interface Design; Technical Writing; Microprocessor Utilization; Computer Architecture.

We've been providing confidential and industry-knowledgeable placement for, software/hardware/MIS professionals since 1969. We can also provide you with free resume preparation and career path counseling. Client companies assume all fees.

nk Norton, Kleven and Co., Inc.

INDUSTRIAL RELATIONS MANAGEMENT CONSULTANTS
Three Fletcher Avenue, Lexington, Massachusetts 02173
Telephone (617) 861-1020

Member:
Massachusetts Professional Placement Consultants
National Computer Associates
(Offices Nationwide)
Representing Equal Opportunity Employers M-F

CIRCLE 185 ON READER CARD



What Are You Waiting For?

Isn't it about time that you took the initiative . . . started controlling your own future . . . working for yourself instead of someone else? You can be like one of our over 500 Kwik-Kopy Printing center owners, in business for yourself, in the place you've always wanted to be, backed by America's fastest growing instant printing organization.

If you have the desire and the financial capability, you owe it to yourself to investigate the opportunities with Kwik-Kopy Printing. Total investment is about \$59,500. (Cash investment is \$19,500 which includes some working capital). Several financing plans are available. Write or call toll free:

Tom Malone, National Marketing Director.

KWIK-KOPY CORPORATION

5225 Hollister • Houston, Texas 77040

US-1-800-231-4542
TEX-1-800-392-6488

Except Alaska and Hawaii



**PLEASE DIRECT CANADIAN INQUIRIES to:
Kent Harding, 109 Telson Rd., Markham, Ontario L3R1E4**

CIRCLE 186 ON READER CARD

In a world full of uncertainty, we certify every flexible disk we make. Not every other one.

While other companies have been putting a lot of money into sophisticated advertising, we've been putting a lot of money into sophisticated test equipment.

And putting the test equipment to work on every disk we make.

That way, the only Ectype Flexible Disks you can buy are disks that have been 100% certified error-free. At higher than standard industry specs.

Our disks live longer, too. Because we add all the correct ingredients to our initial formula. Instead of adding some later as an afterthought.

The result is wear life that exceeds 10 million passes!

Ectype disks are hard to lose and easy to use, too. Because they come in an E-Z Vue box that protects them and doubles as a file system.

So in addition to 100% certification, you get 100% convenience.

For full details, call us toll-free at 1-800-843-9862.



*"Ectype" is a real word that means a faithful reproduction.

SYNCOM® Your flexible alternative.

P.O. Box 130, Mitchell, SD 57301

CIRCLE 187 ON READER CARD

SOURCE DATA

recognition is discussed, with a primary focus on the Voice Numerical Control (VNC) system. Training the voice recognition system to recognize the operator's voice also is covered. Benefits are listed, and several users explain increased accuracy, savings of both time and money, and simplicity of operation. The hardware is pictured, and descriptions are given of the major systems components. Software also is explained. The brochure concludes with comments on the company's commitment to its customers. THRESHOLD TECHNOLOGY INC., Delran, N.J.

FOR DATA CIRCLE 361 ON READER CARD

MAILING SYSTEM

The Speedifold System for large-volume (100,000 pieces or so) mailing of computer-generated correspondence is detailed in a four-color, six-page brochure. The presentation moves from the form to the machine and up to the system. Both form and machine specifications are provided. MOORE BUSINESS FORMS, INC., Glenview, Ill.

FOR DATA CIRCLE 363 ON READER CARD

COST ESTIMATING

A 16-page booklet from this vendor explains how its PRICE modeling software can provide "your window into cost estimating." The brochure introduces the three PRICE parametric cost predicting models:

PRICE, for electronic, mechanical, and electromechanical product development projects; PRICE L, for modeling life cycle costs; and PRICE S, for predicting the costs associated with developing software. Extensive use is made of graphics, block diagrams, and sample outputs. Potential customer benefits, support, reliability, and accuracy also are addressed. Customer satisfaction is covered, and a number of large companies using the software are identified. RCA PRICE SYSTEMS, Cherry Hill, N.J.

FOR DATA CIRCLE 364 ON READER CARD

PERIODICALS

USED GEAR

If the fast changing word processing equipment scene is keeping you from making an investment in a new machine, maybe older equipment is the interim answer. A free catalog of reconditioned wp equipment is available from this vendor, which guarantees the machines will qualify for standard IBM service agreements. A 15-day unconditional return option is also offered. IBM Mag Card, Memory 50 and 100, and MT/ST machines are offered as well as Xerox 800 dual card and dual tape machines. Word Processing Exchange, Inc., 117 N. First St., Ann Arbor, MI 48104 (800) 521-3085; in Michigan (800) 482-3651.

Dataserv has begun offering a free newsletter about their used IBM equipment. The newsletter, called *Overview*, points out that the "second market" for used IBM equipment chalks up at least \$1 billion a year. The first issue is mostly a price list, with some commentary about the vendor's view of market trends, with emphasis on supply and demand. Dataserve Equipment, Inc., 9901 Wayzata Blvd., P.O. Box 9488, Minneapolis, MN 55440 (612) 544-0335.

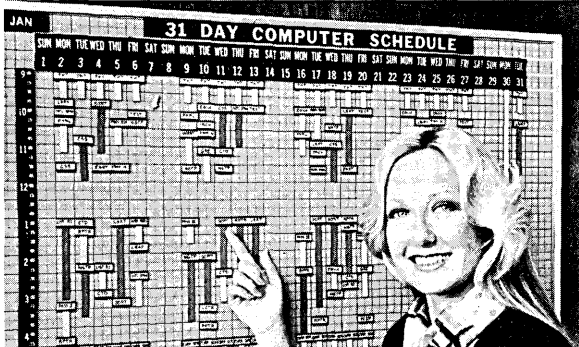
APL PUBLICATIONS

A marketing and consulting company specializing in APL is now offering a quarterly newsletter about APL techniques, services, application descriptions, and news. Subscriptions are \$6 a year, \$10 outside the U.S., Canada, and Mexico. *APL MARKET NEWSLETTER*, Southwater Corp., 2348 Whitney Ave., Mt. Carmel, CT 06518 (203) 288-0283.

CONSULTANT SOURCE

Computer Consultant is a newsletter published six times yearly listing consulting and related services. Consultants listed are all over the country, and represent a variety of specialties by which they are classified in the listing. The largest category in the second issue (Jan.-Feb.) is business applications, followed closely by systems

SCHEDULIZE with Magnetic Controls



FREE
16 PAGE
ILLUSTRATED
BROCHURE

REPRESENTATION THROUGHOUT
MOST OF THE UNITED STATES

- SHOW FACTS INSTANTLY
- CHANGES MADE IN SECONDS
- ELIMINATE FILE REFERRALS
- SYSTEMATIZE YOUR WORK FLOW
- GET THE JOB DONE

For Scheduling • Programming • Personnel • Sales •
Shipping • Inventory • Maintenance • Production •
Quotations • Computer • Special Situations

201-938-6000

METHODS RESEARCH

70 ASBURY AVE., FARMINGDALE, N.J. 07727

CIRCLE 188 ON READER CARD

Your Investment Can Grow From \$7,500 to \$20,000!

People can make big money fast. Millions have been made trading correctly on future prices of world traded commodities.

Our unique commodity program, designed for the beginner as well as the experienced investor LIMITS YOUR RISK AND MAXIMIZES YOUR PROFIT!

For your **FREE**
BROCHURE Mail
Today!

Registered C.T.A. & C.P.O.



Envel Management Ltd., 924 Anacapa St., Santa Barbara, CA. 93101 80034

FILL IN AND MAIL TODAY.

- Please send me your FREE commodity brochure.
 I have have not purchased commodities before.

Print Name _____

Address _____

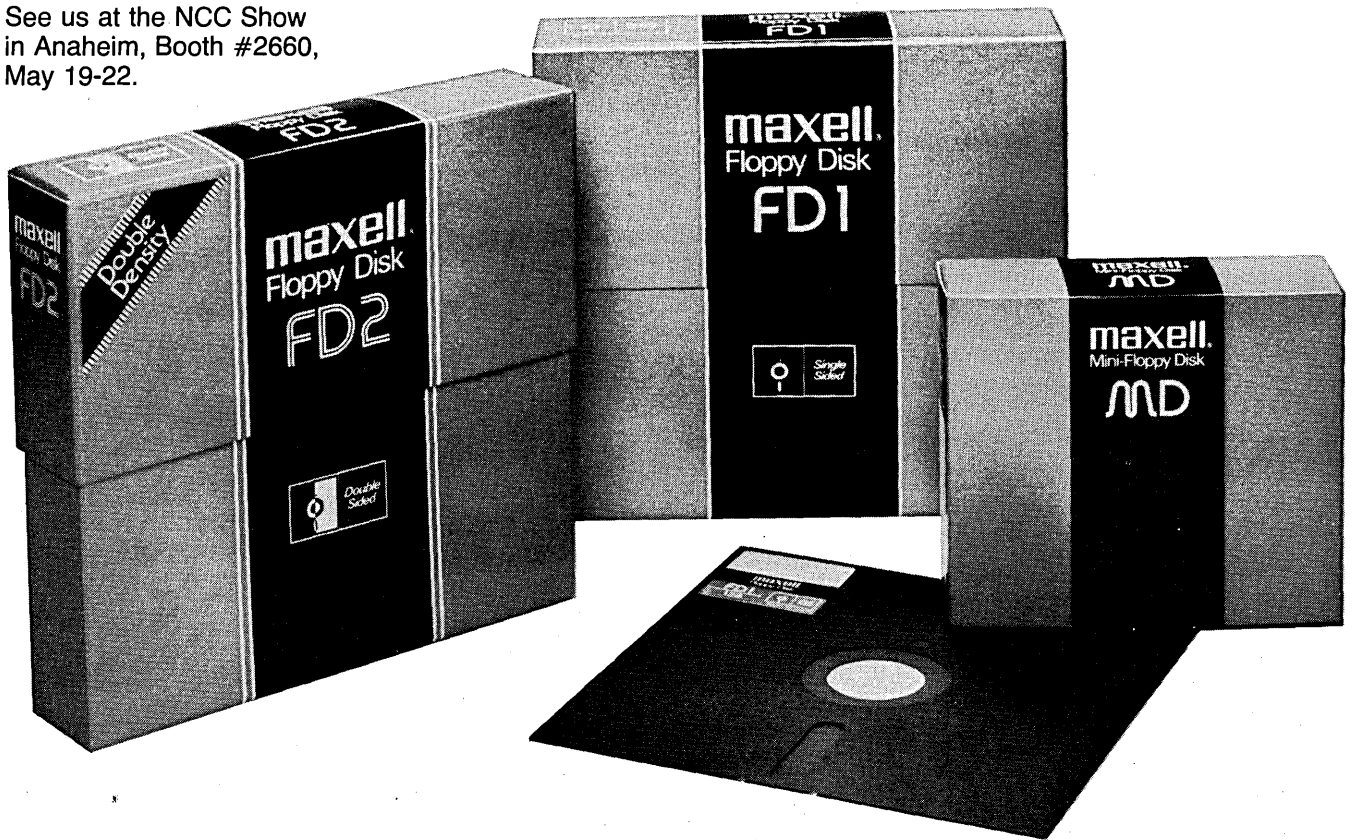
City/State/Zip _____

Ph. Bus. () _____ Res. () _____

Inquiries without phone numbers cannot be processed.

CIRCLE 189 ON READER CARD

See us at the NCC Show
in Anaheim, Booth #2660,
May 19-22.



We make our Floppys as if your job depends on them. Because it does.

In your work, data is too important to lose. So if you use a Floppy Disk with even a minor flaw—like a dropout—you risk a lot. That's why Maxell has taken the danger out of Floppy Disks.

Maxell: the world's most dependable Floppy Disks.

We've devoted two generations to building our reputation as manufacturers of the world's finest magnetic media. Our Floppy Disk technology achieves a consistency that is rarely equalled . . . and never surpassed.

Even the jackets our floppys come in are made to resist heat and mechanical shock. And they're specially treated to prevent the build-up of static charges, so they do their part to increase the total reliability of their precious contents.

Made better than most specifications.

To guarantee complete interchangeability, all Maxell floppys conform to ISO, ECMA, ANSI, JIS, and IBM standards.

