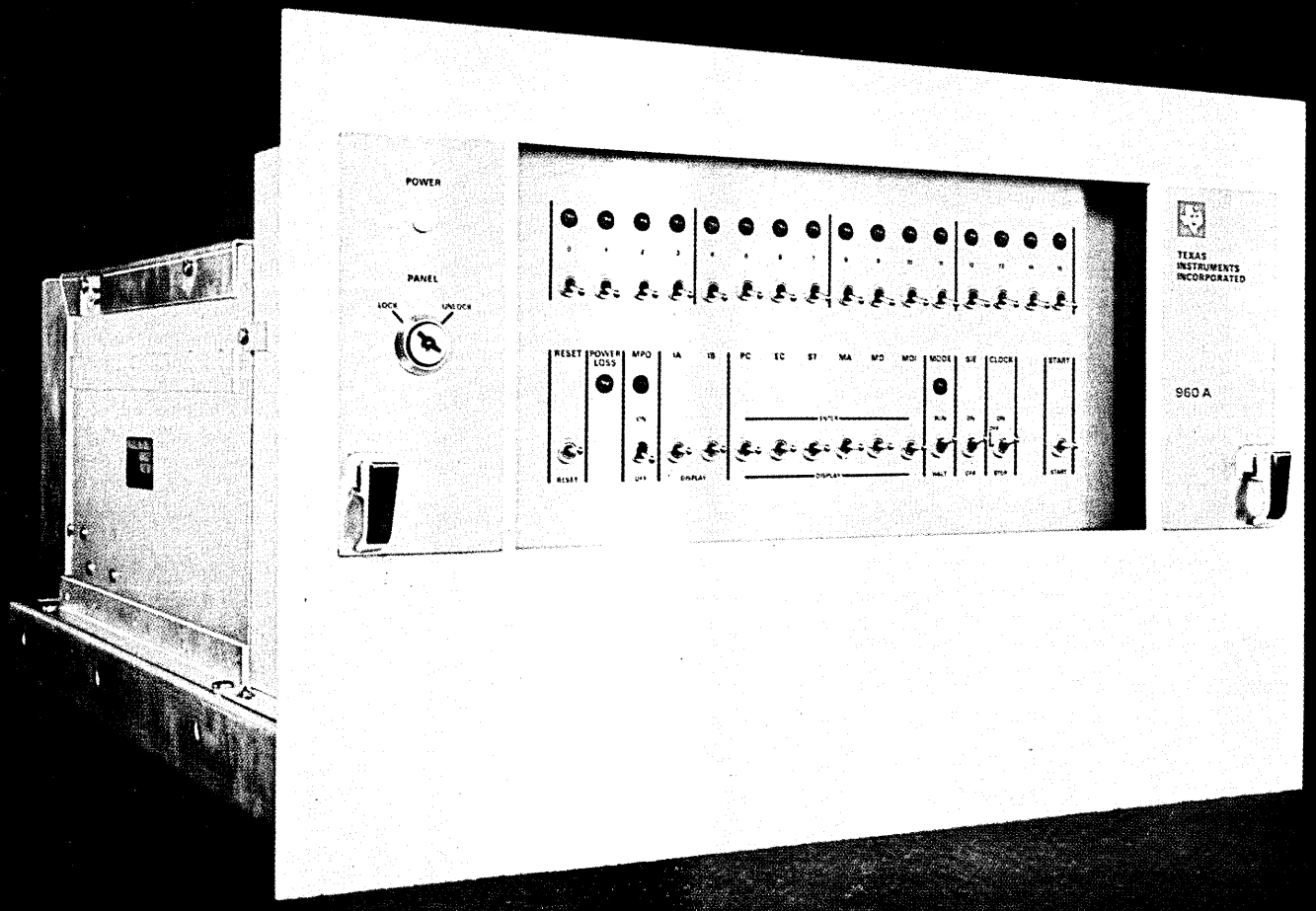
DATAMATION®

71

December 15

edp in europe

TI announces the leader...



in minicomputer price/performance

Model 960A
$2,850

Quantities 1 to 100
CPU with 4K memory $2,850
CPU with 8K memory $4,350
CPU with 16K memory $7,350

The 960A is the newest addition to the proven family of TI computers used to solve the problems of industrial automation.

With the capability of using single bits of standard 16-bit words to perform sensing and control functions directly, and the easy-to-use "shop language" software, the 960A is especially cost effective in manufacturing automation, process control and data collection systems applications.

The basic price of the 960A includes the power supply, a Direct Memory Access (DMA) channel, automatic parity checking, and a full, lockable front panel. The new 750-nanosecond semiconductor memory is expandable to 32K in the basic chassis at $1500 for each 4K increment. Also provided in the basic chassis is space for 512 input/output lines that are expandable to 8,192 I/O lines.

Options include hardware multiply and divide, memory write protect, power fail with auto restart, a battery pack good for two weeks of memory refresh, and a 65K memory.

Extensive software backup for the 960A includes:

- ☐ FORTRAN with extensions to permit direct I/O interfacing, to produce re-entrant code, and to allow logical operations and bit manipulations.
- ☐ General Purpose Language Translator which allows the creation of applications-oriented program languages.
- ☐ Operating systems ranging from a small batch processor to a full disc operating system with background/foreground processing.
- ☐ Assemblers and Linking Relocating Loaders.
- ☐ Cross-Assemblers for large computers.
- ☐ Source maintenance, debugging and utility programs.

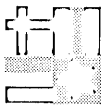
For applications support TI offers the resources of its experienced Applications Engineering group. Also, training courses on 960A software and hardware are scheduled regularly, and TI service facilities are located throughout the United States and abroad.

Would you like to know more about the new 960A price/performance leader? Write to Computer Products Marketing Manager, Texas Instruments Incorporated, P.O. Box 1444, Houston, Texas 77001. Or call (713) 494-5115, extension 2745.

TEXAS INSTRUMENTS
INCORPORATED

DECEMBER 15, 1971

volume 17 number 24



EDP IN EUROPE

26 Close Cooperation: Europe's Best Hope

ROBERT B. FOREST. The people who run Europe's biggest computer companies seem to have reached a consensus: international cooperation is now essential. Some companies that may be involved: Philips, CII, ICL, and Siemens.

26 Etroite Coopération: Le Meilleur Espoir de l'Europe

ROBERT B. FOREST. Les Européens qui gèrent les compagnies d'ordinateurs semblent avoir atteint un consensus: la coopération internationale est maintenant essentielle. Quelques compagnies qui sembleraient s'y intéresser: Philips, CII, ICL, et Siemens.

26 Enge Zusammenarbeit: Europas Beste Hoffnung

ROBERT B. FOREST. Die Leute, die Europas grösste Elektronenrechner-Gesellschaften verwalten, scheinen zu folgendem Schluss gekommen zu sein: internationale Zusammenarbeit ist jetzt notwendig. Einige Gesellschaften, die einbezogen sein können sind: Philips, CII, ICL, und Siemens.

36 The Multipartite Accord

PHIL HIRSCH. It's possible that this plan to reduce trading problems among European countries will prove a barrier to U.S. companies.

36 Les Accords Multipartite

PHIL HIRSCH. Il est possible que ce plan pour réduire les problèmes d'échange entre pays européens devienne une barrière contre les compagnies américaines.

36 Die Multilaterale Übereinkunft

PHIL HIRSCH. Es ist möglich, dass dieser Plan, die Handelsprobleme unter den europäischen

departments

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DATAMATION 71®

Ländern zu vermindern, den U.S. Gesellschaften Hindernisse bieten kann.

38 Soviet Computing: a Giant Awakens?
JAMES TITUS. Russia's five-year plan calls for the tripling of the current computer population – a goal most experts see as impossible without the help of western manufacturers. Will the U.S. ease its restrictions?

38 Ordinateurs Soviétiques: un Géant Se Réveille?
JAMES TITUS. Le plan quinquennal russe demande de tripler la population actuelle d'ordinateurs – plan que la plupart des experts considèrent comme impossible sans l'aide des constructeurs occidentaux. Les Etats-Unis diminueront-ils leurs restrictions?

38 Sowjetische Elektronenrechner: ein Riese Erwacht?
JAMES TITUS. Russlands Fünfjahresplan sieht eine Verdreifachung der gegenwärtigen Elektronenrechner-Bestückung vor – ein Ziel, welches die meisten Experten als unmöglich ohne Hilfe der westlichen Hersteller ansehen. Werden die U.S.A. ihre Beschränkungen lockern?

44 East-West Trade . . . Trickle or Torrent?
ANGELINE PANTAGES. Doing business with the communist nations is still a tricky and difficult proposition. And the U.S. government's reluctance to ease restrictions doesn't help. But pressures – from both sides – are mounting to open the trade routes.

44 Echange entre l'Est et l'Ouest . . . Ruisseau ou Torrent?
ANGELINE PANTAGES. Traiter des affaires avec les nations communistes est encore une proposition difficile et risquée. Et l'appréhension du gouvernement américain envers une détente des restrictions n'aide guère la situation. Mais la pression – des deux côtés – augmente pour ouvrir les routes d'échange.

44 Ost-West Handel . . . Rinnsal oder Strom?
ANGELINE PANTAGES. Geschäftsbeziehungen mit den kommunistischen Nationen aufzunehmen ist noch ein heikles und schwieriges Unterfangen. Und das Zögern der U.S. Regierung hilft keineswegs, diese Einschränkungen zu lockern. Jedoch der Druck – von beiden Seiten – verstärkt sich, die Handelswege zu öffnen.

GENERAL

52 A Fable for Our Times
BRUCE G. WHITENER. The way the salesman explained it, the prospect would not only get his laundry done completely automatically but would also have the immense advantages of management information.

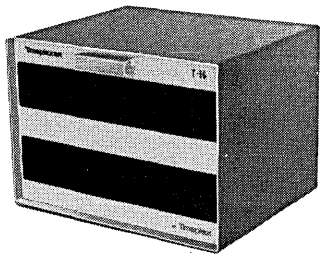
COMMENTARY

58 Perspective
The California Public Utilities Commission is weighing complaints against Pacific Telephone and General Telephone of California by two independent terminal makers who contend they should be allowed to connect their terminals directly to the intrastate dial-up lines. The outcome will have national implications for terminal makers who have been fighting Ma Bell since 1968 for the right to connect directly to interstate lines.

About the Cover
Merger talk and market forces may be combining to change the nationally restricted shape of the European computer industry. The border lines removed, our art director's design allows new forms to emerge.

BE FRUGAL AND MULTIPLEX... THE NEW WAY

NEW high performance TDM at a total system cost less than $10 per channel end per month* ...built-in modem included!



Called the Timeplexer, this unique product represents a new approach to small system TDM design. In addition to such standard features as 8 simultaneous speed/codes, efficient baud rate intermix, automatic mid-point channel feedthrough, and a test generator-comparator, such options as remote loopback, intercity contention, three full-duplex control signal transmission and display, multiple channel synchronous data intermix, line quality monitor, choice of built-in or external high speed modem, and such special options as adaptive speed channel cards, software demultiplexing formats and redundant logic and power supply, the Timeplexer comes in compatible 4, 16 and 20 channel versions, which may be interconnected to configure any size system required. Why not let a Timeplex representative prove to you that TDM is the best medium for the message?

*Two year lease basic unit with sixteen channel cards and modem. Price $194 per channel per end purchase.

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CIRCLE 45 ON READER CARD

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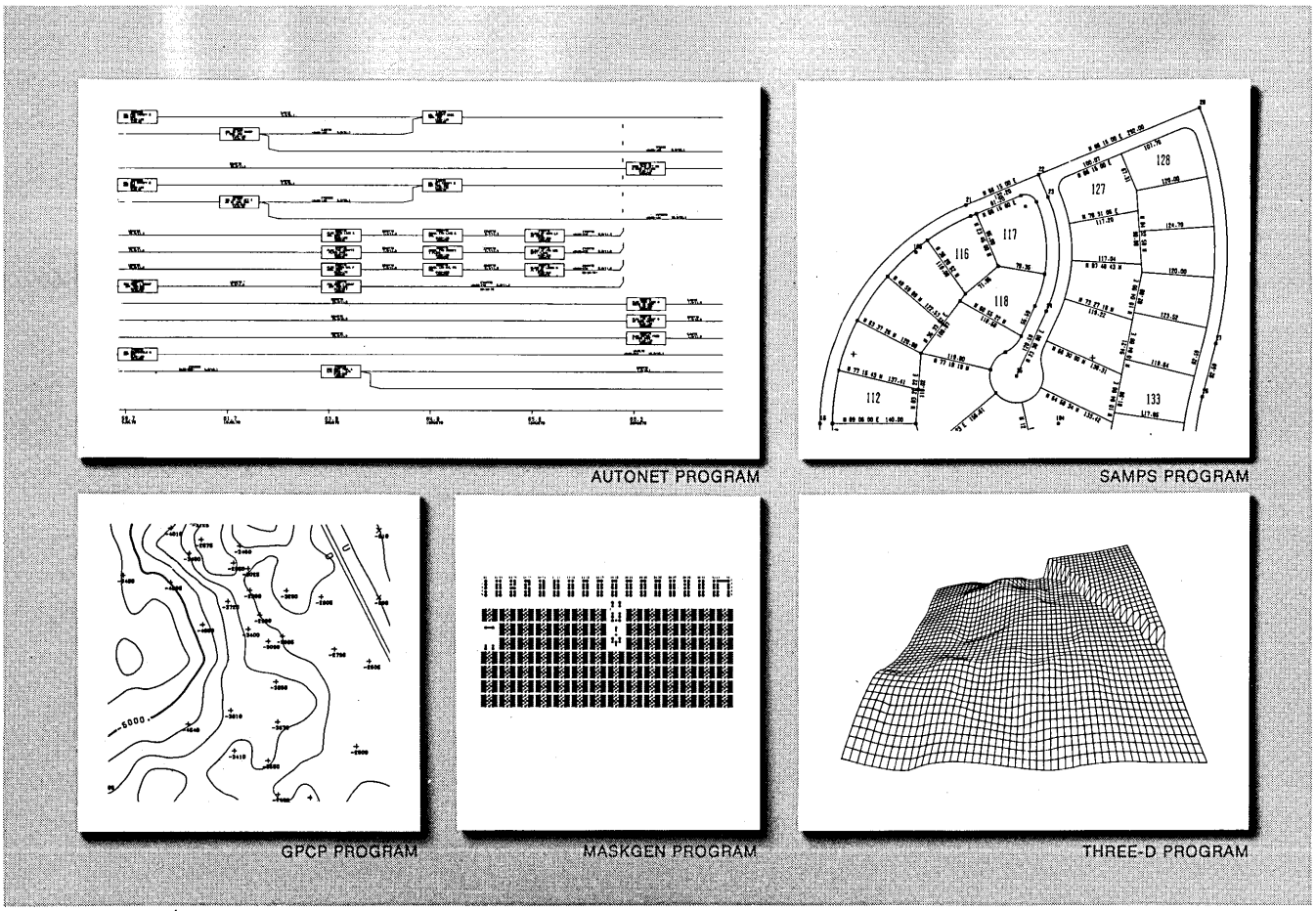

