MODERN DATA

November 1973

Product Profile: SMALL BUSINESS SYSTEMS

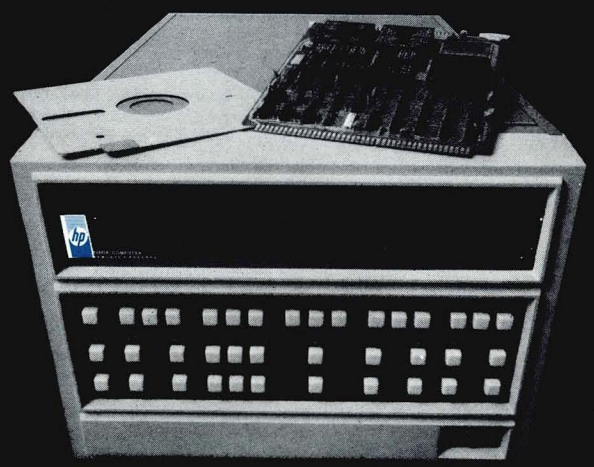
****

FLOPPY DISC
HP 2100
A-D CARD

DACONICS HAS INTEGRATED VERSATILITY WITH RELIABILITY. NOW.

We did it because you needed it. You wanted the proven strength of the 2100, mated-up with the specialized nature of your needs. So we put together a proven floppy disc with a compatible DOS-M Package and a plug-in A-D card to make it all work in beautiful harmony.

We've heard of your needs —now we'd like to hear from you. Give us a collect call. We've refined the workhorse.



DACONICS 925 Thompson Place • Sunnyvale, California 94086 • (408) 732-2634 • TWX: 910-339-9296

CIRCLE NO. 1 ON INQUIRY CARD

Educational television for less than $1600.

To help handle the computer input/output problems in the educational field, Infoton has developed the Vistar/GT display terminal. It sells for a low $1595 — and that's before educational discounts. With a price like that you can't afford to rent. Convert today, and be in operation tomorrow because the Vistar/GT comes complete. With no extra-cost custom-built options to install, on-line set-up is simple and easy.

Here's a partial list of of what you get for less than $1595:

- *80 characters x 24 lines*
- *75 to 18,000 bps asynchronous data rates*
- *Switch selectable*
- *EIA and 20/60 ma current loop interface*

Infoton SATISFYING YOUR NEED TO KNOW
A WHOLLY OWNED SUBSIDIARY OF OPTICAL SCANNING CORP.
Second Avenue, Burlington, Massachusetts 01803 (617) 272-6660

CIRCLE NO. 2 ON INQUIRY CARD

Our new time-sharing terminals operate at 120 cps in interactive or batch mode. Either way you save.

And you save in two ways: You reduce communications line costs and cut computer connect time.

With these 1200 baud terminals you make full use of telephone line capacity. So even with moderate terminal usage, your savings can really mount up.

We offer two models of our EDT-1200 series: The KSR, which operates at 10, 30 or 120 cps, switch selectable. The MSR (Magnetic Send-Receive) additionally offers a magnetic tape cassette buffer for data storage and high-speed transmission.

These electronic terminals use regular paper, and since they are impact printers you can get up to six copies. You can set and clear horizontal tabs locally and remotely.

The EDT-1200 and the buffer are the most reliable units of their type we know of. But since perfection eludes us, we back them up with Termicare,® our centralized diagnostic, maintenance and support service for all terminals.

With these new terminals our product line is now up to 78 models with 228 options, with speeds of 10, 15, 30 and 120 cps.

For details about the EDT-1200, or about any of the 306 ways we can help you with terminals, please contact me. Z. V. Zakarian, Western Union Data Service Company, 16 McKee Drive, Mahwah, N.J. 07430. 800-631-7050 (N.J. 201-529-1170).

"The KSR is for interactive, and the MSR (directly below) for batch time-sharing."

Z. V. Zakarian

western union data services company

CIRCLE NO. 3 ON INQUIRY CARD

MODERN DATA

NOVEMBER 1973 ■ VOLUME 6 ■ NUMBER 11

53 **PRODUCT PROFILE**

SMALL BUSINESS SYSTEMS

It's hard enough to define a small business system without getting into the even stickier question of how to determine your need for one. This two-part article does not provide simple answers (there are none), but it does explain what products are available, how they differ, and how they can affect a prospective user's existing operations.

FEATURED THIS MONTH:

18 **THE TELEX DECISION**

It was common knowledge that IBM had the fastest legal gunslingers in the east. But this time the showdown was in Tulsa, Oklahoma. And after the smoke had cleared . . .

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SUBSCRIPTION AND READER INQUIRY CARD.....OPPOSITE PAGE 76

INTRODUCING THE INTELLIGENT WAY TO DO LARGE SCALE REMOTE JOB ENTRY.

It's our intelligent Sycor 340.

You see, we've given it the same large scale remote job entry capability as IBM's 2780. Including a high-speed card reader, 300 lpm printer, 2780 compatible bi-sync . . . the whole package.

But that's where the similarity between the two ends. Our Sycor 340 not only costs less, but runs circles around the old 2780 when it comes to intelligence and versatility.

Standard on the Sycor 340 is its capability for error-free data entry. It's also programmable—so you can edit, validate and perform range checks and other operations only an intelligent terminal can. Since it already features a CRT and keyboard console, you don't have to pay for them as extras.

And how's this for versatility: you can use the 340 to talk to your time-sharing computer using our asynchronous communications package.

Or if you need bulk storage, you can get an optional IBM-compatible magnetic tape drive.

What's more, for those locations where you don't need a 300 lpm printer, we have 50 lpm and 80 cps models for you to choose from.

To find out more about this versatility, economy and 2780 compatibility in large scale remote job entry, call your Sycor representative today.

It's the intelligent thing to do.

SYCOR

Corporate Offices: Ann Arbor, Michigan 48104 (313) 971-0900. **District Sales Offices:** Atlanta (404) 457-1166 • Boston (617) 890-7290 • Chicago (312) 986-1833 • Cleveland (216) 831-8625 • Dallas (214) 521-6710 • Detroit (313) 355-5770 • Hartford (203) 529-1100 • Houston (713) 688-5224 • Indianapolis (317) 784-6779 • Los Angeles (213) 640-0120 • New York (212) 371-9050 • Philadelphia (609) 665-1170 • Pittsburgh (412) 922-3350 • San Francisco (415) 349-6626 • St. Louis (314) 878-0090 • Washington (703) 525-7300. **Canada:** Sycor International Ltd., Toronto (416) 429-0883. **Service Centers in 80 cities.**

Sycor has opportunities for experienced data processing equipment salesmen and systems engineers in major cities.

CIRCLE NO. 4 ON INQUIRY CARD

MODERN DATA

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Modern Data
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Introducing the super accounting system for small and medium size companies

The Philips P-350 office computer . . . handles all your accounting procedures faster, easier, at less cost.

The Philips P-350 is the world's largest selling small office computer. It does everything from simple billings to complex management reports, at an unmatched cost/performance ratio. It is easy to operate . . . and easy on your budget. Outstanding features include: Core memory, automatic forms handling, MLC capability, magnetic tape cassette devices. And a full range of input and output peripherals. Unique leasing plan available. Call today or return coupon for complete cost-saving facts.

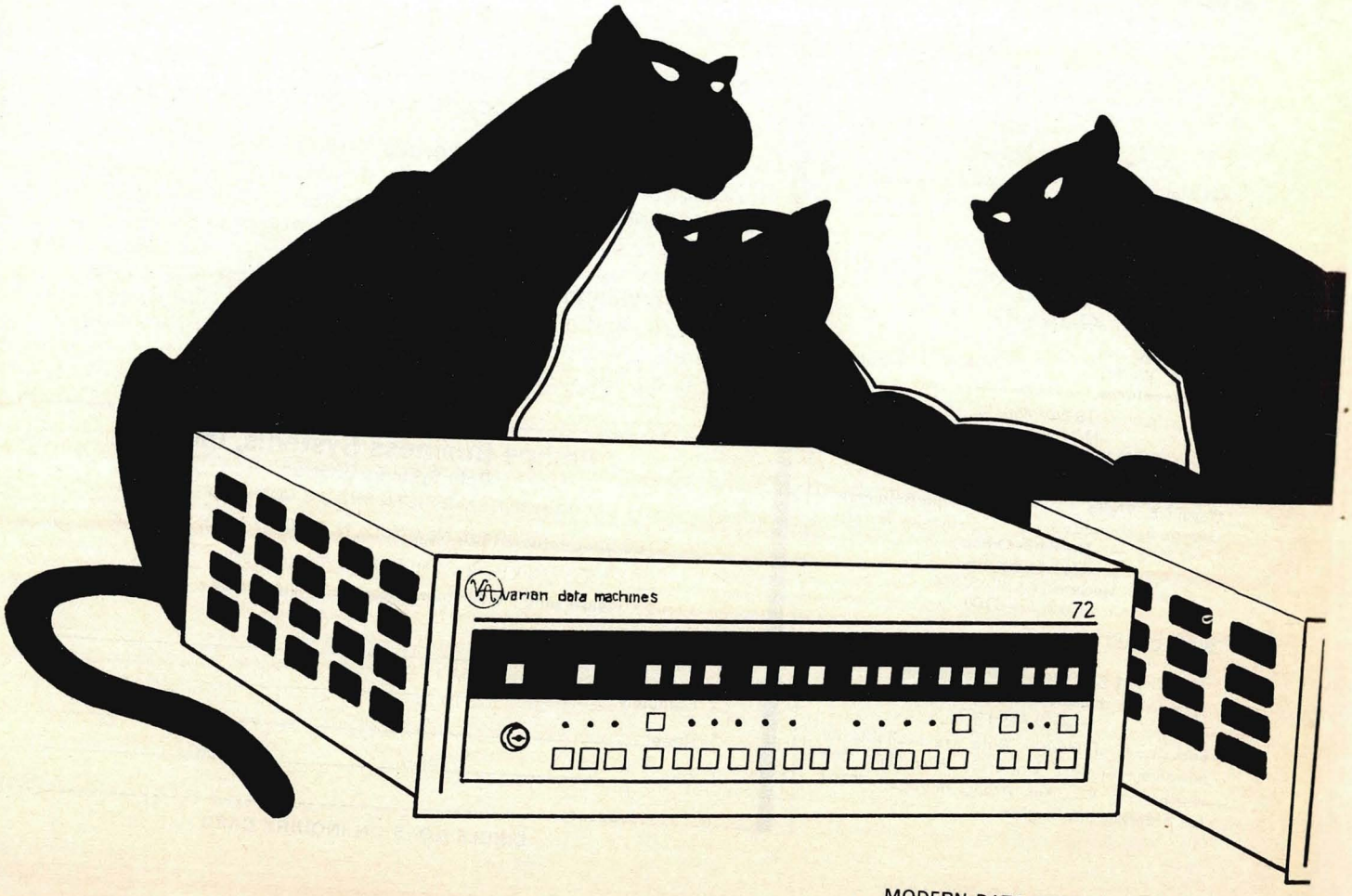
Philips Business Systems, Inc. MD-1173-350
Data Systems Division
A NORTH AMERICAN PHILIPS COMPANY
100 East 42nd Street, New York, N.Y. 10017 (212) 697-3600

☐ I would like a demonstration of the Philips P-350.
☐ Please send me complete literature on the Philips P-350.

Name_____
Company_____
Street_____
City_____ State_____ Zip_____

CIRCLE NO. 5 ON INQUIRY CARD

Introducing the Varian Family of Mini Killers.



In the name of performance, Varian has killed all limitations attached to the mini.

Feature for feature, capability for capability, Varian's combined software/hardware computer systems outperform any and all standards heretofore set by the mini.

And even challenge huge room-sized systems on their own ground.

But we have something that makes us even bigger than just one better mainframe or one better system. It's the Varian family. Namely our V-70 series which includes the V-72, V-73, and V-74.

The Varian 70 family is of tremendous advantage to the systems-oriented user. It lets your designer and programmer choose from three CPU's with different capabilities and three different price tags. But all three with the same Varian family trait of advanced open-ended hardware and software, extensive I/O options, and peripherals. It's really like having a series of computer system building blocks.

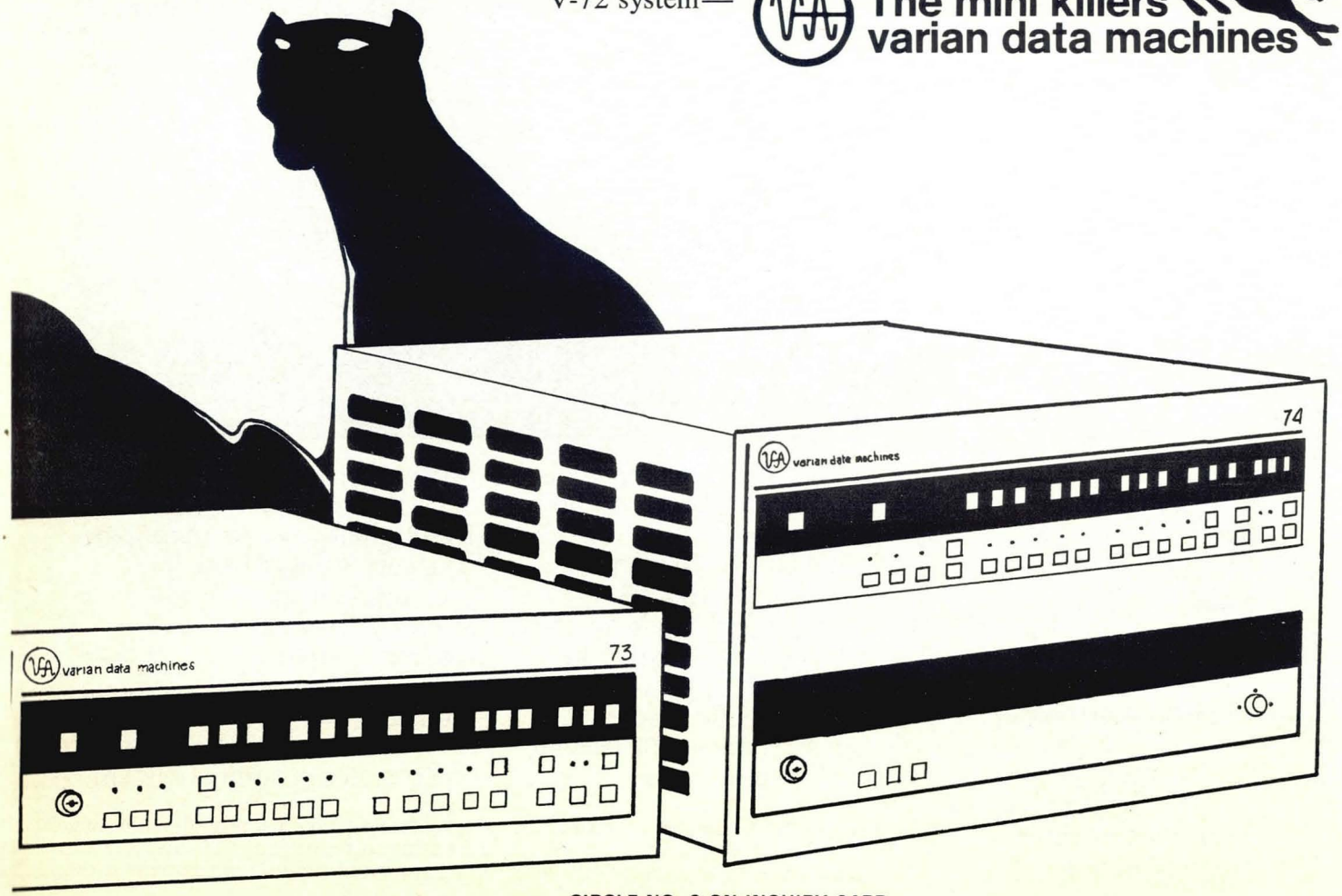
Building blocks that make our systems not only easier to understand, but easier to configure. It boils down to getting a system tailor-made to your own needs at off-the-shelf prices. Invest in only what you need technologically at the time. And when your needs change, invest in more capability to upgrade your system. And because all Varian hardware and software are open-ended and interface, just plug in more of Varian's building blocks.

Whether you start out with the 8K core, 1 port memory of our V-72 system—or need the Memory Map, parity, Writable Control Store, and the 330 nanosecond, dual port, 256K memory of our V-74—we'll support you with software that's not in our minds, but right on our shelves.

Complete with a multi-task executive and real-time operating systems which keep fast-response jobs in the foreground while processing away at batch jobs in the background. Plus Varian assemblers and compilers.

In short, everything you need to keep you operating right on the money. Introduce yourself to the Varian family of mini killers. Write for a detailed comparison of our V-70 family. Varian Data Machines, 2722 Michelson Drive, Irvine, California 92664. Or call (714) 833-2400.

The mini killers
varian data machines



CIRCLE NO. 6 ON INQUIRY CARD

The Prime Computer

A totally new way to buy, use and upgrade computer systems.

The Plan introduces the first two-year guaranteed trade-in schedule. This program fully protects your computer investment when it's time to expand. Grow as much and as fast as you wish. The Plan will back you all the way.

The Plan protects your budget by eliminating arbitrary system packaging. You only buy what you need. With 3 discount schedules, you need pay as little as possible.

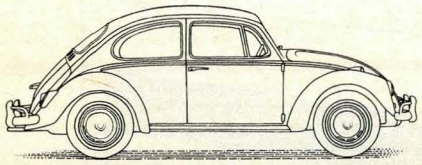
The Plan also protects your software investment. Only Prime offers upward *and* downward system compatibility. Without modification.

The Plan offers a whole new maintenance procedure, too. Built-in integrity checks can isolate a fault to a circuit board and maintenance is as simple as replacing the board.

There's even a program called Air Spare. It's fast delivery of a backup board and low-cost repair of the defective one.

Everything we offer at Prime, hardware, software and support, works together as a logical system, be it large or small. You can put together a powerful, reliable, easy-to-use computer system at a better total system price than ever before possible. The Plan shows you how.

Read on.



Plan on a guaranteed trade-in

You can start your system with any Prime Computer. If, for any reason it isn't the best one to handle expanding applications, trade it in. Trade all of it or parts of it. Trade whatever is standing between you and better performance.

For instance, to upgrade from a Prime 200 to a 300 processor, simply trade in the original processor board. You can then plug in a fully equipped* Prime 300 for $5000 (less a 50% trade-in credit for certain optional features on the original processor).

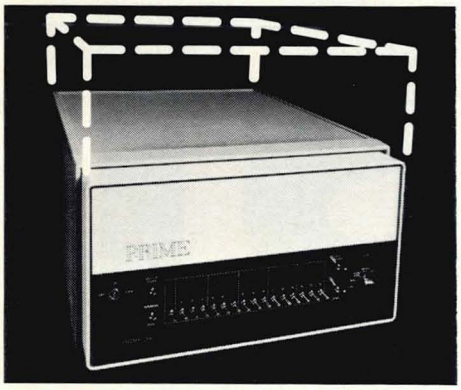
You can also elect to keep the original processor as a spare. The cost is only $1000. Keep your original power supply, memory and chassis, too. Or selectively upgrade any of them under similar trade-in arrangements.

Of course, all the software written on the original system

*Standard features include: virtual memory, restricted execution mode, memory protection, byte parity, extended direct addressing, integer multiply/divide, direct memory access system, automatic program loaders and microverification.

User Plan.

will run on the new one without modification. Only Prime makes this possible. Only the Prime Plan guarantees it.



Plan on unheard of compatibility

On any Prime processor, you can write real-time and time independent programs in any language, under the control of any development system with its associated support packages. What's more, you can execute them on any Prime processor under the control of any operating system without modification (time, peripheral and memory size dependency aside).

Choose Any Processor*	Choose Any Development System	Choose From Support Packages
100 200 300	DOS DOS (VM) (Virtual Memory) Stand-Alone	File System Library Utilities IOCS

Choose Any Language	Choose Any Operating System*
Macro Assembler FORTRAN BASIC	DOS DOS (VM) RTOS RTOS (VM) Stand-Alone

*Software utilizing unique Prime 300 hardware features may require modification to execute on the Prime 100 or 200. Software dependent on unique RTOS features does not run under control of DOS or DOS (VM).

Plan it right, right off

The right combination of computer resources are all here and they're yours to select.

Pick a processor. Enhance it with options if you wish. Select memory size and speed. Add peripherals and controller.

		PROCESSOR					
		100		200		300	
Memory	First Increment	4K	8K	4K	8K	8K	8K
	Cycle Time	1 μsec	1 μsec	750 nsec	750 nsec	750 nsec	600 nsec
	Parity	no	no	yes	yes	yes	yes
Chassis	5 Slot	x	x	x	x		
	10 Slot	x	x	x	x	x	x
	17 Slot	x	x	x	x	x	x
Features	Battery Backup		x		x		x
	Automatic Prog. Load		x		x		x
	Direct Mem. Access		x		x		x
	Integer MUL/DIV		x		x		x
	Extended Direct Addressing				x		x
	Microverification				x		x
	Single Precision Floating Point Arith.				x		x
	Double Precision Floating Point Arith.				x		x
	Writeable Control Store						x
	Virtual Memory						x

Then package the electronics in the right size chassis and you're done. We'll provide the right power supply to handle whatever you put together.

There are no arbitrary restrictions. No surprises, either. With the chart above you could start planning now.

Plan on running full time

Prime service is every bit as sound as its technology. It's just as inventive, too. For instance, you can pick a full service contract or choose to use our services only when required. In either case we maintain a nationwide network of service and customer service representatives. They're ready to help.

We even have a way to hold maintenance costs to an absolute minimum. We call our idea Air Spare. For $200 we'll loan you a spare (processor, memory or controller). We'll then repair the faulty unit while you keep on running. And better than running, the whole replacement is handled by air express.

Read more about it in the Plan.

One more thing to plan on

The Prime Computer User Plan is a unique and remarkably logical document. You've just been treated to a sampling here. For the first time you'll know everything to expect in a computer system. Read the Plan. Send for it today.

To: Prime Computer Inc.
23 Strathmore Rd.
Natick, Ma. 01760

☐ Send the Plan
☐ Send Planner
(He'll call for an appointment.)

Name

Title

Company

Address

City State Zip

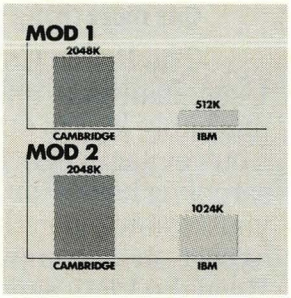
PRIME

CIRCLE NO. 7 ON INQUIRY CARD

370/ST

When we built our new add-on memory for IBM System/370 Model 145, we wanted to give you more reasons to buy ours than anyone else's.
Here are eight of them.

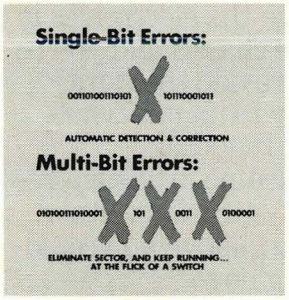
ONE.



DOUBLE (OR QUADRUPLE) YOUR IBM 370/145 MEMORY CAPACITY...

Regardless of the Model 145 you now have, you can expand it to two megabytes. For most 145 users, that means unlimited growth of systems, applications, files, packages and processing flexibility. Memory restriction is a thing of the past. Your investment in mainframe hardware is preserved for years to come.

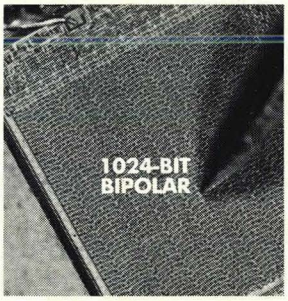
TWO.



GET THE MOST COMPLETE MEMORY PROTECTION EVER OFFERED...

370/STOR 145 detects and corrects all single-bit errors, so efficiently they don't exist as far as you are concerned. And it provides immediate reconfiguration in the event of a multi-bit error. A flick of a switch isolates the error sector, and the rest of memory keeps running... and running... and running. It's like having no downtime problems to worry about.

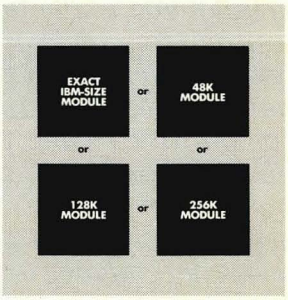
THREE.



USE THE FASTEST, SAFEST MEMORY TECHNOLOGY AVAILABLE TODAY...

The 1024-bit bipolar chip. Both Cambridge and IBM use it for their 145 memories. It's extremely fast. It provides stable storage of data. It uses a single power level that eliminates many circuits, components, interconnect points and materials. The result: lower cost and great reliability for you.

FOUR.



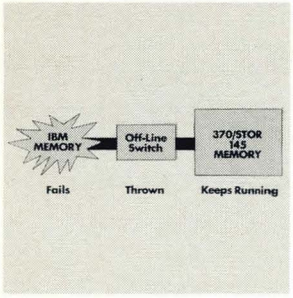
AND GET THE MEMORY SIZE YOU WANT RIGHT NOW. NO WAITING.

No one ever offered the choice of memory sizes available with 370/STOR 145. You can select exact IBM-size modules. Or 48K modules. Or 128K modules. Or 256K modules. And mix them any way you want. So you grow the way you want – in big steps or small. And you can start right now. We're already delivering.

CAMBRIDGE MEMORIES, INC., 696 Virginia Road, Concord, Mass. 01742 (617) 369-8850

OR 145

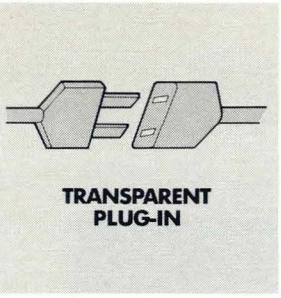
FIVE.



THAT'S NOT ALL. THIS MEMORY KEEPS WORKING, EVEN WHEN IBM'S QUITS.

It's like having a built-in back-up main memory. If your resident IBM memory fails, 370/STOR 145 will keep going. Just throw a little switch on our memory panel, and the failed IBM memory is disconnected while 370/STOR 145 continues to run full speed. Need we explain the virtues of that attribute?

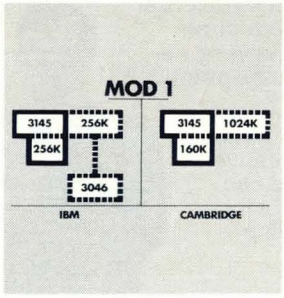
SIX.



AND YOU CAN INSTALL ONE MEGABYTE IN LESS THAN A SINGLE DAY...

370/STOR 145 is a stand-alone unit. It connects to your CPU through plug-in connector cables. That makes it completely transparent. You can use all IBM hardware, software and maintenance without alteration. The interconnect is so direct that we'll get your first megabyte running in less than a day.

SEVEN.



IN FAR LESS FLOOR SPACE THAN IBM OR OTHER MEMORIES NEED...

We are noted for our compact memories. They help us get orders, because computer sites have space problems, too. With 370/STOR 145, we get compact indeed: up to a megabyte in a single chassis, with power supply built-in. The result, if you have a 145 Mod 1, is more than twice the capacity in about half the space.

EIGHT.

AT A PRICE THAT YOU CAN'T BEAT... UNLESS ALL YOU SHOP IS PRICE.

Cambridge sells value. That means the right performance at the right price. We've gone out of our way to build 370/STOR 145 as a memory product you can't beat in performance, regardless of the supplier. But we also know you want the right price—so we give it to you. Ask our local sales office to quote you our lease and purchase terms.

370/STOR 145. The newest product from Cambridge, a company that knows that its future depends upon the excellence of the products it builds for you.

CAMBRIDGE.

A good place to put your information.

360/CORE
Up to two megabytes of main memory for Models 22, 30, 40, 50, 65 and 67 processors in the System/360 line.

370/STOR
Up to four megabytes of main memory for the Models 145, 155 and 165 in the System/370 computer family.

EXPANDACORE-11
Memory expansion systems for all PDP-11 processors, featuring up to 30% speed increases. Two-way data save and interleaving.

EXPANDACORE-620
Up to 65K of main storage for all 620/i, L, F-100 and L-100 minis. Self-contained and self-powered 5¼" plug-in systems.

OTHER MEMORIES
Core, semiconductor and DOT data storage systems for OEM and End-user computer mainframe, controller, peripheral, terminal and auxiliary memory products.

CIRCLE NO. 8 ON INQUIRY CARD

iomate of the month

The industry's broadest line of mini peripherals. Paper tape equipment. Disc, magnetic tape and mag tape cartridge storage systems. Line printers. Card readers. OEM data-entry and communications terminals. Controllers and adapters. All available from one supplier. With volume discounts across the full product mix.

This month's iomate is the iomec representative. Your single source for a complete mini peripheral program.

He starts with hardware. Advanced data input, output and storage equipment designed specifically for mini computer applications.

Next, he can provide the interfaces. Software compatible interfaces that link iomec peripherals to the most popular mini computer systems. They're completely transparent to your present operating system.

And he can back your systems with customer engineering. Maintenance service that's available to you and your end-user customers from fully equipped, professionally staffed service centers in major cities across the country.

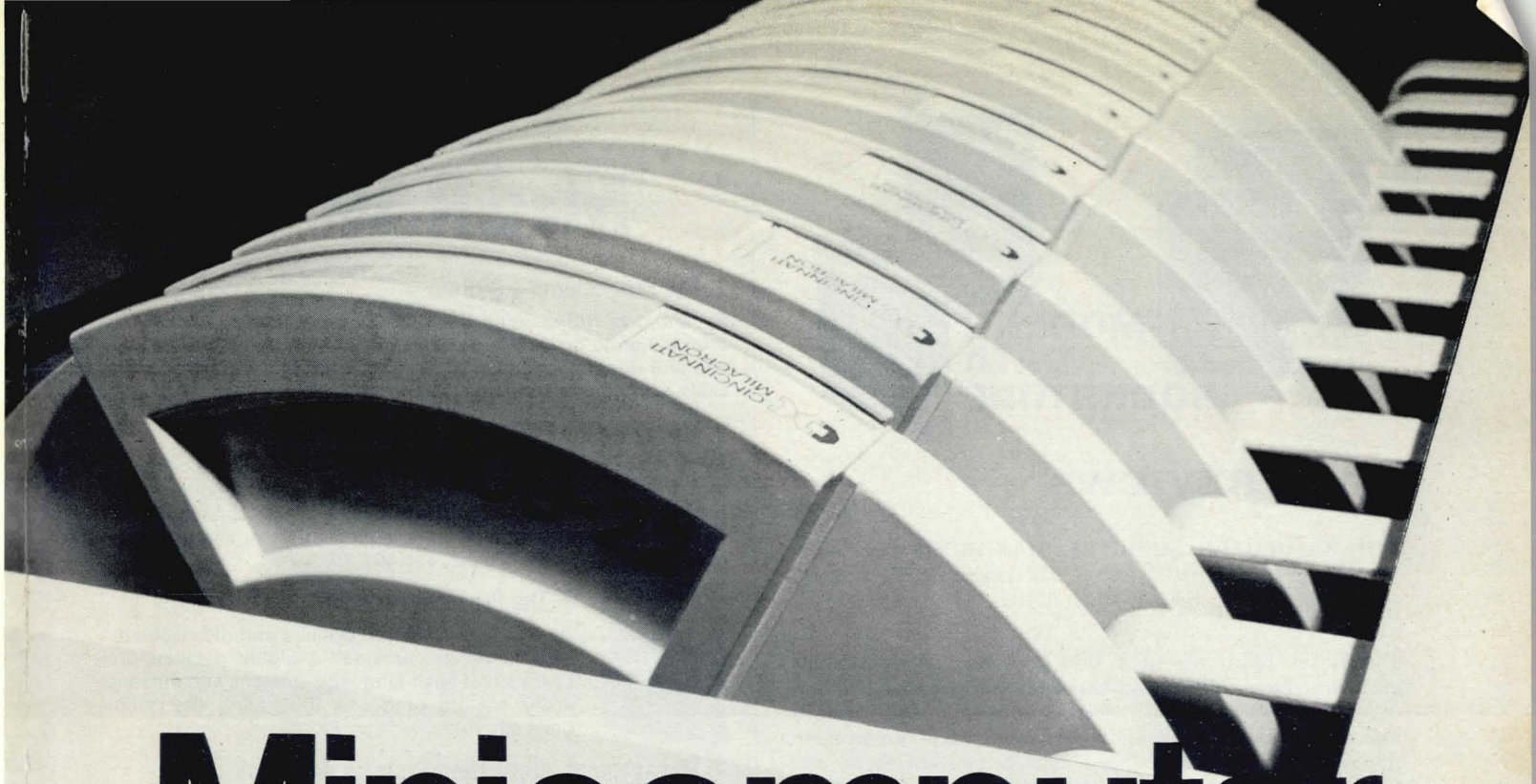
Finally, he can cut your peripheral costs. With OEM discounts based on the total volume of peripherals you order. Even if your order includes several different iomec product lines.