But even more important to you, Maxell's own tolerances are tougher than the industry's.

And our inflexible Quality Control inspections permit nothing to blemish our hard-earned reputation.

So when your job depends on full data retrieval, depend on Maxell Floppy Disks. They work best . . . and so will you.

Maxell offers the full range of Floppy Disks, from standard 8-inch to 5¼-inch, plus Data Cassettes.
Dealer inquiries invited.



maxell[®]
DATA PRODUCTS
The Quality Alternative

Maxell Corporation of America, Data Products Group
60 Oxford Drive, Moonachie, NJ 07074 Tel. (201) 440-8020

CIRCLE 190 ON READER CARD

SOURCE DATA

development. The editor discusses directly relevant tidbits such as tax information, reference to a small business lobby, and retirement and insurance plans available to consultants. Features and other items are being solicited. Yearly subscription rate, including one listing per issue, is \$18. *Computer Consultant*, P.O. Box 30214, Bethesda, MD 20014 (301) 770-2726.

INDUSTRIAL COMPUTING

North-Holland Publishing Co. has launched a new international journal focusing on practical information about automation in industrial applications. The first issue contains articles on computer-aided manufacturing, a general theory of the sequencing of processes, interpolation algorithms for numerical control, and an overview of computer-aided pc board design. The journal will address a wide variety of industrial uses of computing, and includes related international conference coverage. A free copy of the first issue is available from North-Holland/Elsevier, Attn. John Tagler, Journal Information Center, 52 Vanderbilt Ave., New York, NY 10017.

SOURCE SOURCE

TCA now publishes a glossy four-color monthly magazine about its product, *The Source*, a subscription data base for micro-computer users. The magazine, *Source-*

world, features articles, interviews, editorials, and news. A monthly department entitled *The Forum* solicits articles from readers. Forum contributions in the first issue include "Federal Information Management: Is There Any?" "The World Future Network," and "Concerns Within Change." \$2 per issue. Telecomputing Corporation of America, 1616 Anderson Rd., McLean, VA 22102 (703) 356-6790.

ON-LINE DATA BASE NEWSLETTER

IDP Report, which stands for *Information and Data Base Publishing Report*, will be published twice monthly. The first issue is eight pages and packed with news about commercial and experimental on-line information services.

In Columbus, Ohio, a test of home delivery of information via telephone line is planned for this fall in a joint venture by OCLC Inc., a nonprofit corporation that operates a national library network, and Banc One, a bank holding corporation. The system will provide access to a new encyclopedia, bill paying, bill and banking information, a roster of community events and data, and the card catalog of a nearby public and college library.

Columbus is also the home of Qube, the experimental interactive cable tv system. A spokesman for OCLC points out that while only 15% of the population now have

cable, 97% have a telephone. He also points out, however, that tying up the phone to search a data base may be problematic for some.

McGraw-Hill Information Systems, the R&D arm of the publishing firm, reports the development of a new modem they hope to use to deliver the Dodge Report.

Transmission of 2,400 bits per second over telephone lines is being quoted by system consultant Paul Baran, which would mean an average Dodge report of 700 characters would take about three seconds to send. A small test has taken place but the system, it is stressed, is not yet ready for use. The first issue of *IDP Report* also contains reports on TCA's new home information retrieval service, *The Source*, which will be marketed through franchises for a \$100 hookup fee, plus \$15 per hour for prime time use or \$2.75 after 6 p.m. Also covered are plans for the Information Industry Assn.'s survey of the industry, French and British plans as discussed at a recent meeting of IVIPA (the International Videotex Information Providers Assn.), new legal and business indexes, a report on Xerox's acquisition of Kurzweil, and some short financial notes. The newsletter is \$195 per year, multicopy rates on request. Knowledge Industry Publications, Inc., 2 Corporate Park Dr., White Plains, NY 10604 (914) 694-8686. *



THE HEAVY DUTY COUPLER

Heavy duty rubber cups hold fast... knock out noise.

Crystal control punches through rain-soaked, muddy lines to grab weakened signals.

Torture testing boosts reliability above 99%.

DATEC Heavy Duty couplers are guaranteed.

We're building our reputation on acoustic couplers. We've got to build them better.



DATEC

Datec Incorporated
300 E. Main Street
Carrboro, N.C. 27510
(919) 929-2135

DATEC 30 originate only. DATEC 32 originate and answer. Full or half duplex switchable. 0-300 BPS.

If you currently earn between \$20,000 and \$48,000 we've got a better job for you...NOW!

Every day you spend in the wrong job is a waste of time, money and talent...YOURS! Your talents and experience are in great demand and you can choose among many rewarding opportunities available in your field. But how?

Talk to the experts at Wallach. We've been successfully recruiting professionals like yourself for over 15 years.

Nationwide opportunities include technical/management consulting, project management, R&D, test and systems evaluation in the fields of Communications, Satellites, Weapons, Intelligence, Computer, Energy, and Aerospace systems. Specific skill areas include:

- Software Design
- Data Base Design
- Telecommunications
- Minicomputers
- Programming
- Signal Processing
- Digital Systems
- Microprocessor Design
- Systems Architecture
- Applications
- Command & Control
- Systems Programming
- Compiler Design
- EW/SIGINT/ELINT
- MIS/OPs Research
- Diagnostics

Don't waste another day in the wrong job! Call Perri Reeder collect at (301) 762-1100 or send your resume in confidence. We can find you a better job. Let us prove it to you...NOW!

WALLACH...Your career connection
Equal Opportunity Employer Agcy.

WALLACH
associates, inc.

1010 Rockville Pike
Box 6016
Rockville, Maryland 20852
(301) 762-1100

ADVERTISERS' INDEX

SOFTWARE & SERVICES

Allen Services Corporation	278,279
A.P. Publications	281
Atlantic Software Inc.	279
Automated Quill	278
C-S Computer Systems	278
Cytrol	282,283
Dartnell	282
Dataware	282
Duquesne	282,283
Dylakor	282
Evans, Griffiths & Hart	279
Express Software	282,283
Finar Systems	279
Hansco Data Processing	279
Harlan S. Hersey Inc.	279
International Electronic Machinery	280
Legler Systems Company	281
Raymond G. Lorber Inc.	281
Mathematica Products Group	281
MicroPro International	278
Mitchell & Gauthier Assoc.	281
Plycom Services Inc.	281
Polymorphic Computer Systems	280,281
Software Consulting Services	280,281
Tomark	280
Transcomm Data Systems	280
Unique Automation Processing	280
U.S. Robots	280

BUY, SELL, LEASE

Data Products Maintenance	283
InterData Forms & Systems	283
Unitronix Corp.	283

DP MARKETPLACE

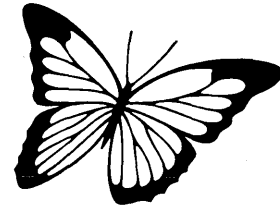
REI Sales Company	283
C.D. Smith & Assoc.	283

JOB MARKETPLACE

Dalton Dalton	284
Federal Trade Commission	284
Improved System Technologies	284
National Personnel Consultants	284
Parker Page Associates	284
Systemation Consultants Inc.	284

SOFTWARE SERVICES

NEW LIFE FOR 1401 PROGRAMS



CS-TRAN converts your 1401 *object* programs to COBOL for the main-frame or mini of your choice.

CS-TRAN is the *only* translator that accepts your object programs, patches and all, yet allows you to include actual COBOL paragraph names and record definitions.

If you'd like more details about new life for your 1401 programs just call or write Russ Sandberg.



C·S Computer Systems Inc.

90 John Street, New York, NY 10038 • 212-349-3535

CIRCLE 207 ON READER CARD



for Shared TAPE and DISK Mounts

Transparently Manages Shared TAPE and DISK Mounts

- MSM automatically controls TAPE ALLOCATIONS among your systems. MSM also works for SHARED MOUNTABLE DISKS.
- Allows more EFFICIENT TAPE DRIVE UTILIZATION. Your tape drives will be treated as a single combined pool, rather than several smaller ones. This will have a tendency to reduce overall tape drive requirements.
- Alleviates confusing operator burdens. Without MSM, operators must manually coordinate device usage among the various systems.
- ELIMINATES COSTLY JOB RE-RUNS due to inadvertent multi-system tape allocation.
- Provides a SINGLE-SYSTEM IMAGE with respect to device allocations.
- MSM is COMPLETELY COMPATIBLE with the standard operating system allocation philosophy. MSM simply extends it to cover all systems in your complex.
- MSM is the ONLY TRANSPARENT APPROACH to handling SHARED TAPE and SHARED DISK allocation.
- MSM now runs with MVS, SVS, MVT, VS1 and MFT.
- New SOFTSWAP feature allows MSM to reduce the scope of allocation "blockage" when a DDR tape SWAP occurs.
- MSM can be installed in 10 MINUTES — NO IPL is required.
- Requires NO SYSTEM MODIFICATION whatsoever.
- Additional overhead caused by MSM is INSIGNIFICANT.
- MSM is now being used in well over 100 installations throughout the world.

To Acquire MSM, or for more information . . .

Toll-Free: 800-543-7853 x 203
(in OH: 513-890-1200)



ALLEN SERVICES CORP.
Software Dept. 212 W. National Rd.
Vandalia, Ohio 45377

CIRCLE 208 ON READER CARD

WordStar™

by



INTERNATIONAL CORPORATION

*"The Leader in
Microcomputer
Word Processing"*

Come by Booth 16 at NCC

MicroPro International Corporation
1299 Fourth St., San Rafael, CA 94901
(415) 457-8990 TLX 340-388

CIRCLE 209 ON READER CARD

D. G. APPLICATIONS AOS and RDOS

Manufacturing
Distribution
Prof. Time Acct.
Construction
Project Mgmt.

Public Warehousing
Photocopy Dealers
Trucking
Report Generator
Business/DBMS

Limited number of distributorships
available in prime areas to qualified D.G.OEM's.



THE AUTOMATED QUILL, INC.

3501 South Corona Suite 5
Englewood, CO 80110
(303) 761-2722

CIRCLE 210 ON READER CARD

PC/70™

PROJECT PLANNING & CONTROL SYSTEM

"BEST TRAINING"
"BEST SUPPORT"
"EASIEST TO USE"

YOUR BEST OPPORTUNITY FOR SUCCESS
Another Productivity Tool from the
Project Management Specialists at:

ASI  Atlantic Software, Inc.
Lafayette Building
Fifth & Chestnut Sts.
Philadelphia, PA 19106
215-922-7500

CIRCLE 211 ON READER CARD

SRCCOMPR IBM UTILITY

- Compares source programs, JCL and card data.
- Detects inserted or deleted lines and continues comparing.
- Shows what changes have been made on a line by showing the old version and the new version.
- Can bypass sequencing columns and comment cards.

Remember...

- IBM utilities fail on inserted or deleted lines.
 - Panvalet or Librarian change-date-stamps do not show what changes have been made.
- OS and DOS versions for \$500. perpetual lease.*

HARLAN S. HERSEY, INC.
106 Quaker Drive,
West Warwick, RI 02893
(401) 822-0176

CIRCLE 212 ON READER CARD

SDM/70™

SYSTEMS DEVELOPMENT METHODOLOGY

"BEST TESTING GUIDELINES"
To Create Reliable Systems

"BEST TUTORIAL MATERIAL"
To Improve Staff Skills

**"BEST APPROACH TO FOSTER
USER & MANAGEMENT
INVOLVEMENT"**

To Achieve Project Success

from **ASI**  Atlantic Software, Inc.
Lafayette Building
Fifth & Chestnut Sts.
Philadelphia, PA 19106
215-922-7500

CIRCLE 213 ON READER CARD

RSTS/E & RSX-11M SOFTWARE PACKAGES

KDSS multi-terminal key-to-disk data entry system
TAM multi-terminal screen-handling facility for transaction-processing applications
FSORT3 very fast record sort for RSTS/E
SELECT convenient, very fast extraction of records that meet user-specified criteria (RSTS/E only)
BSC/DV a DV11 handler for most bisynchronous protocols (RSTS/E only)
COLINK links two RSTS/E systems using DMC11s
DIALUP uses an asynchronous terminal line to link a local RSTS/E system to a remote computer system

Evans Griffiths & Hart, Inc.
55 Waltham Street
Lexington, Massachusetts 02173
(617) 861-0670

CIRCLE 214 ON READER CARD

ESTIMATE PROJECT TIME and COST

- FASTER
- EASIER
- MORE ACCURATELY

with the **ESTIMATOR™**

ANOTHER PRODUCTIVITY TOOL FROM
THE PROJECT MANAGEMENT SPECIALISTS AT:

ASI  Atlantic Software, Inc.
Lafayette Building
Fifth & Chestnut Sts.
Philadelphia, PA 19106
215-922-7500

CIRCLE 215 ON READER CARD

How to count your chickens before they hatch.