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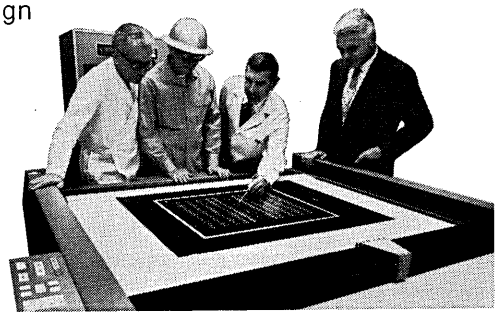

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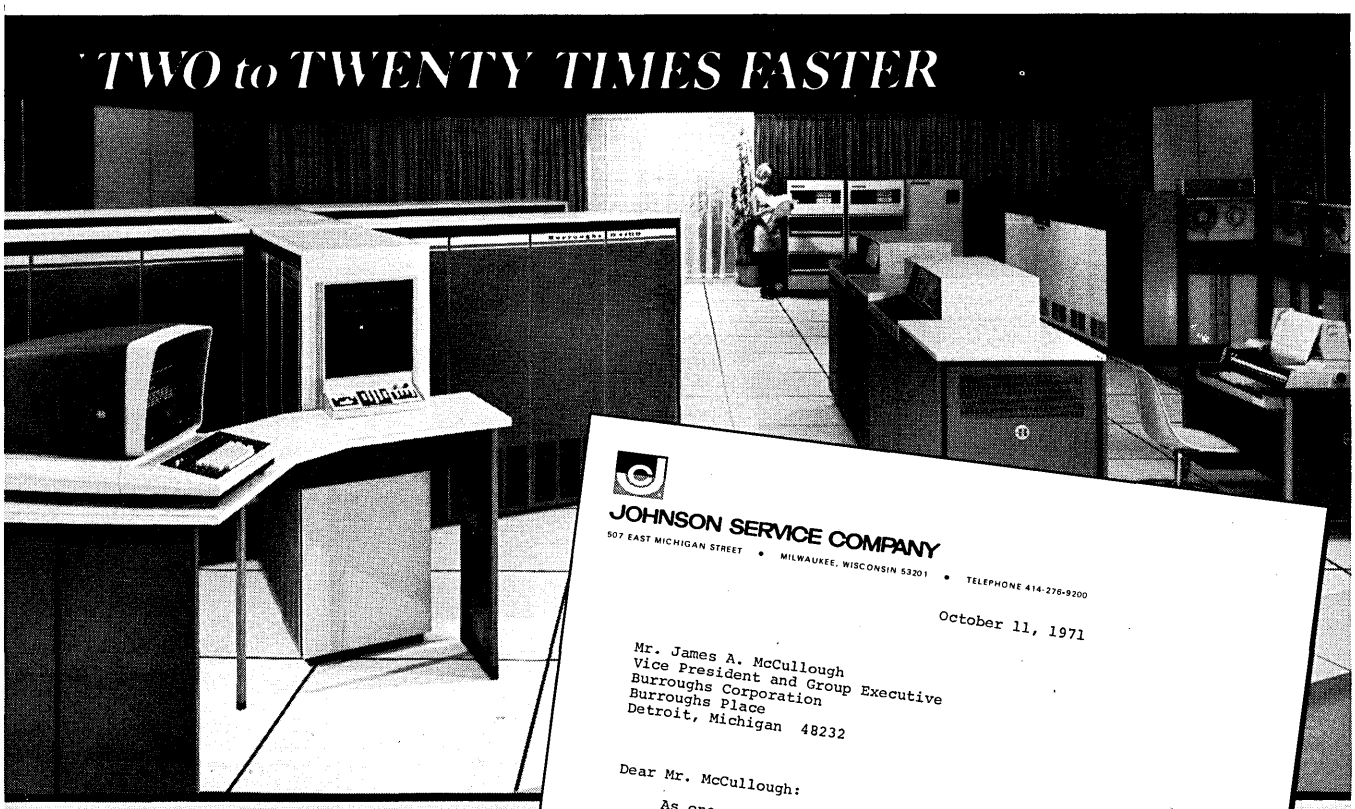

JOHNSON SERVICE COMPANY
507 EAST MICHIGAN STREET • MILWAUKEE, WISCONSIN 53201 • TELEPHONE 414-276-9200

October 11, 1971

Mr. James A. McCullough
Vice President and Group Executive
Burroughs Corporation
Burroughs Place
Detroit, Michigan 48232

Dear Mr. McCullough:

As one of the world's largest suppliers and installers of building automation and comfort control systems, we can certainly appreciate the value which the customer places on a timely and trouble-free installation. Our experience as recipients of the first B-4700 System merits our comment in that we were running production jobs just three working days after delivery.

Our experience would indicate that several firsts have been set in your industry. The B-4700 was delivered approximately one month ahead of schedule. Its performance meets or exceeds our expectations, and the hardware appears to be extremely solid. The speed with which it was installed certainly points to the fine job done by your Engineering and Manufacturing Staff, but a large amount of credit must also be given to the outstanding local Field Engineering Group.

We offer you our congratulations on a superior new product that permits us to provide even better service to our customers.

Sincerely yours,

JOHNSON SERVICE COMPANY

Roger V. Resek

Roger V. Resek
Manager, Systems and Data Processing

RVR:lt

BURROUGHS ANNOUNCES and DELIVERS the B4700 SYSTEMS

Burroughs new B 4700 Systems are being delivered *now*. Powerful systems. Easy to program and manage. Uniquely responsive to changing business conditions.

With fast new circuitry coupled to a superior system design and mature software. (*B 4700 COBOL program throughput is twice or more that of Burroughs B 3500, long considered the outstanding system in its class. FORTRAN programs run up to 20 times faster.)

With the added power of two, three or four processors all sharing one fully-protected data base. Up to 80 input/output channels. Parallel multiprograming (each processor runs many jobs concurrently). Data communications pre-processors. Operator display consoles. Improved peripheral units.

With virtual memory ability to simplify programing. Burroughs Master Control Program for system self-management. Priority scheduling. On-the-spot reconfiguration. Conversion without reprograming or even recompilation for B 2500 and B 3500 users. Conversion software to help others take this major step up.

With total modularity for system expansion at any time without reprograming. To fit growing workloads. New applications. Constantly changing conditions.

Read what one B 4700 user has to say . . . then contact your Burroughs representative. He's ready *now* with the systems you need *now* and for the dynamic years ahead.

Johnson Service Company since 1885 has offered a one-source responsibility for the world's automation needs . . . design, manufacture, installation and service from 114 branch offices in the United States and Canada.

Burroughs

RCA FAKES OUT IBM--HANDS OFF TO UNIVAC

At press time, Univac and RCA had agreed in principle on Univac's acquisition of RCA's rental base of some 700 machines. Until the end, Donegan hung onto IBM people and organizational approaches, hoping to raise money to buy the mess he had created. Reminds one a bit of Marie Antoinette combing her hair at the guillotine.

FIRST XDS SIGMA 9 GOES TO TENNESSEE

A flurry of activity at Xerox Data Systems: The first Sigma 9, introduced a year ago, has been delivered to Memphis State Univ. Dual configuration 9s also are scheduled for delivery before year-end to the Newport News, Va., shipyard and to Carlton College in Ottawa. First delivery of the company's XOS operating system --also announced a year ago--was made earlier this month to parent Xerox Corp., Rochester, for use under ANS Cobol on Sigma 7s and 6s.

Meanwhile, the company has started offering an APL time-sharing service adapted to run under the firm's UTS (Universal Time-Share System). It is being used by Canada's Defense Research Establishment near Quebec City, and will be offered with full support to anyone late next summer.

HENRY ROWEN OF RAND: FIRST OF MANY TO GO?

President Henry S. Rowen may not be the only person forced to abandon Rand Corp. as pressure mounts to cut back DOD funds to the "think tanks." Rowen announced his plans to resign from Rand only five days after a House Appropriations Committee released its recommendations that funding for the Air Force's Project Rand be cut to $8 million from the $11 million asked for. Project Rand is the firm's biggest activity accounting for 40% of its annual $27 million cash flow, a spokesman said. At this writing the $3 million cut seemed to have House and Senate backing, thus placing Rand in a tough spot. It is halfway into fiscal year '72 and may be presumed to have spent half of the $11 million, leaving less than $3 million to carry it through next June 30. The House committee asked for cuts of 25% from three other think tanks and suggested such work be done in-house. In a reference to the Daniel Ellsberg Pentagon Papers incident, it added that "in matters of security, better control can be maintained in-house."

DECISION IN JANUARY ON TELETYPE'S CRT

Decision to produce Teletye Corp.'s first crt-equipped terminal (see May 15, p. 19) is to be reached in January by parent AT&T. About 1,000 of the 2400-baud terminals have been produced at Teletype's Skokie, Ill., headquarters and are installed throughout Bell System companies, although neither company will comment. Performance history at Bell and at some trial installations with other customers will determine whether the company will offer the product--called a Communications Display Terminal (CDT)--to the public.

EMM STILL PLANS TO EXPAND USER OFFERINGS

Financial desperation in bad times was the only factor in the withdrawal of support by Electronic Memories and Magnetics last fall from budding Semiconductor Electronic Memories, Inc., of Phoenix. S.E.M.I. had a 370/135 bipolar memory add-on ready for delivery. But the project is dead unless other sources of money are found. Nevertheless, EMM's interest in the 370 market goes beyond semiconductor memories--they hope to acquire a large disc file capability and a terminal product. At the recent FJCC, a squad of EMM marketing specialists spent a lot of time button-holing prospects in a market feasibility study. These products would be added to the core memory add-ons introduced with great fanfare by EMM at the Las Vegas show.

BRIEFCASE COMPUTER

In a 2300-sq. ft. plant in the Los Angeles suburb of Northridge, John N. Blankenbaker, a former Scantlin Electronics vp, labors over the next 40 models of a briefcase-size binary computer he makes and sells for $750. Called the Kenbak 1, after the name of his new company, the computer has the essential arithmetic and logic operations of computers of any size and is aimed at the education market, although crusty COBOL programmers like to fool around with it too. Input is through console switches and output from console lights. Blankenbaker has sold 10 and hopes his new run will satisfy the Christmas rush.

CMC BACKING MINI MAKER

Orange County's newest minicomputer company is being financed by Computer Machinery Corp., the Los Angeles key-to-disc manufacturer. Products of the new company, called MCC (see Dec. 1, p. 7), will be marketed under the Computer Machinery name.

RUMORS AND RAW RANDOM DATA

ICL of the U.K. won't bail out Consolidated Computer of Canada unless it gets majority interest of the financially troubled data entry company, which doesn't want it that way...Computer Communications, Inc., looks to a new $5 million third-party leasing agreement with Hale Bros., San Francisco, to put them into the black this year. Agreement provides for extensions to $15 million...Century Data Systems will start shipping its IBM 3330-like disc drive, the model 230, in the first quarter to Burroughs and BASF. The 370-compatible unit is due at mid-year, says president George Canova... We hear there are strong rumors in Japan that Burroughs and that company's trading firm, Takachiho Koeki, are getting together on a joint R&D venture...IBM is rumored preparing a consent decree to offer up to the Justice Dept. before election day next November. It's a sure bet Justice won't get its case to trial until well after the elections, so obviously IBM is hoping to give them something less painful to think about... At the recent FJCC, the busiest bees seemed to be the IBM and Japanese competitive analysis teams, leading one wag to suggest that IBM might do well to award a facilities management contract to Japanese technicians to perform IBM's competitive analysis.

Sycor's intelligent terminal...

tailored programming without high-priced programming costs...

with a pre-taped Program Library:

■ Range Checking ■ Table Look-Up ■ Value Comparison ■ Multiplication / Division
■ Code Conversion ■ LRC or CRC checking for communications ■ Card Reader and Card Punch drivers
■ Check Digit generation / verification ■ Conversational Mode—And more to come

Of the 12K bytes of total memory available in the 340 terminal, 3K bytes are optional MOS / LSI read / write memory. Our Program Library, developed to help you make the most of this, loads from cassette and executes at the push of a button. Now you can simply add memory and powerful programs as you need them. And, at a fraction of what it would cost to create your own software, as other systems expect you to do. The 340 already contains field-proven, general purpose programs in its 8K bytes of ROM. We spent 27 man years of machine language programming to develop them—so you wouldn't have to absorb the expense, and risk your schedules, doing it. We developed the software library for the same reason!

ROM programs to optimize your application: Omission Detection™ ■ Capacity Control™ ■ Addition / Subtraction (zero balancing / batch totals) ■ 1200, 2,000 and 2400 baud binary synchronous communications ■ Unattended communications ■ Data Compression ■ 30 cps printer, 50 lpm printer ■ 1,000 cps cassette recorders ■ Automatic Paging™ ■ Tab Compression

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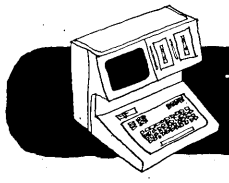
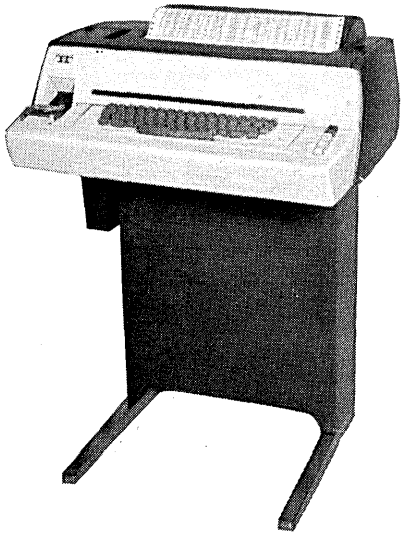


Thousands of Sycor terminals are in service in 25 countries worldwide.