Call your iomec representative today. He can save you a lot of shopping around.

iomec inc

3300 Scott Blvd., Santa Clara, Cal. 95050 (408) 246-2950
Route 9, Southboro, Massachusetts 01772 (617) 481-2500

CIRCLE NO. 9 ON INQUIRY CARD



Minicomputer SOFTWARE

Here's an exciting new operating system with RPG that dramatically simplifies and speeds data processing applications

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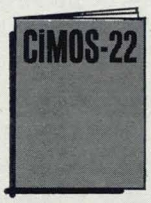

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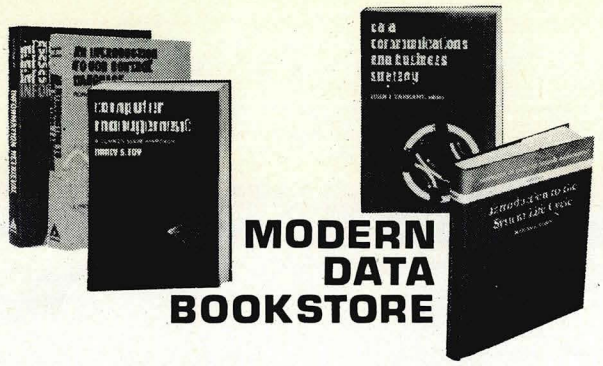


BOOK REVIEWS

THE COMPUTER SURVIVAL HANDBOOK *by Susan Wooldridge and Keith London. 216 pages, $6.95. Gambit, Inc., 53 Beacon St., Boston, Mass. 02108.*

The jacket blurb describes this book as "an unorthodox guide for the perplexed and harassed manager that tells not only what *should* happen when a computer is introduced into a business organization but also what unfortunate things all too often do happen, how to prevent them, and how to clean up the mess if they *have* happened anyway." Also, "this book gives the innocent executive a down-to-earth understanding of how to cope with the computer and manage the computer managers." Both are accurate statements.

The Computer Survival Handbook is packed with vital information yet avoids unnecessary detail. It is humorous without being silly, informal but organized, and introductory without being condescending. How, why and even *whether* your company should enter the computer age are the questions examined, and the authors supply all the tools to answer them.

The flaws in this book are so minor as to be almost nonexistent: a few misspellings and misabbreviations (although American, rather than British, usage happily prevails); an example involving allocated costs appears to argue counter to the intended point; two caveats regarding analysts' interviews are not quite fair; and a misquoted homily about "never allowing your ship to be caught on a lea [sic] shore in a gale" suggests that the authors might be as dangerous to have guiding a ship as they would be valuable to have guiding a company. But these are all nits. If you read only one book on the subject of management and the computer, this should be it. — A.R.K.

MINICOMPUTERS FOR ENGINEERS & SCIENTISTS *by Granino A. Korn. 303 pages, McGraw-Hill, New York. $17.50*

Of interest to the businessman with some engineering savvy as well as to the more technically inclined, this book provides a good introduction to the workings and uses of minicomputers. As befits a text on computers for the quasi-novice, main emphasis is placed on software aspects (programming), but chapters do outline interfacing problems and the applications of minis in the "real" world. The only faulting factors on this text rest with the outdated references cited (most circa 1969 to 1971), and descriptions of minis that have left the marketplace (the architecture of an Interdata Model 1 instead of a new series 70; Varian's 520/i instead of a 620 or 73). This criticism is, of course, from a nit-picking (or witted) editor, and can be disregarded by those in search of a general text on minis. — J.A.M.

McGRAW-HILL'S

1. The Programmer's COBOL

By Marjorie Berk. Helps the COBOL programmer quickly find information to prepare a program for a computer. Features easy use and direct application of its comprehensive treatment of the COBOL computer language. *250 pp., $19.50*

2. Managing the EDP Function

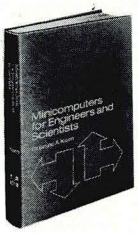
By A. Ditri, J. Shaw and W. Atkins. Here is a nontechnical guide that the generally-trained executive can use to control EDP functions. This unique reference provides practical methodology for planning, resource allocation, implementation, and control of computer operations. *228 pp., $15.50*

3. The Programmer's RPG

By Rochelle Gershon. Defines and discusses the RPG language, provides a highly detailed presentation of each language element, and presents many sample programs illustrating the definitions and rules. *443 pp., $22.50*

4. Management Information Systems Handbook

By W. Hartman, H. Matthes, and A. Proeme. A step-by-step approach to the preparation of a computerized data processing system for business organizations utilizing the ARDI approach (Analysis—Requirements Determination—Design and Development—Implementation and Evaluation). *750 pp., $29.50*



5. Minicomputers for Engineers and Scientists

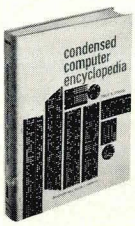
By Granino Korn. This book will give anyone who is using or planning to use minicomputers a full understanding of the units now available and of how their possibilities may be more completely realized. Also covers peripherals, assembly language, etc. *352 pp., $17.75*

6. 360/370 Programming in Assembly Language, Second Edition

By Ned Chapin. This is the most widely used book on assembly language programming for all models of the IBM 370 as well as the IBM 360, Univac, and former RCA Spectra 70. It includes models 135, 145, 155, 165, and 195. Even programmers who normally use languages such as COBOL, PL/1, FORTRAN, RPG, and ALGOL will find this book valuable. *544 pp., $13.50*

7. Introduction to Computer Operations

By William Fuori and Lawrence Orilla. A broad overview of what a computer system is, what it can do, and how to operate it. Explains console operations, job and peripheral equipment setup, scheduling and job processing. *544 pp., $11.95*



8. Condensed Computer Encyclopedia

By P. Jordain. Arranged alphabetically, this work explains the array of terms, items, technical details, interpretive languages, etc. connected with computers. Numerous examples, detailed essays, and precise, accurate explanations sweep away the mystery surrounding computers. *448 pp., $15.50*

9. A Guide for Software Documentation

By Dorothy Walsh. Clearly sets forth the steps and content for the preparation of documentation for a variety of computer situations—and shows just which topics should be covered. Documentation models included are product specification, operator's guide, internal logic manual, subprogram, program library, assembly language, etc. *158 pp., $16.50*

FAMED BOOKS ON COMPUTERS...

10. Managing Computer System Projects

By John Shaw and William Atkins. Presents and describes—in working detail—a methodology for the planning, development, and implementation of computer-based systems. Emphasis is on the *practical*—what to do and why—using proven management techniques. *304 pp., $16.50*

11. The Corporate Computer: How to Live With an Ecological Intrusion

By Norman Sanders. Shows managers in all industries how to create, organize, and re-organize a computing function for their firm. The emphasis is on the how-to aspects of managing the computer installation—or its output. *176 pp., $10.00*

12. Principles of Data Communication

By R. Lucky, J. Salz and E. Weldon. A reference book of timely information on such matters as theoretical performance bonds, adaptive equalization, optimum pulse transmission systems, and error control. *198 pp., $15.50*

13. An Illustrated Guide to Linear Programming

By Saul I. Gass. Introduces the concepts of linear programming in a nontechnical and humorous manner. A fascinating introduction, it moves logically from the basic to the more sophisticated ideas. *224 pp., $9.95*

14. The Programmer's Algol

By C. Lecht. A sound guide to the classic ALGOL language, alphabetically arranged for use as a programmer's desk reference. A valuable book, it gives an entirely new approach, treating ALGOL instructions as a series, proceeding from simple to complex. *251 pp., $10.75*

15. Advanced Linear-Programming Computing Techniques

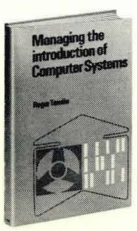
By W. Orchard-Hays. Offers vital information on linear programming, and the mathematics of algorithms used in programming, debugging, documentation, and so on. Geared to the needs of practitioners, it gives fundamentals *and* pitfalls. *355 pp., $12.50*

16. Systems Programming

By John J. Donovan. Thoroughly class-tested, this is the only presently available book that covers the entire spectrum of systems programming, including the use and implementation of assemblers, macros, loaders, compilers, and operating systems. *500 pp., $14.95*

17. On-Line Computing: Time-shared Man-Computer Systems

Edited by Walter J. Karplus. Based on the extensive experience of recognized experts in the field, here is a comprehensive guide that quickly gives you a practical grasp of today's time-shared on-line computing systems. This authoritative volume is of great help to everyone who wants to set up or utilize these computer systems with maximum efficiency. *352 pp., $15.50*



18. Managing the Introduction of Computer Systems

By Roger Tomlin. A completely practical and *nontechnical* book designed especially to help executives understand the fundamental principles of managing or contributing to successful computer projects; how to understand the work that is needed, and how to manage it or most effectively participate in it. *200 pp., $12.00*

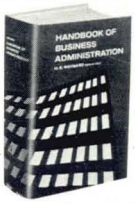
19. Automatic Information Organization and Retrieval

By Gerard Salton. Deals with automatic information storage and retrieval and the computer processing of large information files, with special emphasis on automatic text handling methods. Described are procedures for dictionary construction and dictionary look-up, statistical and syntactic language analysis methods, automatic information dissemination systems, and methods for user interaction with the mechanized system. *514 pp., $16.50*

Additional Business/Personal books of special interest

20. The Executive's Accounting Primer

By Robert L. Dixon. As clear as A-B-C: the accounting vocabulary, basic accounting reports, the fundamental debit-credit structure, general accounting methods and specific accounting matters you're likely to meet as well. *328 pp., $9.95*



21. Handbook of Business Administration

H. B. Maynard, Editor-in-Chief. This unique handbook is the only master reference developed expressly to serve all executives with major management responsibilities. Features a treasury of trouble-shooting advice and guidelines worked out by 177 of the nation's most respected management figures and business authorities. *2,048 pp., $29.50*

22. Nine Roads to Wealth

By David L. Markstein. A simple, easy-to-understand, *layman's* guide to "leverage"—the wealth-building technique behind just about every fortune being built today. Mr. Markstein explains what leverage is, and why leverage makes it possible to earn enormous profits on even a small investment. *224 pp., $6.95*

23. The Evaluation Interview, Second Edition

By Richard A. Fear. Since the first edition of this widely used guide, the author has trained more than 1,000 interviewers in business, industry, and education, and more than 25,000 copies of his book were bought by top personnel and management people. Since you're aware that each employee is an investment, why not use the guide that shows you how to scientifically pick "good investments"—consistently? *336 pp., $9.95*

24. Motivating Human Behavior

By Ernest Dichter. In a fascinating and practical guide, a leading authority on the latest psychological methods of human motivation gathers, explains, and illustrates—from actual findings of more than 4000 research studies—case-tested techniques you can use to motivate your peers, superiors, and subordinates to behave in a prescribed manner. *272 pp., $12.95*

25. Handbook of Modern Accounting

Edited by Sidney Davidson. As a business or professional person who is *not* also an accountant, you can have instantly at your fingertips the right answers to every accounting question. The work of 48 foremost experts from CPA, industrial, and academic disciplines, this guide is *the most* comprehensive, practical, up-to-date accounting reference ever published. *1226 pp., $22.50*

26. The Complete Estate Planning Guide

By Robert Brosterman. The first book for the *general reader* to cover all the varied aspects of modern estate planning. Shows how and where to save money, invest it, and administer it, how to plan for long-term financial growth, and how to take advantage of tax-saving opportunities. *318 pp., $9.50*

To order any of these McGraw-Hill books, use the Special Order Card between the cover and page one.

NEWS ROUNDUP

IBM-TELEX

Subsequent to completion of the article which appears on pages 18-19 of this issue, MODERN DATA received word that Judge A. Sherman Christensen has rescinded his damage award against IBM. In a statement released to the wire services after MD's normal editorial closing date, Judge Christensen said, "I have concluded that my computation of antitrust damages against IBM involves substantial error. Accordingly, defendant's motion to amend the findings, conclusion and judgment or in the alternative for a new trial on the issue of damages is hereby granted."

SOFTWARE AND SERVICES

The market for packaged computer software and services, which totaled $770 million in 1972, will climb to $1.5 billion by 1975 and exceed $2 billion by 1982, according to a new study by Frost & Sullivan, Inc., a New York City-based market research firm. The study predicts that the sale of software packages alone will reach $410 million by 1977, and $540 million by 1982. Software package sales amounted to $135 million in 1972. An even larger market exists for packaged computer services, according to the study: from $635 million in 1972, to $1.2 billion by 1977 and to exceed $1.5 billion by 1982.

SOFTWARE TAXATION

The California legislature has passed a bill excluding all but "basic operational" (systems level) software from taxation as tangible property. The bill extends permanently a two-year moratorium on taxes for assembly/compiler-level software (utilities, support packages, etc.). Its passage marks the end of a long struggle by the Data Processing Management Association, Dylakor Computer Systems, and non-affiliated users to overturn an original ruling which taxed all software.

CASEY AT THE BYTE

"Vida Blue has struck out more blue-eyed Croatians with athlete's foot than any other major league pitcher." Well, maybe not. But we often wonder from whence cometh the weird sports info we *do* get. One source, at least for the American Baseball League, is the Sports Information Center in Boston, a subsidiary of the Bay State Milling Co. It seems the parent firm has enough time free after processing business data to feed daily game statistics into its NCR 100. The resultant summary reports are mailed weekly to team statisticians, and they, in turn, provide them to the press.

MSI WINS A & P ORDER

The Great Atlantic & Pacific Tea Co. is to supermarkets what Sears, Roebuck is to department stores. In fact, only Sears ('72 revenues of $10.9 billion) exceeds A & P ($6.4 billion) among *all* retailers. While A & P has not yet decided on a supplier of POS terminals, in September MSI Data Corp. announced it had been selected to supply the giant supermarket chain with $3 million worth of order entry (inventory) terminals. By year's end, 2000 of the little keyboard/cassette units will have been delivered to 60% of A & P's 3,780 stores.

A MINI/MAXICOMPUTER

Generically, minicomputers have always been associated with mainframes noted for their small word sizes and main memory capacities as well as their low price tags. Interdata has changed all of this with the introduction of the 7/32 —a 32-bit, low-cost ($9,950 and up) "minicomputer." The new processor is not just another dual 16-bit mini, or one that employs segmentation and relocation to break the 64K memory limit. The Interdata 7/32 performs true 32-bit arithmetic and logic operations. Programs of up to 1 megabytes may be accommodated, with an architectural limit of 16 megabytes of directly addressable main memory. The 7/32 has two sets or stacks of 32-bit general-purpose registers, 16 registers in each set, allowing one set to handle user programs while the other is used for OS or I/O.

BITS & BYTES

Programmers, by definition, are problem-solvers. They are also notorious game-players. A new publication, *People's Computer Company*, attends to both these proclivities. For five highly enjoyable issues, send $4.00 to PCC at P.O. Box 310, Menlo Park, Cal. 94025.

The National Science Foundation is supporting a travel grant program for attendance at IFIP Congress 74 to be held August 5-10, 1974, in Stockholm. Applications may be obtained through the Math Division, National Research Council, Washington, D.C. 20418.

Boston radio station WBZ supports a "commuter computer clubcar" program to reduce that city's automobile traffic. Similar in concept to a computer dating agency, the carpool program matches riders with drivers.

The New York Stock Exchange announced it will discontinue operation of its Block Automation System (MD, July 1972), a three-year-old information network linking brokers and institutions. An economy move and the availability of alternate sources were cited as reasons for the discontinuance.

NCR admits being unprepared for the flood of orders received for its recently announced NCR 775 bank proof and encoding system. The firm said it received almost 2500 orders for the system within 90 days of its debut — more than double projections.

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Your turn to celebrate.

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THE TELEX DECISION

A legal precedent matched only by the Carterfone case in its impact on our industry.

The first IBM antitrust case to be resolved by a court has resulted in a resounding defeat to the giant computer maker. Judge A. Sherman Christensen's September 17 decision in the U.S. District Court of Tulsa to award Telex Computer Products, Inc., $352.5 million in triple damages can only be described as staggering. While there was little doubt that some cash and injunctive relief to Telex was in the offing, the enormity of the compensation awarded to the Tulsa peripherals manufacturer — more than five times its 1973 revenues — in all probability exceeded even Telex' wildest expectations. The damage finding for Telex was, however, only part of Judge Christensen's decision in the 21-month-long case. IBM was also ordered to:

- Eliminate permanently all penalties for premature termination of previously-offered long-term leases provided the lessees give 90 days notice, and to omit termination penalties from any 90-day or longer leases written in the next three years.
- Disclose all interface details of future products at the time of their announcement or manufacture, and disclose such information for all presently-available S/370 products by mid-November.
- Price separately all functionally different products (e.g., memories, control units, and processors) regardless of whether they are, or can be, contained in one cabinet.
- Use a uniform percentage markup over actual development and production costs for all products.
- Cease "adopting, implementing or carrying out predatory pricing, leasing or other acts, practices or strategies with intent to obtain a monopoly in the market for EDP peripheral equipment plug compatible to its CPUs, or any relevant submarkets thereof."

In regard to IBM's counterclaim that Telex had raided it for employees Telex could induce to reveal IBM trade secrets, Judge Christensen found completely for IBM. In fact, he reserved his harshest words for this matter, stating that "the court deals here not with isolated instances of misappropriation," but with "a programmed and massive invasion by Telex of IBM's trade secrets" for the "willful and deliberate" purpose of using the gleaned information in the design of its own products. Accordingly, he instructed Telex to pay IBM reparations totaling $21.9 million plus costs and attorney's fees associated with IBM's copyright claims; return all IBM confidential documents; destroy all Telex documentation which infringes on IBM copyrights; refrain from hiring any former IBM employees for a period of two years without specific court approval; and refrain from ever assigning any former IBM employees to perform work similar to their tasks at IBM within two years of their termination from IBM.

REACTION

Not unexpectedly, the effects of the decision were immediate, widespread and Krakatoan. On Wall Street, Telex shares rose 85% in two days. IBM plummeted almost 40 points in the same period, representing a loss to shareholders of over $5½ billion — an amount more than a billion dollars greater than the total revenues of any but the top 18 U.S. companies.

Telex president Stephen Jatras was obviously satisfied by the decision, stating that Telex was "quite pleased with the outcome," and that it fully justified Telex' decision to pursue the case. He also said that Telex would now "vigorously prosecute the foreign aspects of the case which were severed from the domestic issues during pretrial preparations and which are still pending." Other plug-compatible manufacturers were not long in voicing their own inclinations to bring IBM into court, thus establishing a trend sure to delight hordes of corporate ambulance-chasers. This mood was best expressed by Jack Biddle, executive director of the Computer Industry Association (see box), who was quoted in *Business Week* as stating that "As many as 40 companies

EVERY CIA HAS ITS LITTLE SECRETS

Since its inception in July, 1972, the Computer Industry Association has spearheaded the assault against IBM by lobbying, providing information to the press, serving as a clearing house for legal materials, and formulating some of the strongest arguments for curbing IBM.

Executive director Jack Biddle, and president and founder Dan McGurk, a former president of Xerox Data Systems, are its only full-time officers. CIA is headquartered in Encino, Cal., and public and press relations are handled by the offices of Kekst and Co. in N.Y.C. The organization also retains "a full-time legal staff" in Washington, D.C., consisting of at least one lawyer: antitrust specialist Jack Pearce.

CIA charges its supplier members annual dues of 1/30th of 1% of gross revenues "derived from activities related to the computer and/or data processing industry." User members are charged 1/10th of annual equipment and software rentals or rental equivalent. Minimum dues are $1,000/yr., and maximum dues are $50,000/yr. from suppliers and $15,000/yr. from users. Individual members are charged a flat $100/yr.

CIA does not make its finances public, but based on its June 5, 1973, statement that "Member companies had annual revenues of approximately $800 million in 1972," it would have been entitled to receive $266,400 from just its supplier members that year. (No user companies were listed as members as of June 5, 1973.) Its largest member, Memorex/ILC Peripheral Leasing, reported revenues of $145,422,000 in 1972, equivalent to dues of $48,400. For the fiscal year ending March 31, 1972, Telex reported revenues of $68,131,000, equivalent to dues of $22,688. If Judge Christensen's decision stands, CIA would be entitled to receive $110,000 from that action alone were it not for its $50,000 limit on dues.

How Judge Christensen arrived at a damage award of $352.5 million for Telex . . .

Deprivation of Market Share	$ 70 million
Past Lost Rental Profits	20 million
Anticipated Lost Rental Profits	19 million
Lost Sale Profits	8.5 million
Base Total	$117.5 million
Triple Damages (as provided under the Sherman Antitrust Act)	X 3
Total Damages	$352.5 million

are in a position to bring suit. All you'd need if the decision stands is a Xerox machine and a month of discovery to bring the record up to date."

User reaction was mixed. Most IBM users contacted by MODERN DATA mentioned they would benefit by the removal of the penalty clause, although no users contacted indicated any intention to pre-terminate their leases. The EDP manager of an insurance firm said he expected lower prices from a folding of IBM's price umbrella, while another employee of the same firm said he expected prices of IBM peripherals to go up because of the new uniform pricing requirement. One user said he thought such companies as Memorex, CalComp, and Potter were entitled to compensation for IBM's predatory pricing policies, but that "Telex had compromised itself." Another said that "Telex always has had more than enough smarts to make it on their own," and that he "would take Telex gear over IBM's any day." A systems design consultant suggested that the injunctions against Telex were more serious than those against IBM since "you can't ship equipment without documentation."

IBM: DOWN BUT FAR FROM OUT

Twenty years ago, IBM's "persuasive argument" may have held. Today, against a background of such cases as those recently brought against Xerox and Eastman Kodak, and the recent Holiday Inns judgment, the relief directed in the Telex case against IBM can scarcely have come as a surprise. What is surprising is the number of IBM-supporters who interpret the Telex decision as an utter disaster for IBM, if not for the whole concept of a manufacturer's right to control its own products. We see it differently.

Certainly if the amount of Judge Christensen's award remains intact after appeal, the immediate financial and legal burden on IBM will be enormous. Another dozen-or-so triple-damage awards of like magnitude would hamstring even a megalith of IBM's size (1972 net earnings of $1.2 billion); it would be the rare independent that could resist the temptation to follow Telex into the courts, or demand out-of-court weregild.

The injunctions, however, are another matter. While they too are harsh (especially the three-year restriction against any *pre-termination penalties), the transfusion they give to the plug-compatible industry can only be beneficial to IBM over the long term. Why? Because the health of that industry will continue to reflect on, as well as depend on, a healthy IBM. It is a symbiotic, rather than a parasitic, mechanism that is involved. It is the core of the frequently-heard argument that IBM has already gained far more from the existence of a plug- and software-compatible market than IBM has lost to it, i.e., that a user who knows he can go around the corner for a wide range of viable support and peripheral alternatives is that much more likely to opt for an IBM base. It was this combination of IBM and an IBM-compatible market, rather than the strength of IBM alone, that drew the noose around General Electric and RCA.*

How this situation came to develop and what can be done about it will be decided by another case at another time. Those issues are far more complex than any brought forward in the Telex case, and the tendency to oversimplify them is already too evident. Consider, for example, the naive but popular argument that "big" necessarily equates with "bad," which contradicts the function of the courts to decide when—and if—"big" becomes "too big," and suggests that graph paper can replace jurists.

But regardless of the position one takes toward IBM's power to establish de facto *standards over the industry as a whole, it is patently* de facto *that IBM has done so for a large and internally competitive sub-industry. To believe for one moment that IBM will lose the major share of the sub-markets it continues to create is absurd. Such a presumption implies that IBM got to where it is today by being the only source of EDP products. IBM was not even the first source. It simply should not be the last word.* —A.R.K.

Among those IBM-users supporting the decision, most agreed it would indeed benefit the industry by promoting greater competition. A Route 128 programmer summed up the general attitude by saying that his manager had been trying for months to get approval for non-IBM memory, and "the decision may have finally won it for him."

"We want a healthy industry, but let's not kid ourselves that it can come without cost."

Among all users contacted, a majority endorsed Judge Christensen's recognition of a separate plug-compatible market and the need to protect it. But even larger majorities characterized the injunctions as "good" and the award as "bad." The likelihood that IBM might be prone to penalties of equal magnitude from other plug-compatible manufacturers was mentioned often, and there was some concern regarding the effect this might have on the quality of IBM support. The aforementioned programmer told us: "We want a healthy industry, but let's not kid ourselves that it can come without cost."

THE CENTRAL ISSUE

The focal point of the Telex case was whether, as IBM claimed in its "persuasive argument," a manufacturer has a natural monopoly power over all devices designed exclusively for attachment to its own product. Judge Christensen struck this down with the argument that IBM had itself demonstrated the existence of a separate plug-compatible market by attempting to suppress it. As examples of IBM's predatory actions against Telex (as one such plug-compatible manufacturer), the judge cited IBM's introduction of a fixed-term lease plan, selective price cuts, and the 2319A and 2319B disc drive modifications. Judge Christensen specifically did ***not*** address the question of whether IBM had exercised monopoly powers in the overall systems market, the central issue in the pending Justice case.

Against IBM's contention that fixed-term coverage was determined by lower-echelon managers and did not reflect corporate anti-competitive policy, the judge referred to internal memos alluding to a so-called "Blue Ribbon Committee" of high-level IBM management that discussed the impact of individual competitors and strategies for dealing with them. This was done on a product-by-product basis and significantly excluded CPUs.

Even IBM Chairman Frank Cary was not spared. His assertion that if tapes and discs had not been put on the fixed-term plan IBM "would go out of business" was criticized as "having the character of confession" and "overstated."

IBM RESPONSE

IBM has already announced that it will appeal the decision, claiming that it "goes beyond that of any judicial precedent and contains serious errors of fact and law." But before filing an appeal, IBM will have had the opportunity in mid-October (well before the time you read this) to appear once again before Judge Christensen and ask for elimination of some of the injunctions and a reduction in the award. Failing a reduction, IBM will likely ask for at least its abeyance until an appeal is heard. Otherwise, according to Telex trial counsel Floyd Walker, the cost to IBM of a delayed appeal which does not result in a reduction "could be very expensive. If IBM loses again, it will have to pay the Oklahoma interest rate, which is 10% annually. That works out to nearly $100,000 a day." ▲

CIRCLE NO. 11 ON INQUIRY CARD

INTERNATIONAL NEWS

BULGARIA LOOKS FOR WESTERN TECHNOLOGY

The Bulgarian electronic industry has grown rapidly in the last few years and Bulgaria recently created a new Ministry of Electronics with responsibility for all electronic production, sales, imports, and services. Designated to produce computer equipment was IZOT, an established electronic manufacturer. Delegates from that organization and its trading division, IZOTIMPEX, recently visited the U.S. where they toured 20 different companies and explored the possibilities of cooperation via the licensing route. Among the companies visited were Control Data, Data Products, Honeywell, Rockwell International, Calcomp, and Wangco.

DUTCH SERVICE STATION SYSTEM

A Dutch manufacturer of automatic vending machines has developed a minicomputer-controlled gasoline pump which can be programmed for either cash or credit card. According to the manufacturer, Koppens Automatic B.V. of Bladel, the Netherlands, the new control system, known as the Type PCS-10 post-payment system, has been introduced already at many gas stations in Holland, Germany, and Belgium with very successful results. The self-service system is now available for export, and Koppens plans to establish an office in the U.S.

RIAD DEVELOPMENT

As the RIAD computers are beginning to receive more publicity among the Soviet Bloc COMECON countries, more details of the overall development effort are becoming available. *Informatyka*, a Polish magazine, reports that since inception of the RIAD project five years ago the program has involved about 20,000 specialists in six different countries. The Soviet Union is the largest contributor to the RIAD project and its biggest proponent, giving the project full support at the highest party echelons. M.E. Rakovsky, deputy director of GOSPLAN, the Central Planning Committee of the Soviet Union, was one of the prominent speakers at the RIAD exhibition in Moscow last May.

BURROUGHS IN YUGOSLAVIA

Burroughs has already installed about 15 of the 80 B1700 systems it sold to a Yogoslav bank last year. So far all operations are conducted on behalf of Burroughs by HERMES, a Yugoslav representative firm based in Ljubljana (no connection with the well-known Swiss typewriter manufacturer). Sales support and maintenance for Burroughs equipment is provided from the Burroughs office in Fribourg (Switzerland), which has responsibility for all European operations and reports directly to Detroit. Software for Burroughs machines is being developed by the *Institute Mihailo Pupin* in Belgrade under contract to the Yugoslav bank, but it has now reached a point where direct Burroughs support will be of value. The Institute is very active in computer technology in Yugoslavia and has developed its own 2311-like disc pack for use with disc drives used in Yugoslavia on many IBM and Honeywell installations.

EAST EUROPEAN MINIS PROLIFERATE

Now that minicomputers are in fashion, East European manufacturers are beginning to introduce their models to compete with western imports and even the COMECON RIAD series of small-to-medium computers. Hungary introduced its new TPA 70 mini at the Moscow RIAD computer exhibit even though it is not part of the RIAD line. The large number of potential buyers was too much of a temptation to miss the opportunity.

The TPA 70 is Hungary's second mini. Both it and the earlier TPA/i are manufactured by the Electronics Dept. of the Hungarian Central Research Institute for Physics, which is part of their Academy of Sciences.

The Polish K-202 mini appears to have run into some trouble with a British marketing organization which requires that it meet higher operation levels before it is accepted for marketing to the West. Bulgarians have uncovered their own IZOT 310 minicomputer, and East Germany is busy producing PRS 4000 and KRS 4200 process control machines for its own consumption. Even the U.S.S.R. is in the mini game, marketing its MIE 1 and MIR 3 computers overseas.

ICL WAVING FLAG IN PEKING

Although it is skeptical about any near-future potential of the computer market in the People's Republic of China, Britain's International Computers, Ltd. nevertheless participated in the British Industrial Technology Exhibition held in Peking this spring. While ICL showed no equipment, the company displayed photographs of its 1091A and 1092A models and presented a number of technical papers. ICL sold two of its 1900 computers to China in the mid-1960s, but because of China's present policy of self-sufficiency it is not expected to present any significant market for electronic equipment.

GEIS IN USSR

General Electric Information Services, a longtime supplier of timesharing services overseas, is now looking into the possibility of expanding its timesharing service into the Soviet Union.

Representatives of the special USSR/East Europe office which is set up at GE headquarters in Bethesda are studying the possibility of setting up a store-and-forward unit in Moscow linked to GE computers in London. They are discussing the project with the U.S.S.R. Ministry of Communications, which would act as a distributor and administrator of the service in Russia.

QUICKLY AROUND THE WORLD

For an excellent guide to industrial locations in Canada, write Don McGillivray, Editor, *Financial Times of Canada*, 10 Arundel St., Place Bonaventure, Montreal 114, Quebec. Ask for a copy of the industrial site supplement of June 25.

General DataCom has announced separate agreements with International Aeradio of England and France for representation in the U.K., France, Belgium, and 19 French-speaking African nations; and with Applicazioni Elletro-Telefoniche of Turin for the manufacture and sale of GDC products in Italy.