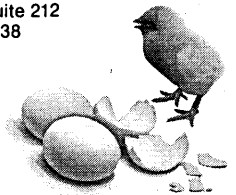
All you need is a DEC PDP-11 with RSTS and FINAR — the financial analysis and reporting language.

- Budgets
- Project evaluation
- Cash flow
- Forecasts
- Planning
- Consolidation

FINAR SYSTEMS

132 Nassau St., Suite 212
New York, NY 10038
(212) 222-2784

Chicago
(312) 698-2023
Houston
(713) 960-0848
San Francisco
(415) 348-8810



CIRCLE 216 ON READER CARD

5120 PACKAGE

Installed at multiple locations, our fully-integrated BICARSA package (Billing — Inventory Control — Accounts Receivable — Sales Analysis) is now available to other Ill parties.

Your first installation will more than cover our one-time fee — then it's all gravy. But don't take our word for it — we have printed material to show you, and a demo kit available to help you make that first sale.

HANSCO DATA PROCESSING, INC.
P.O. Box 236, Wilbraham, MA 01095
413-732-9613

CIRCLE 217 ON READER CARD

PREVENT "Wild Cards" IN YOUR DATA



ALLEN SERVICES CORPORATION

with... SUPER-MSI™

Multiple Systems Integrity Facility™

Consider - SUPER-MSI...

SHARED DASD USERS:

- **PROTECTS YOUR DATA INTEGRITY** by preventing simultaneous destructive updates by jobs in different systems.
- **Eliminates RESERVE Lock-outs** (both performance Lock-Outs and "deadly embrace").
- **DOES NOT SACRIFICE RELIABILITY** as do other approaches to the problem.
- **Now has extended VSAM Dataset Integrity** to specifically handle the internal VSAM Dataset SHR options.
- **Informs Operators and/or TSO users** (as appropriate) about the precise task (job, TSO user, etc.) causing dataset conflicts.
- **Provides powerful operator commands** to Control and Monitor performance and activity.
- **Is TRANSPARENT** to users, and almost transparent to operators.
- **Is Independent of system environment** — for example, it works equally well with MVS, MVS-SE, SVS, MVT, VSI, MFT, HASP, ASP, JES2, JES3, etc.
- **Can be installed in 10 minutes** without an IPL and with **NO SYSTEM CHANGES** whatsoever.
- **MSI is already being used** by well over 400 installations throughout the world.

For More Information, or to Order a No-Obligation FREE TRIAL...

In Europe:

Mr. J.A. Kaluzny
UNILEVER GMBH • 15 Dammtorwall
2 Hamburg 36 • West Germany
Tel: 040 3490 2229

From Anywhere Else:

ALLEN SERVICES CORPORATION
Software Dept. 212 W. National Rd.
Vandalia, Ohio 45377

Toll-Free: 800-543-7853 x 203 (in OH: 513-890-1200)

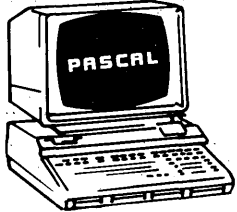
CIRCLE 218 ON READER CARD

Now Eclipse Time-Sharing

- Only time-sharing system for Mapped RDOS, unmapped RDOS and DOS which allows simultaneous FORTRAN, ALGOL, BASIC and assembler program execution
- Supports all standard Data General software
- Can utilize any RDOS-supported hardware
- Multi-user record lockout, multiuser spooling, and shared code support

POLYMORPHIC COMPUTER SYSTEMS, INC.
 P.O. Box 3584
 Boulder, CO 80307
 (303) 422-1182


CIRCLE 219 ON READER CARD



PASCAL

FOR
HP 9835 & 9845

Hewlett-Packard owners have waited a long time. Now at last discover what your 9835A or 9845B can really deliver when you apply the IEM Pascal 35 or 45 system. For complete information call or write.



International Electronic Machinery, Inc.
 P.O. Box 1818 Fort Collins, Colorado 80522
 Phone (303) 226-6672 TWX 910 930 9005

Manufacturer Representatives Inquiries Welcome

CIRCLE 220 ON READER CARD

MORE RT-11 SOFTWARE

- Low-cost WORD PROCESSING
- EZTRAN - Word Processing File Transfer and Remote Program Maintenance.
- Timesharing communications—Text transfers to IBM, UNIVAC CDC, DEC.
- REMOTE JOB ENTRY - high speed link to IBM systems.
- TSX and RTSORT products.
- SIMILE—DATA BASE MGR.

All our products are guaranteed and reasonably priced. Do something for yourself and your company, call us at (714) 549-4832.

Unique Automation Products
 17922 Sky Park Circle
 Suite L
 Irvine, CA 92714
 'DEC PDT/LSI Specialists'

CIRCLE 221 ON READER CARD

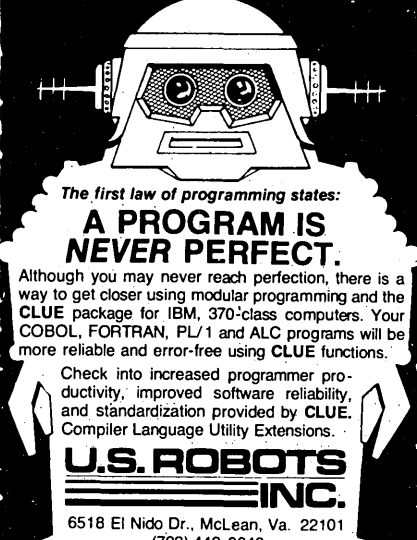
IBM OS USERS

Abend-Aid Can Get You Out of The Dumps.

Cut the high cost of abends with the dynamic software Package Abend-Aid. Prints in English the cause of abends and data needed to correct them.

Call 313-559-9050
TOMARK
 Another service of Compuware

CIRCLE 222 ON READER CARD



The first law of programming states:
A PROGRAM IS NEVER PERFECT.

Although you may never reach perfection, there is a way to get closer using modular programming and the CLUE package for IBM, 370-class computers. Your COBOL, FORTRAN, PL/1 and ALC programs will be more reliable and error-free using CLUE functions.

Check into increased programmer productivity, improved software reliability, and standardization provided by CLUE. Compiler Language Utility Extensions.

U.S. ROBOTICS INC.
 6518 El Nido Dr., McLean, Va. 22101
 (703) 442-9040

CIRCLE 223 ON READER CARD


Yes, you can combine data processing and word processing!

Doc-FTM can turn your general purpose computer into a word processing machine with access to all of your data processing resources. With Doc-FTM you can send "friendly" overdue account form letters to your delinquent customers, and you can print a patient's medical record in humanized upper and lower case. You can also print reports, manuals, program documentation, etc.—and reprint easily from machine readable source (rather than waiting for extensive retyping) when changes occur.

Doc-FTM is a document text formatter which processes user commands to position, justify and paginate text. It is distributed in ANS COBOL source form—both as a stand-alone program and as a callable subroutine—for \$1000.

SOFTWARE CONSULTING SERVICES
 901 WHITTIER DRIVE
 ALLENTOWN, PA 18103
 (215) 797-9690
 ATTN: MARTHA CICHELLI

CIRCLE 224 ON READER CARD



BUSINESS APPLICATIONS

TOLAS-II DEC RSTS/E

ICP Million Dollar Award Winning Products, from the World's First Commercial RSTS Service Center.

DISTRIBUTION SYSTEMS <ul style="list-style-type: none"> • Order Entry/Invoicing • Inventory Management • Sales Analysis • Purchasing 	FINANCIAL SYSTEMS <ul style="list-style-type: none"> • Accounts Receivable • Accounts Payable • Financial Reporting/Analysis • Payroll • Fixed Assets
---	--

TRANSCOMM DATA SYSTEMS
 1380 Old Freeport Road
 Pittsburgh, PA 15238
 (412) 963-6770

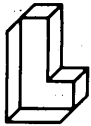
945 Front St.
 San Francisco, CA 94111
 (415) 433-7123

AUTHORIZED **digital** COMPUTER DISTRIBUTOR

CIRCLE 225 ON READER CARD

SERIES /1 Customized Programming

project management systems
general business applications
event driven executive
computer graphics



Raymond G. Lorber,
Incorporated
Systems & Programming Design
4820 Bank of America Center
San Francisco, CA 94104
(415)434-2607

CIRCLE 226 ON READER CARD



FREE
Data booklet on specialized
software information
systems covering:

- * GENERAL SOFTWARE
- * DATABASE SOFTWARE
- * MICRO & MINI SOFTWARE

A. P. Publications Ltd

322 ST. JOHN STREET · LONDON, E.C.1

CIRCLE 227 ON READER CARD

**Now
NOVA
Time-Sharing**

- Only time-sharing system for Mapped RDOS, unmapped RDOS and DOS which allows simultaneous FORTRAN, ALGOL, BASIC and assembler program execution
- Supports all standard Data General software
- Can utilize any RDOS-supported hardware
- Multi-user record lockout, multi-user spooling, and shared code support

**POLYMORPHIC COMPUTER
SYSTEMS, INC.**
P.O. Box 3581
Boulder, CO 80307
(303)422-1182

CIRCLE 228 ON READER CARD

MPGSWIFT for TP applications

Maximize staff productivity
and customer service with MPGSWIFT

- | | |
|-----------------------------|--|
| Ease of Use | Learn to write TP applications in one day |
| Ease of Installation | Install in one hour |
| Maintenance | Add terminals, files, programs while MPGSWIFT continues to operate |
| Language Support | Cobol, Assembler, PL/1, Fortran, RPG, RAMIS |
| Evolution | Entry level to large network without reprogramming |
| Productivity | Online program development with one-half the effort |
| | Over 100 installations. DOS, DOS/VS, and DOS/VSE |

Productive software for business data processing from

Mathematica Products Group

P.O. Box 2392 • Princeton, New Jersey 08540 • 609/799-2600



CIRCLE 229 ON READER CARD

ACCOUNTS PAYABLE

Version 2 (21 COBOL programs) is now available with many cost-saving features and low purchase price. Easy to install, operate and modify. Designed for any size company.

Free brochure describes how this APS software saves time and money call (415) 254-1264 or write:

LEGLER SYSTEMS CO.

23 Charles Hill Road
Orinda, CA 94563

CIRCLE 230 ON READER CARD

DEC RSTS/E USERS

From one of the pioneers in commercial data processing using RSTS. Off the shelf software ready for immediate delivery. Completely interactive. Extensively documented. Fully supported. Ideal for OEM's, service bureaus or end users. Cost effective solutions including:

- ACCOUNTS PAYABLE
- GENERAL LEDGER
- FINANCIAL REPORTING
- ACCOUNTS RECEIVABLE
- PAYROLL

For complete details, contact us at:

Plycom services, Inc.
P.O. Box 160
Plymouth, IN 46563
(219) 935-5121

CIRCLE 231 ON READER CARD

ACSL

The Advanced Continuous Simulation Language is a powerful but easy to use program designed for modelling the behavior of dynamic systems. Applications range from control system analysis to chemical plant models to urban dynamics.

- Interactive or Batch Graphics
- Unlimited Problem Size
- FORTRAN Compatibility
- Stiff Integration

ACSL reduces program development time by factors of two to ten: ACSL is available for CDC 6000/7000, IBM 360/370, UNIVAC 1100, SEL 32, PDP 10/20 and VAX II computers. Access through UCS, CYBERNET and other national networks.

MITCHELL AND
GAUTHIER ASSOCIATES, INC.
P.O. Box 685, Concord, Ma. 01742
(617) 369-5115

CIRCLE 232 ON READER CARD

Give me the right tools, and I can move the world!