Right! It's a new low-cost, wide-platen data terminal

It's the Teletype® model 38. And its capabilities go far beyond the wide format aspect of operation.



The new model 38 line design incorporates many of the things that made the Teletype model 33 so popular: It's a modular line. Exceptionally reliable. Extremely economical; costs very little for all of its capabilities. It's really a logical extension of the model 33 design concept and is system compatible with it.

. . . the important differences

```
1         2         3         4         5         6         7         8         9         10        11        12        13
12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012

      model 38 prints a 132 character line

                                    Generates all 128 ASCII code combinations

                                                                  Prints in two colors if desired

      PRINTS IN UPPER and lower case

                                Accepts standard 14-7/8" fan-fold computer stock

                                                                  Offers a variety of interface options

.....and doesn't cost very much!!!!

                                                          On a price performance basis you won't find a better buy!
```

The model 38 prints 132 characters per line at 10 characters per inch. This wide format enables you to send and receive data using the same fan-fold computer paper stock used in your computer room. So you can move the data generated by your computer to any number of remote locations across the nation without time-consuming reformatting problems.

The model 38 generates *all 128 ASCII code combinations.* You can print the full complement of 94 standard graphics, including upper and lower case alphabet characters. And it provides all the functional control necessary for easier operation.

If you would like to input computer data in red and receive output data in black, or vice versa, the Teletype 38 terminal has this capability, too.

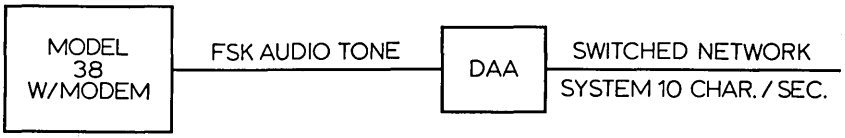
As you can see, the 38's format flexibility makes it easier to get your data in and out of the computer. And it broadens your on-line capabilities as well.

. . . the line is complete

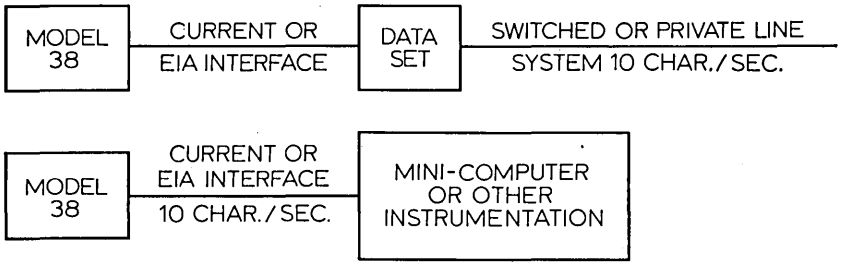
The Teletype 38 terminal is available in receive-only, keyboard send-receive and automatic send-receive configurations. Which means all of the reports, forms, and tabular material you generate can be moved *instantly* to all office, plant, warehouse, and sales locations that need the data using a terminal that best fits system requirements. Saving valuable time, and providing more efficient and profitable operation.

. . . plug to plug compatibility

The model 38 is available with several interface options, operating at 10 characters per second (110 baud).

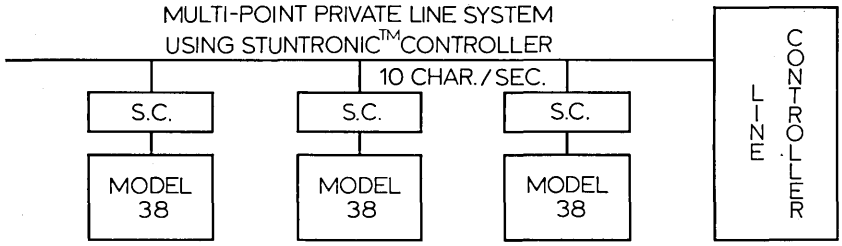


The terminal can be equipped with a built-in modem with simple two-wire, audio tone output which connects directly to the data access arrangement.

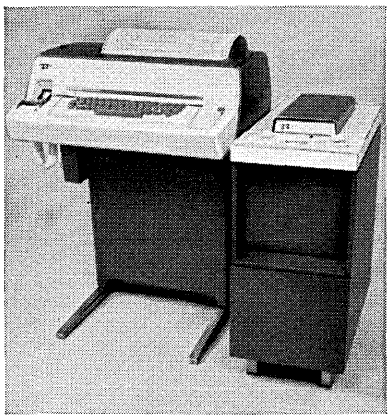


A second interface option is really two options in one. The set is equipped with both a voltage interface that conforms with EIA Standard RS-232-C *and* a current interface of 20 or 60 ma.

This means you can readily fit the model 38 into just about any switched network, private line or time-sharing system going without special "black box" engineering. Or use it to add maximum input/output capabilities to your minicomputer at a realistic price.

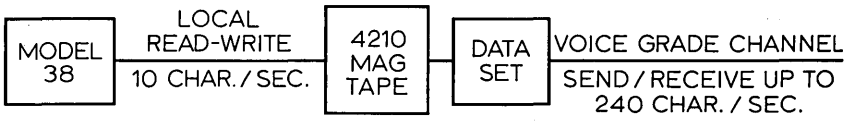


You can even use the model 38 in multi-point "selective calling" systems by adding a Teletype Stuntronic™ station controller.



. . . automatic send-receive operation up to 2400 words per minute

For systems requiring higher speed capabilities, the model 38 can be used with the Teletype 4210 magnetic tape data terminal. This combination provides on-line speeds up to 240 characters per second. The 4210 uses compact 3″ x 3″ x 1″ magnetic tape cartridges that hold up to 150,000 characters of data. Tape recording, editing, and correction functions are extremely simple.



If you are generating heavy-data loads in a teleprocessing or remote batch processing system, the on-line time saving aspects of this terminal combination are exceptionally dramatic. It is also possible to send or receive data on-line with the model 38 at 100 wpm using the optional built-in modem, if required.

So take a close look at this new wide-platen terminal offering. If you would like more information on the model 38, or any other part of the total line of Teletype data communications equipment, write: Teletype Corporation, 5555 Touhy Ave., Dept. 81-29, Skokie, Illinois 60076.

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The System for the Seventies

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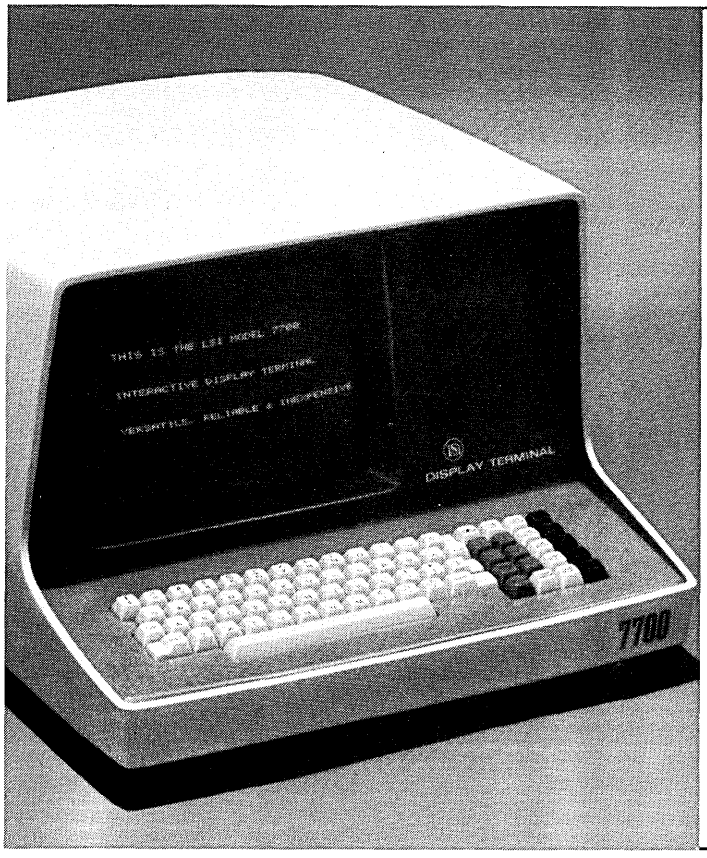
CALENDAR

DATE	EVENT/SPONSOR	LOCATION	CONTACT	COST
Feb. 14-18	Applied Communications System Engineering Seminar	Tampa	Prof. George W. Zobrist Electronic Systems Dept. Univ. of South Florida Tampa, FL 33620	$275
May 22-26	5th Australian Computer Conference	Brisbane	W. R. Cooper & Assoc. 730 George St. Sydney 2000, Australia	$40
June 6-8	1972 Society for Information Display International Symposium	San Francisco	Lewis Winner 152 W. 42nd St. New York, NY 10036	$30, members $40, others $2, students
June 12-14	Conference on Computers in the Undergraduate Curricula	Atlanta	Dr. John W. Hamblen Southern Reg. Educ. Board 130 6th St., N.W. Atlanta, GA 30313	$35, faculty $75, others
June 13-16	Summer Simulation Conference of the Simulation Conf. Board	San Diego	O. P. Hall, Jr. TRW Systems, M/S 01/2060 One Space Park Redondo Beach, CA 90278	$50, members $55, others $25, students
June 14-16	NordDATA-72	Helsinki	Finnish DP Association Runeberginkatu 46 C 40 Helsinki 26, Finland	$120 (U.S.)
June 19-21	ACM, IEEE 9th Annual Design Automation Workshop	Dallas	H. M. Wall Associates 809 Massachusetts Ave. Lexington, MA 02173	$45, members $50, others



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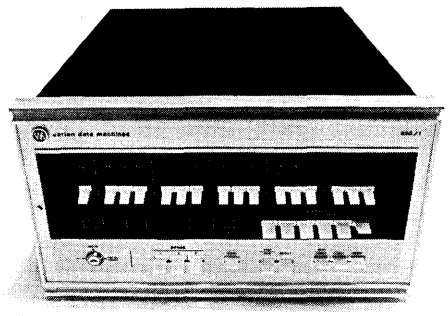
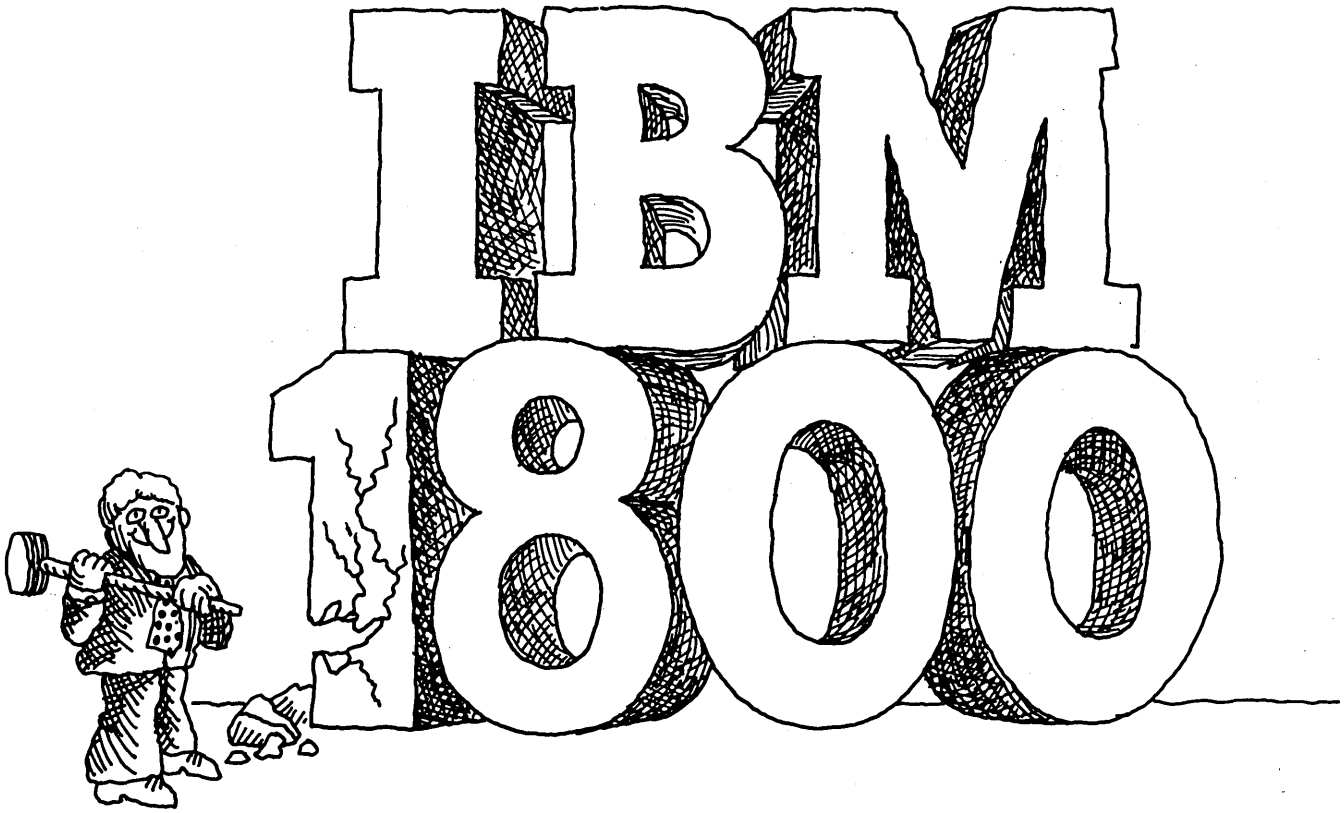


VORTEX is the real-time operating system built to match the capabilities of the 620/f. Put them together and you've got the most potent combination ever offered in the minicomputer market.



VORTEX: The hammer in our hands.

The payoff is in dollars. Compare the 620/f with VORTEX to the IBM 1800. In equivalent configurations—Theirs: $110,000 on up. Ours: $55,050. And we require less memory than the 1800. Our minimum requirement is 16K vs. their 24K. This leaves more room for expansion and shows one of the reasons your entry cost is much lower. If you need more, our plug-in add-ons are much less expensive.