CIRCLE NO. 12 ON INQUIRY CARD

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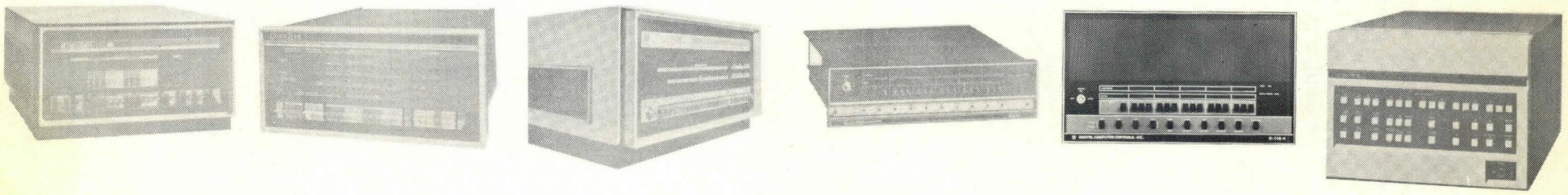

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D.C. DATASCAN

Alan Drattell, Washington Editor

FPC POLICY: The Federal Power Commission has announced a policy to establish a fully automated computer regulatory information system to assist it in carrying out its responsibilities imposed by the Federal Power and Natural Gas acts. The new policy will provide industry and the public at large with prompt and ready access to a central data bank designed to reduce the quantity of existing manual files and accommodate the development of new regulatory techniques. The FPC also plans to restructure the current methods of reporting data to the Commission by using EDP, and to issue agency EDP standards related to a respondent's submission of data.

MULTIYEAR LEASES: Arthur F. Sampson, administrator of the General Services Administration, has submitted to Congress a draft of legislation that would permit GSA to sign multiyear leases for data processing equipment through the Federal ADP Fund without obligating the full amount of the contract. Sampson's request stems from a 1971 report by the General Accounting Office which determined that nearly all Federal ADP rentals for Fiscal Year 1969 were for one year or less. Millions of dollars could be saved by going to multiyear leases, according to the study. Sampson said that most manufacturers and suppliers offer discounts under multiyear leases and most government-leased ADP equipment is used for three years or more. Use of a bigger capitalized revolving fund, Sampson noted, would overcome the requirement that Federal agencies finance equipment acquisitions with funds available during a specified fiscal year.

STATISTICAL COMMISSION: Three senators — Adlai Stevenson of Illinois, Charles McC. Mathias of Maryland and Lee Metcalf of Montana — are sponsoring S. 2142, a bill to establish a U.S. Statistical Commission "to establish, coordinate, and carry out statistical policy for the United States." In introducing the bill, Sen. Stevenson said it is designed to protect the integrity, accuracy, and confidentiality of government statistics and to insure that the process of collecting, analyzing, and publishing these statistics is free of political interference. He called the measure the "truth in statistics" bill, and he added that it would be one step in correcting one of the "imperfections in our system of government" that Watergate has "warned" us about. The Commission, according to Stevenson, would be headed by seven appointees — three named by the President, two by the Senate, and two by the House. The appointments would be on an overlapping basis for a period of seven years, and the appointees could not be removed by the President except for dire cause. Several agencies and statistical functions would be transferred to the new Commission, including the Bureau of Labor Statistics, the Social and Economic Statistical Administration — which includes the Census Bureau and the Office of Business Economics — and the National Technical Information Service of the Dept. of Commerce. "Provisions assuring confidentiality of information are included in the bill," said Stevenson. "The very strict provisions now applying to data collected by the Census Bureau would apply to all data collected by the new agency."

PATENT SYSTEM: Declaring that much of the nation's economic welfare depends on a healthy patent system, Dr. Betsy Ancker-Johnson, Assistant Secretary of Commerce for Science and Technology, told the American Bar Association recently that the establishment of ths Office of Technology Assessment and Forecast can do much to meet "some of our most pressing needs." She explained: "The availability of vast quantities of information, distilled by computer to show trends in technology as revealed by analysis of issued patents, can be a chief factor in better decision making. Yet, until now, there has been no single source from which either business or Government could obtain comprehensive information covering the entire spectrum of technology. It is the purpose of our newly established Office of Technology Assessment and Forecast to fill this need." The program draws on a data base which includes information contained in the U.S. Patent Office's file of over 11 million patent documents. Each year some 250,000 documents are added. As technologies are developed, the entire file is scrutinized and new categories and subclasses are created to reflect changes. The changing patterns of patent activity can spotlight areas of technology exhibiting unusually rapid growth, and can locate unused patents of promise in such critical fields as new energy sources and pollution abatement.

RECORDS: In the face of substantial increases in the costs of paperwork preparation, handling and storage, how effective has the National Archives and Records Service been in improving records management programs throughout the Fed? The General Accounting Office took a look and found that NARS has had limited success in persuading Federal agencies to correct weaknesses in their records management programs. One reason: NARS "identifies needed improvements and recommends rather sweeping changes without showing corresponding savings, a factor of vital concern to agency management." Another reason for limited success is the fact that NARS has never told the President, Congress, or the Office of Management and Budget about a particular agency's poor records management program "even though (NARS) consistently . . . found serious weaknesses in agencies' programs." Meanwhile, the Government's record holdings are increasing dramatically. Since 1966, storage has gone up by some four million cubic feet and now totals 30 million cubic feet.

IN BRIEF

A Federal Standard for paper tape take-up or storage reels has been announced by the National Bureau of Standards. Order prepaid (20 cents) from Supt. of Documents, Government Printing Office, Washington, D.C. 20402. Ask for FIPS PUB 27, 1973 June 30.

Dot has available a report entitled "An Overview of Urban Goods Movement Projects and Data Sources." For a copy of the report, which was prepared at MIT's Urban System Lab., write: Office of the Assistant Secretary for Policy, Plans and International Affairs, Attn: TPI-10, Dept. of Transportation, 400 Seventh St. S.W., Washington, D.C. 20590.

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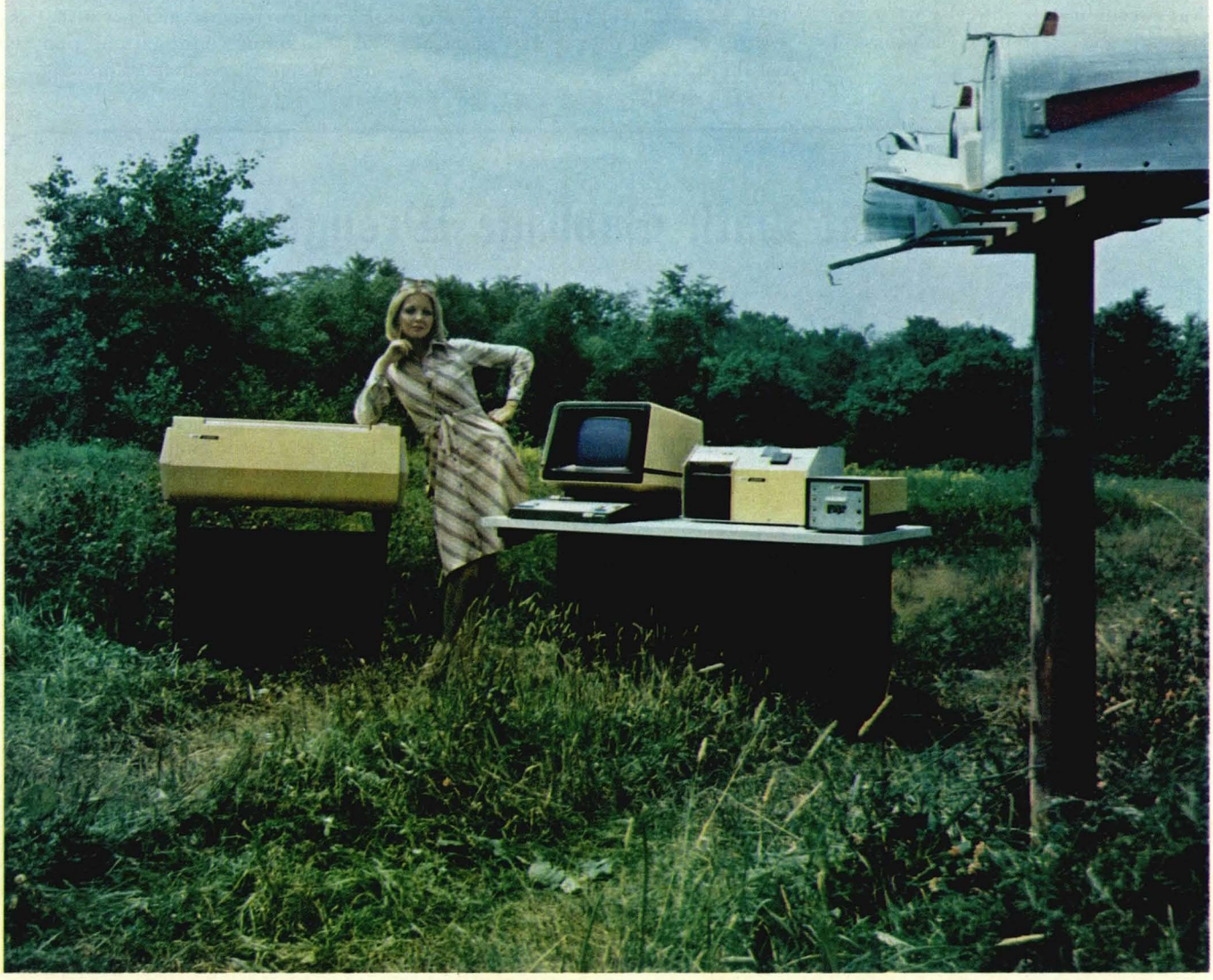

CIRCLE NO. 13 ON INQUIRY CARD

ORDERS AND INSTALLATIONS

The Singer Co. has received an order for up to 2,000 MDTS (Modular Data Transaction System) point-of-sale terminals, forty System Ten computers, and related equipment with a total value of about $7.5 million. The order was from Societe Francise Des Nouvelles Galeries, a leading French retailer which operates 86 stores and is the central buying organization for an additional 96 stores. The Singer equipment will be installed in 60 stores over the next three years.

The Illinois Secretary of State's Office has ordered a large-scale Model 6080 dual-processor computer from Honeywell valued at $8.1 million. To be used in part to supply an established statewide police network with driver and vehicle information, the system will have two million bytes of main memory and 7.1 billion characters of online disc storage.

Japan's Sumitomo Bank, which is believed to operate the world's largest online, real-time computerized banking network, has ordered five NCR Century 350 computers totaling $23 million in value. Initial installations will be at the bank's Osaka data center to be followed by installations at the data center operated by Sumitomo in Tokyo. Last year Sumitomo installed four Century 300s to supplement twelve NCR 315 computers currently used for online processing. The 350 systems will eventually replace the computers the bank is now using in its online network, which connects over 1,500 NCR terminals at tellers' windows throughout Japan.

The U.S. Navy has awarded Computer Machinery Corp. a $4.3 million contract to install key-to-disc data entry systems at naval data centers throughout the U.S.

Century Research Center Corp., a Japanese service center, has ordered a Control Data CYBER 70 Model 74 computer system valued at $3 million. The Model 74 will be connected to a CDC 6600 system presently in use at the center's Tokyo headquarters.

Burroughs' largest commercial computer, a B7700, has been ordered by Europe's second largest steel producer, ARBED, in the Grand Duchy of Luxembourg. ARBED also ordered three B1728 small-scale computers and 24 input and display terminal systems. Total value of the order exceeds $3.8 million.

The first of the new Xerox 530 computer systems was shipped to Jordan Dennis, Co., a New England direct marketing service firm. The $200,000 configuration will be used by the firm to manage a data base of four million records, soon to be expanded to some 55 million records, and for such tasks as marketing information analysis, record sorting, and related printing.

What Hath Babbage Wrought

GILDING THE LILY

Data General produces some fine little systems for which it writes great software. But the writing that gets into their advertising copy is something else. A recent ad for DG's new Nova 2 mini stated that it was "so inexpensive that it even looks good with a *quantity-one* [our italics] price tag of $5,600." A footnote to the ad stated: "Minium order, five systems."

Included in the same ad was the line: "It [presumably, the $5,600 "quantity-one" figure] buys 16,384 16-bit words of 1000-nanosecond memory." C'mon fellas, 1 microsecond even *sounds* better.

Ad submitted by:
T.R. Meier
The Mitre Corporation
Bedford, Mass.

GOTTA BE A WAY

In 1970, Brooklyn College's computing students had to buy their own punch cards at the college bookstore and there weren't enough keypunch machines. The B.C. computer-aided instruction center, having a terminal room next door to the keypunch room, mercifully stepped in near the end-of-term crunch to offer their 15-port CAI system for two hours a day as a key-to-disc system. The students' freshly punched & interpreted cards would emerge an hour after each keying session.

One day a freshman wandered into the terminal room, blank cards in hand. He goggled at all the CRTs, timidly sat before a terminal, and read the instruction sheet. He then started searching all over the CRT terminal for something, closely examining the ventilation slots in the sides of the cabinet. Finally he turned to his neighbor and whispered, "Where do you feed the cards *in*?"

Submitted by:
Abraham Getzler
Courant Institute, NYU
New York, N.Y.

MODERN DATA will pay $10.00 for any computer-or-EDP-related item published in our WHAT HATH BABBAGE WROUGHT Dept. Send all submissions to:

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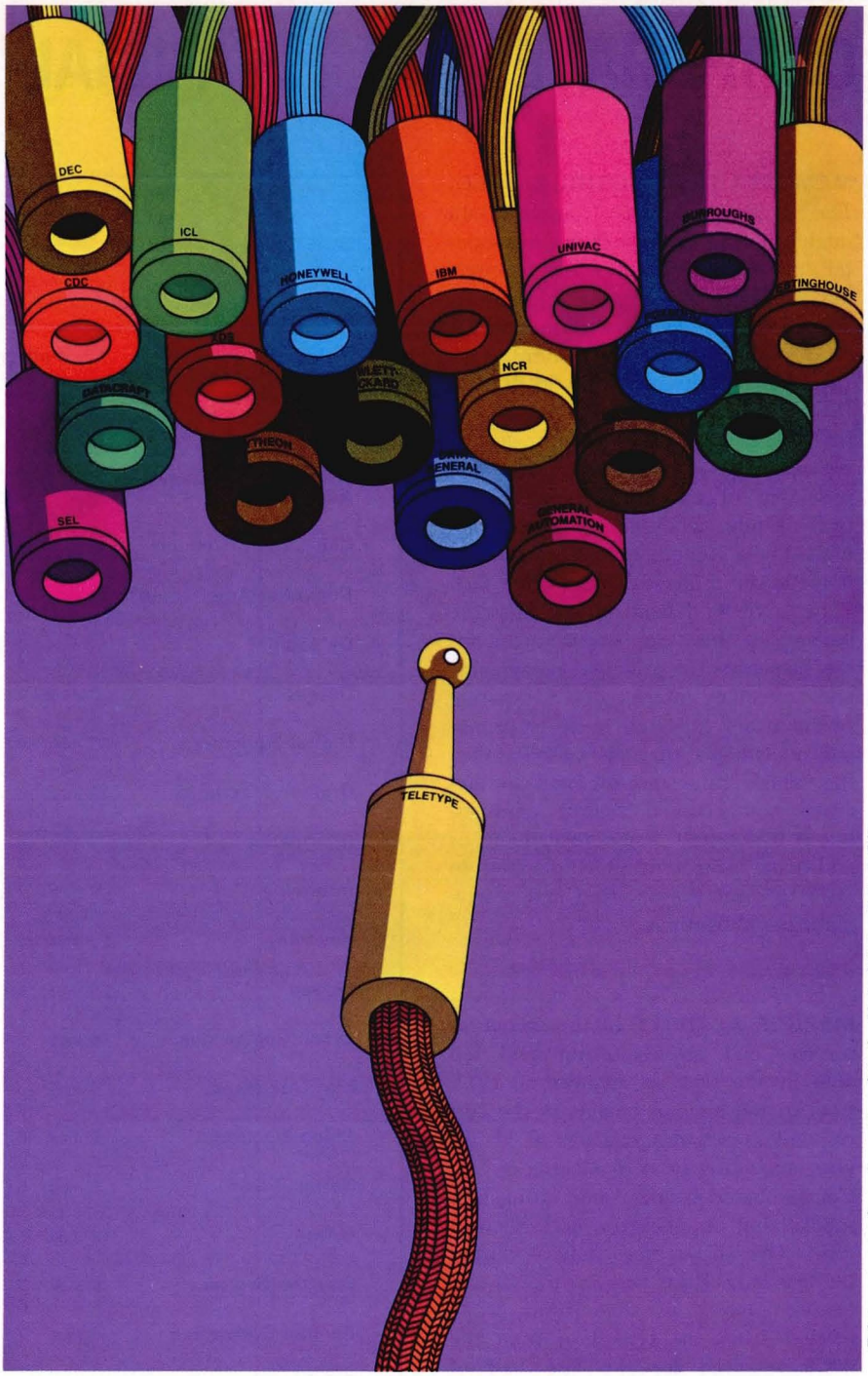

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The number one standard-duty data terminal in the industry is our model 33 series. And our new wide-platen model 38 offers big system features at economy system prices.

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We also build equipment for paper tape systems, as well as a magnetic tape terminal for greater on-line savings. As you can see, our reputation in point-to-point communications has served us well in computer terminals. No one comes close to us in reliability, flexibility and economy.

It takes more than manufacturing facilities to build the machines Teletype Corporation offers. It also takes commitment. From people who think service is as important as sales. In terminals for computers and point-to-point communications.

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CORPORATE AND FINANCIAL NEWS

MEMOREX DEBT RESTRUCTURED: The possibility that Control Data might infuse some much-needed capital into ailing Memorex fell through, but Memorex might make it after all. The financially-troubled firm said it "has reached basic agreement with Bank of America and the lenders to ILC Peripherals Leasing Corp., Memorex' wholly-owned subsidiary, regarding restructuring of debt obligations and providing of additional credit facilities." While definitive agreements remain to be signed, Memorex reported it made the interest payment due Oct. 1 on a 5¼% debenture and, for the balance of this year, has arranged for the suspension of principal repayments and any other interest due. Operating revenues are expected to cover principal repayments through 1974-76, during which time interest will be accrued and charged against earnings, but still deferred. Some refinancing or additional restructuring is planned in 1976 to meet the deferred and newly-maturing obligations.

MERGER ACTIVITY in the computer services and manufacturing field fell 48% in the first six months of 1973, from 61 net announcements in the corresponding period a year ago to 32 this year, according to W.T. Grimm & Co., Chicago-based financial consulting firm specializing in mergers and acquisitions. Overall merger activity during the first half of this year for the 40 categories covered by the Grimm study totaled 2,198, an 11% drop from the 2,478 reported for the first half of 1972. Within the computer classification, 17, or 53%, of the transactions represented divisional or fractional sales. In the first half of 1972 there were 33 divisional sales. Of all industry groupings, divisional sales accounted for 38% of the 2,198 total, the same percentage as last year.

SALES RECORD: Microdata Corp. reported that July bookings reached an all-time high of $1,388,000, an increase of more than 15% over the previous high of $1,209,000 reached in February of this year and an increase of more than 35% over the $900,940 figure established last July.

BOX SCORE OF EARNINGS

COMPANY	PERIOD		REVENUES	NET EARNINGS (Loss)	EARNINGS (Loss) PER SHARE
Analysts Int'l.	12 mos.	6/30/73	3,100,000	179,000	.21
		6/30/72	2,200,000	98,000	.12
AutEx	9 mos.	6/30/73	4,147,666	236,716	.35
		6/30/72	3,291,143	230,411	.42
AUXCO	6 mos.	6/30/73	1,910,516	118,812	.10
		6/30/72	1,042,061	85,179	.08
Cal. Cmptr. Products	12 mos.	6/30/73	80,308,000	465,000	.16
		6/30/72	53,871,000	(12,899,000)	(4.72)
Computer Automation	12 mos.	7/1/73	11,264,456	1,192,312	.75
		7/2/72	4,874,860	598,864	.46
Datapoint	12 mos.	7/31/73	18,538,000	1,901,000	1.09
		7/31/72	5,410,000	(2,220,000)	(1.68)
Datatrol	3 mos.	7/31/73	1,338,000	57,000	.10
		7/31/72	558,000	27,000	.06
Digital Equipment	12 mos.	6/30/73	265,469,000	23,500,000	2.16
		7/1/72	187,553,000	15,300,000	1.49
Graham Magnetics	12 mos.	6/30/73	11,176,000	900,000	.96
		6/30/72	9,033,625	917,463	1.10
Informatics	3 mos.	6/30/73	5,332,000	293,000	.17
		6/24/72	4,787,000	133,000	.08
Interdyne	9 mos.	7/31/73	1,601,000	(57,000)	(.03)
		7/31/72	1,441,000	(62,000)	(.04)
Keydata	12 mos.	7/31/73	9,501,000	847,000	.30
		7/31/72	7,507,000	348,000	.14
Leasco	6 mos.	6/30/73	354,070,000	23,563,000	1.48
		6/30/72	315,609,000	20,466,000	1.26
Lynch Comm. Sys.	6 mos.	6/30/73	9,964,251	788,960	.38
		6/30/72	7,331,159	697,523	.34
Mgt. Assistance	9 mos.	6/30/73	47,694,000	(1,570,000)	(.09)
		6/30/72	38,360,000	(5,917,000)	(.35)
Milgo Electronic	9 mos.	6/30/73	15,621,000	2,298,000	1.44
		6/30/72	8,944,000	1,422,000	.89
National CSS	3 mos.	5/31/73	5,280,368	387,284	.35
		5/31/72	3,783,273	281,464	.26
Odec	12 mos.	6/30/73	6,200,000	(260,000)	(.14)
		6/30/72	2,200,000	74,709	.04
Quotron Systems	6 mos.	6/30/73	6,168,209	(1,162,365)	(.55)
		6/30/72	4,863,373	(1,513,311)	(.72)
Remote Computing	3 mos.	7/31/73	884,525	63,699	.09
		7/31/72	730,516	19,359	.04
Scientific Computers	12 mos.	6/30/73	3,773,326	112,975	.14
		6/30/72	3,684,722	172,516	.21
Sys. Dimensions Ltd.	12 mos.	6/30/73	9,900,000	1,500,000	.75
		6/30/72	5,800,000	(434,000)	(.26)
Symbolic Displays	6 mos.	6/30/73	1,307,741	57,785	.10
		6/30/72	1,050,900	(4,504)	(.01)
Sys. Engrg. Labs.	12 mos.	6/29/73	17,082,000	513,000	.20
		6/30/72	15,719,000	1,112,000	.43
Terminal Data	9 mos.	6/30/73	3,018,450	207,304	.29
		6/30/72	2,647,543	394,401	.57
Telex	3 mos.	6/30/73	19,763,000	(4,007,000)	(.38)
		6/30/72	19,454,000	711,000	.07
Wang Labs	12 mos.	6/30/73	47,704,529	3,293,530	.82
		6/30/72	39,048,987	3,103,635	.77
Wavetek	40 wks.	7/7/73	6,238,685	400,583	.47
		7/1/72	4,466,978	239,941	.31
Western Union Int'l.	6 mos.	6/30/73	33,549,000	2,907,000	.95
		6/30/72	31,618,000	2,422,000	.79
Wyle Labs.	6 mos.	7/31/73	57,329,000	1,807,000	.52
		7/31/72	43,691,000	781,000	.22

RECENT ENTRIES: **Carroll Telecommunications Consultants** has been formed in Sunnyvale, Cal., to offer communications system design, new product evaluation, market survey, and equipment design services . . . **GSI** (General Systems International) of Anaheim, Cal., is developing an IBM 3740-type data entry system and has entered into separate development and license agreements with Applied Magnetics Corp., BASF of W. Germany, and Hitachi of Japan. GSI system products will be available for sale to OEMs . . . **EMI Ltd.,** London, and **Threshold Technology Inc.,** Cinnaminson, N.J., have signed a letter of intent leading to the formation of a joint venture company to market speech recognition systems. The new company, which will be 60 percent owned by EMI, will be established at Hayes, Middlesex, England.

MERGERS AND ACQUISITIONS: **Racal-Milgo Ltd.** has acquired a 20% interest in **Enquiry Systems, Ltd.** and has entered into a joint venture agreement to develop and market a communication storage buffer. Racal-Milgo, located in Reading, England, is a jointly-owned subsidiary of Milgo Electronic Corp. and Racal Electronics . . . **Rockwell International Corp.** has acquired three subsidiaries of **Lamson Industries, Ltd.** (London) engaged in the manufacture and distribution of electronic calculators and accounting machines: **Sumlock Comptometer, Ltd.; Sumlock Anita Electronics, Ltd.;** and **Ruf Organisation, Ltd. . . . Scientific Measure Systems, Inc.** of Cherry Hill, N.J., has purchased the CRT terminal product line of **Video Systems Corp.** of Pennsauken, N.J. . . . **Informatics Inc.,** of Canoga Park, Cal., has purchased the assets of **Asystance Co.,** Raleigh, N.C., for an undisclosed amount of cash and common stock. Asystance specializes in developing business and financial software packages. Informatics also reported the completion of its previously-announced acquisition of **SDA Corp.,** a service firm based in Cheverly, Md., for 141,167 shares of Informatics stock on a pooling of interest basis . . . **Time Sharing Information Service** of Philadelphia, Pa., and **George Grodahl and Associates** of London, England, have merged to form a new company, *Telis, Inc.,* which will combine both firm's services relating to the remote computing industry.

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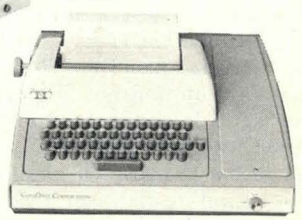

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CIRCLE NO. 15 ON INQUIRY CARD

IBM THINKS P.O.S.-ITIVELY

After capturing the lion's share of the computer and typewriter trades, and making inroads in the copier market, the Grey Giant has finally decided that the point-of-sale field — in the form of cash registers and bank terminals — should be the next products blessed with the IBM imprimatur. By announcing its 3650 Retailer System and 3600 Finance Communication System, the White Shirts from White Plains have entered the frontiers of transaction processing pioneered by Singer, NCR, Burroughs, *et al.*

3650 RETAIL STORE SYSTEM

Aimed at the department or discount store merchandiser, the 3650 consists of a store-site programmable controller, an intelligent POS terminal (register) with independent as well as online-to-controller operational features and magnetic wand reader option, a communications facility for connecting remote stores to a controller or to a central host CPU, and a magnetic stripe tag/ticket encoder-printer unit.

The 3651 controller contains from 41K to 57 Kbytes of memory and an integral 5 Mbyte disc unit. Using its own logic, the 3651 can handle many in-store applications, such as transaction data collection; credit authorization; purchase order, receipt, and merchandise tag data entry; sales audits; and store management report printing. It is available for a monthly ETP charge of $700 to $820, or a standard monthly rate of $824 to $1,024. Purchase prices range from $31,500 to $39,160.

Used at the sales transaction site, the 3653 POS terminal contains panel displays for numeric data and transaction status codes, a numeric keypad with 19 function keys, a backlit operator guidance panel for 20 messages, a three-station journal log and sales-check/cash receipt alphanumeric printer, status indicators, and a cash and media drawer. The optional magnetic wand reader can read encoded price tags, credit cards, and employee ID badges. The terminal is available on a purchase-only basis for $3,575. The wand option, also on purchase-only, costs $350.

The back office or stock room administrative terminal consists of a 3275 Display Station (a member of the 3270 terminal line already in use on the System/370) and a 3284 40 cps printer (another 370 peripheral). The 1920-character CRT display rents for $165/month, or may be purchased for $6,700. The printer costs $130/month or $5,590 on purchase.

Up to three store loop adapters allowing twisted-pair cable communications at 2400 bps may be attached to the 3650 system. The first loop will service up to 63 locally attached devices; the second or third optional loops may be either local or remote, with remote attachment servicing up to 64 devices. Each remote adapter extends store communications to up to three remote locations, each terminated by a 3659 remote communications unit. The maximum network can therefore handle one local and six remote stores with up to 191 devices linked to a single 3651 controller. The 3659 remote communications unit goes for $90/month under ETP or $106/month on standard rental, or may be purchased for $4,050.

The host communications adapter allows interfacing with a centrally located System/370 using a new Synchronous Data Link Control (SDLC) transmission technique. Basic data rate is 2400 bps over leased lines. Systems attachment to the 370 is via an IBM 3704 or 3705 communications controller.

The 3657 ticket unit produces three sizes of printed and magnetically encoded sales tags. Output is 500 tickets/minute for a 1″ x 1″, 19-code/22-character tag to 167 tickets/minute for a 1″ x 3″ 60-code/64-character tag. ETP cost is $550/month. Under a standard rental the cost is $647/month, or the 3657 may be purchased for $22,500.

Programming support for the 3650 retail store system includes IBM subsystems which maintain system libraries, tailor and transmit data from computer to controller, and create tables, format controls, and file space for the controller.

Watch your money appear via the bank's IBM 3604 keyboard display terminal . . .

3600 FINANCE COMMUNICATION SYSTEM

The modular 3600 system, designed for commercial banks and savings & loan institutions, consists of a bank-site communications controller, a keyboard display teller terminal with optional magnetic stripe read/write encoder, a journal tape and fanfold document printer, a passbook and document printer, an administrative line printer, and a self-service cash dispenser terminal for after-hour withdrawals.

The 3601 communications controller contains from 8K to 41 Kbytes of read/write memory and an internal

floppy "diskette" drive for data and program storage. Supervisory programming allows the 3601 to control the operation of teller and cash dispenser terminals, and communications to a central-site mainframe. The controller can maintain bank operations during communications line failure or central CPU downtime. An integral modem allows 1200 bps transmission (4800 bps rates may be by an external modem). Depending on memory size and options, ETP charges for a 3601 range from $440 to $825 per month. Standard monthly rental is at $518 to $974, and purchase prices range from $19,850 to $37,350.

The 3604 keyboard panel display terminal is available in numeric-only and alphanumeric models. The terminal may be equipped with a 1200 bps modem for branch bank operations where a 3601 controller is not required. Features include a 240-character display, programmable function keys, and a magnetic stripe read or read/write encoder option. The 3604 is available under ETP for $60 to $125/-month, and at $71 to $147/month on standard lease. Purchase prices are from $2,450 to $5,180.

. . . and watch it disappear into the department store's IBM 3653 POS terminal.

The 3610 document printer can be shared between two teller stations and can print on cut forms, journal/audit rolls, and continuous fanfold paper. It operates at 30 cps for a 64-character set, or 15 cps for a 96-character version. ETP prices are $70 to $100/month, and $83 to $117/month under standard agreements. Purchase prices are $2,800 to $4,000.

The 3612 passbook printer can print on horizontal- or vertical-fold passbooks, and has the same printout features as the 3610 unit. Cut forms, journal rolls, or continuous forms are printed by the top half of the 3612, while passbooks are handled in a separate printer in the bottom half. Prices range from $115 to $160/month on ETP, $135 to $188/month on standard lease, and $4,600 to $6000 on purchase.

Other 3600 finance communication system terminals include the 3614 cash dispenser unit for teller-less withdrawals or customer-initiated inquiries, and the 3618 administrative line printer. ETP costs for the 3614 are from $545 to $580/month; standard rentals go from $640 to $682/month. Purchase prices are $20,380 to $21,630. The 3618 printer, operating at speeds up to 155 lpm, goes for $235 to $275/month on ETP, $276 to $323/month on standard rental, and $10,000 to $11,600 on purchase.

Like the 3650 retail system, the 3600 finance system operates under IBM's new SDLC discipline, and interfaces with 370/125 through 168 CPUs via 3704 or 3705 communications controllers. The finance system is supported by virtual storage programming under VTAM on DOS/VS, OS/VS1 and OS/VS2, and under TCAM through VTAM on OS/VS1 amd OS/VS2.