SCOBOL™ and SFORTRAN™ are the right tools to make structured coding easy and natural. Why hand-translate from your structured design language to COBOL or FORTRAN? SCOBOL and SFORTRAN extend COBOL and FORTRAN control structures to give you fully nestable *if-then-else-endif*, *while-do-endif*, *select-case-endif*, and 5 others. The precompilers automatically translate your S-language programs into equivalent COBOL or FORTRAN.

The precompilers are written in the S-languages themselves. That's why they can be run on so many machines. If your computer has a reasonably standard COBOL or FORTRAN compiler, we probably already have either SCOBOL or SFORTRAN installed on it. Contact us for details. SCOBOL and SFORTRAN are distributed in source code form for \$1400 each. Monthly lease plans are available.

Software Consulting Services

901 Whittier Drive
Allentown, PA 18103
(215) 797-9690

CIRCLE 233 ON READER CARD

RXS-11 USERS

Do you need increased thruput???

The standard RSX-11M disk driver does not take full advantage of hardware overlap capabilities. All thirty installations of CYTROL's Overlap Seek Disk Driver (OSDD) have benefitted from system thruput improvements!

OSDD features include:

- overlapping of seek operations with data transfer
- support for RK, RM, RP and all compatible drives
- dual porting support
- all standard driver functions
- compatible with all versions of RSX-11M
- simple installation - no SYSGEN

CYTROL Incorporated
4570 West 77th Street
Edina, MN 55435

CIRCLE 234 ON READER CARD

ATTENTION SHARED DASD AND SHARED TAPE USERS ... YOU NEED SDSI/STAM

SDSI Shared Dataset Integrity

- SDSI protects data integrity by guarding against concurrent update from multiple CPUs.
- SDSI automatically improves system performance by eliminating device RESERVES.
- SDSI eliminates RESERVE LOCK-OUTS.
- SDSI provides operator and TSO users information about dataset conflict conditions.
- SDSI requires no system or user program modifications and installs in minutes.

STAM Shared Tape Allocation Manager

- STAM automates the sharing of tape and DASD devices thus allowing allocation decisions to be made faster and reducing the possibility of human errors.
- STAM makes more efficient use of tape pools thus allowing you to reduce tape drive requirements.
- STAM provides global operator commands and control.
- STAM eliminates JOB re-runs due to multiple tape drive allocation errors.
- STAM requires no system or user program modifications and installs in minutes.



**DUQUESNE
SYSTEMS INC**

TWO ALLEGHENY CTR.
PITTSBURGH, PA 15212
PHONE 412-323-2600
TELEX 902 803

CIRCLE 235 ON READER CARD

WHAT'S NEW? READ THIS!

LIBRA+

A remarkable on-line performance monitor and partition balancer for DOS/VS and DOS/VSE.

The LIBRA+ package contains a variety of job control and diagnostic facilities. The product's emphasis is on detecting bottlenecks and solving problems with minimum impact on system performance.

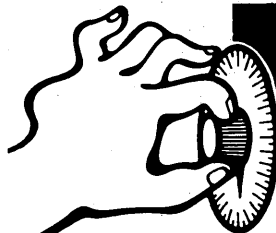
LIBRA+ reduces the need for emergency IPL's, job cancellations and program reruns. Besides these throughput and performance benefits it also increases on-line user satisfaction by providing facilities to rescue the on-line system when it stalls or when users complain about response time.

Send for Free system-details today. Act now!

**EXPRESS
SOFTWARE**

125 Jericho Tpke.
Jericho, NY 11753
(516) 333-6733

CIRCLE 236 ON READER CARD



The Right Combination

Unlock those tough conversion problems with Dataware's proven combination of software and services.

SPS/1400/1410 AUTOCODER to ANS COBOL

The industry's most successful translator will eliminate the burdens of emulation and costly maintenance of second generation language.

For more information please call or write today!

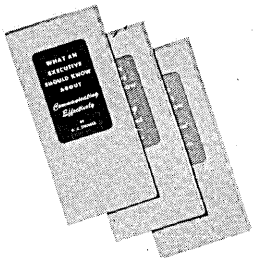
The Conversion Software People

Dataware, Inc.

2565 Elmwood Ave., Buffalo, NY 14217 (716) 876-8722

TELEX
91519

CIRCLE 237 ON READER CARD



Helps your executives increase output and profits!

What An Executive Should Know . . .

(a low-cost, self-administered executive development program)

Each month your executives receive a timely, 24-page, easy-to-read pocket-size booklet guaranteed to . . . educate, motivate and challenge them to do an even better job. Typical titles are—What An Executive Should Know About: 1) Himself, 2) Management, 3) Managing People, 4) Making Decisions, 5) Planning For Growth, 6) Managing Time Profitably, 7) The Art of Administration, 8) Human Relations, 9) Communicating Effectively, 10) Innovation In Management. Try one issue FREE.* (Minimum of 5 copies per issue.)

5 to 9 copies ... \$1.08 each 10 to 49 copies ... \$1.05 each 50 to 99 copies ... \$1.03 each

Yes . . . enter our trial subscription for ___ copies each month. (Minimum: 5 copies a month.) *If not completely satisfied, we may cancel after one month and owe nothing.

Firm _____ Name _____

Sig. _____ Address _____

City & State _____ Zip _____

Complete & Mail For Your FREE Trial Subscription . . . Today - to: DARTNELL, 4660 Ravenswood Avenue, Chicago, IL 60640.

DATM-580-S

CIRCLE 238 ON READER CARD

Report Writer/ EDP Audit Software Tools for 360/370/4300*

Dylakor

16255 Ventura Boulevard
Encino, California 91436
(213) 995-0151



Over 1000
Installations

*303X, AMDAHL, ITEL, etc.

CIRCLE 239 ON READER CARD

EDP Managers... You need QCM

You've tried solving your performance problems with hardware monitors, sampling software monitors, unsatisfactory billing systems, SMF and RMF inadequacies, simulators, . . .

Now, try something that works! QCM.

QCM is the only complete system that precisely monitors all hardware and software processes, accurately bills all operations and improves performance . . . all on a full-time basis.

Let us show you how QCM has meant control, efficiency, confidence and dollars to our customers.

Fill in and mail the coupon or call:



**DUQUESNE
SYSTEMS INC.**

1511 Park Building
355 Fifth Avenue
Pittsburgh, Pa. 15222
(412) 281-9055

I'm ready to try something that works! Please provide more information about QCM.

MVS OSVS VSI MVT OMFT

Name _____

Title _____

Organization _____

Address _____ Telephone _____

City _____ State _____ Zip _____

CIRCLE 240 ON READER CARD

WHAT'S NEW? READ THIS!

DATA-GO

At last... a truly comprehensive test data generator for DOS, DOS/VS and DOS/VSE.

Let's face it. Plodding through live data files to create a realistic test is no easy task. Chances are not every possible condition will automatically be found. But with DATA-GO one needs only describe the data desired.

Not only does DATA-GO reduce user effort in testing programs but it also provides for a more thorough test. This eliminates possible errors in later production execution of the program.

Use Reader Service Number and we'll immediately ship complete system details to you free of charge or write to us directly. Act now!

**EXPRESS
SOFTWARE**

125 Jericho Tpke.
Jericho, NY 11753
(516) 333-6733

CIRCLE 241 ON READER CARD

PDP-11 TRANSACTION PROCESSING

CCS-11 is an efficient data base/data communication system with a proven record in the PDP-11 based commercial applications world. It extends RSX-11M to provide:

- A communications management system that supports up to 300 terminals and provides powerful yet easy to use screen formatting, input editing, and data validation facilities.
- Machine to machine communication including facilities for point-to-point BSC communication with IBM mainframes.
- A comprehensive data base management system that is specifically designed for high volume transaction processing and includes features like a CODASYL-type data manipulation language, shadow recording, and data base journaling.
- Simultaneous real-time, batch, program development and system maintenance.
- Many other features that make on-line transaction processing easier and less expensive.

Applications can be written in any DEC supported language and have access to all RSX-11M services.

CYTROL Incorporated
4570 West 77th Street
Edina, MN 55435

CIRCLE 242 ON READER CARD

BUY, SELL, LEASE

WHEN YOU NEED

DEC...

TERMINALS

- VT-100
- LA36
- LA120
- LA180

PDP11/03 SYSTEMS

LSI/11 MODULES

Demand... Delivery Demand... Discounts
Demand... UNITRONIX



UNITRONIX
CORPORATION

(201) 874-8500

198 Route 206 ■ Somerville, NJ 08876
TELEX 833184

CIRCLE 243 ON READER CARD

INFLATION—Need not cause you a financial dilemma

Let us show you how to save time and money with our skills and experience. Through our expertise in Forms Design you can increase efficiency and reduce expensive handling costs. One of our specialties is the Data Mailer; it eliminates costly separation of components parts, assembling, inserting and sealing.

We are your source for all your Business Forms and Computer Products requirements.

With us, "meeting deadlines", is a normal function. Large or small orders are handled with the same courteous and considerable care. *Still Skeptical?* Then let us call on you and prove what we mean.

Please have your representative phone, call on us.

Name _____ Title _____

Company: _____

Address: _____

Telephone No.: _____ Ext: _____

Inter Data Forms & Systems, Inc.
19 West 44th Street
New York, N.Y. 10036

CIRCLE 244 ON READER CARD

DP MARKETPLACE

FOR SALE!
Like new HP 2621
interactive terminals

This asynchronous terminal operates at 110-9600 baud rate, has a 24 x 80 display (high-resolution 1920), RS232C full duplex operation, a 128 ASCII character set, 8 programmable function keys, and two full pages of buffered memory. Best of all, it comes with a full 30 Day Warranty.

HP 2621A \$1,350 (list price \$1,495)
HP 2621P \$2,395 (list price \$2,650)

Phone toll-free (800) 225-1008

In Massachusetts, call (617) 273-2777. Or, you may get your free new REI Sales Catalog by writing:

19527 Business Center Drive
Northridge, California 91324

CIRCLE 246 ON READER CARD

OHIO SCIENTIFIC

Get the catalog and
our low prices

**DATA PRODUCTS
MAINTENANCE CORP.**
9460 Telstar
El Monte, CA 91731

(714) 994-4180
(213) 573-5991

CIRCLE 245 ON READER CARD

BROKER IN

DEC SYSTEMS & COMPONENTS

**C.D. SMITH &
ASSOCIATES, INC.**
730 N. Post Oak Road,
301
Houston, TX 77024
713-686-9405

CIRCLE 247 ON READER CARD

FINANCIAL PROGRAM ANALYST

Exciting position is open with a leading consulting firm for an individual with at least 3 years financial programming experience. Our requirements call for a minimum of 3 years COBOL. This energetic person should also have a business or accounting background. Bachelor's Degree in Mathematics, Business Administration or related field, or equivalent practical experience, is a must. This is an excellent opportunity for a supervisory position for the right individual. Excellent starting salary and employee benefits. For interview, please send resume to:

Donald T. Parent
DIRECTOR OF HUMAN RESOURCES
DALTON *DALTON *NEWPORT
3605 Warrensville Center Road
Cleveland, Ohio 44122
 An Equal Opportunity Employer M/F

CIRCLE 248 ON READER CARD

Independent (or about-to-be independent) consultants
Can you teach
Structured Analysis/Structured Design?

IST Associates present seminars on our structured systems development methodology, all across North America (so it doesn't matter where you live), and also in Europe and S. America. We provide consulting help to our clients in developing systems using Structured Analysis/Design (as set out in the book by our principals, Gane & Sarson). Most Associates make a high income working for IST 10 or 15 days a month, and are free to do their own work (or sleep or ski or sail) the rest of the time. If you combine experience in structured development with an ability to teach in an amusing, charismatic style, send your statement of competence to:

Greg Grosh, Improved System Technologies, Inc.
888 Seventh Avenue, New York, N.Y. 10019

CIRCLE 249 ON READER CARD

TOLL FREE PROGRAMMERS

SEATTLE	BOISE
PORTLAND	DENVER
LOS ANGELES	SALT LAKE
SAN FRANCISCO	SPOKANE
SAN JOSE	SAN ANTONIO
PHOENIX	

18-26K

SYSTEMS ANALYSTS

SEATTLE	LOS ANGELES
DALLAS	LONG BEACH
HOUSTON	KANSAS CITY
SAN FRANCISCO	ATLANTA

20-32K

SCIENTIFIC PROGRAMMERS

CLEVELAND	SAN JOSE
DALLAS	HAWTHORNE CA.
EL PASO	HOUSTON

27-34K

SR. ANALYSTS

SEATTLE	OAKLAND
SAN FRANCISCO	MILWAUKEE
PORTLAND	PHOENIX

26-34K

**All Resume's Confidential
 No Preference Without Your
 Approval**

DOUG YAMADA
PARKER PAGE ASSOCIATES
PO Box 12308
SEATTLE, WA 98111

LOCAL 206-622-6848
OUT OF STATE 800-426-0342

CIRCLE 251 ON READER CARD

EDP SPECIALISTS

EES, PROGRAMMERS, SYSTEMS ANALYSTS, \$16,000-\$45,000. Immediate outstanding opportunities. Sunbelt. Nationwide. Leading companies. Positions available at all levels. Reply in confidence to J. F. Halloran, President, NATIONAL SEARCH, P.O. Box 73006, Houston, TX 77090 (713/376-9383).