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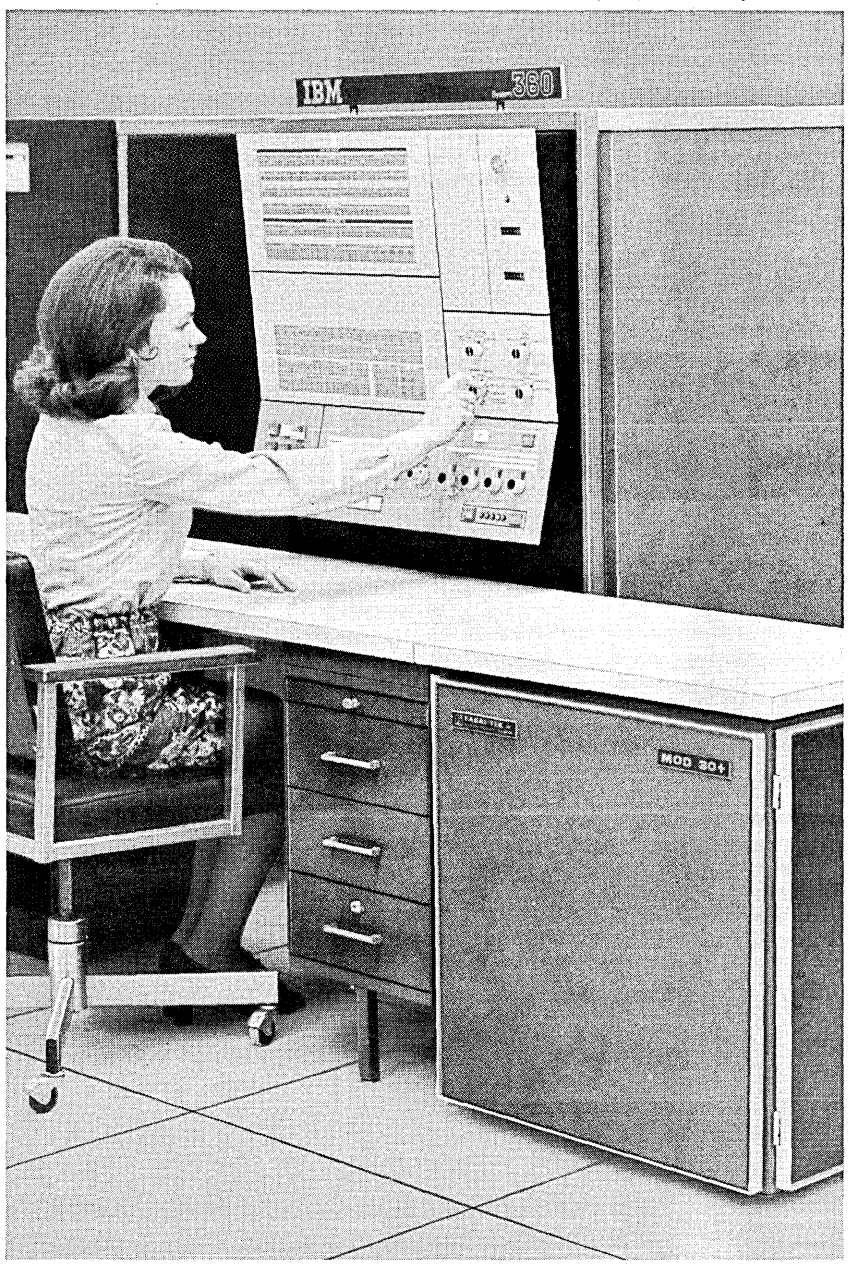

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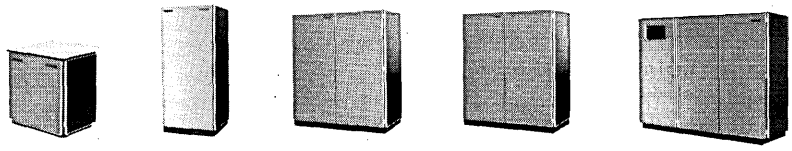


LETTERS

McLeoding the issue

Sir:
Frederic G. Withington's opinions published in your Forum of the Oct. 15 issue (p. 80) have been brought to my attention with the implication that the remarks about the current generation of overcommitment are aimed at people like me who advocate the use of computers to study social problems.

Actually, I take issue with Mr. Withington on only one word. If he had used the word "help" instead of "enable" in the third line of Item 6, he would have shown that he had a clear enough understanding of what we are trying to do to be qualified to criticize.

It might also be worth noting that shrill jackasses who verbally paint gray areas black, instead of trying to help throw light on the problems, should also be thankful for the First Amendment.

JOHN MCLEOD
Simulation Councils, Inc.
La Jolla, California

The gist of GIS

Sir:
Re: the Oct. 15 article on GIS (p. 20):

The contrast of the last three paragraphs with the rest of the article was quite odd. Given the general lucidity and pertinence of the preceding, it's almost as if those last three paragraphs were the unenlightened and embarrassed afterthoughts of another person.

In the first place, it's not at all clear what prompted the authors to ultimately approve GIS. If, as the bulk of the article suggests, GIS is awkward, demanding, costly, and rather limited—and in point of fact it is all that—then why was it retained? The authors give no clue.

In the second place, one should have a bit more reluctance (in view of the rest of the story) to use such buzzwords as "data management system" in reference to GIS. It's not interactive in the usual sense; and it is a mixed (some compiled, some essentially interpretive . . .) implementation of a programming language as such. Since, moreover, the operational capabilities of GIS are conspicuously a small subset of the operational capabilities of, say, PL/I or ESPOL, what shall we call the latter if GIS is to be called a "data management system" or, as the name has it, "generalized information system"? Spare us the crap, boys.

I concluded they copped out rather than take the position so obviously implied by most of their writing, so let me say it for them: As programming languages go, GIS is an enormous and pointless pain in the ass.

CHARLTON H. ALLEN
Arlington, Virginia

Caveating with care

Sir:
As one who has been up against, through, and/or around the problems of designing application systems using data management systems (File Exec and Mark IV), it was with bemused sympathy I read the Kreger-Nathanson article (Oct. 15, p. 20).

I will spare you the gory details of my experiences, but suffice it to say that the problems I became aware of on the first system have made me a more critical (careful?) user of the second. Would it be too trite to say *caveat emptor*? Providing, of course, that the *emptor* who's *caveating* be a highly experienced data processor and one who knows what data management systems can and cannot do.

As a second, but by no means secondary, point, one must note that there is no excuse for not designing the application system in sufficient detail to grasp its scope. This would hold whether the system is to be programmed in COBOL or any of the data management systems.

Beyond these few comments, all I can say to my fellow analysts trying to fit the square peg of their application system into the round hole of their data management system, Write On!

MICHAEL S. WEINBERGER
Washington, D.C.

Long worded

Sir:
As a manufacturer of 24-bit computers, we appreciate Dr. Cohn's article (Oct. 15, p. 26). Unfortunately he was not aware of the Datacraft family of 24-bit computers when he wrote it. The DC 6024/1 and 6024/3 computers have been available for approximately three years, at prices under $50,000. Dr. Cohn predicts that it should be possible to market a 24-bit processor for under $15,000. In fact, we will be delivering our DC 6024/5 computers early in 1972 for under $15,000.

When the 24-bit word length is implemented with third-generation hardware, the results are even more outstanding than those shown in his tables. Needless to say that with a cycle time of 600 nanoseconds, the operation times are much shorter than the other computers shown. If we talk about floating-point hardware, floating-point add, subtract, multiply, and divide are now down to 1.8, 1.8, 4.2, and 9.6 microseconds, respectively.

When I compared the results of the best 16-bit computer against our software floating point, I found that the 16-bit computer required approximately 7-8 times more memory cycles per operation, but this figure rose to as high as 25 in certain cases.

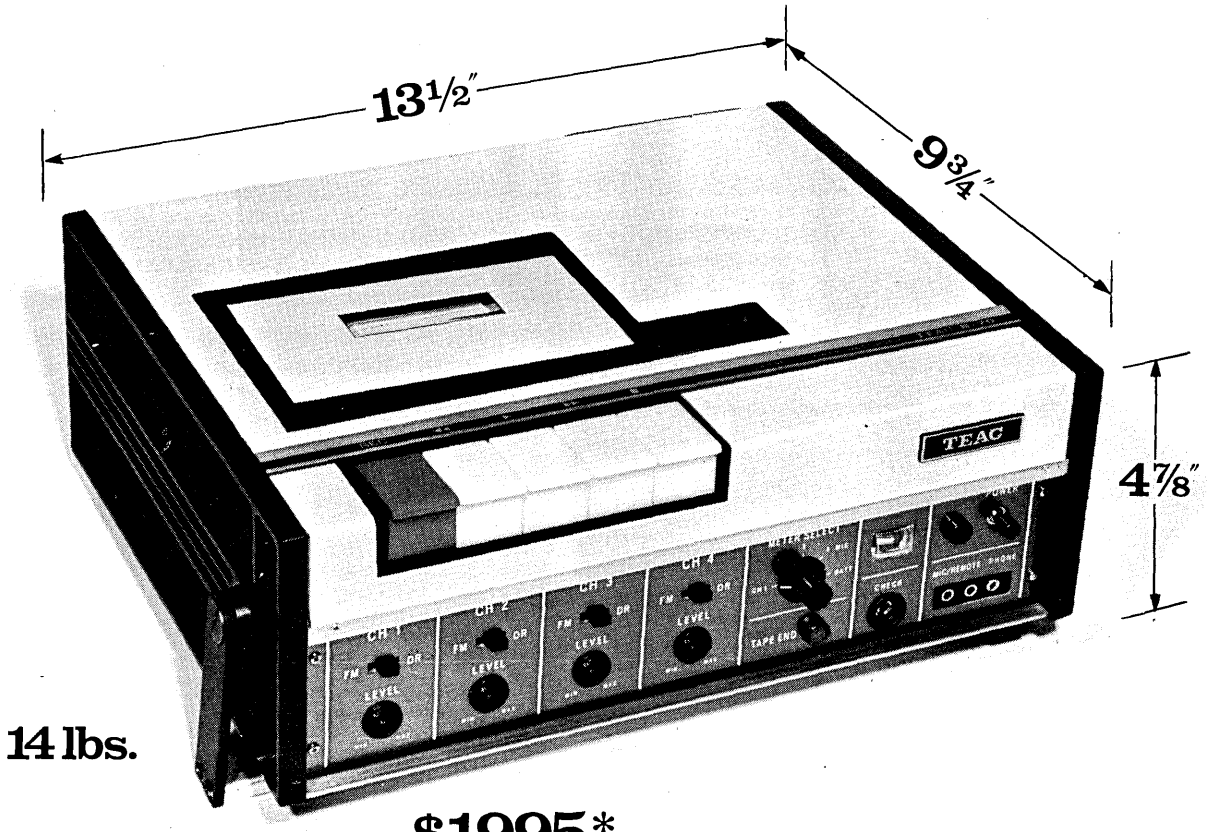
One other point which Dr. Cohn did not cover is that the trend over the past number of years has been for hardware costs to become lower while software costs have increased. Because of this, there has been a trend to program real-time applications in FORTRAN rather than assembly language. Even the more modern 16-bit computers, which were not included in the comparison, are not particularly well suited to do this.

JAMES P. DIXON
Datacraft Corporation
Fort Lauderdale, Florida

Sturm uber entwurf

Sir:
The indictment of short-word architectures by Dr. Charles E. Cohn in your Oct. 15 issue (p. 26) is long overdue. I have railed against half-word instructions in avionics computers for years with little effect. Their intuitive appeal apparently transcends all reason.

Dr. Cohn correctly identifies addressing difficulties as one of the culprits. What is the sense in designing an instruction format which severely limits random access in a random-



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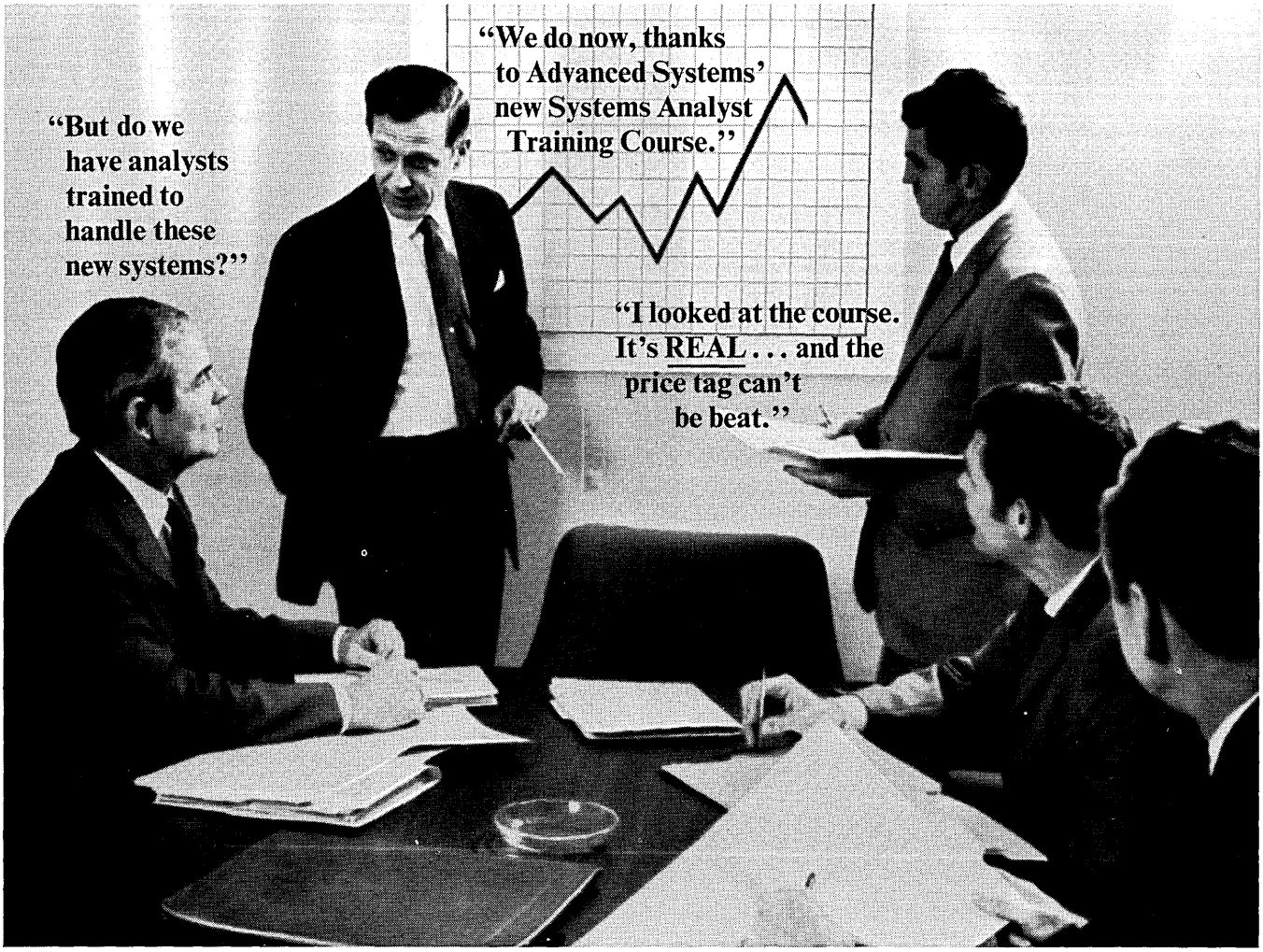