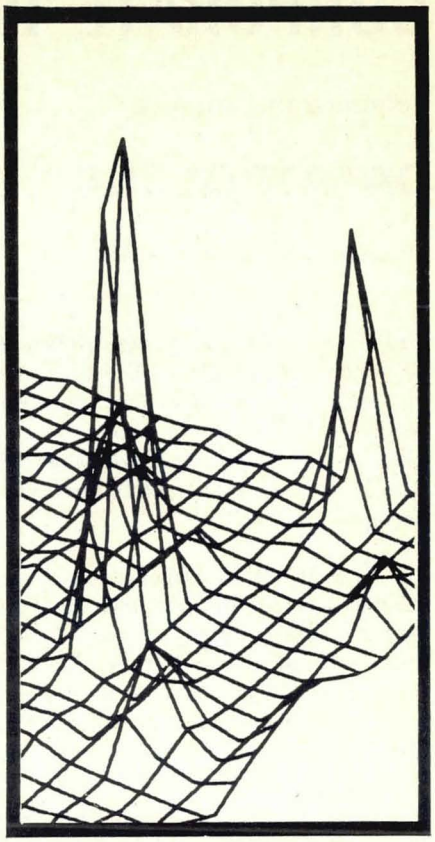
MARKET IMPACT

Singer and NCR share top billing in POS today. IBM's joining the cast should see a triumvirate established in retail merchandising POS by 1976 — a market which by then should easily exceed annual sales of $200 million. Although White Plains has not yet announced a POS system for the supermarket trade, it is a safe assumption that such systems are under development or even ready.

The market for transaction-oriented systems in banking is also forecast to pass the $200 million level by 1976. Burroughs and NCR at present lead in this market, and IBM's entry will result in another three-Giant race.

In both the retail and banking fields, however, three giants do not a market sate. Well over fifty firms will be vying for a piece of the action, and even a small percent of $200 million is nothing to scoff at. ▲

Computer users:



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CIRCLE NO. 17 ON INQUIRY CARD

CORPORATE PROFILE

Featured this month:

DATATROL INC. (Over-the-Counter)

Hudson, Massachusetts

OFFICERS & DIRECTORS: ***Robert L. Fronk,*** President, Chairman; ***Leon Jackson,*** Executive Vice President, Director; ***John J. Lifford,*** Treasurer, Director; ***Paul P. Brountas,*** Secretary; ***Dr. Murry E. Sherry,*** Vice President — Product Line Systems; ***John M. Norris,*** Controller. **Other directors:** *John M. Dumser, Jr., David D. McNeish, Howard G. Roecker, George B. Rockwell.*

BACKGROUND: A Delaware-chartered company, Datatrol was incorporated in May 1969 to design, manufacture, and market special-purpose, computer-based data entry and retrieval systems. Robert L. Fronk, Leon Jackson, and John M. Dumser, Jr., co-founders of the company, previously held sales management positions with Digital Equipment Corp. David D. McNeish, also a co-founder, is president of Breck, McNeish, Nagle and DeLorey, Inc., a Boston investment firm. In 1971 Datatrol completed installation of retail credit authorization systems for its first three customers: The Joseph Horne Co. (Pittsburgh), J.L. Hudson Co. (Detroit), and Winkelman Stores, Inc. (Detroit).

FACILITIES: Datatrol leases 31,000 ft² of space in two buildings located in the Kane Industrial Park, Hudson, Mass. Manufacturing operations occupy 10,000 ft²; administrative, marketing, and engineering offices occupy the remainder. Current plans call for the leasing of additional space in a third nearby building, now under construction. The company maintains sales offices in six cities and service offices in seven cities. Datatrol presently employs about 200 people.

PRODUCTS: Datatrol's three major products are two retail credit authorization systems and one bank teller information system. All three are minicomputer-based, dedicated, online systems. Datatrol supplies central system hardware, terminals, software, and training on a "turnkey" basis and provides maintenance service. The CS 1400 Voice System allows retail clerks at the point of sale to request credit authorization via Bell System Touch-Tone telephones or the equivalent. Data entry instructions and credit approval or disapproval are provided by means of recorded voice messages. The CS 1500 Terminal System is similar but replaces the Touch-Tone telephones with a Datatrol-designed terminal (resembling an electronic calculator) which includes 16 keys for data entry and a three-digit numeric display for coded instructions and credit authorizations. Both systems can be designed for "positive" (all accounts are online) as opposed to "negative" (only "bad" accounts are online) credit authorization procedures. The TTS-370 Teller Terminal Information System utilizes another Datatrol-designed terminal, with an eight-digit numeric display, by means of which bank tellers can access daily trial balances and other account information while servicing normal customer transactions such as check cashing. Voice response is also available. Datatrol systems are normally customized, and can include a wide variety of optional equipment such as additional processors, additional disc storage, CRT display terminals, and hard-copy printers. Prices vary widely, of course, but are usually within the following ranges: CS 1400, $50,000 to $200,000; CS 1500, $200,000 to $600,000; TTS-370, $60,000 to $150,000. Maintenance is provided under separate service contracts.

CURRENT POSITION: Presently installed or on order are fifteen retail credit authorization systems, eight bank teller information systems, and one order entry system. Organizations with installed Datatrol equipment include Lord & Taylor (New York), Gilchrist's (Boston), G. Fox & Co. (Hartford), and Bankers Trust Company (New York).

OUTLOOK: Datatrol sees the market for its retail credit authorization systems as including multi-store retailers with $40 million or more in annual sales. The company expects to sell systems not only to merchants currently without any computer-based credit authorization equipment, but also to replace existing "negative" authorization systems with its "positive" systems. Datatrol places commercial banks with $70 million or more in assets (the top 1000 U.S. commercial banks) in its market for teller information systems. This equipment, which now accounts for one-third of Datatrol sales to date, should provide an increasing portion of the company's future revenues. Beyond the "top 1000" bank market, Datatrol hopes to sell teller systems to service companies specializing in smaller commercial banks, and to joint-venture service companies operated by groups of banks. In general, Datatrol will continue to design, manufacture, and market specialized systems.

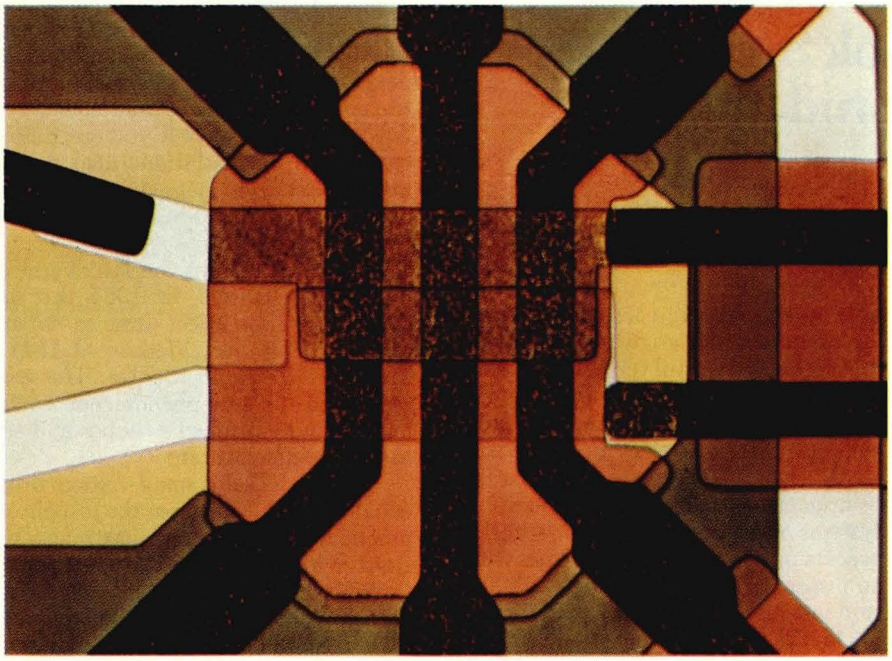
FINANCIAL SUMMARY: Datatrol went public in January 1973 with an offering of 250,000 shares of common stock at $8.00 per share. Distribution was handled by Breck, McNeish, Nagle and DeLorey, Inc. of Boston. Net proceeds to the company after underwriting discounts were $7.28 per share. The company steadily lowered its net losses from Fiscal Year 1970 to 1972, showed a gain in 1973, and had a profitable first quarter in fiscal 1974. As of April 30, 1973 Datatrol reported total assets of $4,163,407, total stockholders' equity of $2,771,782, and 1,018,196 shares of common stock outstanding. Current ratio was 3.1 to 1. A total of $338,600 in federal income tax loss carry-forwards is available, expiring as follows: 1975, $161,800; 1976, $164,000; 1977, $12,800. In addition, the company has unused investment tax credits approximating $22,000 which expire through 1980. During fiscal 1972, Datatrol raised $900,000 through a private sale of 300 units, each selling for $3,000 and consisting of 500 shares of common stock, warrants to purchase an additional 417½ shares of common stock, and a $1,000 note. The purchase agreement includes restrictions on the payment of cash dividends.

Period Ending	Revenues	Net Income (Loss)	Earnings(Loss) Per Share
F.Y. 4/30/70	$ 16,933	($359,913)	($.99)
F.Y. 4/30/71	379,698	(258,859)	(.60)
F.Y. 4/30/72	991,307	(23,949)	(.05)
F.Y. 4/30/73	3,265,161	495,105	.51
3 mos. 7/31/72	558,000	55,000	.06
3 mos. 7/31/73	1,338,000	110,000	.10

DP DIALOG

Notes and observations from IBM which may prove of interest to data processing professionals.

DP DIALOG appears regularly in these pages. As its name suggests, we hope DP DIALOG will be a two-way medium for DP professionals. We'd like to hear from you. Just write: Editor, DP DIALOG, IBM Data Processing Division, White Plains, N.Y. 10604.



The Josephson junction magnified many times its actual size.

Superconducting Computers May Run at Super Speeds

Computer technology in the last decade has advanced by quantum leaps. Microscopic transistors can speak the simple "yes-no" binary language of computers in less than a billionth of a second. Giant memories hold massive amounts of data which can be tapped to solve complex problems with astonishing speed and accuracy.

But as fast as modern computers can now operate, present speeds can not cope with the heavy demands of missions in space and long-range weather forecasts.

However, it appears a major advance may be in the making. After many years of intensive research, IBM scientists at the Thomas J. Watson Research Center in Yorktown Heights, New York and at IBM's research center in Zurich have developed an electronic switch which can operate at a speed of about ten-trillionths of a second—more than 100 times faster than the fastest transistor now used in computers. Even more important is that the new switch requires only about one ten-thousandth of the power needed to run present-day transistors. It thus gives off only a very small amount of heat.

Dr. Wilhelm Anaker, of the Yorktown Research Center, explains: "Computer speed is limited by heat as much as by switching time because when transistors are placed closer to-

(Continued on next page)

Nobel Prize to Three Scientists

The Swedish Academy of Sciences in Stockholm awarded the 1973 Nobel Prize for Physics to three scientists for their pioneering work in the field of electron tunneling. They are Dr. Brian Josephson, British scientist, Dr. Leo Esaki of the IBM Thomas J. Watson Research Center and Dr. Ivar Giaever of the General Electric Company.

Dr. Esaki, who joined IBM in 1960, was the first to clearly demonstrate electron tunneling in semiconductor junctions and put it to use in the tunnel diode, a high-frequency electronic device. The later research of Giaever and Josephson on tunneling and superconductors revealed effects which, in addition to their scientific importance, have been combined by IBM scientists to build a new type of computer switching device which is reported to be the world's fastest.

Students at De Anza College in Santa Clara County, part of California's state-wide community college system and one of the many users of SRA textbooks.

SRA's Textbook Systems Motivate Students

In the last two decades as the data processing industry has grown, so has the ever-present need for better education and materials in the computer sciences/data processing field. Toward this end IBM, through its subsidiary Science Research Associates, is publishing a wide range of data processing texts for the college market.

The SRA College Division in Palo Alto, California is a part of SRA in Chicago, an innovative publisher specializing in instructional materials and tests for the elementary and secondary markets. It was acquired by IBM in 1965.

The college division, now in its fourth year, has available 70 titles with the main strength in the computer science/data processing area. Unlike other publishers, SRA turns out not just textbooks but entire educational systems, based on exhaustive research in the academic market to find out just what is needed in what areas. A wide array of supportive material accompanies many of the texts.

These innovative capabilities have been successfully combined not only with IBM's own data processing expertise but also with that of experts in the field. The combination has so far produced a string of successes. C. W. Gear's *Introduction to Computer Science,* which was published earlier this year, is already in use at over 125 colleges. It introduces the student to the computer problem-solving process, with emphasis on the basic principles with which the student can learn any of the common computer languages.

The text comes with an instructor's guide, transparency masters and three language manuals on BASIC, FORTRAN and PL/1. SRA also has available individual textbooks on every major programming language.

Another successful text, *Information Processing* by Marilyn Bohl, came out in 1971 and is now in use at over 200 colleges. Her book gives a comprehensive view of the hardware and software components of modern data processing systems and the part each plays in the processing of information. It comes with an instructor's guide, a study guide for students and transparency masters.

On the more advanced level SRA offers several texts, including Mark Elson's *Concepts of Programming Languages,* Harold Stone's *Discrete Mathematical Structures and Their Applications* and *Simulation of Discrete Stochastic Systems* by Herbert Maisel and Guilano Gnugnoli.

Although SRA textbooks are sold on all levels, emphasis is on the introductory. Michael Crisp, publisher of SRA's new College Division, explains: "Our objective is to get high quality, readable texts in the hands of the student. We want to get him started in a better way, through superior editing and design, along with a wide range of teacher and student aids."

He concludes: "Our philosophy is to motivate these students by presenting material in exciting, meaningful ways with examples they can relate to and identify with." **IBM**

Superconducting Computers

(Continued from preceding page)

gether to speed up the flow of signals between them, the risk of overheating is sharply increased."

The new switch is called a Josephson junction, after the British scientist, Brian Josephson. During his graduate studies at Cambridge in 1962, he predicted through mathematical calculations that electron pairs in a superconductive state could "tunnel" through an electrical insulator, if it is thin enough and placed between two superconductors. Superconductivity is the state in which there is no electrical resistance in certain materials when they are cooled to within a few degrees of absolute zero or minus 460°F.

Josephson also believed there would be no difference in voltage across the insulator between the superconductors if the flow of electrons were kept below a certain threshold. However, if the flow of electrons should exceed this threshold, then a small voltage would develop across the insulator. (An electric current in normal conductors never flows unless there is a voltage differential.) His calculations also determined that if a magnetic field were applied to the junction, a voltage drop would appear.

Josephson's thesis was later verified by other scientists. In 1965 the so-called Josephson effect came to the attention of Dr. Juri Matisoo at IBM's Yorktown Research Center. He was convinced the new phenomenon could be used in high speed switches and set to work to demonstrate it.

He knew that a small voltage drop could be produced across the Josephson junction by applying a weak magnetic field while a current was flowing through it. He also suspected that the voltage would develop rather quickly. It then could be used to steer a current from one superconducting branch into another and in turn represent the basic "yes-no" language of a computer. Since the voltage drop would be small, only a fraction of the energy needed to switch a transistor would be required.

As Dr. Anacker recalls: "At first our main problem was to fabricate an ultra-thin, pinhole-free oxide layer about ten to twenty atomic layers thick. There were those who thought it couldn't be done. But after a while we were able to come up with a new method for preparation of these oxide layers which worked."

Although Dr. Anacker reports the Josephson junction is still in an early stage of development with many more improvements to be made, he says: "It is now a real possibility that the world's fastest switch may become a part of computers in the years to come." **IBM**

New Computer System to Benefit Retailing

As costs in the retail business mount, store managers are taking a closer look at how they can improve operations. Many believe that a major need is the organization of store operations into a single smoothly-flowing system, both for individual stores and multiple units. Up until now efforts to automate operations have been limited to accounting procedures.

Recently, IBM expanded that focus with the introduction of the IBM 3650, a total operating system, designed to integrate the full range of store-wide merchandising and financial functions. It includes a point-of-sale terminal which helps the sales personnel to complete a sale swiftly and accurately. But it goes far beyond that. The new system can control the flow of merchandise from purchase order, through receiving goods, ticketing them with a retail price and the actual sale to inventory control and accounts receivable.

It can streamline such functions as credit authorization, sales audit, personnel training and scheduling. And it can provide management with an up-to-date overview of operations as a whole, vital to maximizing profit opportunities.

Although the IBM 3650 is a store-wide system, involving virtually all store activities, implementation can be carried out in phases, with different functions becoming operative over a period of time.

Components of the 3650 System include four systems devices used by store personnel. They are the 3653 Point-of-Sale Terminal, the 3657 Ticket Unit, the 3275 Model 3 Display Station and the 3284 Printer. These components are linked to a control unit, the 3651 Store Controller, which in turn is on line to an IBM System/370 computer. Up to six remote stores can be linked to a controller by means of the 3659 Remote Communication Unit.

IBM

The Computer Helps Market Chiquita® Bananas

Every week 10 or 11 shiploads of bananas marketed by Chiquita Brands, Inc., a subsidiary of United Brands Company of Boston, arrive in U.S. ports from Albany to Seattle, most of them ordered before arrival. Buyers for the remainder must be found while the bananas are being unloaded and shipped from the ports. It is vital to match supply and demand on a day-by-day basis.

With the help of an IBM computer, Chiquita Brands now has ample data available so management can make marketing decisions quickly and efficiently, based on their knowledge of the continual variations in demand and the heavy volume of highly perishable merchandise. The System/370 Model 155 computer, operating with IMS, is in Boston where it is linked to terminals at eight ports and six sales centers. When a ship arrives at a port, customers' trucks are loaded in accordance with orders previously entered in the system and transmitted to the ports. Any discrepancies in filling the orders are transmitted back to the computer. These records become the basis for invoices.

With the information this new system provides, management can make better pricing and distribution decisions. They also gain a better understanding of buying patterns for a given geographic market.

Bananas not sold at the ports can be routed to areas of greatest demand shown by nationwide data, rather than the limited information formerly available to local offices. The system makes it possible for Chiquita's customers to place orders farther in advance. At any time, they can get quick answers as to the status of their orders. The IBM system enables Chiquita Brands, Inc. to serve each customer in a more effective and efficient manner than ever before.

IBM

Every week 10 or 11 shiploads of Chiquita Brand bananas arrive in U.S. ports.

® Chiquita is a registered trademark of United Brands Company.

Data Processing Training...

in Watts

"This course was not only one of the most stimulating educational experiences I've had, but it also gave me the chance I really needed to get and keep an interesting job that paid well."

This was Jackie Glover's reaction to the computer programming course she took three years ago at the Los Angeles Urban League Data Processing Center. The center teaches data processing courses for no tuition to those who could not otherwise afford the training. The curriculum includes courses in computer programming, computer operating, keypunch operating and one just recently added in clerical skills. The center, which opened in 1968 near Watts, is sponsored jointly by IBM, the Bank of America and the Urban League. IBM provides the manager and instructors and the educational materials. The bank supplies the building and pays for its maintenance. The Urban League screens and tests the students and places them after they have completed the course.

In Los Angeles, instructor Jackie Glover (second from right) reviews a program with students Diane Johnson, Ennis Davis and Willie Davis.

Just before coming to the center, Jackie had worked as a hair color technician. Upon graduating from the center's intensive 13-week programming course, she was hired as a programmer at IBM's Systems Manufacturing Division in San Jose. Since then she has come full circle to return to the center as a programming instructor.

Jackie is one of over 700 students who so far have graduated from the Urban League Data Processing Center. Ernie Barrios, the center's manager, says over 97% have been hired by over 200 companies—most in the Los Angeles area but some out of state.

On a tour through the large stucco building, Barrios said: "These people are high school graduates and they're bright. They're disadvantaged only economically."

To qualify, students must be high school graduates and show an aptitude for the particular course they are interested in. Prospective programmers must also pass a logic exam. Barrios emphasizes: "Our students probably have a better chance of success, not only because of the intense instruction they get, but also because at least half their time at the center is spent in the computer room with actual on-site, hands-on computer experience."

and Harlem

The success of the Urban League's data processing center in Watts prompted IBM to help open a similar center in New York City's Harlem just last year. This time IBM teamed up with the Sperry & Hutchinson Foundation and the Opportunities Industrialization Center of New York (OIC). Again, IBM provided the data processing equipment and materials along with the instructors and manager. Sperry & Hutchinson donated $25,000 to help convert a Harlem factory into a data processing center.

Lauchland Henry, IBM's manager, reports: "We've graduated over 135 students with about 90% placement. Most are working at many corporations and banks in the New York area. Many of them have already made rapid progress."

Their success is no accident. Besides a rigorous screening process, the center demands high performance from the students. "We're pretty tough on them," says Lauchland Henry. "But we have to be, if they're going to learn what they have to in the three months or less they are here."

One of the instructors, Dorothy Fort, a former systems engineer for IBM, explains: "What we're trying to do is get the students used to 'working' while they're learning. We not only give them as much computer time as possible but also full knowledge of actual work situations. It's really a golden opportunity for them."

The students seem to concur. Jan Webster, who spent a year at college, could not afford further training. Anxious to go into data processing, she heard about OIC's data processing center and was able to qualify for the course in programming. Another student, Jamie Perez, had worked at a variety of odd jobs. After passing his high school equivalency exam, he took OIC's eight-week course in computer operations. Mike Macklin, who had been a baker at several large hotels in Manhattan, was lured into data processing by the prospect of high salaries, but could not afford the training. After completing the computer operator's course at OIC, he said: "This school offers the best opportunity in the city. They're not only helping us learn what we have to know to get good jobs but how to keep jobs when we get them."

In Harlem, Patricia Baker and Malcolm Baptiste discuss results of program with instructor Dorothy Fort (far left).

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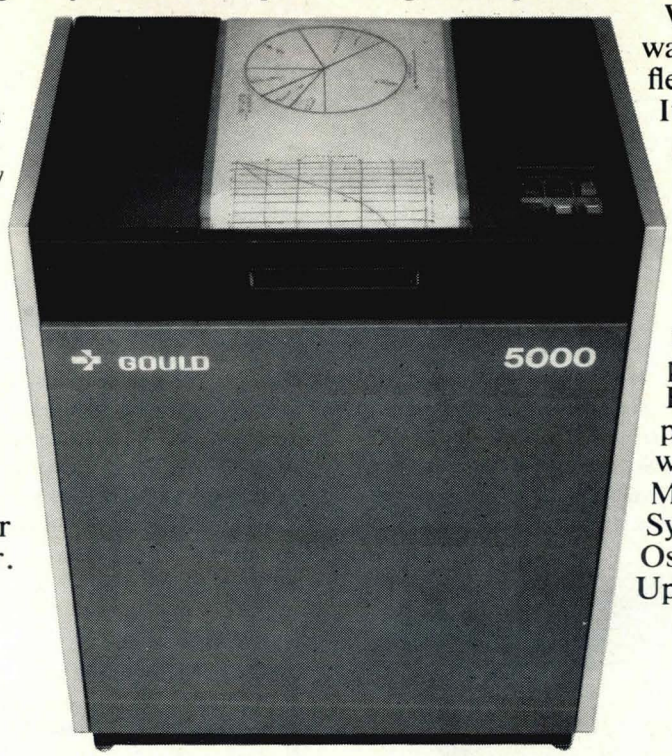

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CIRCLE NO. 18 ON INQUIRY CARD

A SPECIAL SECTION FEATURING THIS MONTH:

DATACOM NEWS

DATACOM Q & A

COMMUNICATIONS CLINIC

DATACOM NEWS

MODEMS, MUXES & MISC.: DATAcap's (Chicago, Ill.) new Series A Coupler digitizes one or more analog signals and produces an RS232-compatible signal which can drive a Teletype Model 33 directly. Basic unit price $1,545, with OEM discounts available . . . Two from the **Telecommunications Division** of **Data Products Corp.** (Woodland, Cal.):

Analog/Digital Coupler from DATAcap

Model AU-PSU port-sharing module, a priority of queuing device for two lines connected to a single computer port; and the UM-113B answer-only modem, a full-duplex unit compatible with Bell 103 and 113B data sets . . . **DataStat** (Sunnyvale, Cal.) has introduced a series of frequency division multiplexers: FDM-1300 handles 12 channels at 134 baud; FDM-1500, 8 channels at 150 baud; FDM-3000, 4 at 300; and FDM-6000, 2 at 600. All are designed for asynchronous data, serial by bit or serial by character . . . Model 5500 TTY Line Switch from **Frederick Electronics** of Frederick, Md., accepts up to eight full-duplex terminations, which in turn can handle up to four simultaneous, full-duplex conversations. The automatic switch works with any 5-, 6-, 7-, or 8-bit asynchronous code and operates at program-selectable speeds from 37.5 to 1200 baud. The 5500 is also programmable for answer-back codes and call classing . . . **Gandalf Data Communications Ltd.** (Ottawa, Ontario) has added a 50,000-baud model to its LDS 200C series of short-haul "local data sets." Called the LDS 250, the new modem handles lines up to one mile plus . . . **Omnitec Corp.** of Phoenix, Ariz., has a new direct-dial, auto-answer modem, the Model 4002, for use with teleprinters, available with a control panel that mounts in Teletype Models 33 or 35 . . . The new MCU-4 Modem Contention Unit from **Penril Data Communications** (Rockville, Md.) allows a single Penril or equivalent modem to service up to four nearby terminals. Tandem operation is also possible. Unit price for the MCU-4 is $490, with quantity discounts available . . . **SEG Electronics,** a subsidiary of **Comstron Corp.** (Richmond Hill, N.Y.) has announced the availability of the SEG Model FA-1755A Digital Delay (Echo) Generator. Offered especially for data communications equipment manufacturing and testing applications, the delay generator simulates the characteristics and impairments of common carrier lines. The Model FA-1755A operates over a voice channel bandwidth of 200 to 3400 Hz, has an adjustable delay up to 100 ms in 1-ms steps (up to 2 seconds also available) and provides up to 49 dB attenuation in 1-dB steps. Basic unit price is $2,975.

ONLINE SOFTWARE – Hewlett-Packard has added multiterminal access software to its Disc Operating System. The Terminal Control System (TCS), as the new software is called, allows concurrent, interactive access to as much as 47 million bytes of online central storage. Available terminals include Bell teleprinters, HP 2600 terminals and the new HP 2762 30-chars/sec

In typical business situation Hewlett-Packard Terminal Control System software gives many terminals simultaneous, interactive exchange with a central disc-resident data base as large as 47 million bytes.

teleprinter. The system can also accommodate mag tape, line printers, and card readers. A typical system would include 8 to 16 terminals. Based on the HP 2100 minicomputer, central hardware for a TCS-equipped disc Operating System (excluding terminals) would start at $31,000.

• • •

The Programming Methods Division of GTE Information Systems has announced the availability of a new version of its Intercomm communications monitor. Known as Intercomm VI, the new monitor offers support for additional terminals, CPU-to-CPU transmission, interface to the FBI's National Crime Information Center network, new recovery procedures and reduced central processor requirements, according to the supplier.

For more information on Burroughs' small business computer systems, Circle No. 19 on Reader Inquiry Card ➤

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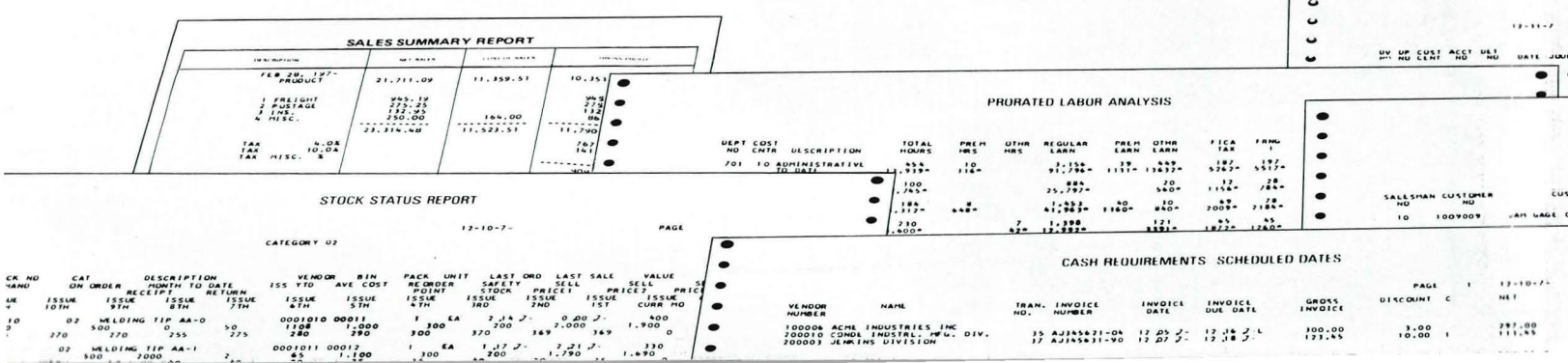
B 700 purchase prices average $50,000; lease prices average $1,250.



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These powerful, 4th-generation systems are priced in the $100,000 range, and may be leased for about $2,500.

BUSINESS MANAGEMENT SYSTEMS from Burroughs BMS™ library include application programs designed to coordinate management reporting functions with the accounting activity. The user can select individual program products, or a complete BMS system, developed by Burroughs for his line of business.

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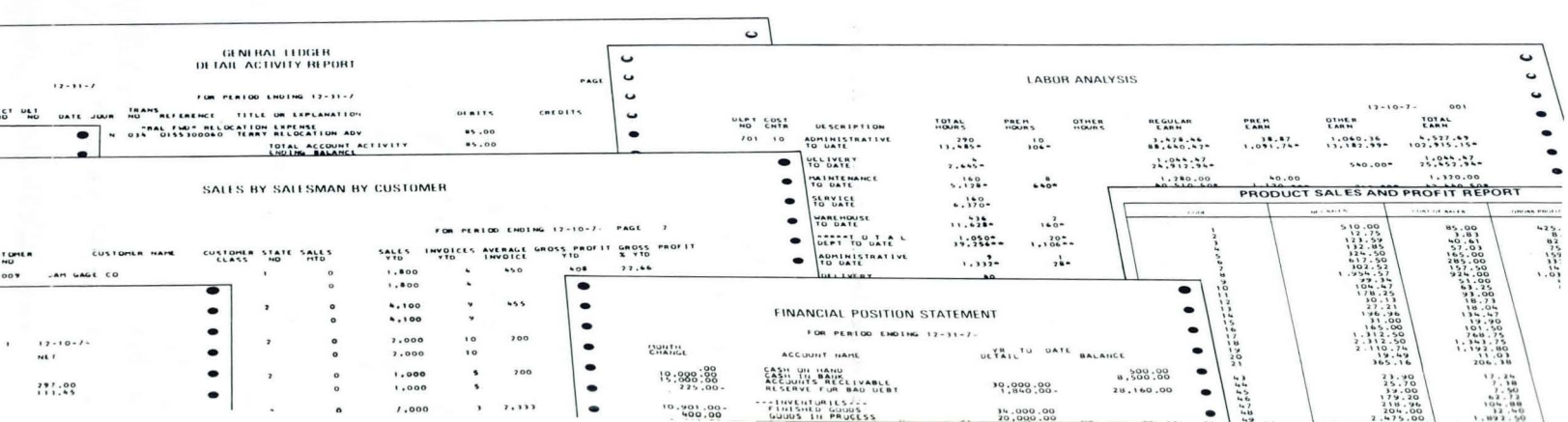

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DATACOM NEWS

A SAFETY FIRST – The telecommunications industry has become the first industry to assist voluntarily the U.S. Dept. of Labor's Occupational Safety and Health Administration in the development of safety regulations since OSHA's creation in April 1971, the administration said. The Telecommunications Standards Committee, a volunteer group of 28 industry and union representatives, recently presented OSHA with a list of proposed safety standards covering such subjects as overhead and underground lines, microwave transmission, ladders, tools, and insulating and grounding devices. The Committee's standards became a part of the OSHA's official proposal.

TENDER OFFER – Rockwell International has offered to buy all the outstanding shares of Collins Radio, which Rockwell already controls through a 41% interest. If Collins stockholders sell all the shares, Rockwell will pay about $74 million. But if Rockwell gets at least 1.7 million of the 3 million outstanding shares, it will control 80% of the firm's voting stock, including the preferred shares it already owns. Then Rockwell could merge with Collins and take advantage of some $32 million in tax loss carryforwards Collins has piled up over the last few years. What's more, Collins finally turned a profit for its third quarter of fiscal 1973 ending last May, and Rockwell feels its future performance will be strong.