ENGINEER, \$40K. So. Cal. Engineering Group/State-of-the-Arts Air Defense System/Design-Installation-Test-Proj. Mgr. Contact THE PROFESSIONAL SEARCH GROUP, SALLY WALTERS PLACEMENT AGENCY, 320 Market St., San Francisco, CA 94111 (415/981-1414).

EDP MANAGEMENT / SYSTEMS ANALYSTS / PROGRAMMERS, \$18,000-\$40,000+. Choice upstate NY & U.S. open positions. EDP placement specialists. In confidence send resume or call James F. Corby, Pres., NORMILE PERSONNEL, 5 Leroy St., Box 110 Westview Station, Binghamton, NY 13905 (607/723-5377).

all positions listed are fee-paid



CIRCLE 250 ON READER CARD

PROGRAMMERS ENGINEERS

with systems programming/software dev exp IBM/OS & other large systems or minicomputer assembly language sought by quality energy, mfg, systems & consulting cos. Software, hardware & real time applications optys. \$19-32,000 SW, SE, W, MW & NE. Other clients seek business applications analysts & programmers with financial, mfg, or energy co applications exp Cobol, PL1, RPG, assembly \$18-29,000 SW & SE.

Confidential contacts controlled by you. Resume to J. L. Gresham, BChE, MBA will contact you at home first. Est. 1966. member AIChE. Fees paid. (713) 781-3300.

Systemation Consultants, Inc.
 employment service

P.O. Box 42212 Houston, Texas 77042

CIRCLE 252 ON READER CARD

The Federal Trade Commission has immediate openings for Data Processing and Information Systems Professionals
Salary (GS-5, \$11,243 p.a. to GS-12, \$24,703)

These individuals will serve as computer technicians, programmers, and systems analysts in the application areas of:

- Legal support systems
- Administrative systems, and
- Management information systems.

Assignments are challenging, the user groups are highly professional attorneys, economists and managers, and opportunities exist for professional technical growth. Highly qualified applicants for GS-11 and GS-12 positions will have COBOL and IBM JCL experience. DBMS, especially INQUIRE, experience is desirable.

To apply: Send a current SF-171, performance appraisal, and OPM rating to:

Federal Trade Commission
Division of Personnel
6th and Pennsylvania Avenue, N.W.
Washington, D.C. 20580
Room 121
ATTN: LeBaron Frost

If you need additional information please contact LeBaron Frost on (202) 523-5046.

CIRCLE 253 ON READER CARD

SOFTWARE

PROFESSIONALS...

When was the last time you were allowed to design, de-bug, document, test...and deliver...an entire project?

It's S.O.P. at ITT Avionics. At ITT Avionics . . . the industry leader . . . there's always a wide diversity of active projects for you to get your hands on. Work in electronic defense . . . communications . . . navigation/identification . . . with a relatively new and growing group of dedicated professionals.

You'll stay with a project—from start to finish—and see the fruits of your labor . . . be involved in integration . . . and have abundant support equipment including advanced hardware interfaces to give you realtime display of what you're doing.

You'll work in a campus-like setting in Northern New Jersey, 11 short miles from Manhattan and its attractions, but far from its hassles. And, you'll be in the center of one of the finest residential and recreational areas of the country . . . with a wide choice of excellent schools.

SOFTWARE ENGINEERS

All levels available. Bachelor's preferred in one or more of the following: Electrical Engineering, Physics or Computer Science (experience in lieu of degree would be considered). Real-time Assembly language programming background desired. Responsible for software design, coding, testing and integration of the software programs into signal processing, electro-optical scanning/tracking and other systems. Experience should include one or more of the following areas:

• Airborne Minicomputers • Radar Warning Receivers • Radar Signal Processing • Total Systems Integration • Multi-Computer Architecture • Microprocessors • Threat Analysis • Emitters • Receiver Definitions • Surveillance Radar • C³ Systems

These exceptional career opportunities provide competitive salaries, outstanding relocation and settling-in package . . . and comprehensive fringe benefits, including 100% tuition refund.

Call COLLECT to Henry Balbo at (201) 284-3023

**Or send your resume to Mr. Balbo,
ITT Avionics Division, 390 Washington Avenue,
Nutley, New Jersey 07110.**

ITT AVIONICS DIVISION

An Equal Opportunity Employer, M/F

U.S. Citizenship required.

CIRCLE 194 ON READER CARD

COMPUTER PROGRAMMERS

In historic Alexandria, Virginia, Defense Logistics Agency (DLA) offers computer programmers big challenges and great opportunities for advancement. Our role in America's defense posture is the worldwide supply and logistics support of the four U.S. Military Services.

Openings exist for applications programmers for the IBM 360/370 and UNIVAC 1100/80 series computer systems.

Positions are in the U.S. civil service in salaries ranging from \$13,925 to \$17,035 per annum, with potential to \$26,794.

Requires experience in developing programs in COBOL and/or assembler language. Experience using structured design and programming concepts is also highly desirable although not required.

In addition to conventional batch applications, personnel will be involved in teleprocessing, and Data Base Management Systems (CCA Model 204 and QLP/DMS-1100).

So come join the DLA team in our partnership with the Military Services and enjoy all the benefits, stimulation and opportunities offered by career positions with the U.S. Government.

For immediate consideration, send your resume or Federal Personal Qualification Statement, Standard Form 171 (available at the Post Office), to:

**Defense Logistics Agency
ATTN: DASC-ZE(B), Rm 4D690
Cameron Station
Alexandria, Virginia 22314**

U.S. citizenship required
An Equal Opportunity Employer

ADVERTISERS' INDEX

Able Computer	245	Digital Research	97
Adage Interactive Computer Graphics	48	DuPont RECRON COM Silver Film ...	271
Alpha Micro Computer	241	Dunn Instruments, Inc.	205
A.M. Jacquard Systems	91	Eastman Kodak Co.	173
American Association for Artificial Intelligence	266	ECS Microsystems	75
Anderson Jacobson, Inc.	247	Edutronics/McGraw-Hill	287
Applications Software, Inc.	261	Elgar Corporation	203
Applied Digital Data Systems	66,67	ENA DATASYSTEMS, Inc.	190
Auerbach Publishers Inc.	133	Enivel Management, Ltd.	274
Aydin Controls	167	Exide Electronics	265
Bell Systems	182,183	Floating Floors, Inc.	82
Braegen Corporation	114,115	Floating Point Systems, Inc.	101, 105
BTI Computer Systems	20	Fox-Morris Personnel Consultants ..	290
Carterfone	103	Frequency Technology, Inc., TDC Div.	199
Century Data Systems	206,207	General Electric, Information Services Co.	192,193
Cincom Systems, Inc.	162,163	General Electric, Space Div.	291
Codex Corporation	191	General Electric TermiNet	181
Computer Corporation of America ..	249	General Electric VIDEO	246
Computer Devices, Inc.	149	Goal Systems Corp.	215
Computer Sciences Corporation	216,217	GRAPHIC CONTROLS Coated Products Div.	201
Computer Task Group, Inc.	255	GTE-Telenet, Marketing Communications Dept.	32,33
Computer Transceiver Systems, Inc.	253	Halcyon	176
Condition Power	116,117	Harris Data Communications Div.	69
Control Data Corp.	142,143,211	Hewlett Packard Corvallis	139
Cromemco Incorporated	2	Hewlett Packard Terminals	259
Crown Industries	158	Hewlett Packard	218
Crown Publishers	240	Honeywell	16,17
Cullinane Corporation	99	Houston Instrument	127
DASD Corporation	92	Hughes Aircraft Company	44
Data General Corporation	110,111	IBM-General Systems Division ..	118,119
Data Set Cable Company, Inc.	88	ICCC/80 Executive Committee	151
Data Systems Design, Inc.	95	Informatics Inc.	23
Datafusion Corporation	80	Information Builders Inc.	72
DatagraphiX	223	Infotron Systems Corporation	239
DATAMATION	222	Innovation Data Products	296
Datapoint Corporation	5	Intel Commercial Systems Div.	10,11
Dataram Corporation	81	Intelligent Systems Corp.	237
Datec Incorporated	276	Interface Mechanism, Inc.	180
Datum	Cover 3	Intermetrics	230
Defense Logistics Agency	286	International Data Sciences	248
Digital Equipment Corporation	58,59,128,129	International Entry Systems	4
		International Systems, Inc.	70

Interstate Electronics Corporation	.. 130
ISSCO	..... 84
C.ITOH	..... 221
ITT Avionics Division	..... 285
Johnson Systems, Inc.	..... 108
Kennedy	..... Cover 2
KV Jackets, Kleer-Vu Industries, Inc.	.. 90
Kwik Kopy Corporation	..... 272
Lear Siegler Inc. Data Products Div.	46,47
Management and Computer Services, Inc.	..... 8
Markline	..... 263
Martin Marietta Aerospace	..... 290
Matrix Instruments	..... 157
Maxell Corporation of America, Data Products Group	..... 275
McCormack & Dodge Corporation	.... 37
Megatek Corporation	..... 147
Memorex Computer	..... 208
Methods Research Corp.	..... 274
Micom	..... 231
Micom Systems, Inc.	..... 107
Microengine Company	..... 295
Micropolis	..... 86
Mostek Memory Systems	..... 120,121
MSA	..... 153
Nanodata Computer Corporation	... 257
National Advanced Systems	..... 56,57
NBI	..... 113
NCR Corporation Micrographic Systems Div.	..... 155
NEC Information Systems, Inc.	..... 9
Network Systems Corp.	..... 27
Nichols and Company	..... 106
Nixdorf Computer Corporation	.... 28,29
North Star Computers	..... 164
Northern Telecom Systems Corp.	.. 24,25
Norton, Kleven and Co., Inc.	..... 272
OCLI	..... 138
Olamic Systems Corp., Software Publishing Div.	..... 54
Olamic Systems Corp., Software Services Div.	..... 40
Pansophic	..... 34
Paradyne	..... 14,15
Pitney Bowes	..... 267
Planning Research Corp., Central Software	..... 36
Plessey Peripheral Systems	..... 41
Prime Computer, Inc.	.... 30,31,102,289
Printronix, Inc.	..... 109

Your DP Training Is An Investment!

Make it a profitable one with the help of Edutronics/McGraw-Hill. Money Spent on DP training is an investment. The expected dividend, of course, is an increase in efficiency and productivity. So why gamble with your money and your people. Invest in an organization with an international reputation, extensive resources and unlimited growth potential. Invest in Edutronics/McGraw-Hill. We can help make the most of your training investment today as well as tomorrow. Whether it's DP training in subject areas such as CICS, TSO, VM, VSAM, MVS, or structured COBOL, we've got what you need in a library of videotapes designed to be used on your job site. For more information on making the most of your DP training investment, write or call us toll free at 1-800-255-6324. We'll turn your investment into a profit.