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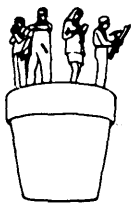

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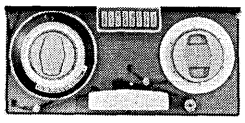

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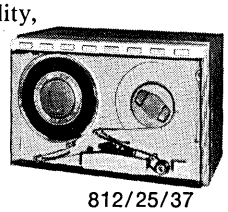
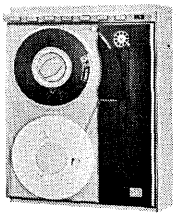


812/25/37

Take our Mod 10. It has become the predominant, modern performance, low-cost 10½" reel tape drive available today. Straightforward, up-to-date design, speeds of 25, 37 or 45 ips, easy to use and easy to maintain, with electrical and mechanical features not usually expected in low-cost tape systems. Like the Mod 7 and Mod 8 Series, the Mod 10 brings the user unprecedented mechanical simplicity through its direct drive, without belts or pulleys.

The Mod 7 is truly low in cost, yet, as do all Wang models, provides channel-by-channel deskewing for improved data recovery. The Mod 8 has 50% more tape capacity with 8½" reels, and has tape speeds to 37½ ips.

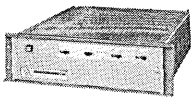
And now the Mod 1075, with 75 ips tape speed and vacuum column design, brings to the low-cost tape handler field a level of performance never before achieved, with unparalleled data and mechanical reliability.



1075

The right connections

Plug-to-plug compatibility with most controllers, IBM head guide spacing and tri-level read threshold for recovery of marginal data are features of every Wang tape system. Our Phase-Encoding Formatter provides up to twice the performance, without a comparable increase in price.



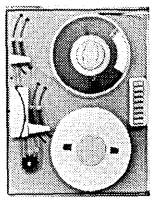
Formatter

The in-the-field performance and OEM acceptance of Wang tape systems is not accidental. These systems are designed and built by engineers with a total of more than 250 man-years experience in magnetic tape systems. As pioneers in the design of the single-capstan drive, we have been responsible for a number of design innovations that have been adapted by virtually every manufacturer of tape handling equipment.

How much testing is enough?

Wang tape systems represent a new, high level of performance verification, usually referred to as quality control. We believe we take it a step further. Example: electronic modules are burned-in for four days, over a temperature range of 0° to 160°F, under power. If a component fails, the module is reworked and the entire test cycle is repeated. Drives go through unit tests under typical in-use conditions, and are run continuously over a routine of tape cycling that tests them in all operating modes. Before the system is shipped, it has been stressed beyond the environment for which it is specified. Each system is computer tested. Varying data patterns, servo repetition rates and operational margins are established.

A print-out of the test gives the customer positive verification of the tests results. A description and interpretation of the tests accompanies each print-out, leaving no question about the extent and nature of the tests performed.



1025/37/45

A likely choice

Our OEM customers also like the choice they get when they consider the Wang Computer Products line of tape handling equipment. Reel sizes of 7", 8½" and 10". Tape speeds from 12.5 to 75 ips. And they can read and write data at 200, 556, 800 or 1600 cpi (NRZI or phase encoded), or pick a model for read only . . . great for off-line printer applications.

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access memory?

Another culprit is the restricted operation-code field which limits the instruction set. A classic horrible example of this is the idiotic Apollo guidance computer with its eight-instruction (yes, 8!) repertoire.

Software is so much more costly than hardware that manufacturers would do well to listen to programmers' ideas in machine design. After all, what is the ultimate goal in building computers?

WALTER A. STURM
Los Angeles, California

To replace programmers?

Neering standardization

Sir:

Having programmed extensively in eight BASIC compilers, I must agree with Jerry L. Ogdin's article, "The Case Against . . . BASIC" (Sept. 1, p. 34), when he speaks of the many variations which have evolved within the BASIC language over the years.

I feel that these variations are a result of the large number of time-sharing companies which came into existence several years ago. However, with the failing of a large number of these companies in recent years, the number of different BASIC compilers is on a decline.

As users begin to use fewer BASIC compilers, BASIC will become more and more standardized by the simple process of elimination. Therefore, I must disagree with Mr. Ogdin's statement that "BASIC has effectively been killed as an industry-wide language . . . " I feel optimistic that a language as popular and easy to learn as BASIC will evolve into an effective tool for novices and professionals alike.

JOHN V. NEERING
Ann Arbor, Michigan

Junk man needeth

Sir:

I recently read, with much interest, your article in the Nov. 1, 1970, issue (p. 41), "Fading Species." I have found myself on the other side of that particular situation; that is, trying to find someone who wants to get rid of an old processor or components.

I am a college student in the process of "building" a computer with graphics display capabilities. Since my financial resources are extremely limited, I am forced to rely on the help of interested people in the industry to obtain parts and equipment.

Of course, I could hardly have used the 30-ton Univac II referred to in your article. However, I have read of other, smaller, second-generation equipment that has been disposed of. But somehow I never find out about it until after the fact.

I am currently searching for any second-generation processor, peripherals, or — especially — old display equipment, complete, but in any kind of condition. I can use almost anything I can get. Can your readers help?

MARK JAMES
1521 Vine Street
Belmont, California 94002

Rears its ugly warhead

Sir:

I have read the article "On the ABM" in the Sept. 1 issue (p. 79) and disagree with it on a number of questions.

The definition of the success of the ABM is given as the lesser reduction of the gross national product than would occur without the ABM, taking into account the cost of the ABM and its testing ("inadvertent firing or misfire"). I have three objections to this first part. First, damage from radiation on a short-term and long-term basis does not figure in this estimate, just as pollution is not reflected in the gross national product. Second, there will be no way to independently verify this claim as the study will undoubtedly be stamped SECRET. Third, this means that the ABM will not "work" unless there is "an attack"; that is, a nuclear world war. I believe that it is more important to bring about nuclear disarmament than to construct a system whose "success" is dependent upon nuclear attack.

The article claims that the controversy on the ABM is whether the complex of computers required can work despite the failure of individual computers and operators. This is not true. The objection raised by the Computer Professionals Against ABM is that it would involve a highly complex computing task without any testing under actual operation conditions on parallel operation. Since the precise nature of the computing task could not be defined (evasive measures such as chaff, electronic countermeasures, radiation from exploding warheads), defensive measures could not be programmed and tested in advance.

Nuclear explosions in the atmosphere have been made illegal by international law. I wonder who would take the responsibility for any "misfire"? The ABM system could itself initiate a nuclear explosion through misinterpretation of radar signals, machine malfunction, or programming error.

The article said that failures in commercial applications aren't relevant to the ABM. The cost and effort for military systems is about ten times that used for a commercial application; much more testing is done for military systems. Then what is the explanation for the C-5A and F-111? If those government scientists who are convinced that the ABM will work know of a way to program correctly without testing, I wish they'd let the rest of us in on their secret.

The last question raised concerns the relationship between the technical and political sides of a question. Of course, a technical question can have political considerations, using "political" in a wider sense than is used in the article. But it is foolish to reject any technical argument simply because it involves politics and confine this question only to a nebulous "global political strategy." Those who oppose the ABM on technical grounds should not abandon their technical expertise in favor of subjective arguments on "global politics and national priorities."

The article claims that it is not important whether or not the ABM would work, only if it is *believed* that it would work! This sounds as if the proponents of ABM don't believe in it themselves. Has such an argument ever been used for any other weapon?

R. A. SOBIERAJ
Perth Amboy, New Jersey ■

a thought about you...

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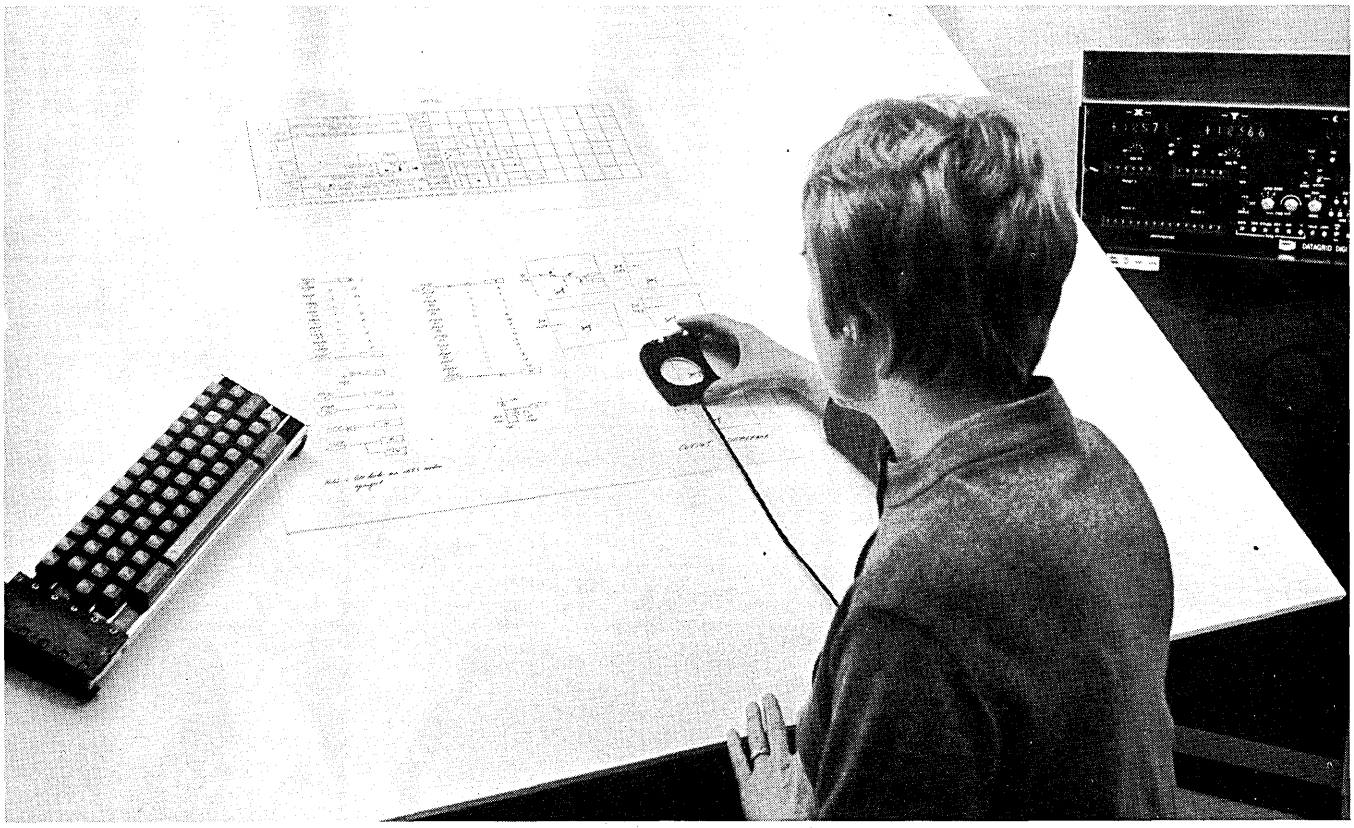