HELP – Data 100 has organized a "communications systems division" that will assist clients in analyzing data communications problems, implementing recommended systems, developing customized hardware/software packages and managing total data communications systems. Two of the new division's four departments are operational now, according to Data 100: consulting services, which will help determine clients' communications requirements and define the specifications of appropriate systems; and the advanced systems group, which will develop customized, large-scale hardware/software packages. The new services will be marketed exclusively through Data 100's sales representatives and will be available on a fixed-price or hourly-rate basis.

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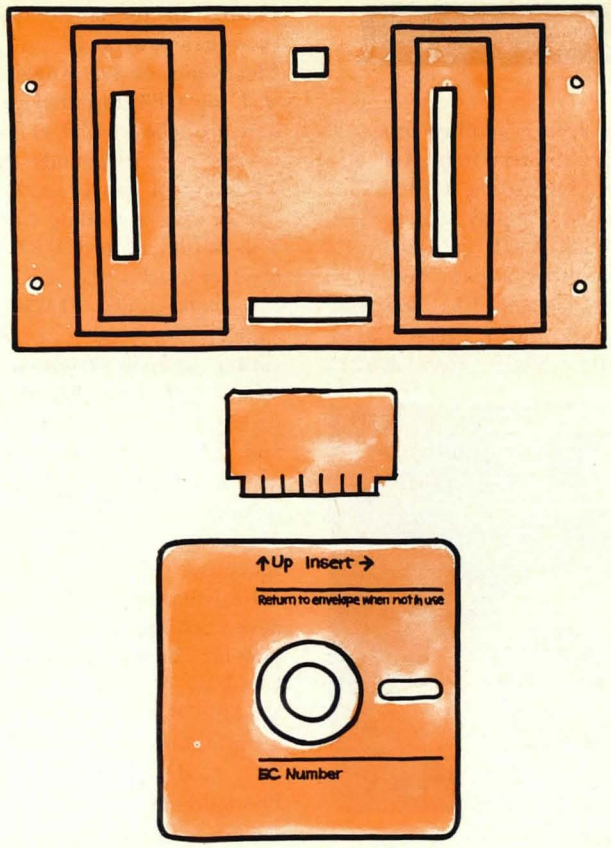

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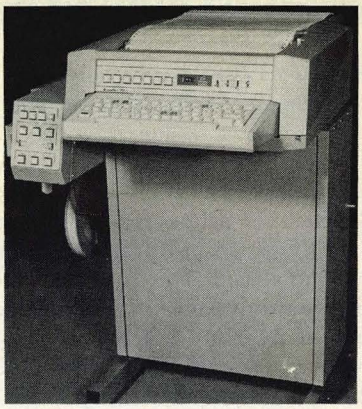
CIRCLE NO. 20 ON INQUIRY CARD

DATACOM NEWS

TERMINALS: Here's another series of CRT display controllers from **Ann Arbor Terminals** (Ann Arbor, Mich.): The RO200C Parallel Display Controllers read 7-bit parallel ASCII data at up to 1620 chars/sec from a data bus or a peripheral and deliver EIA standard 525-line composite video. Prices: 32x16 characters, $790; 80x16, $940; 80x24, $1,070, all for single quantities with two-year warranty . . . **CAR-MEL Electronics** of Los Angeles, Cal., has a desk-top CRT terminal so compact it's hard to believe. The D-301 "Informer" weighs only 10 pounds, consumes only 40 watts of power and is fully EIA compatible, according to the company. The Informer's tiny CRT features two-level intensity and cursor addressing. For single units, $1,950; lots of 100, $1,055; 250, $950 . . . The **Communication Systems Division** (Lynchburg, Va.) of **General Electric** now offers pedestal versions of its TermiNet 300 and 1200 teleprinters. The pedestal-mounted terminals are (not surprisingly) about the size of a Teletype Model 33 and have optional shelf space for modems or what-have-you. All existing options are available in the new versions. By the way, the ever-popular TermiNet 300 is now marketed by Hewlett-Packard as the HP Model 2762A for $4,775 including software. Interface hardware is $750 . . . The Model 100F CRT Copier from **Photophysics** of Mountain View, Cal., records a display image on 8½″ × 11″ paper in eight seconds or less, according to the company. The 100F accepts EIA standard RS170 video signals, uses a large-area photocell to produce a negative, and then prints a positive with an image area up to 8″ × 9½″ . . . **RCA's Electromagnetic and Aviation Systems Division** (Van Nuys, Cal.) has announced a new line of intelligent CRT terminals. The Flexiterm family, as the new line is called, utilizes the Fleximite special-purpose microprocessor developed by the RCA division . . . **Sanders Data Systems** is offering three new IBM-compatible intelligent terminal systems, collectively

CAR-MEL Electronics' D-301 Informer: Is everything really in there? And where's the cable?



GE TermiNet 300 Teleprinter in pedestal mount

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CIRCLE NO. 21 ON INQUIRY CARD

called the Series 8000. Two stand-alone systems, the 8040 and 8041, have cassette tape storage and handle EBCDIC and ASCII respectively. The clustered 8100 disc system uses EBCDIC. All have offline data capture capability, lots of keyboard editing features, and remote batch communication. One feature Sanders is emphasizing is the ability to create formats and predefine data at the terminal without mainframe reprogramming. The Series 8000 uses the same line discipline as the IBM 2770 RJE terminal, making it compatible with HASP and BTAM, QTAM, and TCAM access methods. Prices: 8040 and 8041 lease for $300 to $320/month, depending on the agreement, and sell for $12,800. The 8100 leases for $735 to $775/month and sells for $31,000 . . . **Terminal Communications** of Raleigh, N.C., has two new 30-chars/sec receive-only printers: the TC-240, compatible with IBM 2740/2741; and the TC-235, an attachment to Terminal Communications' TC-60/160 and its other data display systems. Both printers are offered with two factory-programmed fixed formats (customer-selected at time of order) and one free-form format.

Communications Technology puts a fox in your pocket.

TEST EQUIPMENT: The "Fox Box," a battery-operated signal generator from **Communications Technology** of Timonium, Md., generates and transmits a 64-character "fox message" (i.e., "The quick brown fox . . .") for remote testing of terminals, lines, or what-have-you. More formally called the TG-548, the new shirt-pocket-size tester transmits in async Baudot format at switch-selectable rates of 45.45, 50 and 75 baud . . . For isolating interface problems between modems and terminals, the Dataseeker series from **Dataprobe** (South Hackensack, N.J.) allows electrical access to each of the 25 leads in a standard EIA interface cable. Prices start at $132.50 . . . **Telecommunications Technology** of Sunnyvale, Cal., has announced the 1103B Transmission Test Set, a successor to the firm's 1103A. The new set has a digital dBm meter, digital frequency counter and tunable oscillator, and adds a noise protection filter and damping switch. In addition, the measurement frequency range has been extended to 25 Hz through 60 kHz.

Telecommunications Technology's improved test set

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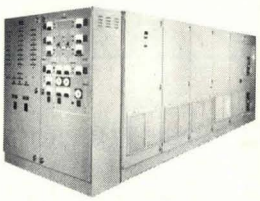

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CIRCLE NO. 22 ON INQUIRY CARD

STUDIES

In a recent survey of subscribers to *Datapro 70,* Datapro Research Corp. found more than eight out of ten users of data modems satisfied with the reliability and performance of the hardware and with the associated maintenence service. The Datapro survey also found that users of Bell System modems were not significantly more nor less pleased with various aspects of their equipment than users of independents' modems. The 36-page report, which also compares the characteristics of more than 225 modems from 48 suppliers, compiles the responses of 216 users with a total of 11,474 installed modems: 2,631 Bell System units and 8,843 from independent suppliers. *All About Modems* is available for $10 per copy from *Datapro Research Corp., One Corporate Center, Route 38, Moorestown, N.J. 08057* . . .

Frost & Sullivan expects the market for specialized carriers' transmission services to expand *5.2 times* from $1.45 billion in 1972 to $7.6 billion in 1980. To cater to this rapidly-expanding market, specialized carriers will purchase more than $500 million in transmission equipment in the eight years to 1980, the market research organization predicted. In its new two-volume report, *The Specialized Communications Market* (available from the company's offices at *106 Fulton St., N.Y.C. 10038*), Frost & Sullivan also pointed to a "revolution" in the independent communications manufacturing industry, resulting in part from the growth of specialized data communications, the advent of MOS/LSI technology, the favorable government attitude towards competition, the movement of large numbers of non-telephone people into the field, and the rapidly-growing size of the market for independent communications equipment and its resultant possibilities for economy of scale and significant R&D funds . . .

And one more in the making: Quantum Science Corp. has been commissioned by a group of telecommunications equipment manufacturers and users to perform a detailed study of the technology of, and markets for, such equipment through 1980. In describing the future study, Quantum Science already sounds as optimistic as Frost & Sullivan — it sees the entry of new carriers as a major factor in the expansion of the total communications equipment market, with annual sales exceeding *$800 million* by 1980. Those who wish to participate in the study should contact *Eli S. Lurin, Director of Marketing, Quantum Science Corp., 245 Park Avenue, New York, N.Y. 10017.*

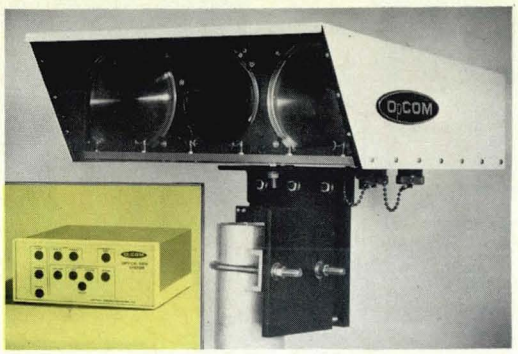
NAVY SATELLITE PROJECT – The FCC has given preliminary approval for RCA Global Communications, ITT World Communications and Western Union International Corp. to participate in a three-satellite communications project for the U.S. Navy and commercial maritime companies. The three carriers will enter a joint venture with Communications Satellite Corp. (Comsat), which proposed the project and will provide 80.2% of the $76 million investment. Applications for construction permits and a formal operating agreement among the participants are still awaiting Commission action.

KEEPING TRACK – Grand Trunk Western Railroad will have a completely automated information network to locate and identify its rolling stock by April 1975. The network, to be installed by ACI Systems Corp. of South Holland, Ill., is designed around 61 Automatic Car Identification (ACI) scanners, which optically read colored identification labels on passing cars. Placed at key traffic and yard locations throughout Grand Trunk's 3000-mile line, the ACI scanners, along with wheel roll-over sensors, will relay locator information back through 12 field computers to two IBM S/370's in the railroad's Detroit headquarters.

DOMESTIC ITT MICROWAVE? – ITT, which never seems to do anything without creating or buying a new subsidiary, may have had one too many. The international communications conglomerate wants to enter the domestic microwave business via a newly-formed subsidiary, U.S. Transmission Systems. It's not just that that name doesn't sound right when juxtaposed with "International Telephone and Telegraph," but that the FCC (or the Justic Department?) will probably think the connection doesn't make *legal* sense either. Although no action has yet been taken on U.S. Transmission's recent application to build the first portion of a proposed New York-to-Houston microwave network, specialized carrier MCI Telecommunications is already saying that, as the parent of ITT World Communications, ITT would seem to be barred from the U.S. market by FCC rules. And it looks like Western Union Corp. may also raise an objection. Giant ITT says it would mainly seek the business of smaller users, since it sees stiffer competition from AT&T in the heavy-user market where Bell gives big discounts. The giant firm also believes, probably with good reason, that its competence in the U.S. microwave market has been enhanced because it has learned from the problems encountered by current contestants in the microwave race.

TEKTRONIX SOFTWARE – Inspired by the U.S. Census Bureau's Census Method X-II (CMX-II), Tektronix' new Plot-10/Decision-Maker business graphics software package is a report-generating statistical analysis and forecasting system for the nonprogrammer. It's usable on the firm's 4010 family of CRT display terminals and 4610 printers. Another Tektronix package, Plot-10/Advanced Graphing II, has been added to General Electric's Management Analysis and Projection (MAP) Services.

FREE! – Under a six-month contract, high-speed users of General Electric's MARK III timesharing service whose monthly tab is more than $2,000 will get to use a DATA 100 Model 70 terminal at no charge. GE has also announced that the Mohawk Data Sciences Model 2400 programmable terminal is now qualified for use on the 2000-baud service.



DO IT YOURSELF – One way of avoiding carrier interface hassles as well as the expense of routing cables through urban areas is offered by Optical Communications, Inc. of Orlando, Fla. OCI's Model LDL Optical Data Link is just that – a means of transmitting synchronous data on a line-of-sight path at rates up to 1.544 megabits/sec. A complete full-duplex system, comprising two infra-red laser transmitter/receivers and two interface units (shown at left) sells for $9,600 and can be delivered in 45 days.

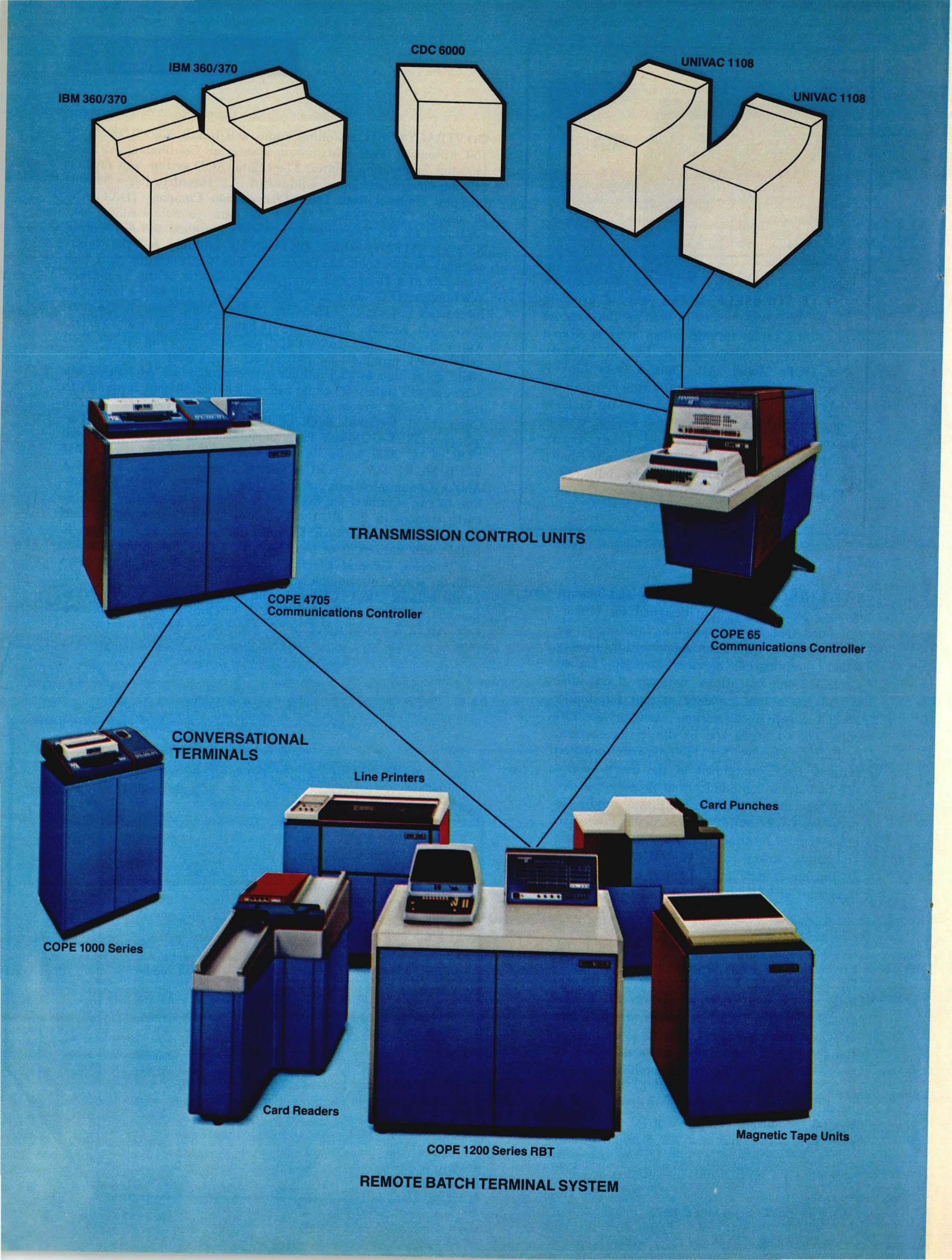
SWITCHING SYSTEM – A store-and-forward message switching system designed for brokerage firms that do not maintain large-scale, in-house computers has been announced by Bunker Ramo's Information Services Division. Called Central Communications Switcher (CCS), the system has a line capacity of four full-duplex multidrop (up to 32 stations each) private circuits. The CCS can also handle six lower-speed multidrop circuits for teletypewriter-oriented systems. Basic equipment at the user's central site includes a communications processor, a cassette tape unit, a message log printer, and a supervisory CRT/printer console. Each branch or other remote location requires a CRT terminal and printer linked to the central site via a programmable control unit. Central site configurations start at $735/month.

★ ★ ★

Bunker Ramo is also entering into a joint venture with Dow Jones to provide a service called DJ News/Recall. To be distributed by BR, the new service will allow access via BR Market Decision System 7 CRT terminals to a data base of recent news headlines in Dow Jones publications. A user of the service enters an alphabetic symbol identifying a company, industry, or government agency, and the CRT displays the headlines of the five most recent news stories on the subject during the previous 90 days on the Dow Jones broadtape or in the *Wall Street Journal* or *Barron's Weekly*. Full text is also available via CRT on demand.

CONTRACTS, ETC.: **Collins Radio** will install a $500,000 GVS-150 Automatic Call Distribution system at Continental Airlines' Houston Reservation Center. The digital ACD system will replace existing electromechanical equipment . . . **Interdata** has a $1-million-plus contract from **Data Transmission Company** (DATRAN) to supply "New Series" Model 55 data communications concentrators for the Teamsters Information Terminal and Accounting Network (TITAN) which DATRAN is building for the International Brotherhood of Teamsters. The concentrators will link terminals to a Honeywell Series 6000 computer at the Teamsters' Washington, D.C., data base. The contract is one of the largest in Interdata's history . . . The City of New York has signed a contract with **Kustom Electronics** (Chanute, Kansas) for $400,000 worth of police data communications gear including 20 MCT-10 mobile CRT terminals for patrol cars . . . Under a contract that could go as high as $2.8 million over several years, **Mohawk Data Sciences** will supply 67 of its System 2400 intelligent terminals to the U.S. Army's Automated Telecommunications Centers . . . The Connecticut National Bank of Bridgeport has installed a **Periphonics** BANK-COMM 7 Programmable Front End Processor and VOICEPAC 2000 Audio Response Unit linked to the bank's IBM S/370 Model 145 . . . **RCA Global Communications** and **RCA Alaska Communications** have awarded contracts worth $4.6 million to two suppliers for the manufacture and installation of three earth stations in the RCA subsidiaries' domestic communications satellite system. **Comtech Laboratories** will get $2.2 million to build earth stations at or near New York City, San Francisco, and Los Angeles. **General Electric's** Space Division will supply $2.4 million worth of single-channel-per-carrier equipment for the earth stations. RCA Globcom and Alascom have leased transponders on Telesat Canada's Anik II satellite as an interim measure. An RCA-owned spacecraft is planned for mid-1975 launch.

GIVE, AMERICA! — It all started with the Candygram in 1959 — Western Union got into the gift business. For gift givers concerned about tooth decay, the quaint old telegraph company later added the Dollygram. Those ideas made a few bucks all right, but recently Western Union Corp., now hip and diversified, has unwrapped the plan of plans: 16 gifts, from golf balls to popcorn poppers, all orderable via a toll-free WATS number and hand-delivered by the nearest of 5500 local merchants. Charge the price, from $15 to $45 plus $2.73 service charge, on your major credit card (how else?). The "only-in-America" service is offered by Western Union Corp.'s newly-formed GiftAmerica subsidiary, which has a Burroughs B6700 and umpteen terminals in St. Louis for order entry, inventory control, billing and even credit card validation. But don't laugh yet — no less a market research authority than Booz, Allen & Hamilton says GiftAmerica's "got it in spades."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CIRCLE NO. 23 ON INQUIRY CARD

HiLo RATES

Last February AT&T filed an application for permission to file revisions to Tariff FCC 260 in respect to the offerings and pricing of voice-grade private line services. The revisions would establish 370 rate centers (i.e., specific locations for calculation of rate mileage) between which channels would be classed as high density (HiD). Channels between these HiD rate centers and all other rate centers would be classed as low density (LoD). A third category, short haul, would be any service where the total channel mileage is 25 miles or less, regardless of whether the route is high or low density. The mileage rates for the three types of channels would be constant at $.85, $2.50, and $3.00 respectively.

The application is a response to the price competition of the specialized common carriers. The latter are offering services principally between large cities since such routes presently carry the heaviest loads and represent the greatest future markets. The fact that they are heavily loaded means AT&T already has high density facilities on these routes. Because of this, AT&T claims lower costs to serve them, both now and on an incremental expansion basis. This is their rationale for proposing the lower rates they believe necessary as a competitive response. Without them, they claim that lost private line revenues will, by 1976, require $100-million in compensating revenues from other services, principally long distance.

As of late July, the permission to file had not yet been granted. The unusual requirement to obtain permission stems from the FCC's prohibition against filings which would "unduly disrupt or delay the conclusion" of proceedings in the private line rate case. AT&T claims that HiLo will not disrupt that proceeding since the changes "do not contemplate a change in the overall rate level for the involved services." As precedent they cite the Commission's permission to Western Union to file competitive rates on the Chicago to St. Louis route.

Perhaps Western Union's filing is only a kind of misdemeanor whereas AT&T's is felonious, since the requested permission seems nowhere in sight. The situation has evolved into a standoff. AT&T stated they would provide detailed cost and market data required with a filing when they actually file. The Common Carrier Bureau requested that material as an input to their decision on the permission issue. AT&T agreed provided it would be treated as confidential until the filing. The Bureau said that would be possible after reviewing the material but would give no prior guarantees. In consequence, the permission application is in abeyance, the Commission's request for public comment has been postponed indefinitely, and AT&T has appealed the Bureau's position to the Commission itself. Granting of even that appeal has been opposed by Western Union, MCI, Datran, and the major press services.

Certainly we won't see HiLo in effect this year. In fact, the entire private line services area is so stirred up that any projection on stability or changed rates is *highly* conjectural. Issues pending in addition to HiLo include the private line rate case, rates for DDS (Dataphone Data Service), hybrid service suppliers, rates for domestic satellite service, and the single customer docket. Nevertheless, the concepts of HiLo are significant. Should AT&T eventually achieve some form of major restructuring, HiLo will certainly be an important shaping factor.

In addition to high and low density routes and rate centers, some other new concepts are introduced:

Homing Point – A designated HiD rate center through which a LoD rate center can access HiD channels. Each LoD rate center would be assigned a homing point in Tariff FCC 255, the present list of rate centers and central offices.

High Density Service Point – A high density rate center in which a station on the customer's service is located.

Channel Terminal – The facilities required to terminate a channel at a rate center; required at each end of each link.

Station Terminal – The facilities required for connecting a channel to the customer's station.

Routing – The customer must specify the routing of services between stations. Consider the two-station service from Chambersburg, Pa., to Youngstown, Ohio, shown in Fig. 1. The routing could be a LoD channel from Chambersburg direct to Youngstown. For this case, the former routing is much less expensive, but this is not always the case, as is shown in Fig. 2. Indeed, Fig. 2 shows a case where any HiLo routing is more costly than present rates.

Another aspect of HiLo routing is that one may access HiD channels only at a Homing Point or at a HiD Service Point. In Fig. 1, the annual mileage charges would be $546

Communications Clinic is a regular monthly column written by the staff of **Berglund Associates, Inc.**, consultants in telecommunications. Readers are invited to submit questions on any aspect of communications or suggestions for future Clinics to:

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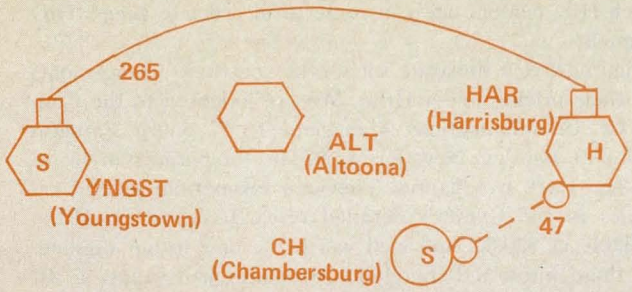


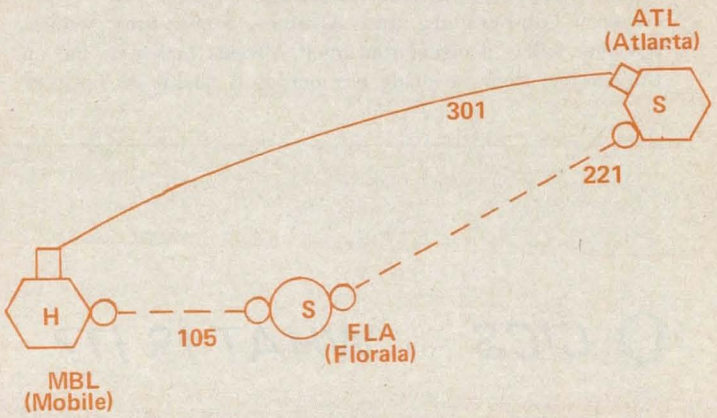
FIGURE 1

Segment	Station Terminal	Channel Terminal	Mileage Cost	Total Cost
CH-HAR	25	30.00	117.50	172.50
HAR-YNGST	25	70.00	225.25	320.25
				492.75

FIGURE 2

Segment	Station Terminal	Channel Terminal	Mileage Cost	Total Cost
FLA-MBL	25	30	262.50	317.50
MBL-ATL	25	70	255.85	350.85
				668.35
		or		
FLA-ATL	50	30	552.50	632.50

Under the present private line rate, an FDX-Type 3002 service from FLA to ATL would cost $488.40



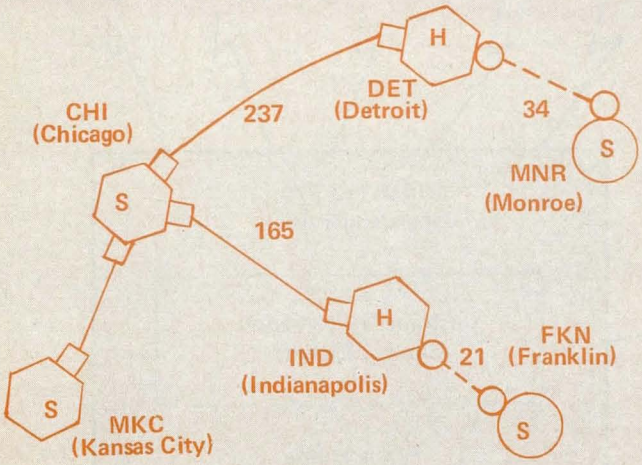


FIGURE 3

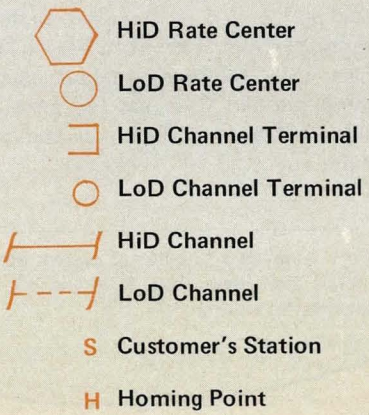
Segment	Station Terminal	Channel Terminal	Mileage Cost	Total Cost
MKC-CHI	25.00	70.00	351.05	446.05
CHI-IND	25.00	70.00	140.25	235.25
IND-FKN*	25.00	30.00	52.50	107.50
CHI-DET	—	70.00	201.45	271.45
DET-MNR	25.00	30.00	85.00	140.00
				1200.25

Under present rates, an FDX-Type 3002 service from MKC-CHIFKN-MNR would cost $1617.17

*This route is not short haul since the ***total*** service exceeds 25 miles.

The following is a summary of rates, and an explanation of symbols (see box at right) for the figures.

HiD Channel	$ .85 per mile per month
LoD Channel	$ 2.50 per mile per month
Short Haul Channel	$ 3.00 per mile per month
HiD Channel Terminal	$35.00 per month
LoD Channel Terminal	$15.00 per month
Short Haul Channel Terminal	$ 3.00 per month
HiD Station Terminal	$25.00
LoD Station Terminal	$25.00
Short Haul Station Terminal	$15.00



less if one could route Chambersburg to the HiD rate center, Altoona. This is not possible, however, since Altoona is not a HiD Homing Point for Chambersburg, nor a HiD Service Point for the customers' service.

Hence, HiLo introduces new complexities into network synthesis and may require routings which are not the least-cost possibility under the circumstances. According to AT&T, the latter is attributable to the fact that homing points are assigned generally on the basis of existing facilities. That is, in the Fig. 1 case they may have facilities between Chambersburg and Harrisburg, but none directly between Chambersburg and Altoona. Since they would, however, allow a direct routing if Altoona had a station on the service, their rationale is moderately shaky. As network designers will have enough trouble with HiLo per se, we would certainly like to see eliminated the restriction on which HiD centers one can route to in order to access HiD channels.

Figures 2 & 3 illustrate some other network arrangements and their pricing under HiLo. We are indebted to the Center for Communications Management, 67 South Franklin Turnpike, Ramsey, New Jersey, 07446, for permission to reproduce these two figures. They are taken from several examples in the Center's detailed research report on HiLo, available at $30.00, and well worth the cost in our opinion. For those interested, Berglund Associates will supply a list of all proposed high density rate centers upon receipt of letter request. Please enclose $2.00 to cover reproduction, postage, and handling. Copies of AT&T's proposed list of rate centers and associated HiD homing points are also available prepaid at $2.00 per state. The complete set (187 pages) is offered at $50.00. ▲

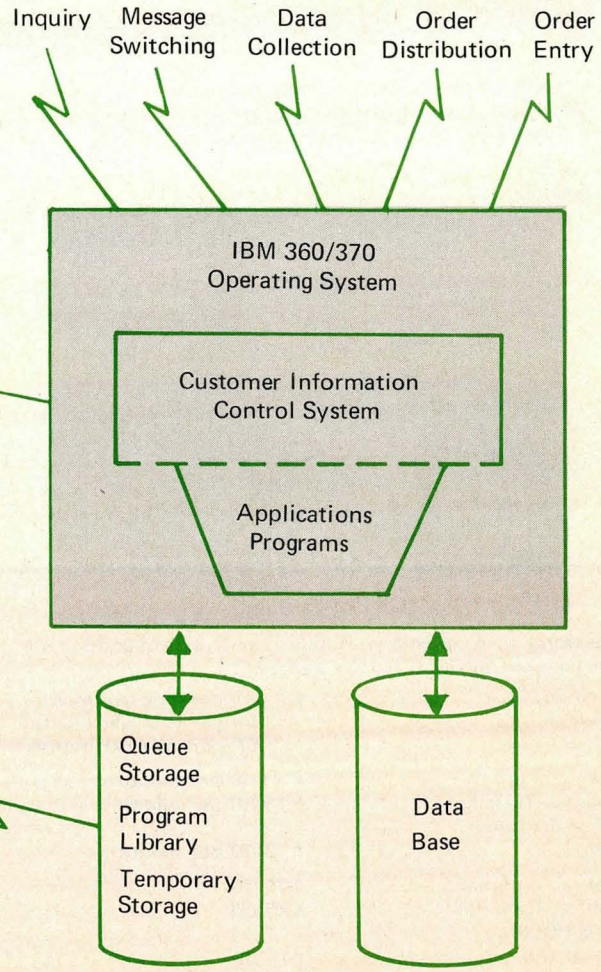
DATACOM Q & A

Q CICS — WHAT IS IT?

By GARY AUDIN

A CICS (Customer Information Control System) is a popular data base/data communications program product licensed by IBM which facilitates terminal management, routing, time management, in-transit queue management, and network supervision. It provides the capabilities shown in the figure, and operates under OS and DOS (including the VS versions), and with BTAM or TCAM (MODERN DATA, Feb., 1973). CICS simplifies the communications interface between user-written application programs and the operating system by allowing message processing routines to be written in COBOL, PL/1, or assembly language. Data base operations that can be handled by standard methods are easily supported, but if the data base structure is complex, IMS (Information Management System) is more suitable. This has led most users to consider CICS as a data communication monitor only.