Edutronics/McGraw-Hill

55 Corporate Woods
9300 W. 110th St.
Overland Park, Ks.
66210

See us in Booths
1209 and 1211 at NCC

Tell me more about an Edutronics/McGraw-Hill training investment

Name _____

Company _____

Title _____

Computer Hardware _____

Address _____

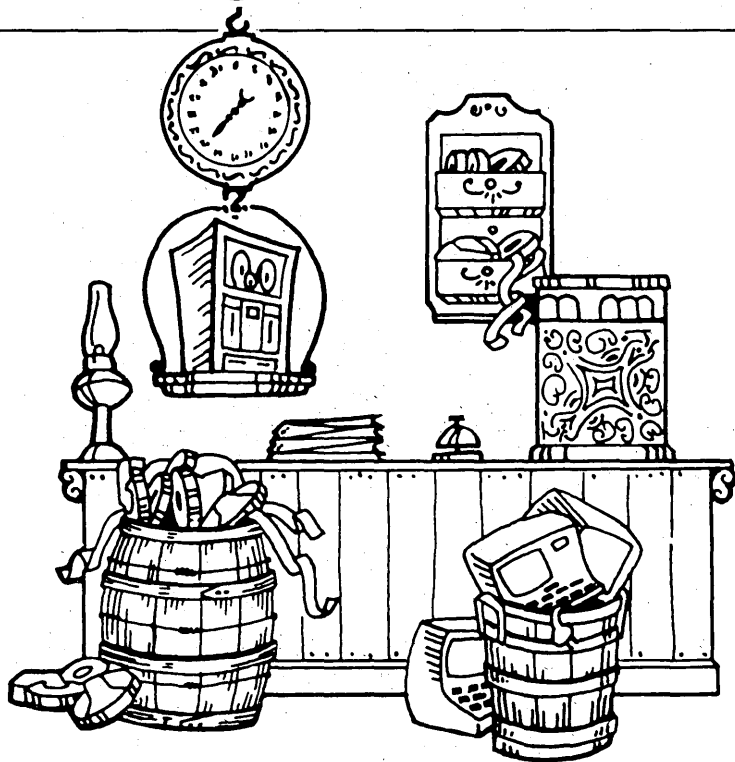
City _____ State/Province _____ Zip _____

Phone _____

CIRCLE 196 ON READER CARD

Quest Systems, Inc. 258	Sun Information Services Company . 197	Turnkey Systems, Inc. 76
Quodata 94	Surgeonics Limited 96	United Technical Products, Inc. 266
Qytel, Data Terminal Div. 256,264	Syncom 273	Universal Data Systems 194
		University Computing Company 224,225
		University Microfilms International ... 38
Racal-Milgo Information Systems, Inc. 134	Tally Corporation 60	Vector Graphic 251
Racal-Vadic 169	Tandem Computers, Inc. 174,175	Verbatim Corporation 159
Radio Shack 39	T-Bar Incorporated 73	Visual Technology, Incorporated 77
Raytheon 137	Tektronix, Inc., Information Display Div. 6,7,79,160,161	Wabash Tape Corporation 230
RCA, Data Services 100	Teletype Corporation Cover 4	Wallach Associates, Inc. 276
Rental Electronics, Inc. 83,85,87	TeleVideo, Inc. 179	Wang Laboratories, Inc. 51,294
Rixon, Inc. 71	Telex Computer Products, Inc. 171	WESPERCORP, Div. of Western Peripherals 1
	Telos Systems Development 96	Westinghouse Electric Corp. 258
SAS Institute, Inc. 213	Texas Instruments, Inc. ... 12,13,226,292	Winthrop Publications 264
SICOB 277	3M Co. 140,141	Wrightline 89
Software AG of North America, Inc. .. 187	3M Co., Data Products 104	
Source Edp 268	Timeplex, Inc. 53	Xerox 242,243
Spectrum International Incorporated 229	Tran Telecommunications 55	Zentec Corporation 18,19
Sperry Univac 232,233	Transaction Technology, Incorporated 65	
Storage Technology Corporation . 42,43	TransNet Corporation 256	

MOVE THE GOODS.



**USE THE
DATAMATION
MARKETPLACE
ADVERTISING
SECTION**

**CALL FRANCIE:
(212) 489-2200**

**Prime opportunities.
Find them at NCC '80.**

We are looking for people with computer experience in Sales, Systems, Field Engineering, Marketing Planning & Development, Engineering, and Research & Development. If you are one of these folks we want to give you the opportunity to discover what it is like to work for the most exciting computer company in the world.

During your visit to the NCC we extend an invitation to you to meet with us to discuss your skills and the outstanding opportunities we offer. Our formula is simple - if you are very good we'll treat you that way.

**Sales, Systems &
Field Engineering**

If your track record shows that you can sell, you should know that we place no cap on earnings for Marketing Reps; we have an accelerating commission plan. The more you sell the more you earn. The Systems and Field Engineering environments at Prime are alluring - personally, financially and professionally - just ask us to show you.

**Marketing Planning &
Development**

In a state-of-the-art environment, interface on product and market strategies with functional elements throughout the corporation. Discover how our remarkable growth has created personally rewarding and professionally challenging opportunities in product planning, market planning and development, training, and corporate communications.

**Engineering and
Research & Development**

Apply conceptual and creative design ability in many new and existing product areas in Engineering; conduct independent research in R & D; work in an environment where we ask you to develop, drive, sell, and implement your ideas.

**To arrange for an
interview.**

During your visit to the NCC, call (714) 975-0262, or send your resume to PRIME COMPUTER INC., 21052 Oxnard Street, Woodland Hills, California 91367.

**PRIME
Computer**

Booth 2353

EDP SPECIALISTS

career search opportunities

\$18,000-\$50,000

DIRECTOR, SYS. & D.P. to \$36,000. Leading div of "Fortune 500" company seeks exp'd pro to direct DP efforts. Degree w/10 yrs exp w/emphasis on mfg applications data base design in large shop environment. Refer RN.

MED. INSTRUMENT SOFTWARE to \$32,000. Prestigious corp needs exp'd software design engr w/future mgmt potential for their fastest growing multi-million \$ medical electronics div. Attractive Mid-Atl suburban location. Refer HG.

SR. SYSTEMS to \$30,000. Billion \$ prestige mfg corp in choice VA location seeks Sr. Analyst w/exp in financial, accounting, payroll or inventory areas. Exceptional growth oppty. Refer DM.

DATA BASE ADMIN. to \$30,000. "Fortune 100" Corp Computer Center seeks candidate to develop on-line data base information systems/DBMS libraries. IMS/

TOTAL preferred. Metro location. Refer AT.

ANALYST to \$30,000. We currently have numerous oppty's for Analysts & Programmers at most levels of exp. Financial & Manufacturing Systems preferred. All costs paid by client co's. Refer JS.

MGMT. SOFTWARE DVLPMNT. to \$30,000. "Fortune 500" Systems Control Div seeks supervisory candidate to direct dvlpmnt of distributed computer systems. Real time process control environment. Ideal metro location. High visibility position. Refer AT.

SR. SUPPORT ANALYST to \$29,000. Atlanta computer service co seeks a "senior troubleshooter" to assist in all phases of application dvlpmnt. Will be individual contributor as well as a "team player" depending on scope of project. Req's 7+ yrs hvy technical bkgd. Honeywell, GCOS w/IDS-1 a "must." Excellent growth oppty. Refer RS.

CONTACT OUR NEAREST OFFICE ABOUT THESE AND OTHER FEE-PAID OPPORTUNITIES.
OUR UNIQUE, COMPANY-OWNED OFFICE SYSTEM ASSURES PERSONAL, CONFIDENTIAL SERVICE.

PHILADELPHIA, PA 19102—S. Burns, 1500 Chestnut St., 215/561-6300
ATLANTA, GA 30346—R. Spang, 47 Perimeter Center, 404/393-0933
BALTIMORE, MD 21204—R. Nelson, 409 Washington Ave., 301/296-4500
CHARLOTTE, NC 28202—J. Schwab, 1742 Southern Nat'l Ctr., 704/375-0600
CLEVELAND, OH 44131—A. Thomas, 5755 Granger Road, 216/749-6030
CLEVELAND, OH 44101—D. Miller, 7921 Jones Branch Drive, 703/790-1335
MCLEAN, VA 22101—N. Shanahan, 1211 Ave. of the Americas, 212/840-6930
NEW YORK, NY 10036—J. Beck, 4 Gateway Center, 412/232-0410
PITTSBURGH, PA 15222—J. Dean, 3490 U.S. Rt. 1, 609/452-8135
PRINCETON, NJ 08540—H. Greene, 3411 Silverside Rd., 302/478-5150
WILMINGTON, DE 19810—G. Smith, 3000 Richmond Ave., 713/523-5504
HOUSTON, TX 77098—W. McNichols, 707 Wilshire Boulevard, 213/623-3001
LOS ANGELES, CA 90017—W. McNichols, 601 Montgomery St., 415/392-4353
SAN FRANCISCO, CA 94111—W. McNichols, 601 Montgomery St., 415/392-4353

FOX-morris
personnel consultants
CIRCLE 200 ON READER CARD

Tomorrow-minded UNIVAC APPLICATION ANALYSTS

Martin Marietta Aerospace, NASA's Contractor on the Space Shuttle External Tank, has immediate openings for Univac Application Analysts.

Position requires designing and programming a variety of engineering and specific programs utilizing ANS/COBOL for application on Univac 11XX equipment.



Qualified individuals should possess a BS in Mathematics, Computer Science, or related discipline, and have a minimum of 3 years scientific and/or business programming utilizing data base methodology.

We offer competitive starting salaries and fully paid company benefits. These opportunities exist at the Michoud Assembly Facility located in Suburban East New Orleans. Qualified candidates interested in learning more about these opportunities at Martin Marietta...the tomorrow-minded aerospace people, should forward resumes including salary history to: Ms. Dottie McCann, Martin Marietta Aerospace, P.O. Box 29304, New Orleans, Louisiana 70189. We are an equal opportunity employer, m/f/h.

MARTIN MARIETTA

CIRCLE 201 ON READER CARD

ADVERTISING OFFICES

Sales Manager
John M. Gleason
New York, NY 10019
666 Fifth Ave.
(212) 489-2200

Eastern District Managers
A. Treat Walker,
Warren A. Tibbetts:
New York, NY 10017
420 Lexington Ave.
(212) 682-7760

New England District Manager
Warren A. Tibbetts:
Manchester, NH 03104
112 W. Haven Rd.
(603) 625-9498

Midwest District Manager
William J. McGuire
Chicago, IL 60601
3 Illinois Center Building
303 East Walker Drive
(312) 938-2900

Western District Managers
Alan Bolté, Jr.:
Los Angeles, CA 90035
1801 S. La Cienega Blvd.
(213) 559-5111

James E. Fillatrault:
Mountain View, CA 94043
2680 Bayshore Frontage Rd.
Suite 401
(415) 965-8222

U.K., Scandinavia, Benelux
Intergroup Communications, Inc.
Wallace K. Ponder, European Director
Paul D. Dimmock, Regional Manager
31 Lyncroft Avenue
Pinner, Middx, HA5 1JU
England
Tel: (01) 868 9289
Cables: PACOM, Pinner

Germany, Austria, Eastern Europe
Tullio Giacomazzi
130 Jermyn St.
London SW1 Y4UJ
Tel: (01) 839 3916

France, Italy, Spain
Gerard Lasfargues
32 rue Desbordes Valmore
750 16 Paris
France
Tel: (1) 504 97 94

Japan
Shigeru Kobayashi
Japan Advertising Communications, Inc.
New Grinza Building
3-13 Ginza 7-chrome
Chuo-ku, Tokyo 104, Japan
Tel. (03) 571-8748

James B. Tafel, Chairman
John K. Abely, President
Robert L. Dickson, Exec. Vice President
John R. Emery, Senior Vice President
Calverd F. Jacobson, Vice President-Finance
Walter Harrington, Vice President and Controller

Technical Publishing

DB a company of
The Dun & Bradstreet Corporation

Satellites on GE Software

So does almost every program underway at GE Space. In fact, fully 35% of our total business is software and data systems.

Our large scale programs . . . earth observation systems, command and control systems, weather satellites, space surveillance programs, communications satellites, ground data processing systems, space shuttle payloads, simulation systems and others . . . have one thing in common. They're as much hardware as software. In short, GE Space is in computer and software technology from the ground up.