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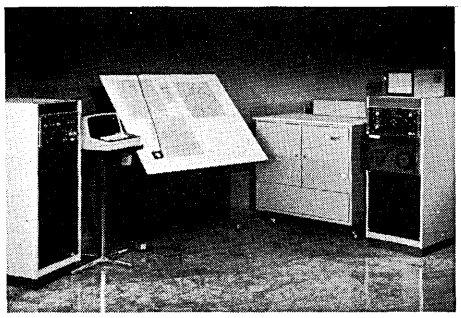
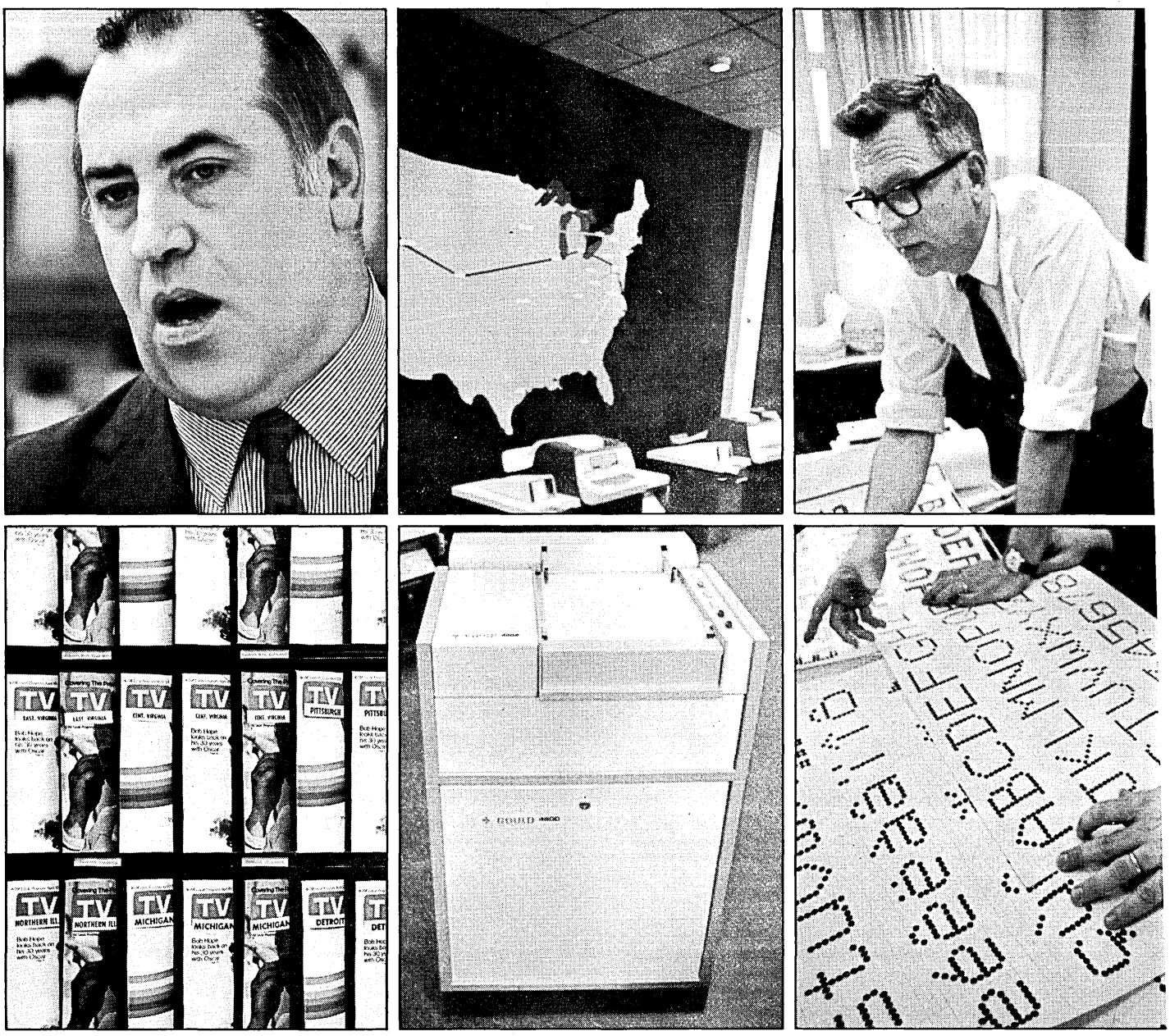


Bendix Computer Graphics



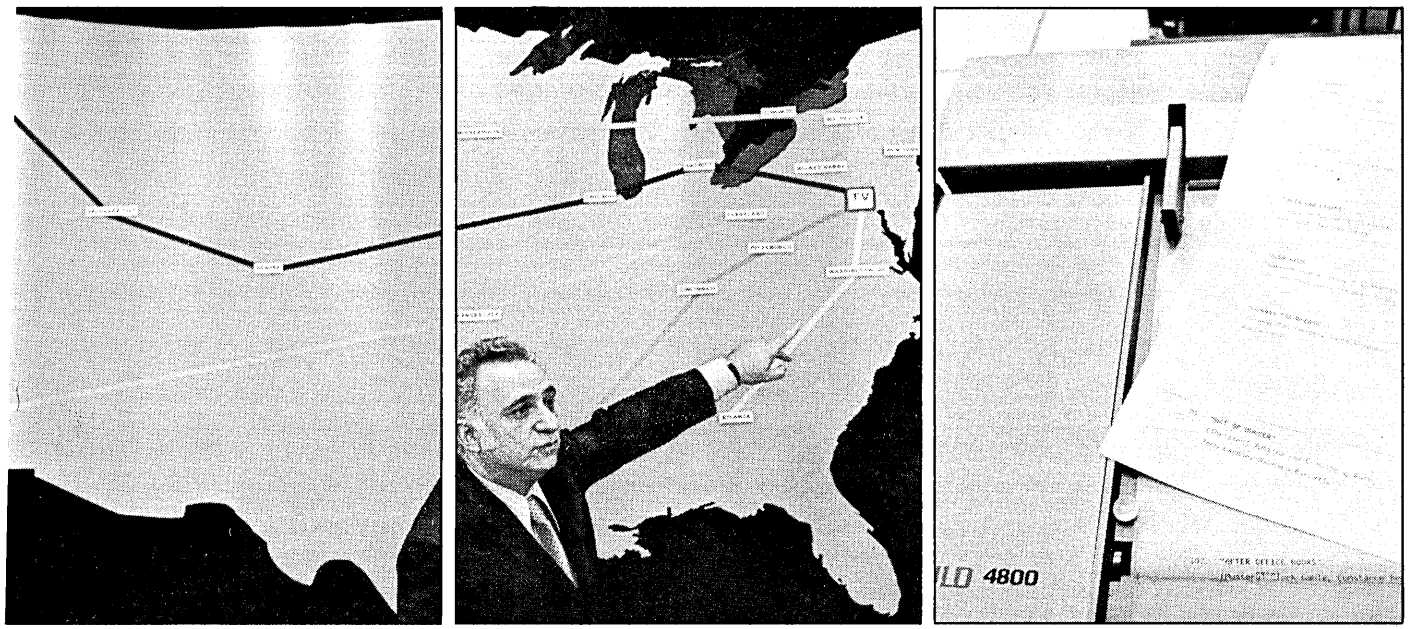
The Gould 4800. It's the newest editorial assistant at TV Guide.

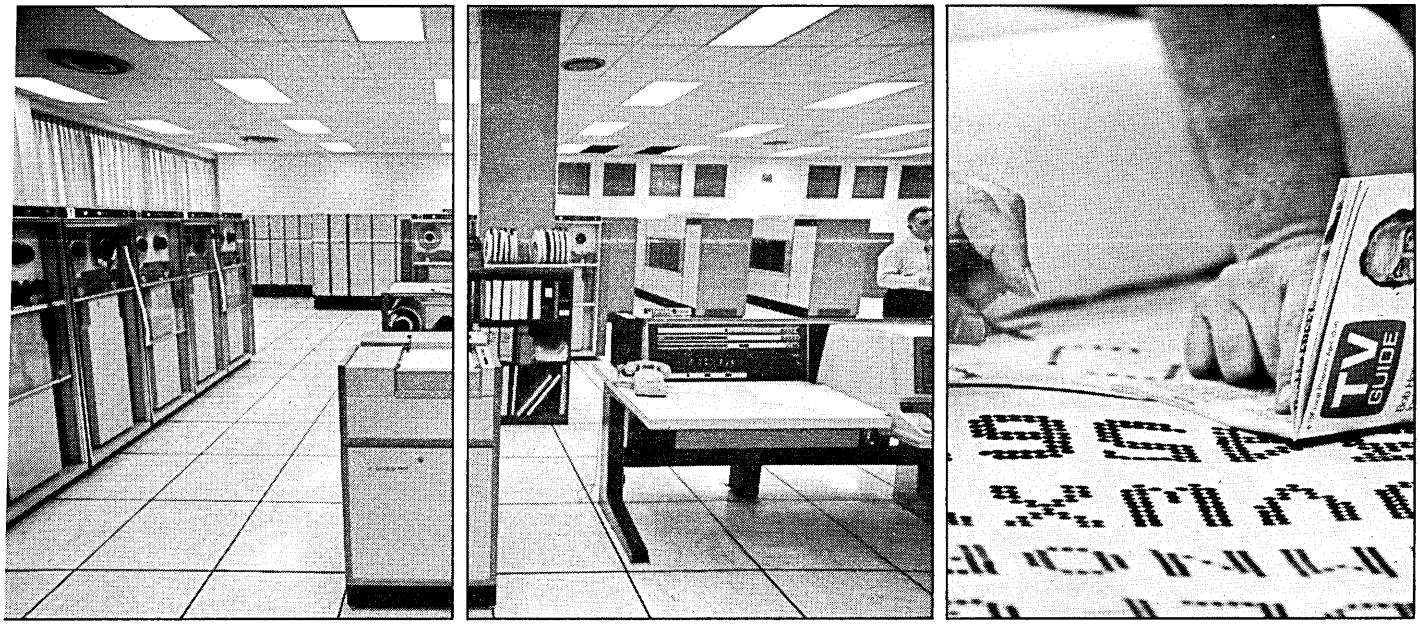
Because the new communications/computer system will make editing TV Guide a lot easier. And the Gould 4800 high-speed printer will be a vital element in the system.

With a weekly circulation of 17.5 million, and 81 regional editions, the problems of editing, coordination, and production are massive for TV Guide. Particularly in the area of daily television schedules, which change so quickly and vary so widely from region to region.

The new computer system will coordinate input from TV Guide's 22 regional offices using Model 37 teletypewriters to transmit online over five AT&T high speed communications line into the central computer, a Univac 1108. The computer will then edit the schedule sections, make dummy layouts, position advertising, hyphenate and justify copy, and transmit tape data for photocomposing machines at the 14 TV Guide regional printing centers.

The Gould 4800 is vital to the entire system. Because it will let editors see how a page looks, before it's even set in type. And since the system operates in a realtime mode, editors will be able to see changes the minute they're fed into the computer.





DATA HANDLING SYSTEMS

GOULD

But there are plenty of other reasons TV Guide likes the Gould 4800. Such as its alphanumerics and graphics capabilities. Its ability to handle upper and lower case, bold, regular, and italic fonts. The Gould 4800 is so versatile, in fact, that TV Guide designed their own fonts.

And the Gould 4800 is fast. So fast that TV Guide gets their material at page per second rates (10 linear inches/sec.). And because the 4800 is electrostatic, it's completely noiseless. So it can be located in the communications center, close to editors.

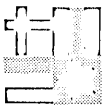
The paper cutter and bin are another big time-saver for TV Guide. The multiple copies are no problem, either. They simply ask the computer for duplicate printouts.

But despite all the 4800 can do for them, TV Guide found they got a bargain. Because the 4800 costs less than impact and other printers. And has fewer moving parts, so they'll save on maintenance and service, too.

The Gould 4800 high-speed printer. It works for TV Guide. It can work for you. Write Gould Inc., Data Systems Division, Marketing Headquarters, P.O. Box 7255, Park Hill Station, Denver, Colorado 80237.

With IBM everywhere and Japan warming up, the European computer industry's number of options is declining

Close Cooperation:



There are signs that European computer industry leaders are coming to their senses.

For years each country has tried to develop its own full-fledged computer hardware industry, offering pretty much the complete range of equipment for a market that was nearly always quite narrowly restricted by its own boundaries.

IBM, meanwhile, oozed across borders, masking its massive international monetary and production strength behind "national" subsidiaries, and ravenously devouring the majority percentage of the market in country after country. (One exception has been Great Britain, where IBM is said to have less than 50%. But one observer feels this is partly by plan: he claims that IBM there is dedicated to keeping ICL "at death's door," strips down its services and support, and is one of the smallest—if most profitable—companies in the IBM European stable.)

Now European companies are beginning to talk merger. This follows the first gingerly international cooperative move with the formation in 1970 of Multinational Data (first called International Data), a company in name and an information-swapping and standards-seeking working committee formed from the member firms: England's International Computers Ltd. (ICL); France's Compagnie Internationale pour l'Informatique (CII or "'C' deux 'I'"), and the U.S. Control Data Corp.

Perhaps more important than cooperation or merger talk is the realization—finally—of the necessity of international cooperation. Maurice Allègre, top French government computer man, puts it simply: "We will be obliged to do something together." Moves like the GE-Honeywell marriage and the sudden death of RCA mean ". . . something must happen or there won't be a European computer industry. Europe," he says, "is firmly decided—*very* firmly—to have a European computer industry."

This belief is not shared with equal intensity by all, but there is a growing realization—even at top governmental levels—of the importance of computers and information processing. A special Computer Technology Gaps report prepared several years ago for the Organization for Eçonomic Cooperative Development stressed the economic and technical multiplier effect of computers. But this has been interpreted so far mainly in terms of national interest, especially in Great Britain.

There the computer industry has been treated by most as synonymous with ICL, a sickly junior giant trying to get off its government crutches. The British software industry, however, is justifiably beginning to howl. The noise, unfortunately, will probably only intensify U.K. internal and anti-American preoccupations, and do little to alert the country to the necessity of international cooperation.

The top-level British computer people interviewed by DATAMATION spoke in much less forceful terms than Monsieur Allègre about the necessity of international cooperation. Even their approval of such a notion is watered down. Murray Laver, head systems man at the British Post Office (which includes telecommunications), likes the idea of a consortium, something like the one that produced the Concorde. "But it won't happen in my time," he says. (He's 57.)

Stanley Gill, a leading British computer pioneer and now a software company executive, is less positive about his country's involvement: "We are not

Siemens . . . is a prime candidate to link up with another company.

European. I can't see what the chances are. They've been talking about it for years, and I've seen nothing happen yet."

Dr. Maurice Kendall, longtime operations research expert and chairman of Scicon (formerly CEIR), likes the idea of a consortium better than that of mergers. "Are we likely to get together? Ultimately, I think yes." Ray Curnow, chief consultant to the committee that prepared the Computer Technology Gaps report, says, "We have no choice."

Accepting the inevitability of cooperation, there remain key questions about the form and the timing of cooperative efforts . . . and who would be involved.

Right now the main players in the game for survival that has begun are the three national "flagship" companies for France, Germany, and the U.K. Add Philips as an outside international force. (Profiles of these companies follow this article.)

ICL must be considered as sidetracked for now. The company has too many internal problems that are acutely amplified by the sagging British economy. Besides, the company already thinks of itself as an

Europe's Best Hope

by Robert B. Forest, Editor

international company. Siemens has just been jilted by RCA, and is a prime candidate to link up with another company. What about Philips?

Not likely. Philips, huge and smug, feels that Siemens must now rethink its position, and awaits a call from the German company that is far less bothered or endangered than most think. Meanwhile, France's CII, aided by internationally minded M. Allègre, has undoubtedly already started its courtship of Siemens. Philips has clearly rejected at least one attempt to form a supercomputer consortium, and can be expected to maintain its traditional "wait and see" stance, primarily because of its allegiance to its subsidiaries in France, Germany, and other countries.