Gary Audin is a director of system projects for Informatics Inc., River Edge, N.J., and is a regular contributor to this column.



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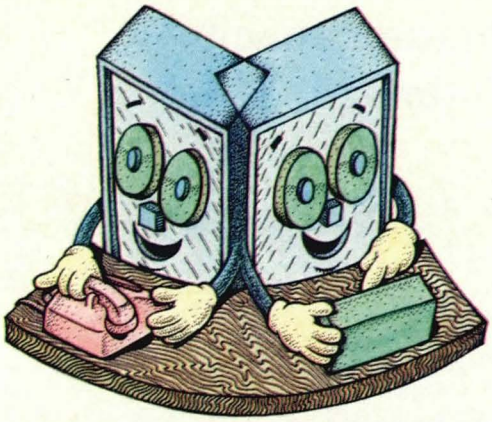

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The Remex P.T.E. offers simultaneous read/write capability in a two-drive system, with completely asynchronous operation from 0 to 300 cps. Storage capacity is 1.6 million bits per cassette, the equivalent of ten 130-foot punched tapes.

Built-in microprocessor adds flexibility. A microprocessor functions as a small computer in the control logic. This permits program stacking with a dial-in automatic file search, TTY or RS-232-C capability and internal automatic tape duplication. It also offers off-line capabilities, allowing key-to-cassette, cassette-to-printer, and punched tape-to-cassette operation.

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CIRCLE NO. 25 ON INQUIRY CARD

SMALL BUSINESS SYSTEMS

Q's & A's For Prospective Users

Anthony S. Niskanen and Oscar H. Rothenbuecher
Arthur D. Little, Inc., Cambridge, Mass.

The authors have reversed their usual roles as market research consultants to computer systems builders, i.e., identifying new markets or prospects for systems manufacturers. Their goal in this Profile is to use their experience to provide guidelines for the prospective user — helping him determine if he is a true candidate for a small business system and what type of system best fits his needs.

New systems for the small user abound in today's computer marketplace — a result of hardware-software design talent being combined with improved, lower cost technologies. Evolving at a fast rate, these systems are breaking down the conventional product categories which define hardware by functions, such as "key-to-disc," "remote batch," "intelligent terminals," "business computers," or "accounting machines." What emerges is a continuum of systems that possess the potential to do a wide variety of tasks. For the prospective user/buyer of such small systems, the choices turning up almost daily are bewildering.

The first suggestion to be made to the prospective user is to *look at these products last!* Look first at yourself and your own business operation.

ARE YOU A GOOD PROSPECT?

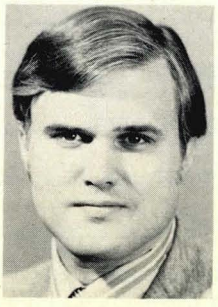
The selection process about to be described is what most good salesmen follow for "qualifying a prospect" before making a sale. It works on a question and answer basis. A majority of "Yes" answers implies a good prospect who will probably be a happy customer. A predominant number of "No's" denotes a poor prospect who will most assuredly be an unhappy customer.

A string of "Yes" answers does not guarantee a sale or customer bliss. It does, however, improve the odds that both the salesman's and the prospect's time will be well spent in pursuing further product proposals and evaluations. With this caveat in mind, the following questions are posed to determine if you are a good prospect for a small business computer (SBC) system.

ONE: Can you organizationally justify an SBC?

Answer "No" if your small operating unit (sales office, administrative office, warehouse) is part of a large corporate or government organization with a number of similar operating units. You will find it less time consuming and much more profitable to seek the aid of the member of your corporate EDP staff who is responsible for planning. This individual

Anthony S. Niskanen is a staff member with Arthur D. Little primarily engaged in product, market, and corporate planning studies associated with the information processing industry. His recent work has included a study of trends in the development of computer peripherals and systems, and an evaluation of the impact of computer technology on the data entry and business forms industries. He holds a B. A. from Amherst College and an M. A. from the University of Massachusetts.



As a senior staff member of ADL's Information Systems Section, Mr. Rothenbuecher has designed and evaluated computer systems for users in the U.S. and overseas. Before joining ADL, he was responsible for the design of VW's National Computer Service. While with Remington Rand Univac, he was in charge of introducing several of the first commercial EDP systems in Europe. Mr. Rothenbuecher has a B.A. from Montana State University, and an M.A. in Industrial Organization from Frankfurt University.

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Don't hesitate to call the systems planner. Your knowledge of your own operation and system requirements will be of critical importance in planning — and in making the right choice.

Answer "Yes" if your operating unit is "one of a kind," a specialized department within a larger organization, or an independent small business.

TWO: Can you cost-justify an SBC?

Answer "No" if your organization has less than six clerical, management, or accounting personnel. If so, you probably don't have a sufficient work flow and/or displaceable general and administrative expenses to justify a general purpose SBC. Although systems can rent for as little as $300 per month, average rentals are closer to $800 to $1000 per month. Associated labor, supplies, and overhead can add from two to three times the hardware rental to total costs.

Answer "Yes" if you presently employ over six white collar personnel or expect to within the next year.

THREE: Is your present system obsolete?

Answer "No" if your operation is functioning smoothly using:

A manual system that can handle a variety of tasks and services.

A service bureau (either online or batch) that specializes in your particular industry and has a number of fully-developed packages for your major applications.

One or more bookkeeping machines. Research tends to support the view that bookkeeping machines are quite effective for small users. Volume may be increased by the addition of another machine, orientation to individual transaction entries, and tub-file manual storage is easy to understand, and new and increasingly sophisticated bookkeeping machines are entering the market at a high rate.

Answer "Yes" if you use:

Tabulating equipment (a resounding "Yes").

A manual system serviced by eight or more employees which is not meeting information-handling needs.

A general purpose service bureau for only one or two applications, where billings approach the $300 to $500 per month level.

FOUR: Are you the right kind of person for an SBC?

Answer "No" if:

You do not require management reporting capabilities beyond those of your present system. Without this need you will probably find that an SBC is more trouble than it's worth.

You are not willing — and cannot inspire your employees to be willing — to accept modified operating procedures.

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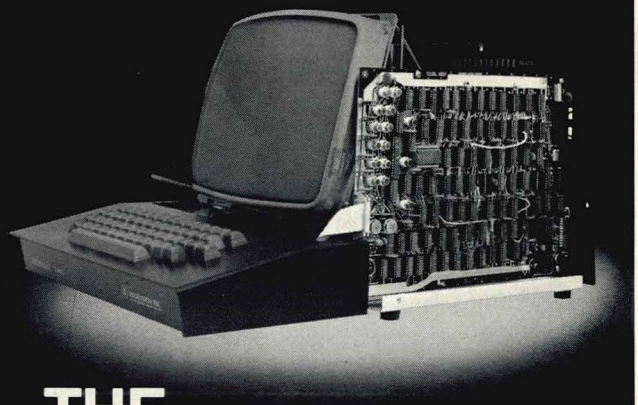

THE INSIDE STORY

All CRT's are silent. They all look about the same on the outside. **But only Teleray is truly different on the inside.** Its logic, memory, character generation, interface, the works, are on a *single* integrated circuit board.

Teleray's so dependable and so maintainable, users call it the *Uptime Terminal.* Not only is everything on one plug-in board, but every one of the 106 integrated circuit chips is a *plug-in,* too! Even with that extra feature, Teleray wins the price battle. Call (612) 941-3300 collect and ask for *Teleray.* This is a really different CRT... on the *inside* and on the price tag.

TELERAY 3300

RESEARCH INC

BOX 24064 MINNEAPOLIS, MINNESOTA USA 55424

No. 148

CIRCLE NO. 26 ON INQUIRY CARD

The worst computer system designs seen in operation are usually the result of forcing the new system to conform to old procedures. The user cannot understand why his system is inefficient, and good programmers avoid such systems like the plague.

You are not willing to invest the time and effort to study the system and learn about its operation, and to either train a key employee or hire a knowledgeable operator who will be responsible for the system.

Answer "Yes" if you're still with us.

If you are heavily on the "Yes" side of the ledger at this point, you're probably a good candidate for an SBC system. Those who aren't quite sure of their status should also count themselves in (for the sake of simplicity, the questions were slanted towards the "No" side).

SELECTING THE SYSTEM

The SBC system field is populated by a large number of companies and models. The fact that many names may not be familiar is not necessarily a disqualifier. Because of the fragmented nature of the user market, specialization in a specific industry/application is quite common.

Most of the systems on the market today use similar — if not identical — hardware components. Differences are primarily in systems software and applications packages, and reflect an orientation towards a specific industry. Information processing procedures within a particular industry have many common elements applicable to all firms in the industry. A systems design house can therefore develop and market a turnkey system which can be adapted to the requirements of any user within any industry.

After determining the companies which market systems for your industry, determine if each company has the capability to support and service systems in your geographical area. Then determine if they are strong enough financially to be around two or three years from now to support and service the system.

The simplest test for geographic capability is to obtain a list of users located in your area. Call — or better yet —personally visit as many installations as possible. Satisfied users are usually willing to talk about their system and any changes made to optimize its application.

Financial testing is not as easy. Firms in any segment of the computer industry function under stiff competition and are in constant need for new funds to support growth. Besides obtaining a standard commercial credit report on the potential vendor(s), also ask for the name of their local commercial bank office. Give the banker a call. Chances are he will be helpful — and also interested in your appraisal of the prospective system supplier.

By the time you start talking to the banker, you should have a better understanding of your present system and its strengths and weaknesses;

Your priorities should be set in terms of what new applications are needed;

You should know the person inside or outside of your organization responsible for the system;

You should have established a timetable for changing or creating new forms and procedures.

At this point you can let the salesman buy your lunch! ▲

CONTROL • *Visual disturbances* • *Work flow* • *Reduced sound transmittal*

You'll do it easily with versatile Packard MARK-10 office landscape systems. Straight and curved partitions and screens in 4 heights can be arranged for any conceivable pattern of work flow. In 3 textures—matte baked enamel, textured vinyl, or Acousti-carpet, all in a variety of colors.

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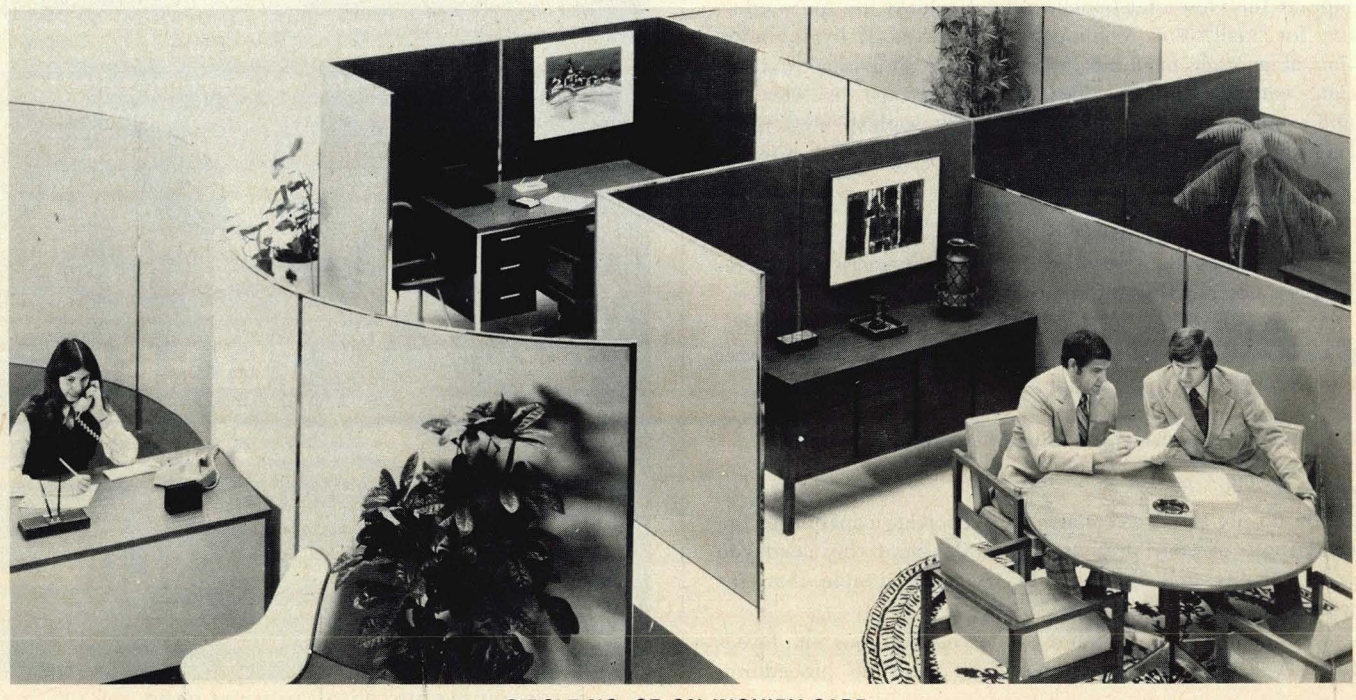


CIRCLE NO. 27 ON INQUIRY CARD

PRODUCT PROFILE

John A. Murphy ● Associate Editor, MODERN DATA

SMALL BUSINESS SYSTEMS

What's Available

The EDP industry has yet to find its Dr. Johnson. Adrift in a sea of semantics, we are left to our own resources to determine what differentiates a computer from a controller or calculator; what constitutes a minicomputer or a microprocessor; who is an end user or an OEMer; etc. This lexical dilemma is due to the newness of the industry, the rapid evolution of hardware/software technology, and the lack of an omnipotent association (IBM excluded) to speak for — or to — the industry. Thus, what is or is not a "small business system" for the purposes of this Profile is determined by following our own, perhaps arbitrary definitions.

Our first "definitive" factor setting a small business system apart from its larger brethren is price. The starting price of a small business system falls under $75,000. To assuage anyone irritated by the "smallness" of this figure, average starting prices for small system hardware are in the $15,000 to $30,000 range. Our second factor is capability. The small business system must be able to process a variety of general purpose tasks, such as invoicing, receivables, payables, payroll, general ledger, inventory, and other accounting operations.

Systems conforming to these factors can be further categorized by the designations — again ours — of "accounting computer" or "small business computer."

Small Business Computer. The Burroughs B700 (background) is centered on a microprogrammed minicomputer with virtual memory-like capabilities that conserve main memory, increase throughput, and decrease core costs. The computer is programmed in Cobol and RPG, and is supported by extensive applications software for the small business user with little or no programming expertise. A companion small processor, the AE300 Audit Entry Terminal (foreground) is an intelligent terminal used to input and verify data onto cassette for subsequent loading into the B700. As data entry volumes increase, more AE300 can be added either on-site or remote to the B700.

ACCOUNTING COMPUTERS

Known also by the pseudonyms "office computer," "magnetic ledger card computer," "electronic accounting machine," or "computer accounting machine," the accounting computer employs a unit record processing approach that is quite similar to manual or non-electronic machine accounting operations. Record storage is on magnetic ledger, tab, or edge punched cards — with card files being maintained for sales, invoice, receivable, payable, inventory, payroll, tax, commission, and other accounts.

An application program is stored internally in the accounting computer with program loading accomplished by card, paper tape, or cassette mag tape input. The computer is single-task, single-operator oriented. Only one application may be handled at a time, and new application program loading occurs only after an existing task is completed. Ledger cards are manually inserted into a console printer for record data input and update. Only one operator console may be supported by the accounting computer, although a number of punched card, tape, or printer peripherals may be operated concurrently under program control for file updates and hardcopy printout.

The accounting computer can come supplied with user-ready, general purpose accounting software. These packages cover the common accounting operations of invoicing-billing, accounts

Magnetic Ledger Card Accounting Computer. The Litton/ABS Model 1281 can process letter-sized ledger cards containing 1199 digits per side. Data is maintained on a magnetic stripe positioned at the edge of each card side, with remaining space utilized for account or record printout.

TABLE 1 — SMALL BUSINESS SYSTEMS

Company	Model (Type)	System Hardware	System Software	Pricing
Basic Automation Logistics	Intelleque (SBC)	● 4K to 32K 16-bit CPU (Interdata Mod 74) ● 3M to 25 Mbyte disc storage ● CRT terminal I/O ● 200 lpm printer ● mag tape transport ● mark card reader	*Operating Systems:* DOS-Timeshare — supports up to 8 terminals. *Compilers:* Cobol. *Applications:* General Business; Piecework Payroll; Property Management.	$22K to $75K $750 to $2500/mo on 3-yr lease
Basic/Four	350/400/500 (SBC)	● 8K to 65K 16-bit CPU (Microdata 1600) ● 2M to 32 Mbyte disc storage ● CRT terminal I/O ● 165 cps or 200 lpm printers ● accounting machine terminal ● mag tape transport ● punch card reader	*Operating Systems:* DOS-Multiprogramming; Background/Foreground; Timeshare — supports up to 8 terminals. *Compilers:* Basic. *Applications:* General Business; CPA; Fuel Oil Distributor; Travel Agency.	$31K to $110K $680 to $2500/mo on 3-yr lease
Burroughs	L3000/4000 (AC)	● 1280 word 64-bit CPU ● integral accounting machine terminal ● mag tape transport ● paper tape & punch card peripherals	*Compilers:* Cobol. *Applications:* General Business; Special Industry/Applications Program Libraries.	$13K (estimate)
	L5000 (AC)	● 1280 word 64-bit CPU ● integral accounting machine terminal ● mag ledger card ● paper tape & punch card peripherals	*Compilers:* Cobol. *Applications:* General Business; Special Industry/Applications Program Libraries.	$20K (estimate)
	L7000 (AC)	● 2.5K to 8.7K 64-bit CPU ● integral accounting machine terminal ● mag ledger card ● paper tape & punch card peripherals	*Compilers:* Cobol. *Applications:* General Business; Special Industry/Applications Program Libraries.	$16K to $52K $400 to $1700/mo
	L8000 (AC)	● 4K to 64 Kbyte CPU ● integral accounting machine terminal ● mag ledger card ● 90 or 180 lpm printer ● cassette & mag tape transports ● paper tape & punch card peripherals	*Compilers:* Cobol. *Applications:* General Business; Special Industry/Applications Program Libraries.	$13K to $50K $355 to $1000/mo
	B700 (SBC)	● 32K to 48 Kbyte CPU ● 4.6M to 9.2 Mbyte disc storage ● keyboard printer I/O terminal ● 90/164/180/400 lpm printers ● cassette & mag tape transports ● paper tape & punch card peripherals	*Operating System:* DOS-Interrupt. *Compilers:* Cobol; RPG. *Applications:* General Business; Special Industry/Applications Program Libraries.	$42K to $110K $950 to $2600/mo
	B1700 (SBC)	● 16K to 65 Kbyte CPU ● 2.3M to 95 Mbyte disc storage ● keyboard printer I/O terminal ● 90 to 475 lpm printers ● MICR reader/sorter ● mag tape transport ● punch card peripherals	*Operating System:* DOS-Multiprogramming. *Compilers:* Cobol; RPG; Basic; Fortran. *Applications:* General Business; Special Industry/Applications Program Libraries.	$70K to $200K $1500 to $4500/mo
Clary Data Comp	404 (SBC)	● 8K to 64K 16-bit CPU ● 5M to 10 Mword disc storage ● CRT, keyboard printer, or accounting machine terminal I/O ● magnetic ledger card ● cassette & mag tape transports ● paper tape	*Operating System:* TOS; DOS. *Compilers:* RPG; Basic. *Applications:* General Business; Country Club.	$30K to $40K $1000/mo on 3-yr 3rd party lease
CNA/Systems	Servus 100 (SBC)	● 8K to 32K 16-bit CPU (Lockheed SUE) ● to 20 Mword disc storage ● CRT terminal I/O ● 300 or 600 lpm printer ● cassette & mag tape transports ● punch card peripherals	*Operating System:* DOS. *Compilers:* RPG; Fortran. *Applications:* Insurance Agency.	$1000/mo on 5-yr lease-only basis
Computer Covenant	IRAS (SBC)	● 32K to 64K 16-bit CPU (DEC PDP-11) ● 2M to 50 Mbyte disc storage ● CRT or keyboard printer I/O terminals ● 150 lpm printer ● cassette & mag tape transports ● paper tape & punch card peripherals	*Operating System:* DOS-Multiprogramming; Background/Foreground; Timeshare — supports up to 30 terminals. *Compilers:* Cobol; Basic; Fortran. *Applications:* General Business; Warehouse Control.	$50K
Computer Interactions	CI-2 (SBC)	● 4K to 32K 12-bit CPU (DEC PDP-8) ● 13M to 52 Mwords disc storage ● CRT terminal I/O ● 60 to 600 lpm printer ● mag tape transport ● paper tape & punch card peripherals	*Operating System:* DOS; RTOS-Background/Foreground; Timeshare — supports up to 12 terminals. *Compilers:* BAL. *Applications:* General Business.	$40K to $120K $1480 to $4440/mo on 3-yr lease
Custom Computer Systems	Simplex-70 (SBC)	● 8K to 128K 16-bit CPU (DGen Nova 1220) ● 5M to 20 Mbytes disc storage ● CRT or keyboard printer I/O terminal ● 150 or 600 lpm printer ● mag tape transport ● paper tape, mark card, or punch card peripherals	*Operating System:* TOS; DOS; RTOS-Multiprogramming; Timeshare — supports up to 8 terminals. *Compilers:* Fortran. *Applications:* General Business; Builder/Contractor; Food Distributor; Word Processing.	$59K $1200/mo on 5-yr lease

AC — Accounting Computer SBC — Small Business Computer

TABLE 1 — SMALL BUSINESS SYSTEMS (Cont'd)

Company	Model (Type)	System Hardware	System Software	Pricing
Data General	Nova 2/840 (SBC-OEM)	• 4K to 128K 16-bit CPU • 1.3M to 97 Mword disc storage • CRT or keyboard I/O terminal • 245 or 356 lpm printer • cassette & mag tape transports • paper tape & punch card peripherals	*Operating System:* TOS; DOS; RTOS-Background/Foreground; Multiprogramming; Timeshare — supports up to 33 terminals. *Compilers:* Basic; Agol; Fortran. *Applications:* Systems House or User Developed.	to $200K
Datapoint	2200 (SBC)	• 8K to 16 Kbyte CPU • 2.5M to 10 Mbyte disc storage • integral CRT I/O terminal • 125 lpm printer • integral cassette transport • mag tape transport • punch card reader	*Operating System:* CTOS; TOS; DOS-Background/Foreground; Multiprogramming. *Compilers:* Cobol; RPG; Basic. *Applications:* General Business [through user libraries].	$10K to $13K $227 to $292/mo (disc not included)
Digital Equipment	Datasystem 340-AA (SBC-OEM)	• 8K to 32K 12-bit CPU (PDP-8) • 1.6M to 6.4 Mwords disc storage • CRT or keyboard printer I/O terminal • 245 to 1100 lpm printer • Linc or mag tape transports • paper tape & punch card peripherals	*Operating System:* DOS-Background/Foreground. *Compilers:* Dibol. *Applications:* Systems House or User Developed.	$34K to $80K
	Datasystem 500 (SBC-OEM)	• 8K to 124K 16-bit CPU (PDP-11) • 1.2M to 160 Mword disc storage • CRT or keyboard printer I/O terminal • 60 to 1200 lpm printer • Linc or mag tape transport • paper tape & punch card peripherals	*Operating System:* DOS-Multiprogramming; Timeshare — supports up to 32 terminals. *Compilers:* RPG; Basic; Fortran. *Applications:* System House or User Developed.	$70K to $400K
Eldorado Computer	125/140 (SBC)	• 8K to 61 Kbyte CPU • 5M to 20 Mbyte disc storage • CRT or keyboard printer I/O terminal • 600 lpm printer • integral dual- or tri-cassette transports • mag tape transports • paper tape & punch card peripherals	*Operating System:* CTOS; DOS; RTOS-Background/Foreground; Multiprogramming; Timeshare — supports up to 32 terminals. *Compilers:* Basic; ESP-Fortran. *Applications:* General Business; Hotel/Motel; Builder/Contractor; CPA; Feed lot.	$21K (base) $550/mo (base) on 3-yr lease
Electronic Engineering of California	Host Computer System (SBC)	• 32K 16-bit CPU (DGen Nova) • 14M to 37 Mword disc storage • CRT or keyboard printer I/O terminal • 360 lpm printer • mag tape transport • paper tape & punch card	*Applications:* Hotel/Motel.	to $500K
Focus Systems	Focus IV (SBC)	• 8K to 32K 16-bit CPU GRI) • 5M to 100 Mword disc storage • CRT or keyboard printer I/O terminal • 700 lpm printer • cassette or mag tape transport • paper tape & punch card	*Operating System:* DOS-Multiprogramming. *Compilers:* RPG; Fortran. *Applications:* General Business; Mortgage & Loan Institutions.	$45K to $137K $942 to $2871/mo on 5½-yr lease
Four-Phase Systems	IV/40 (SBC)	• 8K to 24K 24-bit CPU • 290K to 2.5 Mbyte disc storage • CRT I/⅓ terminal • 300 lpm printer	*Operating System:* DOS-Background/Foreground — supports up to 16 terminals. *Compilers:* Cobol. *Applications:* Order Entry; Inquiry/Response.	$16K to $31K $230 to $455/mo on 3-yr lease
	IV/70 (SBC)	• 4K to 32K 24-bit CPU • 290K to 200 Mbyte disc storage • CRT I/O terminal • 700 lpm printer • mag tape transport • punch card	*Operating System:* DOS-Background/Foreground — supports up to 32 terminals. *Compilers:* Cobol. *Applications:* Order Entry; Inquiry/Response.	$16K to $37K $214 to $613/mo on 3-yr lease
Honeywell	50/58 (SBC)	• 5K to 17.5 Kbyte CPU • 5.8M to 23 Mbyte disc storage • CRT or keyboard printer I/O terminal • 100 to 650 lpm printers • punch card peripherals	*Operating System:* Card OS; DOS-Multiprogramming; Timeshare — supports up to 4 terminals. *Compilers:* Cobol. *Applications:* General Business; Manufacturing.	$50K to $150K $900 to $3500/mo on 3-yr lease
IBM	System/3 Model 6 (SBC)	• 8K to 16 Kbyte CPU • 2.5M to 9.8 Mbyte disc storage • CRT or keyboard printer I/O • accounting terminal • MICR reader • 85 to 115 cps serial printer • punch card peripherals	*Operating System:* Card OS; DOS. *Compilers:* Basic; RPG; Fortran. *Applications:* General Business; Special Industry/Applications Program Libraries.	$48K or $1000/mo (typical system)
	System/3 Model 10 (SBC)	• 8K to 64 Kbyte CPU • 2.5M to 41 Mbyte disc storage • CRT or keyboard printer I/O • MICR or OCR reader • 100 to 1100 lpm printers • mag tape transport • punch card peripherals	*Operating System:* TOS; DOS-Multiprogramming. *Compilers:* Cobol; RPG; Fortran. *Applications:* General Business; Special Industry/Application Program Libraries.	$62K (typical system)
International Computing	95/99 (SBC)	• 8K to 32K 16-bit CPU (DGen 1220) • 2.5M to 5 Mword disc storage • CRT I/O terminal • 165 cps printer • Linc or mag tape transports	*Operating System:* TOS; DOS-supports up to 32 terminals. *Compilers:* Fortran. *Applications:* General Business; Tire Wholesalers; Manufacturing.	$25K to $39K $895 to $1545/mo on 3-yr lease

AC — Accounting Computer SBC — Small Business Computer

OEM-Type Small Business Computer. The DEC Datasystem series of small business computers provide full hardware and operating system (OS) capabilities, leaving the turnkey systems house or user the task of developing business applications packages. These OEM-type small systems are offered by most of the major minicomputer mainframe manufacturers.

receivable, accounts payable, payroll, general ledger, inventory, sales analysis, and cash receipts. Specialized packages tailored to a user industry (auto dealers, insurance agents, builders/contractors, etc.) are also available. Software is written in code peculiar to the specific computer model, or, in some instances, in a more generalized language like Cobol. In most instances the software is priced separately (unbundled) from the computer hardware.

Hardware options include processor memory enhancements for additional online data and program storage; magnetic stripe ledger card, tab card, edge punched card, paper tape, or mag tape cassette peripherals for stored data input/output or program input; and a variety of hardcopy printers for journal tape, ledger, or report printout. Communications interfacing for data transmission to a larger, centralized computer is also available on some accounting computer models.

SMALL BUSINESS COMPUTER

The small business computer — also termed "business minicomputer," "small business system," or "integrated/turnkey minicomputer system" — expands processing capabilities beyond the limits of unit record oriented accounting computers. Online processing is enhanced by maintaining records of data files on random access storage devices, usually in the form of "pizza oven" disc cartridge drives. The discs are also employed for the temporary storage of in-process transaction data, operating system (OS) software, and business applications packages.

The small business computer has the ability to access and update all data files stored on disc that pertain to a particular transaction. Thus, while processing an order, the computer can validate order information and customer credit status; check inventory files for product availability; generate a backorder or invoice form; and update customer, salesman, and inventory files — as well as perform the necessary calculations for the transaction. Since the files are updated continuously, it is also possible to generate timely and accurate management reports on customer, sales, or inventory status on demand.

Some small business computers can support a number of operator consoles, allowing multi-terminal access to the processing and reporting facilities of the computer. Such a feature may be important to business operations that are presently input-limited by single console computers (order entry and inquiry/response applications).

Another capability is an interrupt feature which allows the orderly interruption of an existing processing task for a special inquiry or report generation operation. The interrupted task is stored on disc until the special job is completed, and then returned to the computer for continued processing. Multiprogramming, the ability to execute concurrently a number of different programs, is another feature offered by small business computers. Internal memory holds several programs and the computer's OS controls their execution. A new program is activated whenever an existing one is on idle status or completed. This procedure continues until all programs in memory are completed.

Background/foreground capabilities may also be offered. This feature allows the small business computer to execute an application or utility program in a batch or background mode while one or more I/O terminals performing different data entry or processing tasks are serviced in the foreground.

General purpose and industry tailored business software is available for the small business computer. Most software is written in versions of Cobol, RPG, or Basic, although a few models (like most "accounting computers") employ special machine-oriented languages. Software modifications by the vendor, the user, or both parties is usually required since "standard" software does not meet all of the needs of a particular business operation. As with the accounting computer, small business computer software in most instances comes unbundled from the hardware.

A typical small business computer configuration consists of a minicomputer CPU with at least 4 Kbytes of memory; one to four disc cartridge drives with drive controller; one or more keyboard printer or CRT display operator I/O consoles; a serial or higher speed line printer; and mag tape, card, or paper tape peripherals. Communications facilities for linking the computer with another small business processor or a larger system are optional on some models.

Accounting Computer/Small Business Computer. The NCR 399 straddles the dividing line separating an accounting computer from a disc-based small business computer. The unit record oriented 399 offers a complete range of magnetic ledger card, line printer, tape and card options, and can come with auxiliary disc "platter" storage.

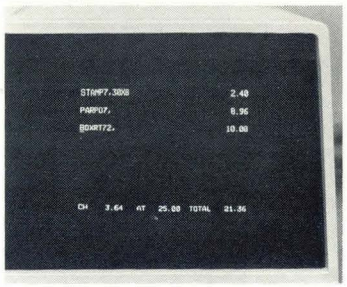
FLEXIBILITY brought RCA and the Postal Service together

The Western Region Postal Service required terminals to perform a **broad range of functions** unique to postal operations – like commodity sales, bulk mail transactions, and overall accounting operations. Terminals **custom configured** with postal oriented keyboards and displays, and printers and card readers... a system **compatible** with existing procedures ...and **growth capability** to accommodate future postal requirements in a flexible and economical manner.

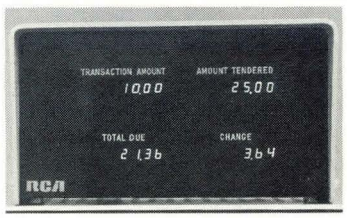
The results...

Terminals with ROM-programmable flexibility to meet a variety of user needs.