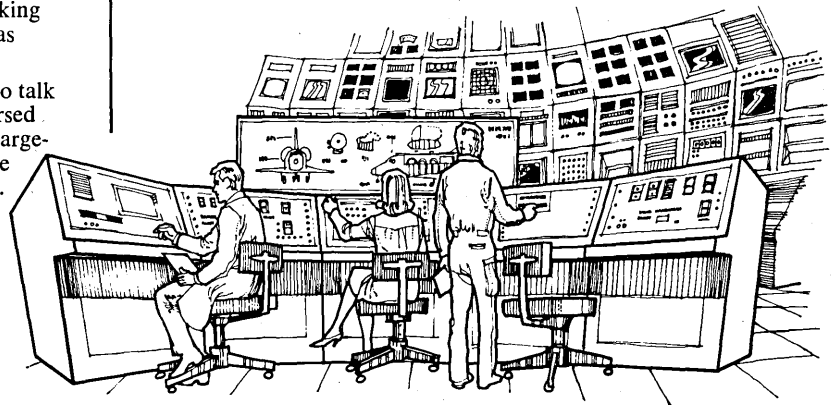
We're giving IBM, TRW and other heavyweights a run for the money. Our software development capability is growing daily. Already we are moving data between ground and satellites at rates in excess of 85 million bits-per-second. We're making comparable advances in other directions such as special purpose processors and software R&D.

These are some of the reasons why we'd like to talk to you if you are (1) a systems engineer well-versed in software development and experienced on large-scale data systems . . . or (2) a seasoned software architect, systems analyst or software engineer.

Apply by sending your resume and salary history to: Mr. W. E. Sarno, Dept. #VF-65-E, General Electric Space Division, Valley Forge Space Center, Goddard Boulevard, King of Prussia, PA 19406.

Investigate these specific openings:

- Systems Engineersup to \$45,000
- Systems Analystsup to \$40,000
- Scientific Application Programmers..up to \$36,000
- Data Base Engineers.....up to \$40,000
- Quality Assurance Engineersup to \$36,000
- Project Engineersup to \$36,000
- Operational Systems Engineers.....up to \$36,000
- Systems Programmers.....up to \$36,000
- Software—Research & Development.....up to \$50,000



GENERAL  ELECTRIC

GE takes pride in being an equal opportunity employer, m/f



Software Engineering Opportunities for Computer Scientists & Engineers

Openings in Dallas and Lewisville, Texas

Join Texas Instruments in the heart of the Sunbelt. You could work in Dallas, TI's home town, or just north of Dallas in Lewisville, a growing community of 30,000. Live better in Texas, where cost of living is below the average of major U.S. cities and where there is no state income tax.

Work with real-time software applications for mini/micro computer based systems and on distributed computer architectures and uni-processor systems.

Application areas include:

- Computer assisted photo interpretation
- Airborne FLIR tracking and fire control systems
- Ground and air launched missile tracking and guidance systems
- Air traffic control support systems
- Image processing
- Military and commercial communications/navigation systems
- Computerized voice encoding/recognition
- SLAR (side looking airborne radar) change detection
- ELINT (electronic intelligence processing)
- Real-time signal processing

Systems Development and Operations Management

- Distributed computing system applications
- Operating system utilities: development and configuration management
- Resource utilization and management system
- User consulting/system analysis/system engineering

- Data communications applications

Languages

- Assembly
- FORTRAN
- PASCAL
- JOVIAL
- ATLAS (test support language)
- Other higher order languages

All phases of software development

- Top level software system definition
- Program design
- Code implementation and test
- System integration and test (factory and field)

Also special openings in the following areas:

- Software management
- Software development for built-in test equipment
- Software diagnostics design
- Software configuration control
- Distributed data processing system/architecture design
- Automatic test generation
- Hardware Diagnostics
- Software training: languages, design procedures, computer architectures

Applicants should have a BS, MS or PhD in Engineering, Computer Science or related field. Send your resume in confidence to: Ed Haynes/P.O. Box 401628/Dallas, TX 75240.

U.S. citizenship required.

TEXAS INSTRUMENTS

INCORPORATED

An equal opportunity employer M/F

READERS' FORUM

WHO BELIEVES IN TOP-DOWN DESIGN?

Top-down design is the Applehood and Mother Pie of software development, right? Hardly anyone takes issue with top-down. You start with the requirements, and you design constituent software elements downward, one hierarchical layer at a time.

Well, there is this fringe group—primarily data processing folk—who talk about data-structure-first design. But somehow, just like you know at the gut level that God and Allah and Buddha are all somehow the same, you also know that data structure is just another top-down approach, where the data structure is the top.

So who could possibly take issue with the rightness of top-down? Everybody.

When was the last time you designed a software system? Think back, now, whether it was last week or last decade. Did you design it all from scratch? If your answer is yes, you aren't thinking hard enough. Remember the library routines you used? The utilities? Did you SORT, or SQRT, or REPORT GENERATE, or RANDOM NUMBER GENERATE? Sure, you did. And did you design those elements from scratch? Not if your head was screwed on tight.

The fact of the matter is, you used—somewhere in your design, and often well up in the design structure—some reusable software modules such as common libraries and utilities.

But to the extent that we use preexisting design elements, that's bottom-up design. And we all do it.

Well, there's *one* example of how everybody takes issue with top-down design. Here's another.

Remember again your last design effort. Did you really calmly work your way down the structure one layer at a time? Or were you nervous about the feasibility of some component of the structure, and did you design *it* all the way to the bottom before proceeding with other branches?

Perhaps you were farsighted enough to see through the feasibility problem at a high level. But most of us, having more limited insight, need to work through the details to be sure that our overall design is on track. Software is a business of masses of detail, aggregated in a malleable structure. Somewhere in that detail there all too often lurks a design-wrecking constituent. It is an unusual programmer or a trivial program that is compatible with a top-down, straight-through design approach. Some designers refer to

this tendency as "iterative design." Others call it "ping-pong design." But whatever the name, it is *not* top-down design.

There, now, is my *second* example of how everybody takes issue with top-down design. Isn't this just a semantic game? Well, to some extent. The fact is, top-down is still viable. It's as good a "divide and conquer" approach as any. With today's ever-enlarging software applications, there has to be some way to break a huge design problem into manageable proportions. Top-down does that.

The problem is, there are literalists among us. Top-down means top-down, they say. None of those bottom-up modules. None of those feasibility studies. If the top minds of our theoretical computer science world say that top-down is best, then top-down it is. And out comes a standards manual requiring top-down design, with penalties for those who don't comply. We don't question, we just believe. Thou shalt top-down. The result is structured badness.

There's another reason for this semantic game. There is value in intellectual exercise. There is value in realizing that what we thought we believed in we apparently don't really believe in. There is value in being aware of times when our practice fails to match our preaching. And perhaps, just perhaps, it leads us to progress.

Acknowledging our true needs, can we define a new and better design approach?

—Robert L. Glass
Seattle, Washington

ONLY NONHUMAN

Those who believe that computers can be anything more than tools betray how little they understand the limits of computer power or value the creative aspect of human intelligence. Researchers who develop computer systems pretentiously called STUDENT, ROBOT, "General Problem Solver," "Logic Theorist," or "Knowledge Representation Language"; manufacturers who describe "intelligent terminals" or "subconscious error checking circuitry"; and textbook authors who discuss person-computer "dialog" or "malicious computer errors" deceive themselves and their audiences. Their casual choice of anthropomorphic terminology results in exaggerated impressions of what computers can be used for and fear about computers "taking over."

Scientists, science fact and fiction writers, and moviemakers often distort the capabilities of computers by presenting the impression of lifelike behavior. The public's response is increased apprehension about computer applications, resistance to technology in general, and anxiety which interferes with learning to use computers productively.

Telecommunications Software Professionals:

OUR COMPUTERS WANT TO TALK WITH YOU

Some of the best computer systems in the business are looking for new ways to express themselves. Maybe you're the one to make this happen.

Wang is one of the top manufacturers of computers and word processing systems of all sizes. We're #1 in CRT-based word processing, #2 in small business computers. Now we're seeking to establish and maintain a leading posture in telecommunications, involving state-of-the-art networking and protocols.

Wang is committed to providing the resources you need to get results. We're moving into a brand new facility—a 12 story tower with fully modern equipment. The right kind of environment for you to achieve your best. We're determined to make Wang the best in telecommunications, so join us and together we'll start new telecommunications projects.

Last year this group grew 400%. We expect our telecommunications development and support staff to double in the next 12 months, and you can shape your career as you grow with us.

If you're talented in telecommunications...then let our computers know what you have to say.

Telecommunications Systems Programmers Associate to Senior Level Project Leaders

If you're a design oriented software development specialist who is not only comfortable with on-going telecommunications standards such as 3270, HASP, x.25 and SDLC/SNA but also capable of addressing the long range projects of the future in protocol and networking development; then we may have a position for you.

Systems Programmers are needed to design, develop and maintain telecommunications systems for our total product line. Positions exist in our Development, Systems Engineering, and Product Support areas and offer a challenge unparalleled in other organizations. These positions are new and represent ground floor opportunities for total systems responsibilities.

Telecommunications Software Technical Writers

Positions exist for qualified writers who are interested in researching, organizing, and writing telecommunications related documents. Projects include Operators' Manuals, Network/Operations/Communications Managers' Manuals, Technical Staff Programmers' Guides and data sheets. Two or more years technical experience and a Bachelor's Degree are required.

If you are interested in the above positions please send your resume, including salary history to Susan Morse, Professional Recruiter, Wang Laboratories, Inc., Dept. D-1, One Industrial Avenue, Lowell, MA 01851.

Wang offers excellent salary and benefits including profit sharing, stock purchase plan, stock bonus plan, medical and dental insurance.

Telecommunications Systems Support Analysts

Software verification is this group's specialty. We make crucial decisions regarding the effectiveness of new developments in a hands-on environment, from minis to mainframes.

Working with all Wang's product lines you will be responsible for the support activities of all Wang's TC products and write telecommunication application software in higher level languages. Frequent interaction with marketing and development will be required.

The Telecommunication Support Analyst will support the pre and post development and pre-installation activities as well as participate in the definition, specification and evaluation of Wang's telecommunication products.

To qualify, you should have a strong data communications background including experience with protocols, modems, networks, and telecommunication hardware and software. Prior experience with large IBM systems 3270 networks or RJE terminals is desirable.

Telecommunications Remote Diagnostic Engineers

Individuals with strong hardware background (BSEE or MSEE) are needed to locate potential problem areas in the entire Wang line of telecommunication products.

You will design fault isolation diagnostics and power-up diagnostic software in real-time, remote, micro-code, environment utilizing micros through mainframes. You must be able to effectively interface with both hardware and software development teams.

If you are interested in the above positions please send resume including salary history, to Thomas Bahlo, Professional Recruiter, Wang Laboratories, Inc., Dept. D-1, One Industrial Avenue, Lowell MA 01851.

WANG

Making the world more productive.

FORUM

Paradoxically, concern about technological advances has often been coupled with the use of technology to simulate human functions. The robots of Karel Capek's play *R.U.R.*, the monster created by Dr. Frankenstein, and the computerlike villains in *Star Wars* generate tension because evil machines take on human forms. The earliest carvings of human figures, the 18th century clockwork-driven dolls that wrote or played music, and Walt Disney's audio-animatronic figures exemplify harmless, but scientifically useless, attempts at fabricating human qualities. Now researchers in artificial intelligence seek to model or replace human performance, but building computer programs that behave like humans only produces museum curiosities for the next century. Progress in developing effective tools depends on taking advantage of the unique features of computers: their extreme speed, ability to repeat operations precisely, capacity to store unlimited amounts of data, and distinctive input/output devices. Building computer systems that behave like people is as foolish as building planes that fly by flapping their wings. The sooner we get beyond this primitive human imitation stage by distinguishing between the basic design principles of computers and the abilities of humans, the sooner we will produce dramatic applications which serve rather than mimic people.

The distorted vision of computers is often accompanied by a distorted vision of human abilities. The behaviorist model in psychology, which deals only with objective measurable physiologic effects, has fostered a machinelike model of human behavior. Some misdirected researchers have been led to conclude that people and machines are so similar that with a few years' effort, they should be able to produce machines that are superior to people. This naive view is useless as a goal and harmful in distorting people's expectations of themselves and of how they will use computers.