The CII-Siemens romance could lead to a merger, or to a simpler cooperative agreement that might pave the way to more serious and complex arrangements later on.

There are other avenues to international cooperation, of course, and these include consortia, shared research, and perhaps even an industry established by the Common Market governments. You can almost certainly rule out the possibility of the last, even though Great Britain becomes a Common Market member in January of 1973. As Murray Laver laconically notes, "There is a difference in the paces of the computer industry and the Common Market."

And, although many people like the idea of a consortium, it's not clear that it would work. The French consider the Concorde *their* product and never mention the British role. Shared research has been tried before. Disastrously, we're told.

Beyond the notion of bilateral arrangements lies the possibility (however dim) of a truly international company in which the production of various system elements would be parceled out to member-country companies.

This allocation, according to Curnow, the outspoken "Gaps" report consultant, is one of the big "bugbears" of the countries . . . and not easily resolved. As M. Barré, the president of CII, told us, "The French government does not want a strong CII manufacturing tape recorders [or any other unit] for the world."

The realization of information processing's multiplier effect may work against truly efficient division of effort amongst the major European firms on any large scale. It's apparent that each country wants to retain its own computing capability . . . and make it as complete as possible.

There are two ways to achieve a European computer company. One would be through intergovernment cooperation or pressure. This is the only way that Philips can envisage a role for itself in such a company. A Philips spokesman told DATAMATION: "We are ready to join long-term programs with financial commitment at the government level." And he adds: "We need well-defined objectives. But not with six companies. What is possible for three companies is not possible for six."

CII's president, Michel Barré, feels, however, that cooperative agreements will start with two companies, then move up for government approval. "The agreements will not come down from the government," he says.

However the agreements start, the problems of forming and running an international company are formidable. One man who should know is Philippe Dreyfus, president of CAP Europe, probably the first binational software house in Europe. And these problems are not erased by the existence of the Common Market. "The Common Market is not all that common," says Dreyfus. And he points to different tax structures, differences in the pricing policies of the various companies . . . differences in cost of living, working conditions and restrictions, educational systems, mobility . . . to name a few.

Add differences in languages, customs, attitudes, laws . . . throw in prejudice and bitterness that sometimes goes back centuries, and you can begin to understand some of the problems in melding members of different nationalities into one company.

"The Common Market is not all that common."

Still, CAP Europe and others are making a start. The president of one successful international service firm told me that while it is still "impossible" to put an Englishman in charge of a German operation, he can install an "acting" Swiss manager there (as long as he uses the "acting" in the title). But an Englishman can be in charge of Dutch people in Holland. "We couldn't have done this 18 to 24 months ago," he said.

I talked to people at other firms who say they are beginning to get that "international feeling." Some of

that is due to the attitudes of youthful employees. "Our young people are willing to go to Germany," said one software company executive.

Still, the prognosis for early voluntary international commercial cooperation amongst the big hardware systems houses is not hopeful.

Meanwhile, outside forces exert continuing pressure on the Europeans to move more swiftly. The results of President Nixon's August economic pronouncements can be expected to intensify what has been called on the Continent "a slowdown" and is certainly a full-scale recession in England. However, many believe that Europe has not reached its computer saturation level—indeed the number of computers in Europe vis-à-vis population lags way behind the number in the States. The feeling is that the demand for computers in Europe is strong enough so the industry will continue to expand rapidly even during the recessionary period.

Thus, most manufacturers on the Continent look for growth to continue at about its same rate or—at the worst—at a slightly slower rate during 1972. There are the feelings, for instance, of Honeywell-Bull and Siemens.

The ignominious withdrawal of RCA from the computer industry also intensifies the need for *some* sort of European entente. But both the RCA collapse and the American economic measures may have a profound psychological impact: making Europeans more independent, less likely to look to the U.S. and U.S. firms for help.

Meanwhile, the perpetual, ominous force called IBM rolls on. Unrestrained by the antitrust laws and across-the-board competition it faces in the U.S., IBM is much more aggressive in Europe. Also, it is the *only* truly international computer company. One top technical man for an international user firm told me he wouldn't consider any other supplier but IBM. "My business moves fast," he said. "I may have to open an office tomorrow in Latin America. If I do, I know that IBM will be there with all its services."

A corner of the Apeldoorn (Netherlands) complex of buildings where 12,000 Philips employees turn out the P1000 series of computers. This multinational giant has additional major manufacturing centers in Germany, France, Belgium, and Sweden.

He and others describe the services and support of IBM's competitors as spotty: they might be good in Zurich, poor in Milan . . . and absent from Barcelona.

Another factor that serves to strengthen and sustain IBM's domination overseas is their European communications development, described by one expert as more advanced than that of the communications companies themselves. IBM is not excluded from the telecommunications business in Europe as it is in the United States. Their work could lead, some feel, to a completely integrated computer/communications system. That would make Ray Curnow's view of the "feasible future" (see p. 31) very feasible indeed.

. . . the Japanese will move smartly to capture the eastern bloc market . . .

Meanwhile, ICL continues to ignore the digital communications skills of Plessey, one of its major shareholders. And Plessey evidently can't be bothered either, in offering its PCM technology to ICL.

And so it goes.

Moreover, while the major European computer companies cannot find a way to get together to fend off IBM, they face another threat—the Japanese.

Henry Sherwood, vice president of Diebold Europe, feels the Japanese represent a bigger threat to the European community than any from the United States. The Japanese have learned the lesson of support that many European firms have failed to master, according to Sherwood. And he thinks that the Japanese will move smartly to capture the eastern bloc market that may be denied to IBM because the socialist countries will not allow themselves to become dependent on a western firm.

"You must remember," says Sherwood, "that the Japanese computer manufacturers are part of what someonce once called a company called Japan Incorporated. So Fujitsu, for example, can, let's say, make a deal through government intervention with Rumania or Poland to sell computer systems and to take in turn agricultural products." (See Angie Pantages' description of similar practices by IBM on p. 45.)

Americans could tell the Europeans some stories about the strength, intelligence and aggressiveness of the Japanese in moving into such markets as automobiles, optics, consumer electronics, and the like. But if the European computer firms have not been able to size up the IBM threat, it is hard to believe they can envisage one more distant.

It is difficult in viewing France, England and Germany and their computer company candidates, to resist the analogy of the Three Little Pigs. Each seems intent upon building its own fortress. The difference from the fable is this:

No fortress built by any one of the Three Little Pigs can survive the huffing and the puffing of the Big Bad Wolf . . . let alone the Bigger Badder one who may be lurking beyond the woods.

Multinational Philips . . .

For years now, rumors have been coming out of Apeldoorn (one hour's flat, fast train ride from Amsterdam) that mighty Philips was flexing its muscles, readying a full-scale invasion of the computer industry.

The company is certainly capable of such an assault. With an estimated 1971 turnover of over $5 billion, it outstrips another giant company that recently decided its annual revenues of over $3 billion were not enough to sustain an edp effort.

But Philips is a cautious giant. It employs about 12,000 in its Data Systems Div. (known also as N.V. Philips-Electrologica). That's more than any other European computer manufacturer save ICL, but 8,000 of those work for the Office Machine group, so as a strictly computer company, Philips-Electrologica

L. E. GROOSMAN, Philips Small Computers Group: "We want to be Philips . . . and stay Philips."

really is about half the size of Siemens, the biggest and most solid computer force on the continent.

Still, the Office Machines force cannot be discounted. Philips deliberately emulated the Burroughs and NCR approach to the computer business, disdaining the route taken by GE and RCA (among others), opting for a "broad customer base."

The tightly run company puts a ceiling on computer losses, estimated to be roughly $40 million in 1970. That was about 1% of Philips gross sales, and if that ratio is repeated, Philips might be willing to drop over $50 million in edp in 1971. But the company's accounting practices are extremely conservative: all development is written off as a current expense. And the fact that 80-90% of Philips computers are rented makes short-term profitability impossible while improving the outlook for long-term profits. Still, maybe 80% of Philips-Electrologica income comes from P350 series office machines, 100% of which are purchased. Over 6,000 of the P350 machines, in the $10-30,000 range, have been installed.

Philips offers a broad line of computers, including minis and a P1000 family roughly equivalent to the 360/25 through /55, including most peripherals. By the end of '71, there will be 100 of the P1000s installed. There are 600 minis installed, but 300 of them are Honeywell 316s, bought before Philips decided to go its own way. Although other Philips divisions offer a rather significant (4-500) oem market, the company will also market externally before 1975, an announced two new models at the FJCC last month. If reaction there is favorable, they will be marketed in the States.

Other Philips system-oriented divisions—such as Telecommunications & Defense Systems, Medical Systems—are considered as marketing outlets of high potential by the Data Systems Div. Other divisions are also candidates for the use and testing of specialized systems involving Philips hardware and software that could conceivably be marketed to the outside world later on.

This sort of internal trial procedure is not new to Philips, which built a couple of large scientific computers between 1957 and 1959 to make sure it knew how before it decided to enter the computer business. The machines are still in use at Apeldoorn "seven days, three shifts a day." Still, it took Philips until 1968 to make its move into full-fledged edp.

Another example of Philips conservatism: the company owns the basic patents on the cassette that is the heart of most key-tape systems, one of the hottest growth segments in a swooning U.S. industry. But Philips doesn't offer a key-tape system.

We asked L. E. Groosman, commercial manager of the small computers group, if Philips were not sometimes *too* conservative. "We never overlook—but sometimes we decide to wait," he said.

While it waits, Philips plugs doggedly ahead, trying to lead from its strengths. Those include a solid worldwide base, the basic requisite computer component technologies—and patience.

A virtue so far, that patience could come back to haunt Philips, which seems to want to play a waiting game in the aftermath of the RCA collapse, rather than rush into any cooperative agreement with Siemens or any other European firm.

Earlier in the interview we had asked Groosman: Does Philips want to be the IBM of Europe? "We want to be Philips," he said, "and stay Philips." Later he said that Philips does not conceive of its role in the future as the European force that can fend off IBM there. His first reaction: "No. But it depends upon the timing. Who could have foreseen the RCA decision? For Philips the problem is not so urgent today. We will wait and see."

But IBM will not wait and see. And whether Philips will acknowledge it or not, IBM is the competition.

The interview with Groosman began with our telling him we had long viewed Philips as a sleeping giant. A large, forceful man, he glared up in good humor and laughed, "We are awake."

That much is clear.

What is *not* clear is how fast events will move in Europe now that RCA's collapse has created the need to restructure the European edp balance of power. If things move swiftly, good, old, sluggish Philips might be left—although awake—at the starting post.

Still, its international experience and its size make Philips a solid bet for survival, and a formidable foe—perhaps even for IBM in the long, long haul.

France's CII . . .

After almost five years of trying to develop a national computing industry, the French figure they've learned enough to warrant another five-year shot.

And so the French government—working through the small but powerful Délégation à l'Informatique (Informatics Bureau)—will pump more than more than $100 million into the French computer industry over the next five years. We say "more than more than" because the government admits to having spent "more than" $100 million on Plan Calcul (as it's called) in the first five years, but will reveal only that they will spend "more than" that between now and the end of 1975. Most of that will go to one firm: Compagnie Internationale pour l'Informatique (CII).

MAURICE ALLÈGRE, Delegue a l'Informatique: "Europe is firmly decided—very firmly—to have a European computer industry."

Mr. Plan Calcul—the head of Délégation à l'Informatique—is Maurice Allègre, a bright young (38) man who has learned about edp the hard way: by trying to save a computer company artificially constructed (almost in a vacuum) from several smaller losers. A product of the elite Ecole Polytechnique, he has since spent about 15 years developing management skills in the upper echelons of the French civil service.

Allègre says that "L'Affaire Bull"—the ignominious acquisition of "the" French computer company (Bull) by an American company (GE) in 1967—inspired Plan Calcul. Others feel that an equal influence was exerted by the fact that the U.S. was able to stop delivery of a CDC supercomputer to the French atomic energy commission.

No matter. The French are committed to a national computer industry (hardware and software) that will revolve around CII. More than that, says Allègre, CII must become healthy. Specifically, goals call for gross sales of $200 million before 1975. They should make it: 1971 sales for CII may total $110 million before figuring revenues from the government and from the added value tax—additions that should bring income up to almost $150 million.

Further evidence that CII may make it is the fact that the company met its goals for its tenuous infancy. "We reached the goals," says Allègre, smiling. "Not exactly in the way we planned to do it, but in another way." And he draws two curves. The last one shows a sharp rise from a sluggish plateau representing "a very difficult" two-and-one-half years.

Even so, Allègre is convinced that meeting the 1975 goals will require some outside help: "CII must make some international agreements." He points to the paper he has been doodling on. It's labeled "Honeywell-Bull." He points to the logo and grins. "But not like this." The results might be a binational firm—"perhaps like Royal Dutch Shell." But he refuses to use the term "multinational," a term he feels that IBM made up. " 'International' is a good word," he says.

Over at CII, President Directeur Général Michel Barré agrees. "We must look outside the boundaries of France—even Europe. Otherwise we would be destined to become a kind of government arsenal. That was not the idea of the origin of the company in 1965."

Barré is an ex-naval officer who joined the French electronics firm CSF in 1954, and followed it into the Thompson group three years ago when the French government consolidated several electronic firms to serve as the technological base from which CII could move.

The biggest hurdle facing CII? Manpower—a result of the rapid expansion the company has faced. But in the next breath Barré admits that things are slowing down a bit. And he claims that many people over 30 are joining CII from IBM—not out of narrow nationalism, he feels, but because people "now believe that CII and Plan Calcul mean success and opportunities."

Still, he acknowledges that another big problem for CII is its reputation and its references, difficult for any company "starting from zero. To be without a past as good as those with a past—and a glorious past—that's not easy," he adds. But it's improving from year to year ". . . slowly, but improving."

Part of the improvement stems from an increased penetration of the French government market by CII. It would be easy to view such progress—from 6% two years ago to maybe 10-15% today—with cynicism. But one knowledgeable observer of the French edp scene emphasizes that Allègre does not believe in legislating or dictating government cooperation in computer acquisition. Indeed, he undoubtedly realizes it would be fatal. Disregard for authority is almost the key national characteristic in a country that has yet to successfully install parking meters in its beautiful and willful capital, Paris.