Built-in keyboard, CRT display, receipt printer, and card reader.



Custom tailored keyboards and specially formatted displays.



Ability to interconnect cash drawers, cassettes, scales, meters, and displays for the postal window customer.

Flexibility comes with all our terminals. That's why the name FLEXITERM™, and that makes togetherness with you both possible and beneficial.

For more on RCA's FLEXITERM terminal systems, call our Marketing Manager, George Turner at (213) 894-8111 or write him at this address. He's flexible too. RCA Custom Terminal Systems, 8500 Balboa Blvd., Van Nuys, California 91409.

RCA

CIRCLE NO. 28 ON INQUIRY CARD

TABLE 1 — SMALL BUSINESS SYSTEMS (Cont'd)

Company	Model (Type)	System Hardware	System Software	Pricing
Linolex	Model A (SBC)	• 8K to 32Kbyte CPU • to 18Mbyte disc storage • integral CRT I/O terminal • 125 lpm printer • cassette or mag tape transport • punch card peripherals	*Operating System:* TOS; DOS. *Compilers:* Basic. *Applications:* General Business; Insurance Agency; Mortgage & Loan Institution; Builder/Contractor; Travel Agency; Law Office; Word Processing.	$13K (base)
Litton/ABS	1220/1221 (AC)	• 2K 40-bit CPU • keyboard ledger card printer terminal • 35 cps printer • mark card, paper tape, & edge punch card peripherals	*Applications:* General Business.	$15K to $17K $500 to $574/mo on 3-yr lease
	1231 (AC)	Same as 1220/1221	*Applications:* General Business; Builder/Contractor; Lumber Dealer; Manufacturing; Hospital.	$20K; $662/mo on 3-yr lease
	1241 (AC)	Same as 1220/1221 with 4K 40-bit CPU	*Applications:* General Business; Auto Dealer; Property Management; Hospital.	$23K; $750/mo on 3-yr lease
	1251/1252 (AC/SBC)	• 4K 40-bit CPU • 16K to 48Kword disc storage • ledger card printer terminal • 35 lpm printer • mark card, paper tape, & edge punch card peripherals	*Applications:* General Business; Auto Dealer.	$27K to $32K $887 to $1068/mo on 3-yr lease
	1281 (AC)	Same as 1241 with mag ledger card capability	*Applications:* General Business; Builder/Contractor; Tax Accountant.	$23K to $25K $758 to $824/mo
Lockheed Electronics	System III (SBC-OEM)	• 8K to 32K 16-bit CPU (SUE) • 5M to 20Mbytes disc storage • CRT I/O terminal • 60 lpm printer • cassette or mag tape transports • paper tape & punch card peripherals	*Operating System:* DOS-Background/Foreground. *Compilers:* RPG; Basic; Fortran. *Applications:* System House or User Developed.	$38K
Martin, Wolfe	Mesa II (SBC)	• 12K to 32K 16-bit CPU (DGen 1200) • 2.4M to 20Mbytes of disc storage — CRT I/O terminal I/O • 600 lpm printer • cassette or mag tape transports	*Operating System:* DOS-supports up to 4 terminals. *Compilers:* RPG. *Applications:* General Business; Builder/Contractor; Tire Wholesaler; Auto Lease; Manufacturing.	$49K to $250K
Microline	MMCS (SBC)	• 16K to 32K 16-bit CPU (HP 2100A) • 5M to 20Mbytes of disc storage • CRT or keyboard printer I/O terminal • 300 lpm printer • mag tape transport • mark card, paper tape, & punch card peripherals	*Operating System:* DOS-Background/Foreground; Timeshare — supports up to 16 terminals. *Compilers:* Basic; Algol. *Applications:* General Business; Materials Planning.	$50K or $1250/mo (base)
Mini-Computer Systems	Micos (SBC)	• 32K CPU (DGen Nova) • 1.3M to 50Mword disc storage • CRT or keyboard printer I/O terminal • accounting machine terminal • 300 lpm printer • cassette, Linc, or magnetic tape transports • mark card, paper tape, & punch card peripherals	*Operating System:* DOS-Background/Foreground; Multiprogramming; Timeshare. *Compilers:* Basic; Fortran. *Applications:* General Business; Builder/Contractor.	$55K (estimate)
Mobydata	500/1000 (SBC)	• 16K 16-bit CPU (DCC D-116) • 2.5M to 10Mword disc storage • CRT I/O terminal • 165 cps printer	*Operating System:* DOS-Background/Foreground — supports up to 4 terminals. *Compilers:* Mobol. *Applications:* Hotel/Motel.	$44K to $70K
National Information Services	Super 3 (SBC)	• 16K to 124K 16-bit CPU (DEC PDP-11) • 1.2K to 160 Mwords disc storage • CRT or keyboard printer I/O terminal • 1000 lpm printer • Linc or mag tape transports • paper tape, & punch card	*Operating System:* DOS-Multiprogramming — supports up to 32 terminals. *Compilers:* RPG; Basic; Fortran. *Applications:* General Business; Banking; Food Wholesaler.	$50K to $150K $1075 to $3010/mo on 3-yr lease
NCR	399 (AC/SBC)	• 4K to 16K 16-bit CPU • 5M to 10Mbyte disc storage • integral keyboard ledger card terminal • mag ledger card • 125 to 300 lpm printers • cassette transport • paper tape & punch card peripherals	*Compilers:* Neat. *Applications:* General Business; Banking; Builder/Contractor; Auto Dealer; Hospital.	$14K to $88K $420 to $2530/mo on 3-yr lease
	Century 50 (SBC)	• 16K to 32K 8-bit CPU • 4.2M to 17Mbyte disc storage • CRT or keyboard printer I/O terminal • ledger card terminal • 300 to 900 lpm printer • MICR or OCR reader • mag tape transport • paper tape & punch card peripherals	*Operating System:* DOS; RTOS-Background/Foreground; Timeshare. *Compilers:* Cobol; RPG; Basic; Fortran; Neat. *Applications:* General Business; Banking; Manufacturing; Hospital.	$71K or $1450/mo (base)
Nixdorf Computer	820/21 (AC)	• 17K 64-bit CPU • integral ledger card terminal • 200 lpm printer • cassette tape • paper tape & punch card peripherals	*Applications:* General Business; Banking; Insurance Agency; Builder/Contractor.	$12K to $30K

AC — Accounting Computer SBC — Small Business Computer

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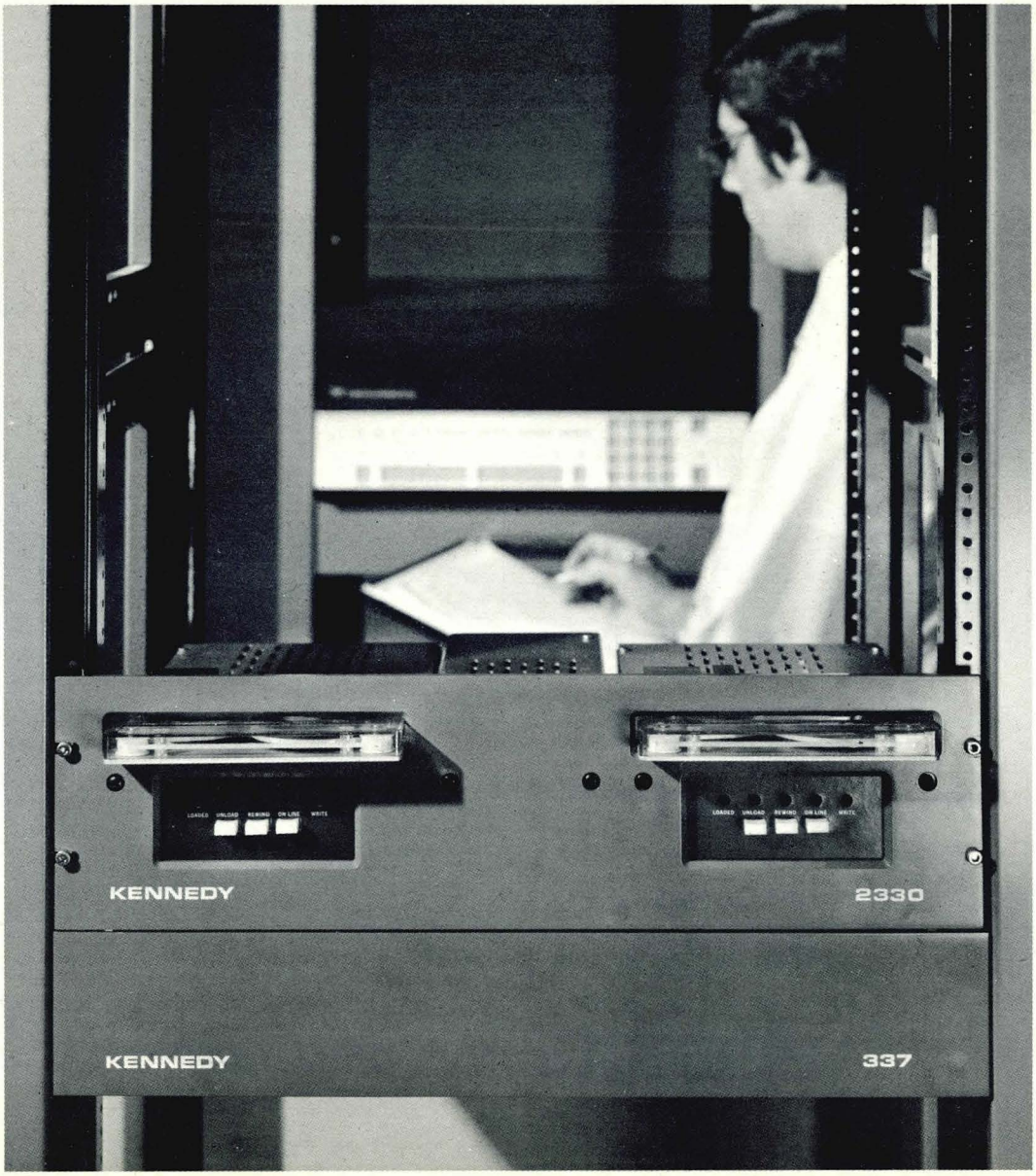

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TABLE 1 — SMALL BUSINESS SYSTEMS (Cont'd)

Company	Model (Type)	System Hardware	System Software	Pricing
Nixdorf Computer (Cont'd)	820/23,25,30 (AC)	Same as 820/21 with mag ledger card capability	Same as 820/21	$15K to $55K
	820/135 (AC/SBC)	Same as 820/21 with 2.8M to 5.6Mbyte disc storage	*Compilers:* Boss. *Applications:* same as 820/21.	—
Philips Data Systems	P350 Series (AC)	• 3.2K to 64Kbyte CPU • integral ledger card terminal • mag ledger card • 90 cps printer • cassette transport • paper tape & punch card peripherals	*Applications:* General Business.	$9K to $27K $300 to $875/mo on 3-yr lease
Q1 Corporation	Q1/C (AC/SBC)	• 4K to 16Kbyte CPU • integral gas panel display I/O terminal • keyboard printer • floppy disc storage	*Operating System:* DOS (floppy). *Compilers:* PL/1. *Applications:* Credit Union.	$9K to $22K
Qantel	Answer (SBC)	• 4K to 32Kbyte CPU • 7.6M to 61Mbyte disc storage • CRT or keyboard I/O terminal • 60 to 700 lpm printer • cartridge or mag tape transport • paper tape & punch card peripherals	*Operating System:* DOS-Multiprogramming — supports up to 12 terminals. *Compilers:* Machine-oriented. *Applications:* General Business; Electrical Distributor; Lumber Dealer; Meat Wholesaler.	$30K (typical system)
RPG Data Systems	RPG 310 (SBC)	• 24K to 64K 16-bit CPU (Cin Milacron) • 2.5M to 5Mword disc storage • CRT I/O terminal • 200 lpm printer • cassette or mag tape transport • paper tape & punch card peripherals	*Operating System:* DOS-Background/Foreground — supports up to 2 terminals. *Compilers:* RPG. *Applications:* General Business; Builder/Contractor; Food Distributor; Property Management.	$33K to $78K $1100 to $2580/mo on 3-yr lease
Scidata	Series 5 (SBC)	• 4K to 32K 12-bit CPU (DEC PDP-8) • to 27Mbyte disc storage • CRT or keyboard printer I/O terminal • 200 600 lpm printers • mag tape transport • paper tape & punch card peripherals	*Operating System:* DOS-Background/Foreground. *Compilers:* RPG; Fortran. *Applications:* General Business; Auto Agency; Wholesaler.	$45K to $80K
	Series 6 (SBC)	Same as Series 5 with 4K to 128K 16-bit CPU (DEC PDP-11)	Same as Series 5 with Multiprogramming & Timeshare.	$55K to $100K
Search Computer Systems	System 70/75 (SBC)	• 8K to 32K 12-bit CPU (DEC PDP-8) • 5M to 20Mbyte disc storage • CRT I/O terminal • 200 lpm printer • cartridge tape transport • punch card & mark card peripherals	*Operating System:* DOS. *Compilers:* Basic. *Applications:* General Business; Manufacturing.	$33K to $50K
Singer Business Machines	5800 (AC)	• 1K to 6K 6-bit CPU • keyboard printer I/O terminal • mag ledger card • 25 cps printer • paper tape & punch card peripherals	*Applications:* General Business; Insurance Agency; Mortgage & Loan Institution; Builder/Contractor; Hospital.	$12K to $23K $378 to $712/mo on 3-yr lease
	System Ten (SBC)	• 20K to 110K 6-bit CPU • 8M to 10Mbyte disc storage • CRT or keyboard printer I/O terminal • 450 lpm printer • magnetic tape transport • mark card, paper tape, & punch card peripherals	*Operating System:* Hardwired Disc Handling. *Compilers:* RPG. *Applications:* General Business; Insurance Agency; Hotel/Motel; Broker; Auto Parts; Construction.	$30K to $300K $800 to $7500/mo on 3-yr lease
Synetics	System 1/300 (SBC)	• 8K 16-bit CPU (DGen 1210) • 1.3Mword disc storage • keyboard printer I/O terminal • 165 cps printer	*Operating Systems:* DOS. *Applications:* Liquor Wholesaler.	$35K to $40K $762 to $817/mo on 3-yr lease
The Systems Corporation	P Series (SBC)	• 8K to 32K 16-bit CPU (DEC PDP-11) • 1.2M to 96Mwords disc storage • CRT or keyboard printer I/O terminal • 600 lpm printer • mag tape transport	*Operating System:* DOS; RTOS-Multiprogramming; Timeshare — supports up to 16 terminals. *Compilers:* Sibol. *Applications:* General Business; Builder/Contractor.	$33K to $88K $1400 to $3500/mo on 3-yr lease
Ultimacc	Disc (SBC)	• 4K to 32K 16-bit CPU (DGen 1200) • to 126Mword disc storage • CRT or keyboard printer I/O terminal • ledger card terminal • 300 lpm printer • cartridge or mag tape transports • paper tape & punch card peripherals	*Operating System:* DOS; RTOS — supports up to 15 terminals. *Compilers:* Basic; Fortran. *Applications:* General Business; Manufacturing; Auto Dealer; Oil Distributor; Wholesaler.	$50K (typical system)
Univac	9210/9211 (SBC)	• 12K to 32Kbytes CPU • to 248Mbyte disc storage • CRT or keyboard printer I/O terminal • 500 lpm printer • OCR reader • mag tape transport • paper tape & punch card	*Operating System:* DOS-Background/Foreground. *Compilers:* Cobol; RPG. *Applications:* General Business.	$52K or $76K (base)
Xerox Data Systems	530 (SBC)	• 8K to 64K 16-bit CPU • 2.3M to 196Mbyte disc storage • CRT or keyboard printer I/O terminal • 350 to 1100 lpm printers • mag tape transport • paper tape & punch card	*Operating System:* DOS; RTOS — supports up to 10 terminals. *Compilers:* RPG; Fortran. *Applications:* General Business.	$39K to $100K $1500 to $2800/mo on 3-yr lease

AC — Accounting Computer SBC — Small Business Computer

REFERENCE LITERATURE

For product literature or detailed information on the accounting computers or small business computers outlined in Table 1, reference the following listing and **circle the appropriate number on the Reader Inquiry Card.**

Basic Automation Logistics, New York, N.Y. 150
Basic/Four Corp., Santa Ana, Cal. 151
Burroughs Corp., Detroit, Mich. 152
Clary Datacomp, Irvine, Cal. 153
CNA/Systems, Chicago, Ill. 154
Computer Covenant, West Simsbury, Conn. 155
Computer Interactions, Great Neck, N.Y. 156
Custom Computer Systems, Plainview, N.Y. 157
Data General, Southboro, Mass. 158
Datapoint Corp., San Antonio, Texas 159
Digital Equipment, Maynard, Mass. 160
Eldorado Computer, Concord, Cal. 161
Electronic Engineering of Cal., Santa Ana, Cal. 162
Focus Systems, San Antonio, Texas 163
Four-Phase Systems, Cupertino, Cal. 164
Honeywell Information Systems, Wellesley, Mass. 165
IBM, White Plains, N.Y. 166
International Computing, Bethesda, Md. 167
Linolex Systems, N. Billerica, Mass. 168
Litton/ABS, Pinebrook, N.J. 169
Lockheed Electronics, Los Angeles, Cal. 170
Martin, Wolfe Inc., San Diego, Cal. 171
Microline Corp., Santa Ana, Cal. 172
Mini-Computer Systems, Scarsdale, N.Y. 173
Mobydata Inc., Orlando, Fla. 174
National Information Services, Cambridge, Mass. 175
NCR, Dayton, Ohio 176
Nixdorf Computer, Chicago, Ill. 177
Philips Data Systems, New York, N.Y. 178
Q1 Corporation, New York, N.Y. 179
Qantel Corp., Hayward, Cal. 180
RPG Data Systems, Los Angeles, Cal. 181
Scidata Inc., Atlanta, Ga. 182
Search Computer Systems, East Hartford, Conn. 183
Singer Business Systems, San Leandro, Cal. 184
Synectics Inc., Kansas City, Cal. 185
The Systems Corp., Honolulu, Hawaii 186
Ultimacc Corp., Maywood, N.J. 187
Univac, Blue Bell, Pa. 188
Xerox Data Systems, El Segundo, Cal. 189

PRICE-PERFORMANCE

The hardware price premium separating a small business computer from an accounting computer may be small. Coupling this low cost differential with the superior performance features of the disc-based small business computer, one might question why the accounting computer remains a viable product. The answer is twofold. First, the accounting computer, being unit record card oriented, may be introduced into a small business operation with a minimum of change in existing procedures. Second, since processing is "task-at-a-time" oriented, OS and applications software tend to be less complex than their small business computer counterparts. Standard, off-the-shelf packages are more likely to meet the needs of the user, and modified or new packages designed for a particular application are less costly.

But time favors the small business computer. Sophisticated software for these systems is becoming less prone to bugs, and the availability of off-the-shelf packages for a variety of business applications is increasing. The potential user is becoming more knowledgeable of the mysteries of programming and/or has access to a ready supply of programmers schooled in Cobol, RPG, or Basic. Thus improving software support and better performance features (faster and more detailed transaction processing, greater online data storage faculities, and superior reporting capabilities) should bring about an eventual share of market predominance for the small business computer.

SUMMARY

The accounting computer presently is the best solution for the prospective user who wishes to computerize his operation with a minimum of effort or change in existing procedures. There are, however, limitations in the transaction volumes that can be accommodated, as well as the degree of processing power obtained relative to a disc-based small business computer. For high volume operations — especially for order entry environs — the small business computer is strongly recommended.

Table 1 presents an overview of small business systems marketed. Note that a clearcut distinction on the type of computer (accounting vs. small business) exists based on disc storage capabilities. Not all disc-based systems are multi-terminal, and some employ ledger card peripherals. Also note that the same hardware configuration may appear several times in the Table under different model names or numbers. Some small business system vendors are turnkey software houses that employ hardware and OS software produced by a common minicomputer manufacturer.

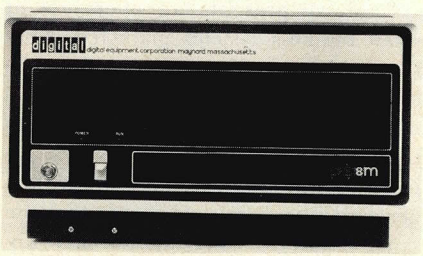
Boundaries delineating classes of computer equipment are obscure at best. Thus some systems identified with other areas of EDP (key data entry or remote batch) are included in the Table. These systems might be more at home in an order entry or inquiry/response environment, so their ability to perform general purpose business accounting operations should be carefully appraised. ▲

NEW PRODUCTS

REAL-TIME SYSTEM

XDS has introduced the Sigma 9, Model 3, a real-time computer with facilities for foreground multiprogramming using virtual memory, remote or local job entry, and hardware or software scheduling. The system can handle two levels of real-time activities together with a background batch. Secondary real-time jobs can be scheduled by software and through local or remote access to the system. Up to 32 jobs can operate concurrently using foreground multiprogramming; advanced multitasking will control up to 255 tasks. Languages available under the new XDS CP-R OS include Symbol, extended Fortran IV-H and extended Fortran IV. The OS requires a minimum of 32K (32-bit), a disc file, mag tape, and a keyboard printer. A typical 64K XDS Sigma 9/3 goes for $451,100 or may be leased on a 4-year basis for $11,390 per month. *Xerox Data Systems, El Segundo, Cal.*

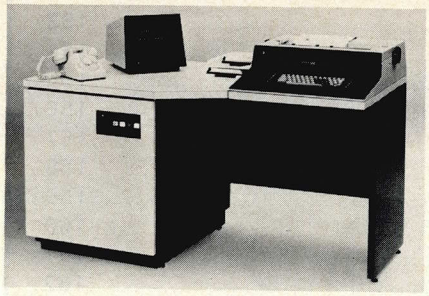
Circle No. 256 on Inquiry Card



PDP-8 WITH PROM

The PDP-8M, latest member of DEC's PDP-8 12-bit minicomputer family, uses a 1K PROM memory module with 256 words of read/write. The PROM, termed the MR8F, uses a technique which allows read/write locations to be spread throughout memory as the program requires. Microprograms can be erased by using ultra-violet light, and then reprogrammed using a PROM blaster. Intended for areas where a minimum of 4K is memory "overkill", the PDP-8M comes in a 1K or 2K version, priced at $1,760 or $2,240 for 100-unit quantities. *Digital Equipment Corp., Maynard, Mass.*

Circle No. 255 on Inquiry Card



DOCUMENT PROCESSING SYSTEM

The MDS 2300 has the ability to capture source data for later transmission and processing as well as functioning as an independent document/invoice processor. Hardware, with performance which equals or surpasses that offered by the IBM 3735, consists of a CPU with disc storage; a CRT monitor; a keyboard teleprinter; bisync communications; and the options of a 100 cps matrix printer, tape cartridge drives, or 800/1600 bpi tape drives. Complete tutorial, exception message and error message operator guidance is provided by the CRT display or teleprinter; all data entered can be validated and corrected prior to document printout or storage. In addition, overlapped operation can be made during keying, printing, and computation. MDS 2300 features also include auto data check; editing and formatting; arithmetic data field operations; unattended polling and data transmission; and online inquiry to a central computer system. Basic rental for a 2300 is $395 per month, maintenance included. *Mohawk Data Sciences, Utica, N.Y.*

Circle No. 252 on Inquiry Card

HIGH-SPEED DISC DRIVES

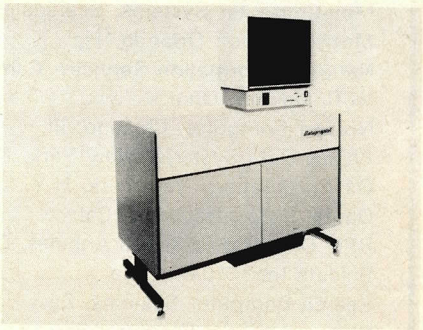
Alpha Data has introduced a family of fixed head-per-track disc drives with average access times as low as 2.1 milli-sec. Members of the family have capacities of from 1 to 16 megabits, and an I/O transfer rate of 4 MHz. Prices vary with capacity and access time. A 4 megabit 4.2 millisec drive costs $5,000. An 8 megabit 2.1 millisec unit goes for $10,000. *Alpha Data, Canoga Park, Cal.*

Circle No. 259 on Inquiry Card

HIGH DENSITY DISC CARTRIDGE DRIVE

Featuring a lateral track density of 200 tracks per inch, the new Diablo Model 44 disc cartridge drive can store up to 100 megabits and has an average access time of 38 millisec. The dual disc drive (one fixed and one removable) uses a 5440-type cartridge, requires only dc power, and comes with rack mounting hardware. Single unit purchase price is $5,775 with OEM discounts available. *Diablo Systems, Hayward, Cal.*

Circle No. 254 on Inquiry Card



COM SYSTEMS

The System 4500 is the latest addition to DatagraphiX's family of computer output microfilm products. Members of the new 4500 series include the Model 120, an online COM recorder for 360/370 installations; the Model 130, an offline recorder that accepts phase encoded and NRZI tapes from a variety of computers; and the Model 150, a minicomputer-controlled offline COM system with formatting and microfiche generation capabilities that can handle print tapes produced by almost any general-purpose computer. The recorders display data pages with up to 160 characters per line and up to 80 lines per page. Film output provides images in horizontal or vertical sequence on 105mm fiche and in cine or comic mode on 16mm film. Images may be reduced 24, 42, or 48 times. *Stromberg DatagraphiX, San Diego, Cal.*

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TEXAS INSTRUMENTS
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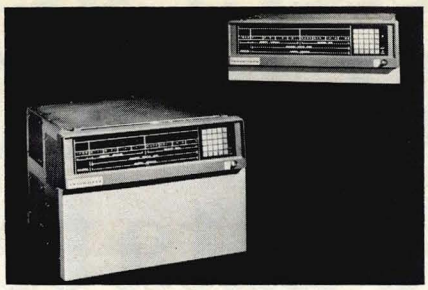
DOCUMENT SCANNER/DIGITIZER

The DSD500 Scanner has the ability to scan directly from original artwork, line drawings, illustrations, advertisements, printed pages, half-tones, etc., with a resolution of 500 points/inch in both X and Y directions. The scanner/digitizer is designed primarily for photocomposition or micropublishing applications where the merging of text with graphics is required for computer-controlled preparation of manuals, catalogs, newspaper ads, etc. Features of the DSD500 include an operating speed of 500,000 sample points/sec; an all-solid-state scanner devoid of CRT's, photomultipliers, spinning mirrors, prisms, etc.; the ability to accept and scan original material without recourse to the intermediate step of converting to film; and the ability to scan and digitize an 8″ by 12″ illustration into 24 megabits in only 48 seconds. The DSD500 Scanner is priced at $47,500 in unit quantities. *Dest Data Corp, Sunnyvale, Cal.*

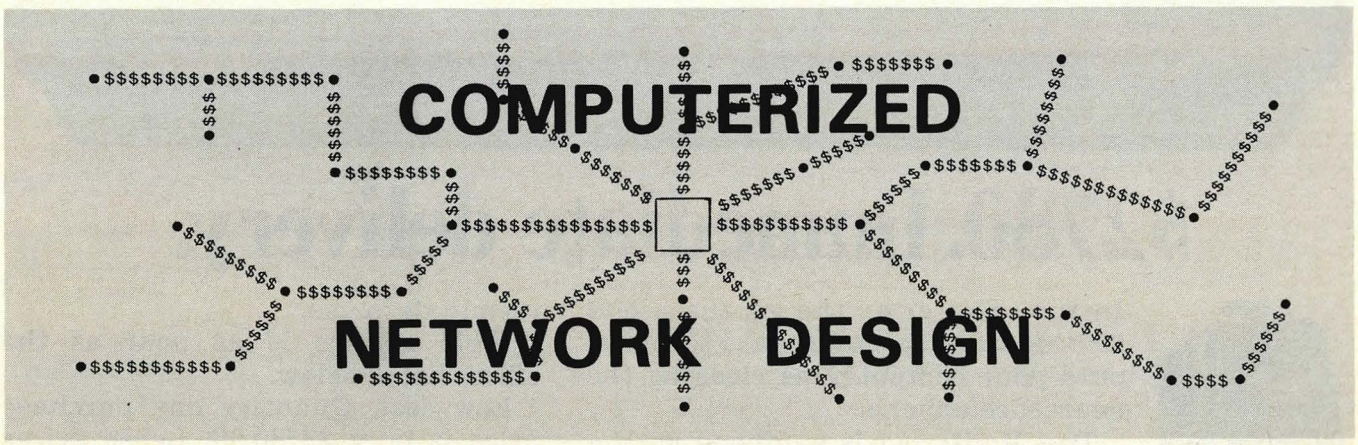
Circle No. 269 on Inquiry Card



SMALL & BIG MINICOMPUTERS

Interdata in a dual announcement has introduced two new minicomputer models — the 7/16, a 16-bit mini with an OEM price tag of under $2,000, and the 7/32, a 32-bit mega-mini going for under $10,000. The modular 7/16 is microprogrammed, using 80 nanosec bipolar ROM, and has such features as 8K to 64Kbytes of 1 microsec or 750 nanosec memory; 16 general purpose registers; 255 I/0 interrupts; and DOS and RTOS software. The 32-bit 7/32 can directly address up to 1 megabyte of main memory (architecture allows direct access to 16 megabytes) without recourse to segmentation and relocation schemes used on pseudo 32-bit minicomputers to break the 64K limit of a 16-bit processor. The 7/32, in its present confisgurations, can come with 32K to 512 Kbytes of 1 microsec or 750 manosec main memory; future memory add-ons will reach 1 megabyte and beyond. Other features include two sets of 32-bit registers, 16 registers in each set; ROM control storage; 1024 interrupts; fullword, halfword, and byte processing; a serial task OS; and Fortran V compiler. The 7/16 and 7/32 are program and I/O interface compatible with other Interdata minicomputers, and both models can come equipped with an optional hexadecimal programmer display and keyboard console. *Interdata, Oceanport, N.J.*

Circle No. 250 on Inquiry Card



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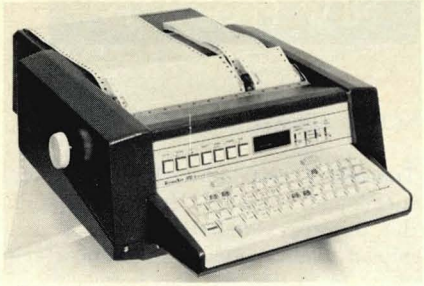

SPLIT-PLATEN TELEPRINTER

GE has enhanced the TermiNet 300 teleprinter with a split-platen enhancement that enables two forms to be prepared simultaneously. Operating independently under computer or local control, the split-platen can be employed in data communications environments where hardcopy printout of parallel but dissimilar information is required. The enhancement uses standard paper rolls, the left platen handling 8″ forms while the right one supports 3″ rolls. Both have pin feed mechanisms which support independent forms indexing – lengthy printout on one platen need not be accompanied by paper loss on the other. *GE/Communications Systems, Lynchburg, Va.*

Circle No. 253 on Inquiry Card

DISC MEMORY ENHANCEMENT

Data Disc has increased the rotational speed on their head-per-track disc drives to 3600 RPM to offer average access times now of 8.4 millisec. The new disc drives, called the 7230-L series, use the same field-proven hardware used in the 1800 RPM 7200 series. Capacities of the 7230-L's range from 560K to 9Mbits, with a maximum data rate of 4.2Mbits per second. The units are also offered with a severe environment option for such applications as process control. OEM prices start at $5,000. *Data Disc, Sunnyvale, Cal.*

Circle No. 264 on Inquiry Card

3330-II DISC PACKS

Memorex has announced the availability of Mark XD double density disc packs for IBM 3330-II and equivalent disc drive systems. The Mark XD is color coded to differentiate it from standard density 3330 (3336) type packs, and comes with a mechanical interlock to prevent use on single density drives. *Memorex, Santa Clara, Cal.*

Circle No. 271 on Inquiry Card

UNIVAC-COMPATIBLE TAPE SYSTEMS

Plug-to-plug compatible magnetic tape systems for Univac 400 and 1100 series mainframes are now available from CalComp. The new 8820 tape systems replace Univac's Uniservo 20, 16C, 12C, VIIIC, and VIC tape units, supporting libraries already in use with no modification or alteration. The 8820 system is comprised of an 8820 tape controller and up to 16 CalComp 300 series tape drives. Features include automatic load, read equalization, loop position sensing, and write pre-emphasis. Purchase price for a six drive system (single density, 1600 bpi) is $125,700; lease arrangements are also available. *California Computer Products, Anaheim, Cal.*

Circle No. 270 on Inquiry Card

NOVA MAG TAPE CONTROLLER-FORMATTER

Decision has packaged a magnetic tape controller and formatter in a single Nova minicomputer-compatible circuit board. Termed the Model 3180, the controller-formatter can interface up to four unformatted phase encoded tape drives to Novas via a daisy chain technique. The 3180 9-track phase encoded format is fully IBM-compatible, and offers such features as a crystal-controlled clock and read-after-write for high reliability. The 15-inch square board occupies a single Nova I/O subassembly slot, and can handle new dual drives which offer both NRZI and phase encode formatting. The unit comes with I/O drivers and diagnostic software to simplify programming. *Decision Inc., Oakland, Cal.*

Circle No. 266 on Inquiry Card

OPTICAL MARK READING SYSTEM

Designed for high-volume test scoring and other mark reading applications, the W2300 uses an internal programmable computer to control OMR operations and perform data formatting tasks. The reader can handle 18,000 sheets per hour, scanning both front and rear sides, for an equivalent read rate of 36,000 pages per hour. Each side of the document has a maximum of 61 rows, each containing 58 mark data channels. A standard W2300 configuration consists of an 8 Kword mini, a mag tape drive, and a TTY operator console; options include a line printer, disc or drum storage, additional tape drives, and a mark/punch card reader. *Westinghouse Learning Corp., Iowa City, Iowa*

Circle No. 261 on Inquiry Card

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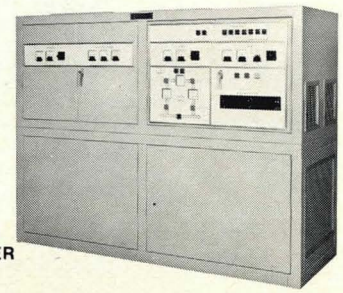
- FREQUENCY CONTROL
- TRANSIENT CONTROL
- LINE ISOLATION
- BRIDGES UTILITY POWER INTERRUPTIONS



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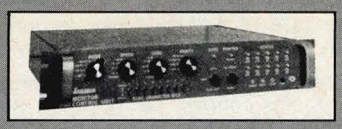
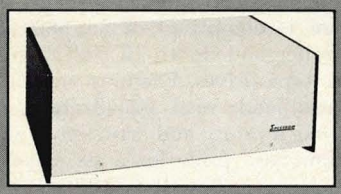
CIRCLE NO. 32 ON INQUIRY CARD

COMMUNICATIONS TESTING AND CONTROL

DEBUG ON-LINE SYSTEMS

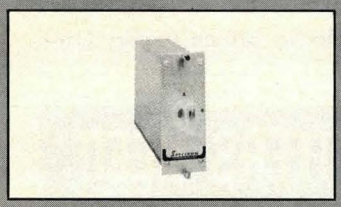


The Universal Monitor insures fast, accurate diagnosis of problems in hardware, software, and communication lines. Hard copy printout of everything sent or received on the data link, including line control characters, makes errors visible. Accommodates any 5 to 8 bit code, and speeds to 9600 bps.