Office workers will use word processing computers to become more productive. Students will use computers to do intellectually challenging homework and creative research. Doctors will use computers to retrieve patient histories or choose lab tests and diagnoses. Use of computers will make possible fuel efficient, safer automobiles, planes, and homes. Communication will be made easier by electronic mail, teleconferencing, electronic banking, and eventually electronic newspapers and libraries. These high technology applications have the potential to bring computer resources to the masses and neutralize the advantages that big business and government have had till now. The democratization of technology is generally beneficial, but extreme care must be taken with computer systems to ensure privacy, guarantee access to people at all levels of society, maintain high reliability, and explicitly assign responsibility for failures. Life-critical applications such as intensive care units, air traffic control, and nuclear reactor monitoring require high dependability and force designers to recognize when decision-making can be automated and when human intervention is necessary.

Though it is useful to know which tasks can be performed by machines, we must place greater value on those which cannot. Only people can be empathic, sympathetic, and emotive. Condolence cards sent by a computer are worse than worthless and tears of joy cannot be coded into binary digits. Relationships, shared experiences, and trust are possible only among people. Computerized bank machines that simulate an excessively friendly teller's greeting only make users wonder how else the bank is trying to deceive them. Learning and creativity are such basic human qualities that, like sexuality, they are definable only from a human perspective.

Fifty years from now, we will look back on the early days of computing as a quaint era when some people believed that computers would compete with human intelligence. By that time, anger over wasteful expenditures for fantasies of artificial humans will be replaced by amusing remembrances of the days when computers were thought to be more than ordinary tools. The recognition that computers have no more intelligence than a wooden pencil will be accompanied by the expanded appreciation that, for better or worse, people control their own destinies.

—Ben Shneiderman
College Park, Maryland

When we say
we deliver
within 30 days...
**WE
DELIVER
WITHIN
30 DAYS.**



WD/90 PASCAL MICROENGINE COMPUTER

The 16-bit WD/90 Pascal MICROENGINE™ Computer is the first microprocessor hardware designed exclusively for direct high-level language execution. P-code is directly executed (no interpreter), resulting in execution up to five times or more faster than equivalent systems.

The WD/90 Pascal MICROENGINE includes:

- Pascal MICROENGINE processor
- 64K bytes of RAM Memory
- Two RS-232 asynchronous/synchronous ports
- Two 8-bit parallel ports (500kHz maximum data rate)
- Floppy disk controller w/direct memory access
- Floating point hardware
- Memory Mapped I/O

PASCAL PERFORMANCE

CALL TOLL FREE 800-854-8300
(outside California)

**The
MICROENGINE
Company**

A Subsidiary of WESTERN DIGITAL

3128 Red Hill Avenue, Box 2180, Newport Beach, CA 92663
(714) 557-3550, TWX 910-595-1139

Dealer Inquiries Invited.

CIRCLE 205 ON READER CARD

MAY 1980 295

1979 DATAPRO HONORABLE MENTION

THE FATS REPORT!

FAST ANALYSIS OF TAPE SURFACES

750 USERS **USE FATS TO CLEAN UP YOUR TAPE LIBRARY...**

FATS will dramatically reduce costly error recovery and reruns caused by poor quality tapes. The **FATS REPORT** will help you determine which tapes should be cleaned, discarded or stripped.

Use **FATS** to insure that your archival tapes can be read after years of storage and that old tapes will run on higher density drives.

Available for IBM DOS, OS, VS and MVS.
Phone or write for your free 30 day trial now so you can compare **FATS** to your **OFFLINE HARDWARE EVALUATOR** or reports generated by **SMF** and **EREP**.

SAMPLE OF FATS REPORT

●	FAST ANALYSIS OF TAPE SURFACES DETAIL REPORT -- FATS VER 4.0 Z							
●	MESSAGE	ID	UCB	LABEL	LOCATION	LENGTH	RETRIES	ACTION
●	FATS204	TAPE2	281	987654	1607 FT	4 IN	10	PERM DATA CHECK
●	FATS204	TAPE2	281	987654	1607 FT	8 IN	10	PERM DATA CHECK
●	FATS204	TAPE2	281	987654	1608 FT	13 IN	10	PERM DATA CHECK
●	FATS204	TAPE2	281	987654	1608 FT	17 IN	10	PERM DATA CHECK
●	FATS204	TAPE2	281	987654	1608 FT	21 IN	10	PERM DATA CHECK
●	FATS204	TAPE2	281	987654	1609 FT	26 IN	10	PERM DATA CHECK
●	FATS204	TAPE2	281	987654	1609 FT	30 IN	10	PERM DATA CHECK
●	FATS204	TAPE2	281	987654	1609 FT	34 IN	10	PERM DATA CHECK
●	FATS204	TAPE2	281	987654	1610 FT	39 IN	10	PERM DATA CHECK
●	FATS204	TAPE2	281	987654	1610 FT	43 IN	10	PERM DATA CHECK

The length of these bad spots would cause unrecoverable data checks and I/O errors during processing.

INNOVATION DATA PROCESSING

970 Clifton Ave., Clifton, NJ 07013 • 201-777-1940

CIRCLE 206 ON READER CARD

FORUM

THE COMPUTER AT STONEHENGE

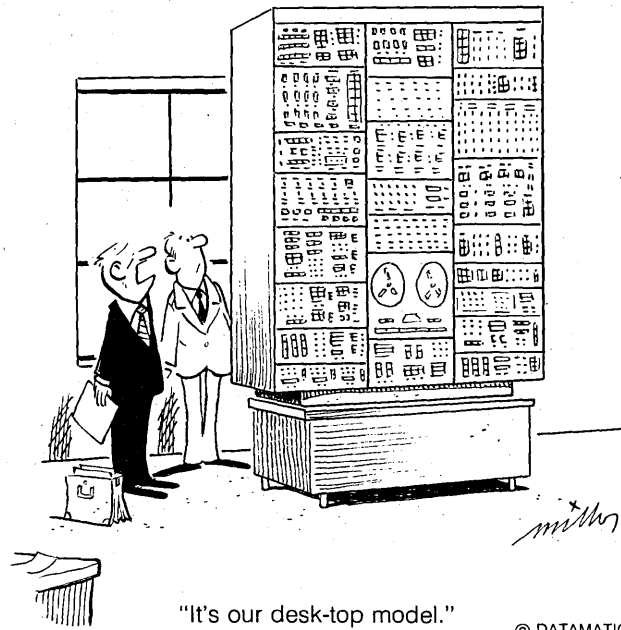
Strange things are done to be number one
In selling the computer.
IBM has their stratagem
Which steadily grows acuter,
And Honeywell competes like Hell,
But the story's missing link
Is the system old at Stonehenge sold
By the firm of Druids, Inc.

The Druids were Entrepreneurs,
And they built a granite box
That tracked the moons, warned of monsoons,
And forecast equinox.
Their price was right, their future bright,
The prototype was sold;
From Stonehenge site their bits and byte
Would ship for Celtic gold.

The movers came to crate the frame;
It weighed a million ton!
The traffic folk thought it a joke
(The wagon wheels just spun);
"They'll nay sell that," the foreman spat,
"Just leave the wild weeds grow;
"It's Druid-kind, over-designed,
"And belly up they'll go."

The man spoke true, and thus to you
A warning from the ages:
Your stock will slip if you can't ship
What's in your brochure's pages.
See if it sells without the bells
And strings that ring and quiver;
Druid repute went down the chute
Because they couldn't deliver.

—Edward G. McManus
Marlborough, Massachusetts



"It's our desk-top model."

© DATAMATION

CARTOON BY WALT MILLER

HEWLETT-PACKARD® TAPE SPEED BARRIER BROKEN BY DATUM

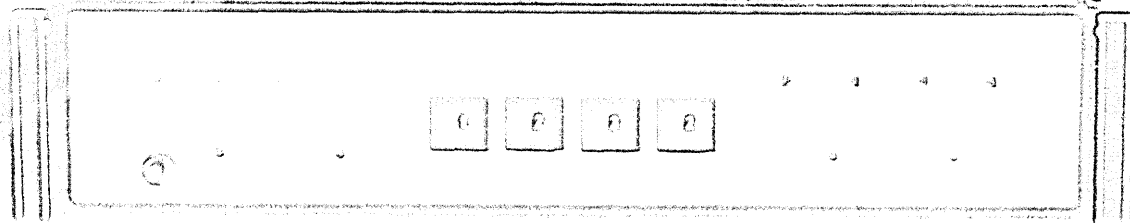
Need more speed than 45 ips for your Hewlett-Packard system? Datum breaks the speed barrier with compatible vacuum column tape systems operating at 75 and 125 ips, as well as 45 ips. Dual Density is standard in all 3 speed configurations.

A new concept in tape subsystems, the 1041 Series is compatible with Hewlett-Packard Models 1000, 2100, 2114, 2115, 2116 and 2100 MX minicomputers. A single EIA rack-mounted external controller is the heart of the Datum system.

Along with increased system thru-put, Datum's Series 1041 offers you multi-transport operation using NRZI and/or PE formats. Up to four tape transports may be driven by each controller.

And we're software transparent to all Hewlett-Packard operating systems.

See Datum break the Hewlett-Packard tape speed barrier for yourself: contact your local Datum sales representative or headquarters today. And Datum gives you one more very special benefit. A superior price/performance ratio!



Datum Inc

See Datum at the NCC Booth 2445

CORPORATE HEADQUARTERS 1838 S. State College Blvd., Anaheim, CA 92805 Tel: 714-538-8888 TWX: 910-512-1289 Telex: 68-55790
EUROPEAN HEADQUARTERS, DATUM (ELECTRONICS) LTD., DATUM HOUSE 50 High St., Esher, Surrey, England 172467232 **ODACUM**
SALES OFFICES, CANADA, Willowdale, ON Tel: 416-314-8880 Telex: 01-88867 **HORROR** **NEW ENGLAND**, Framingham, MA (01701)
Tel: 617-872-8991 **EAST COAST**, Mount Laurel, NJ (07042) Tel: 201-652-5599 **MIDWEST**, Des Plaines, IL (60018) Tel: 312-298-0084 **SAN**
JOSE, San Jose, CA (95117) Tel: 408-239-5870

PPD 107

CIRCLE 2 ON READER CARD

Registered Trademark of Hewlett-Packard

WE FOUND A HOME IN THE OBSOLESCENCE THEORY

The business community is paying a high price for the rapid pace of developments in data communications. Because new equipment has a nasty habit of rendering current models obsolete.

Teletype Corporation is doing something about it. In our industry we're one of the few companies manufacturing its own customized MOS Chips. And it's helping us build future flexibility into our data terminals.

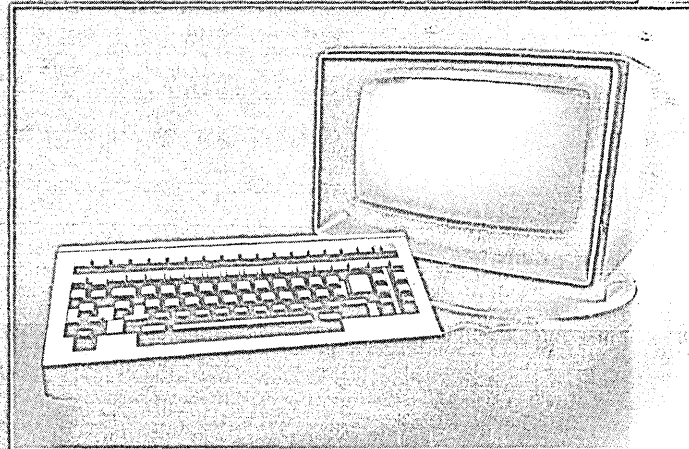
Modular design and built-in electronic adaptability let us redefine and enhance our equipment long after it's gone on line.

So our customers can have the newest features. Without absorbing losses in the form of prematurely obsolete equipment. Or paying for brand new terminals. Or disrupting their entire system.

In business, keeping pace with data has become crucial. The distance between managers and critical information has widened to alarming proportions.

Teletype Corporation is helping bridge that gap. As a member of the Bell System, we're coupling their communications knowledge with our own research and development.

And it's working. We're making early obsolescence a thing of the past. So you won't have to fear the future.



TELETYPE WHERE DATA BECOMES INFORMATION



Teletype Corporation, 5555 Truhy Avenue, Dept. 3143A, Skokie, IL 60077, TEL (612) 932-2000
Teletype is a registered trademark and service mark of Teletype Corporation.