SHARE YOUR MODEMS

The Modem Interface Splitter enables multiple connections to a single RS232 interface. Eliminate multiple modems and service terminals where several polled terminals are located next to each other.



LINE SELECTORS

Manual or relay controlled switches for interconnection of RS232 interfaces.

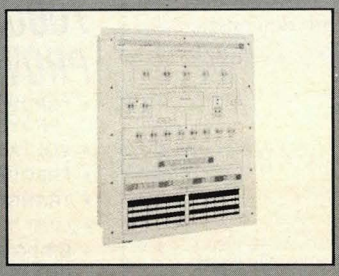
Each Selector transfers up to 16 leads of one interface to either of two others. May be customer patched or factory wired in various gang or tandem configurations for virtually any switching arrangement. Free standing, desk cabinets, and rack mountings available.

Offers new speed and convenience in rearranging circuits between ports, data sets, and terminals.

TECH CONTROL CENTERS

Custom design arrangements of patching fields, switches, and status indicators for monitoring and control of communication systems.

Rearrange leased lines; bring in spare modems; switch to backup systems; bridge for testing.



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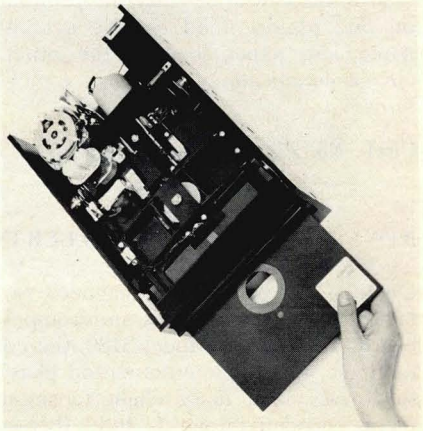
CIRCLE NO. 33 ON INQUIRY CARD

NEW PRODUCTS

SUPER SPEED LINE PRINTER

Touting a 9000-plus line-per-minute speed and automatic forms reduction, the Uppster Model II employs a non-impact plain paper xerographic technique to bridge the gap between conventional line printers and high-speed forms reduction copiers. Features of the Model II include a 132-column printout on an 8½-inch by 11-inch page; multiple copy selection for up to 99 copies under program or operator control; sprocket-driven fan fold paper; an extended character set of up to 175 characters; automatic print contrast control; character set interchangeability; electronic forms control; and built-in controller. *Uppster Corp., Stamford, Conn.*

Circle No. 273 on Inquiry Card



FLOPPY DISC DRIVE

Another entry in the fast-growing field of floppies, the Orbis 74 offers IBM diskette compatibility plus expanded storage to 4.9 megabits for higher storage requirements. The basic 74 stores 2.46 megabits using double frequency encoding in IBM 3740 format and 3.1 megabits unformatted. Data transfer is 250 Kbits/sec, with a track access time of 10 millisec/track stepped and a head settle time of 10 millisec. Average latency is 83 millisec. Expanded capabilities of the floppy disc drive include a capacity of 4.9 megabits and a transfer rate of 400 Kbits/sec. Options available include an operator-engaged write-enable switch and electronic no-hole sectoring, allowing the use of the IBM diskette or equivalent. Plug-to-plug interfaces allow connection to existing controller designs. OEM price for the Orbis 74 is $600. *Orbis Systems, Costa Mesa, Cal.*

Circle No. 272 on Inquiry Card

PDP-11 PAPER TAPE REPLACEMENT

The Series 41, a complete read/write magnetic tape cartridge system, provides higher speed and improved data reliability over DEC's PC11 paper tape unit used with PDP-11 minis. The cartridge contains 190 feet of 0.15 inch tape on two coaxial reels. Full width recording and 7 ips record speed provides for 55 Kwords of storage and a 2800 bps transfer rate. In addition to replacing paper tape, the Series 41 can also function as a bootstrap loader. A 128-word ROM can be activated by panel pushbuttons to complete a core load or refresh, with an 8K reload accomplished in less than one minute. The bootstrap includes CRC data validity word and multiple reload features. An interchangeable ROM is available for cartridge generation. The Series 41 is priced at $2,450, including transport, chassis and software support but less Unibus interconnect cable. *Applied Data Communications, Santa Ana, Cal.*

Circle No. 258 on Inquiry Card

INTELLIGENT 3270 TERMINAL SYSTEM

Described as a "smart" IBM 3270, the Sanders System 8170 is an online interactive CRT terminal system containing an integral programmable controller. Capabilities ensure error-free data prior to transmission, minimizing central CPU program edit time and making the terminal more responsive to user requirements. Standard 3270 control functions and bi-sync line control are provided by the On-Line I control program which resides in the memory of the System 8170 controller. Optional local data validation can be programmed into the 8170 using additional memory and software routines. Most functions, which can be called by the terminal keyboard, concern whether fields can be totaled, sub-totaled or zero-balanced, or whether check digit verification is to be performed. Some functions such as range check and check digit can be handled without keyboard intervention. The System 8170 can be plugged into systems presently using 2260 or 3270 terminals in configurations ranging from 2 to 32 terminals. Purchase price for an 8170 with five CRT's with a 1920-character screen, controller, and modem interface is $29,600; one-year lease price is $740 per month. *Sanders Data Systems, Nashua, N.H.*

Circle No. 262 on Inquiry Card

STATISTICAL SYSTEM

Designed for scientific and statistical number crunching in colleges and universities, DEC's Fortran Engine system is based on the PDP-8 EduSystem-25 configuration. Basic system hardware consists of a PDP-8/E with 12K; a double precision floating-point processor; 256 words of ROM for DECtape bootstrap loading; 1.6 megawords of disc cartridge storage; a DECtape unit; and a DECwriter terminal. The OS/8 operating system controls Fortran IV, multi-user Basic or assembly language. A batch processing option allows the system to handle frequently run jobs or large tasks with or without operator intervention. Typical applications include statistical data reduction, scientific computations, and teaching computer science. Fortran Engine system prices start at $37,085. *Digital Equipment Corp., Maynard, Mass.*

Circle No. 265 on Inquiry Card

THE AUTOMATED CLINICAL LABORATORY MARKET

Frost & Sullivan has completed an analysis of this market with forecasts of sales in dollars and numbers of units, through 1980, for both automated clinical chemistry and hematology equipment, organized by company. Also forecasted are average unit prices, number of automated tests and minicomputer sales.

The results of a survey of laboratories, a review of both existing and new generation equipment, an analysis of the industry structure, and a forecast of the automated laboratory of the future, are included. Hospital, regional, independent, veterinary and industrial laboratories are described in terms of their test load, working environment and importance to the automated clinical laboratory instrument supplier.

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CIRCLE NO. 34 ON INQUIRY CARD

NEW SOFTWARE & SERVICES

SERIES 70 TDOS ENHANCEMENT

TDOS-22A is an enhanced version of the Series 70 Tape Disc Operating System which can support Univac 8440 disc subsystems and Uniservo 16 and 20 tapes. TDOS-22A also contains such improvements as spool file intercept, multi-file spoolout, logical device and logical work file assignment, punched output separation, specification of non-assigned files, and support of an enhanced IPS/70 Information Processing System. Language enhancements are also included for Assembly, Fortran, Cobol and ANS-Cobol, and Ucolt. *Univac, Blue Bell, Pa.*

Circle No. 325 on Inquiry Card

ACCOUNTING PACKAGE

Accounting IV is now available in an ANS Cobol version. The package is designed for medium-to-large facilities, and provides a broad range of general ledger and accounting features. They include the support of a comprehensive data base; responsibility reporting; multi-company consolidation; currency conversions; matrix and graphic report generation; budgeting; and accounting for automatic cost allocation. Accounting IV is also available in PL/1 language, and can be used on 360/370 mainframes with 64K. Price ranges from $25,000 to $38,000. *Informatics Inc., Canoga Park, Cal.*

Circle No. 348 on Inquiry Card

CDC MODULAR SOFTWARE

The Kronos operating system is designed for CDC Cyber 70 and 6000 Series computers employed in terminal-oriented applications. Kronos multimode software handles a variety of terminal-based processing modes, including transaction processing from POS and agent-set terminals; interactive timeshare and deferred batch entry via TTYs; and local or remote batch processing terminals. The modular OS subsystem is designed so that transaction, timeshared, deferred, local, and remote batch processing can be activated or deactivated without affecting base system operations. The CPU is reserved for computing functions while I/O, scheduling, and monitoring activities are distributed to peripheral processors within the computer mainframe. Minimum memory required is 328K, and a configuration can include up to 20M of extended core, disc/drum subsystems, mag tape transports, other I/O peripherals, and up to eight multiplexers handling 16 to 64 lines each. *Control Data Corp., Minneapolis, Minn.*

Circle No. 346 on Inquiry Card

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CIRCLE NO. 35 ON INQUIRY CARD

NEW SERIES MINICOMPUTER SOFTWARE

Interdata has introduced an Extended Fortran IV system and a single-user Basic compiler for their New Series (Model 70 and 80) minicomputers. The Fortran IV compiler supports all language features required by ANSI Standard Fortran. In addition, the compiler permits the extensions of mixed-mode arithmetic; the defining of Hollerith constants and strings by a bracketing apostrophe; the use of Data statements to initialize entire arrays without the use of subscripts; the ability of Data statements to declare hexadecimal constants; the typing of variables using the Implicit statement; and the specification of error and file returns from Read/Write statements. In addition to producing the object program during compilation, the Fortran IV compiler performs error checks on the source program syntax and produces appropriate error messages. At the completion of a compilation, a memory map is printed. The map contains relative address assignments in memory, all arrays, variables, and statement labels which were used in the Fortran source program. The single-user Basic package contains all the features of Dartmouth Basic, plus extensions including Matrix operations; Extended If statement; Input and Print via logical unit; On statement; Print Using (picture format); string operation; Boolean operation; Call (assembly language subroutine); Basic batch generation; and File Control commands. Interdata Basic is supported under their Basic, Disc, or Real-Time operating systems. Fortran IV requires 16½ Kbytes of memory, and is priced at $100. Single-user Basic needs 16K under Basic OS, 24K under DOS, and 32K under RTOS; purchase price is $150. *Interdata, Oceanport, N.J.*

Circle No. 342 on Inquiry Card

COBOL OPTIMIZER

Optimizer II automatically reduces the size and execution time of IBM 360/370 ANS Cobol object programs. Overall memory required is reduced by 20%, and execution time is improved an average of 15% to 20%. Optimizer II is transparent, no action required on the part of the Cobol programmer. The package operates with IBM's ANS Cobol Version 2, 3, or 4, and runs under OS, MFT, VS1, or VS2. One-time license cost is $8,000 to $20,000; rentals range from $333 to $833 per month, and leases from $265 to $750 monthly. *Capex Corp., Phoenix, Ariz.*

Circle No. 352 on Inquiry Card

SECURITY SOFTWARE

New software has been devised to improve the security of masked information in H-P timeshare systems (see MODERN DATA, p. 68, Sept. 1973). The revisions incorporate a new, added level of security interlocks to prohibit access to masked files by unauthorized users. Price involves only the cost of the paper tapes containing the revisions. *Hewlett-Packard, Palo Alto, Cal.*

Circle No. 345 on Inquiry Card

FINANCIAL STATEMENT

Infotab, a product developed by Capex Corp. and offered on a timeshare basis by National CSS, produces tabular financial management reports. Infotab can be used for such applications as company, department, or project budgets; sales analysis; cash flow projections; cost analysis; engineering tabulations; depreciation scheduling; statistical tabulations; market research; investment analysis; loan schedules; revenue projections; and other report generation operations. Infotab is priced on a per table entry or item basis at 2½¢ per item for the first 300 items, and 1¢ per item thereafter. Thus, if a table has 12 columns and 10 rows (120 items), the cost would be $3.60 to generate the report. *National CSS, Norwalk, Conn.*

Circle No. 354 on Inquiry Card

NOVA COBOL

A subset of ANS Cobol for Nova minis has been developed using Blis, an interpretive business oriented language processor. Although Blis includes its own multi-programming system, compatibility with Nova RDOS is achieved since file control is through the RDOS file directory. A minimum Blis system, with or without Cobol, supports two program partitions (simultaneous users) with 16K; six partitions are supported in 32K. Protection between programs is assured because Blis procedure statements are interpreted, rather than compiled, into machine code. In addition to the Cobol compiler, a sort/merge is available, as well as Cobol picture oriented file maintenance and report generator utilities. The Blis system is priced at $1,650; the Cobol compiler goes for $2,000; and sort/merge, file maintenance, and other utilities cost $500 each. *Information Processing Inc., Orlando, Fla.*

Circle No. 344 on Inquiry Card

COM SOFTWARE

The Datacom program enables COM users to convert print tapes or raw data files to microfilm or microfiche without the need for programming or the post-processing of computer-generated tapes. The program is designed for use with the Pertec 3700 COM system and 360/370 computers. Datacom is capable of producing title and index microfiche directly from data bases contained on tape or disc. Parameter card control allows the data file to be restructured into any report presentation without disturbing existing records. Packed fields in the master file may also be edited to display format in the microfiche report. Datacom enables the user to redesign reporting systems to take advantage of the data compression and rapid retrieval features of COM output. Existing reports can be consolidated into a more comprehensive reporting system without major system changes. *Pertec, L. A., Cal.*

Circle No. 343 on Inquiry Card

370 DOS/VS JOB ACCOUNTING

A new version of Jasper is available to provide user billing, system utilization reporting, and analysis of job, operator and component performance for IBM 370 systems operating under DOS/VS. A special feature allows the system to compute a paging constant for every user program. The constant is used to determine the extent of job degradation due to excessive paging. Operations scheduling and reports are produced to aid management in planning better workload mixes and in identifying problem jobs. Jasper's billing reports are based on user-specified rates, and they permit the user to charge for any combination of elapsed or CPU time and/or resources used. Keypunch and programmer time are handled through a card input feature. Jasper can provide "benchmark" capability to installations that have not yet converted to VS. The system will create a data base containing averages for run time, percent compute bound, and I/O factor for all production jobs at the step level using only normal EOJ's to calculate the averages. Performance under DOS/VS will then be compared against averages, and jobs that are excessively degraded will be flagged. Jasper is written in Bal and Ansi-Cobol and is release independent. It can be used on any 360/370 DOS or DOS/VS system, and has a basic price of $1,995. *Datachron Corp., New York, N.Y.*

Circle No. 326 on Inquiry Card

NEW LITERATURE

COMPOSING ROOM OCR

Typesetters and publishers wishing to reduce overhead in composing room operations should read this new brochure on the ECRM 5200 Autoreader. The mini-controlled OCR system converts edited typed copy to machine readable paper tape at a throughput speed of 500 words per minute. *ECRM Inc., Bedford, Mass.*

Circle No. 361 on Inquiry Card

PLOTTING SOFTWARE

Bulletin SW7 covers CalComp RS-274 Software, a system that provides special editing controls to the plotter operator. RS-274 consists of special Host Computer Basic Software (HCBS) and Graphic Controller Software (GCS). *California Computer Products, Anaheim, Cal.*

Circle No. 377 on Inquiry Card

COMPUTER SECURITY

ADT has released a tabloid-sized brochure on computer protection and security. Act of God or man hazards and countermeasures to neutralize them are outlined as well as ADT's capabilities in security systems. *ADT Security Systems, New York, N.Y.*

Circle No. 380 on Inquiry Card

2200 BUSINESS SYSTEM LANGUAGE

A users' guide to the Databus programming language used on the Datapoint 2200 system is available. The booklet is written for business and technical executives, and other non-professional programmers. *Datapoint Corp., San Antonio, Texas*

Circle No. 379 on Inquiry Card

DO-IT-YOURSELF MINICOMPUTER

DEC beware! Control Logic has issued a brochure detailing how to configure general or special purpose minis from their "L" Series line, LSI functional logic cards and components priced from $30 to $465. *Control Logic, Natick, Mass.*

Circle No. 370 on Inquiry Card

VOICE RESPONSE

EDPers wishing to configure speaking computer systems will find a brochure on Cognitronics' 640 of interest. The solid state 640 is programmed to respond voice-wise for the ten digits "zero" thru "nine". *Cognitronics Corp., Stamford, Conn.*

Circle No. 374 on Inquiry Card

POS REGISTERS

Data sheets are available on Omron's electronic cash registers for general retail and parking lot applications. The stand-alone registers come complete with cash drawer, digital display, customer listing printer, and journal listing printer. *Omron Systems, Chicago, Illinois.*

Circle No. 371 on Inquiry Card

PATTERN RECOGNITION & STATISTICAL SOFTWARE

Scientists and statisticians stymied by pattern recognition and statistical analyses problems can find ways to relieve their dilemmas by reading a brochure on Facel, a software library on feature analysis comparison and evaluation. *Recognition Sys., Van Nuys, Cal.*

Circle No. 398 on Inquiry Card

GRAPHICS SYSTEM

Send for a copy of this new brochure on the Imlac PDS-4 if you have a need for both interactive stand-alone and online graphics. The system employs a 16-bit mini and an image generation processor to control and format CRT displays of up to 3000 alphanumeric characters or 2000 inches of graphics. *Imlac Corp., Needham, Mass.*

Circle No. 362 on Inquiry Card

SERIAL PAGE PRINTER

A product folder describes the Facit 4553, a 15 cps, 80-column serial impact printer for low cost printer applications. The 4553 can come with either bit-parallel or CCITT/RS-232-C bit-serial interfacing in print drive-only to printer-character generator configurations. *Facit-Addo Inc., Secaucus, N.J.*

Circle No. 391 on Inquiry Card

FLOPPY DISC DRIVE

Potter's DD4740 Diskette Drive, an IBM 3740 format compatible floppy, is detailed in a six-page bulletin. Full operating parameters are given, and areas of application for floppy-based storage are covered. *Potter Instrument, Melville, N.Y.*

Circle No. 373 on Inquiry Card

DATA DESKS

Worried about the hardware support offered to your $5K terminal by a $5 bridge table? Learn how to prevent a gravity dump while also improving your office image by scanning a product folder on EDP furniture. *Systems Furniture Co., Gardena, Cal.*

Circle No. 372 on Inquiry Card

MULTIPLE MODEMS

A data sheet reviews the features of the CW-120, a multiple modem assembly capable of supporting up to twelve 202-type modems in one enclosure, and equipped with analog and digital loopback testing features. *Terminal Communications/Comware, Raleigh, N.C.*

Circle No. 381 on Inquiry Card

REMOTE PLOTTING

Zeta's 16-page booklet devotes itself to the "why's" and "how's" of remote plotting without lapsing into a "company sell" posture with particular product data. Potential users, tired of wading through reams of computer listing printout for their business report or engineering analysis, should find this brief presentation on remote plotting interesting — especially the section covering the pro's and con's of analog plotters versus standard vector plotters versus differential vector plotters. *Zeta Research, Lafayette, Cal.*

Circle No. 360 on Inquiry Card

FLOPPY DISC DRIVES

Shugart has issued a three-page foldout describing the features of the SA900/901 diskette drives, floppy disc drives with IBM 3740 compatibility or special formatting features. The drives feature capacities of 3.1 megabits, an average latency of 83 millisec, and track-to-track access and head settle times of 10 millisec. *Shugart Associates, Sunnyvale, Cal.*

Circle No. 376 on Inquiry Card

ENGINE POLLUTION MONITORING

An application note briefly reviews the requirements and operation of a minicomputer-based motor vehicle engine pollution test system. *Electronic Processors, Englewood, Colo.*

Circle No. 363 on Inquiry Card

DATA COMMUNICATIONS PRODUCTS

All you might need in the way of low-to-high speed modems, line amplifiers, line adapters and other data communications products are detailed in a new ICC catalogue. *Milgo/ICC, Miami, Fla.*

Circle No. 375 on Inquiry Card

TAPE/DISC DISPLAY SYSTEM

Chi's data sheet on their Programmable Display System will show you how to manage all those reel or pack mount/dismount operations with a minimum of effort. *Chi Corp., Cleveland, Ohio*

Circle No. 367 on Inquiry Card

DISKETTE DATA STATION

Potter's newest entry to the world of data entry, the System 85, is outlined in a pocket-size booklet. The system/station employs "floppy" disk storage compatible with IBM 3740 formats as the data recording media. *Potter Instrument, Melville, N.Y.*

Circle No. 378 on Inquiry Card

OEM PERIPHERALS

This product summary sheet provides the OEM buyer with a menu of chain or drum printers, lister printers, reel-to-reel and 3M cartridge mag tape transports, disc pack drives, punch card readers and paper tape equipment marketed by MDS. *Mohawk Data Sciences/OEM, King-of-Prussia, Pa.*

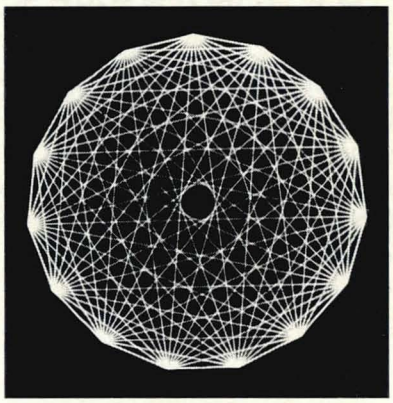
Circle No. 365 on Inquiry Card

HEAD-PER-TRACK DISCS

A short form catalog sums up IDS's capabilities in the fixed head-per-track disc area. Storage products covered include 14Kbit to 51Mbit drives, drive controllers, and end-user disc memory systems. *Information Data Systems, Walled Lake, Mich.*

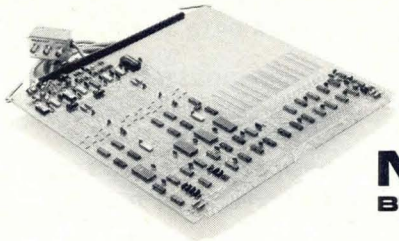
Circle No. 364 on Inquiry Card

Connect the dots for $1095.



It's not enough to have high speed vector graphics from your mini dynamically displayed on your x-y scope. Now Megatek has the lowest cost full graphic interface available. Supplied with ready-to-use software (BASIC) to generate a wide variety of real-time flicker-free (50Hz refresh memory built-in) plots and alphanumerics. Complete CPU compatibility (now available for NOVA series) — no hardware modification.

So don't pay a cent unless you're convinced it's the unbeatable value we say it is. See for yourself. Call us for convincing details on NOVA, PDP-11 and NAKED MINI/ALPHA 16, (213) 530-0654 or write Megatek, 1526 West 240th Street, Harbor City, California 90710.



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BUDGET PERIPHERALS

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CIRCLE NO. 36 ON INQUIRY CARD

INTERFACING ELECTROSTATIC PRINTER/PLOTTERS

Any questions on how to interface a Versatec electrostatic printer or printer/plotter with your favorite CPU will be answered by a new eight-page technical bulletin. The publication details the basic interface, including pin connection lists and timing diagrams, and also describes the operational features of electrostatic print/plot units. *Versatec Inc., Cupertino, Cal.*

Circle No. 368 on Inquiry Card

LINE CONDITIONER

A new data sheet describes Bowmar's Model 478T, a line equalizer designed for voice band data communications channels. The 478T contains twelve separate equalization networks or sections in tandem with twelve amplitude and twelve individual delay controls per channel. Each network is designed to control delay and amplitude discretely at a different frequency. *Bowmar/Instrument Division, Acton, Mass.*

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FOR IMMEDIATE RELEASE

HP ANNOUNCES FIRST $500 FLOATING POINT

PALO ALTO, Calif., --Floating point now can be added to Hewlett-Packard 2100 microprogrammable computer systems for only $500, an 80% reduction. The low price is possible because HP floating point is implemented with a hardware microprogram that simply plugs into the user-accessible microprocessor of HP-2100 computers. The floating point instruction set is implemented in bipolar read-only memory.

Floating point in core memory requires hundreds of words. As a firmware microprogram it conserves memory and runs five to twenty times faster. The 2100 series floating point firmware b multiply, and divide numbers in floating and

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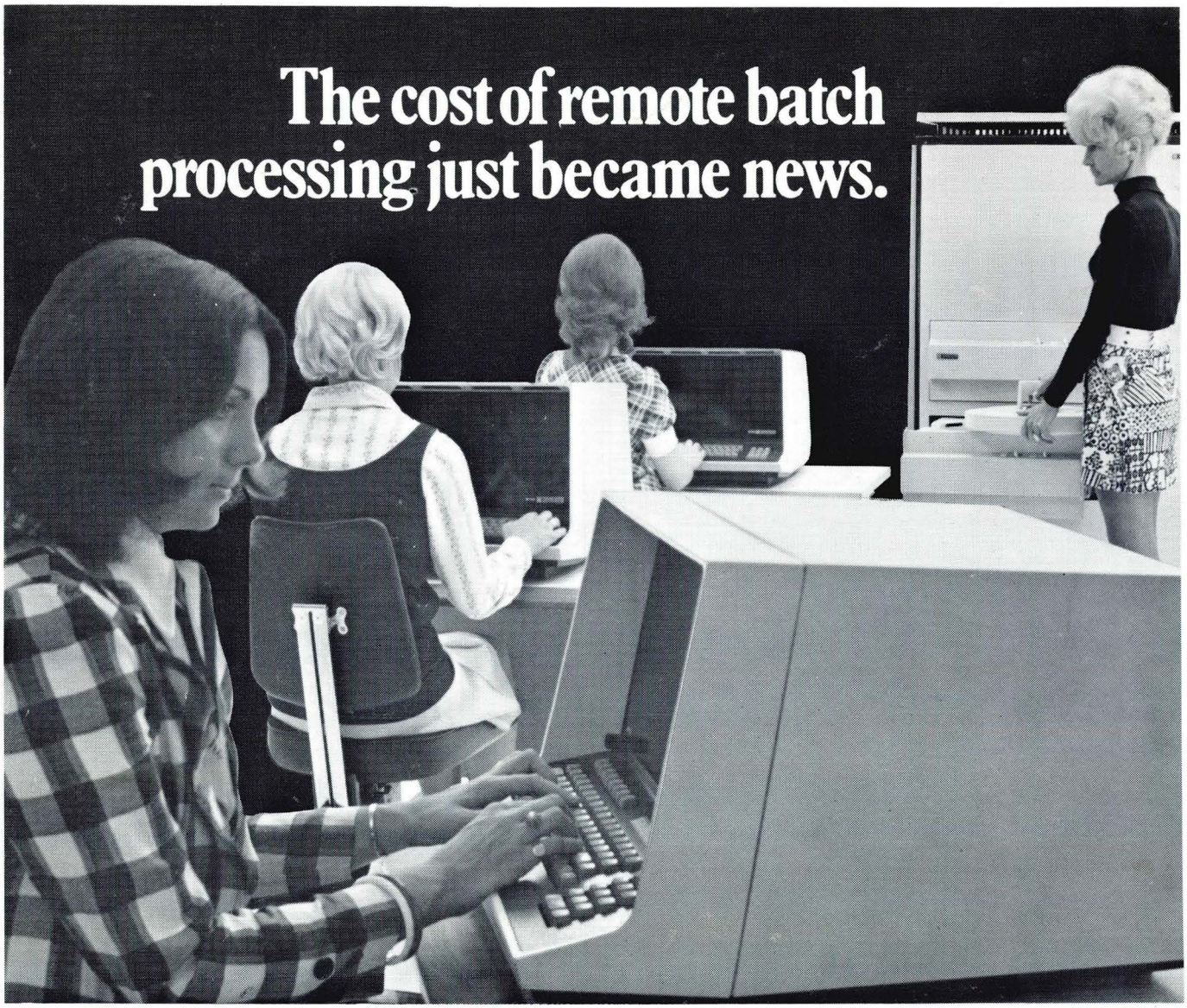
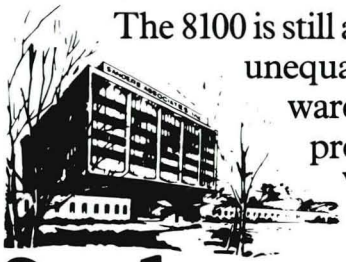
CIRCLE NO. 37 ON INQUIRY CARD

The cost of remote batch processing just became news.



The Sanders 8100 Remote Batch Terminal System can promote savings from all angles. It has exceptional remote-site data entry capabilities in a cost-affective hardware/software package.

The programmable, clustered 8100 system (up to 4 CRT's) offers 5-megabyte disk storage, source-document screen formatting, broad error-checking and editing and Sanders-supplied software for complete system integration. It eliminates card-punch operations, reduces CPU line charges. It simplifies, controls, standardizes and improves turnaround time.



The 8100 is still another answer from Sanders technology rooted in unequalled terminal-industry experience. We have the hardware, the software, the maintenance support – and the proven reliability. Sanders Data Systems, Inc., Daniel Webster Highway-South, Nashua, N.H. 03060. Call (603) 885-3727.

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