M. MICHEL BARRÉ, President Directeur General de CII: "To be without a past—and a glorious past—that's not easy."

What Allègre hopes for is to allow the government to become "an equal opportunity purchaser." IBM has

an estimated 55-60% of the French government market. But Allègre says that CII is now getting one-third of the new orders. "Only one-third," he says meaningfully. "I hope we will get more." After tossing out, then rejecting, a percentage goal, he says the object is "more than we have now. As much as possible."

This goal is shared, naturally, by CII's Barré, who notes that the long-range goal is a self-sustaining, profitable industry. Noting that the company cannot go on "like that" (subsidized) indefinitely, Barré observes that his company cannot achieve this by itself. There is, he feels quite strongly, a need for international cooperation.

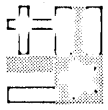
We probed to find out if the CII-CDC-ICL information-swapping and standards-seeking agreement gave a hint of future international cooperation. The answer was diplomatic, but the meaning was clear: No. ICL, it appears, has "technological constraints"—which means, it turns out, too much history of inertia. And CDC, it seems, is held back by U.S. anti-trust laws.

And while CII and Allègre both are evidently discussing some sort of collaboration with companies all over the world, the suspicion here is that part of the talking is a waiting game ploy.

As M. Barré says, "The French government doesn't want a strong CII making tape recorders for the world." What it wants is control of its own abilities to make and use the full range of computing hardware and software in the broadest possible spectrum of applications. What France wants is to keep its national freedom (doing atomic work without the approval of a foreign government), and to offer an industry in which French specialists can learn and grow.

As M. Barré puts it, "The computer business is a coherent business. And the enriching part of the business is for brains as well as money."

Britain's ICL . . .



As the stirring song tells us, "There'll always be an England." But what about its computer industry?

To a certain extent, the computer industry in Great Britain means International Computers Limited. And right now ICL is in trouble, thanks primarily to a rather severe and extended English computer market slump that's part of a larger economic "bleak house." Also, ICL had a working relationship with RCA to produce the System 4, a range that is incompatible with the company's own 1900 family.

Murray Laver, the genial savant who runs the computer show at the huge General Post Office, thinks that ICL "will squeak through." To do so, however, Laver feels that it will have to come up with a new line that will replace/upgrade both the 1900 and the System 4 . . . plus devices to smooth the conversion.

Laver thinks that microprogramming might offer ICL the means to make such a leap ahead. He'd especially appreciate some hardware to take over many software functions, maybe working behind the operating systems facade "to reduce the impact on application programs."

He pointed out that Britain's brilliant Maurice Wilkes, "the inventor of microprogramming, is still hooked on it, and has some interesting ideas about it."

Then there's Europe, which represents a "tremendous potential. It's a long way from saturation." (Some other observers we talked to share this opinion. One feels that the European market is seven years behind the saturation level represented by the United States.) ICL, he points out, exports 30% of its gross, and "a fairly reasonable amount" to the eastern bloc. (But much of ICL's export trade can be credited to commonwealth ties.)

Not everyone agrees with Laver. Ray Curnow, a student of the European computer scene (he served as the consultant to a committee that prepared a report on the industry for the OECD), thinks it would be easier to scrap ICL and start over. "ICL," he said, "wants to push hardware, not applications. It wants production, not efficient use of the computer." He claims that ICL hardware could outperform IBM's on any basis ". . . but they can't realize it." He dismisses it as poorly managed.

And he imagines the following timetable:

1973—Government merges ICL and Computer Technology, funds new company to tune of 10 million pounds.

1974—New British company flounders, joins hands with CDC, CII, Siemens in new firm called CDC Europe.

1975—ICL part of CDC Europe put into mothballs, reduced to maintenance of old gear still installed.

1975—Council of Ministers of Europe awards 100 million pounds to CDC Europe.

—Three months later, CDC Europe announces first complete product line.

—One month later, IBM announces full range of equipment and services linking every conceivable company and activity to a wide series of computers, data bases, terminals, telecommunications, and links.

Curnow won't say this will really happen, but he calls it a "feasible future."

Dr. Stanley Gill, well-known British computing pioneer, is less pessimistic. He believes that for the British computer industry "there is hope for survival, now that a sense of concern has been aroused. But it will be expensive."

The question, says Gill, is: "Will we realistically assess the actions and the cost . . . and will we persuade ourselves that it's worth making the expenditure?" He feels the most effective route to influencing the growth of the industry is through Parliament, which can pressure the civil service.

Why save the British computer industry? "We must save the computing industry or we lose our grip on software technology, on application technology, business systems analysis . . . lose our ability to become more independent of other countries in carrying on our ordinary affairs. It's a 'for want of a nail' argument." He pauses. "It adds up to the question 'Why save Britain?' I think we still have something to offer," he adds with typical British understatement.

Curnow's solution to saving the British computing industry would be to have the government choose XDS as *the* supplier of hardware to the government. This

would force the standardization he feels is necessary to speed computer applications development, the key economic multiplier that will lead to large economic and technical leaps. Why XDS? Superior design in terms of future telecommunications and data base requirements.

ICL need not worry: the government is not about to replace its equipment with that of XDS. But it may not accept either the economic multiplier effect of computer technology so clearly recognized by Curnow, Gill, and others.

Meanwhile, it's not clear what ICL *will* do. It must certainly set its sites on broadened markets, attempting to increase its penetration of Europe and the eastern bloc. Roy Goodman, managing director of Infotech, feels the company should narrow its product line somewhat and sell in depth around the world.

Certainly ICL has one advantage in Europe: it's not American.

That may not be enough to overcome an image that is—to be kind—less than formidable. One top U.K. software man calls ICL "a lame *wingless* duck."

It's still the largest European computer company (employing more than 30,000 in the U.K. plants alone and with 1970 gross sales of $314 million), and must be reckoned with in the intensifying race for prestige that precedes the bartering for position in any European computer consortium.

Germany's Siemens . . .

In 1965, Siemens implemented a grand plan for seriously entering the computer industry that was virtually foolproof: The German electro-technical giant (1970 net profit $55.2 million on sales of $3.2 billion) concentrated its efforts on building a computer sales and servicing force, and stood back and watched the other major European manufacturers engage in costly bloodletting in the form of massive R&D projects. Siemens solved its R&D problem chiefly through a licensing agreement, with RCA.

The plan, as is now apparent, was not quite foolproof: RCA decided to drop out of the computer mainframe business, which means that Siemens must now divert capital from other sources into its computer R&D operation. Informed sources close to the German firm report that not only has Siemens been building up its R&D operation since RCA threw in the towel, but it will continue to beef up its R&D operation substantially in the future.

It has also been reliably reported that Siemens is continuing its plans to manufacture some models of RCA's new line—the 6 and 7, for instance, are being produced in Germany with customer deliveries scheduled to begin in the spring. In addition, Siemens has ordered a few 6s and 7s from RCA—probably less than ten—for earlier delivery.

"The RCA move hasn't hurt us really," said a Siemens official. "I doubt that any Siemens customers canceled orders when RCA bowed out. Our users

German users . . . is the Red Baron alive and aloft? Not really, but . . .

The German computer user is becoming increasingly important these days for a relatively simple reason: He is proliferating, and the rate of proliferation may be geometric. Installations (e.g. users) are expected to triple from 6,000 in 1970 to nearly 18,000 in 1975.

According to Siemens' chief of dp marketing, Dr. Heinz Janisch, there were some 70,000 persons working in data processing in Germany in mid-1971 and that number is expected to swell to 250,000 by 1975. "And nobody knows where those people will come from," says Dr. Janisch.

Siemens and, of course, IBM, run extensive educational courses in Germany. These two firms, plus a host of lesser computer powers in Germany, are being counted upon to stem the tide of what many users feel is already a severe shortage of software people in Germany.

Who is the typical German computer user? To some, he is the Red Baron, a swashbuckling type solving monumental problems by improvising on a 1401 or a Siemens 3003. To others, he simply takes orders and asks no questions. Actually, neither image is accurate.

The German computer user has made particularly rapid strides in the past two or three years and in some ways is as sophisticated as his U.S. counterpart. One reason cited for the recent explosion is the feeling that the use of computers in Germany had been retarded for years because of restrictions placed on German companies by the Allied countries after the war and because Germany was busy building up more basic resources after the war.

The situation at the data processing facility in the city of Munich—which uses both IBM and Siemens equipment—is a fairly typical governmental installation in Germany. Erich Saller, the chief of the computer installation, recalls that the city got its first computer in 1964—relatively late by U.S. standards. The dp manager in government is the

always had the idea they were buying from Siemens, not RCA. We're still expecting to have a very good sales year in 1972."

In a recent interview with DATAMATION, Professor Dr. Heinz Gumin, head of Siemens' Data Systems Div., stressed that Siemens' chief goal in data processing has been growth. Moreover, the firm would appear to have been largely successful in achieving that goal. Siemens has grabbed some 16% of the booming German computer market and most of the growth has come in the past two or three years although the first Siemens computer was introduced in 1959.

"Our average age of installed equipment is less than two years," said Dr. Gumin. "Our policy has been to take existing products and build up a big and good sales organization. We have been able to invest two-thirds of our budget in the sales organization."

PROFESSOR DR. HEINZ GUMIN, Siemens Data Systems Div.: "We have been able to invest two-thirds of our budget in the sales organization."

The demise of RCA is causing a change in Siemens' approach, already noted, but the German company still remains committed to growth. As everywhere in the world, the chief competition is IBM, which has the majority of the computer business in Germany. Some Siemens officials, however, like to point out that Siemens' installed computer base is largely third generation while IBM still has a substantial number of 1401s installed in Germany.

Unlike most other computer firms, Siemens hasn't spun off its data processing marketing and servicing units into separate operations. Dr. Heinz Janisch, head of Siemens' dp marketing, explained that the diversified Siemens has always stressed maintenance and that, in addition, the head of a branch office often has had good customer relations for 15 years from selling other Siemens equipment. Thus, the branch manager tends to cover all marketing areas, although there are data processing specialists in branch offices.

"Also, Siemens is particularly strong in process control," noted Dr. Janisch. "We have about 50% of the process control market in Germany, for instance." Siemens produces most of its process control equipment, but there have been widespread rumors that Nixdorf Computer is developing a minicomputer for Siemens that could have process control uses.

Siemens appears to be melding its mainframe equipment into a more coherent line. The line utilizes some machines of Siemens design, some of RCA design and some merging features of both. Of the new RCA line, it appears that the 6 and the 7 will be the only models offered by Siemens while the German company will continue to offer two or three versions of the Spectra line. The umbrella line is called the Siemens 4004.

Many observers in both the U.S. and Europe believe that RCA's retreat from the industry will eventually propel Siemens into closer cooperation with other computer firms. Already, Siemens has worked closely and effectively with Nixdorf and some think there will be closer ties between Siemens and AEG-Telefunken in the computer area. Still others watch for Siemens to become affiliated with the European research troika composed of CDC, ICL and CII. ■

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one who makes the decisions on the equipment that is to be purchased, although the purchase order must be signed by top officials, who usually aren't familiar with computers.

As a rule, data processing people in governmental installations in Germany tend to be more security-conscious and don't bounce around from job to job. On the other hand, the extreme people shortage in edp is beginning to cause something of a breakdown in the traditional German job security as companies raid each other for people, particularly in the private sector.

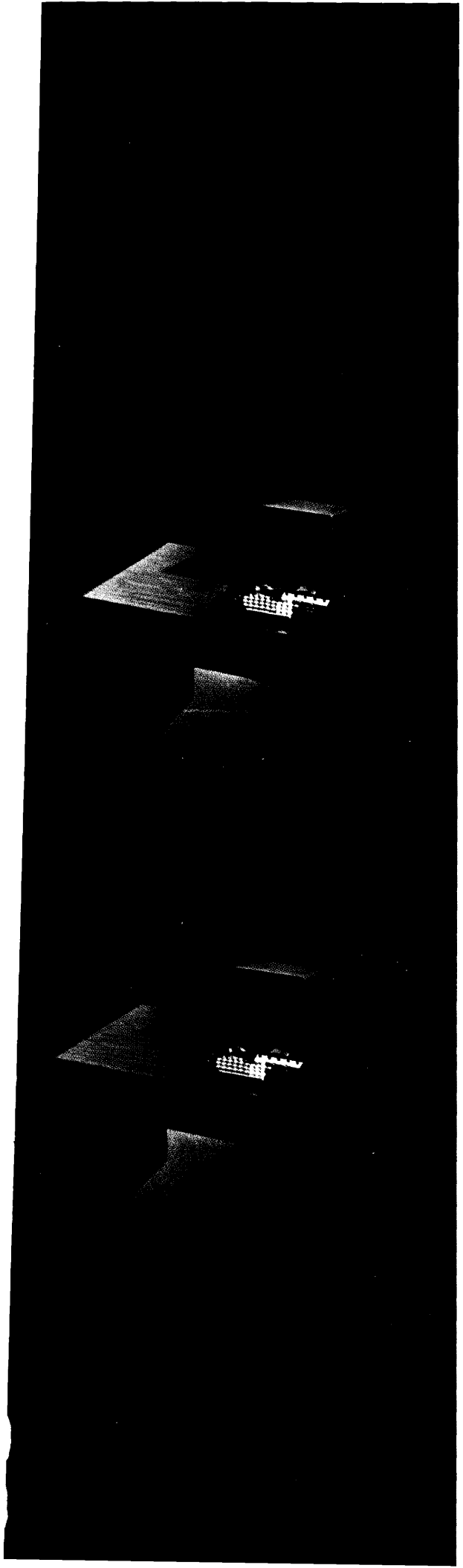
In a survey of the German computer scene conducted by DATAMATION, it was determined that programmers still tend to be university graduates—and as a result well-educated and often fluent in English. As elsewhere in the world, German users tend to look to the U.S. for leadership in the field, although the Germans have been increasingly making new breakthroughs, particularly in software.

Working conditions are often pleasant. At one company we visited, a service bureau called Dietel and Co. in Munich, has the company cafeteria situated across from the computer room and arranged like a sidewalk cafe. And the conference room looks like a large lounge.

"We think it's quite important that the work area be comfortable," said Wolfgang Dietel, head of the firm. "And it really doesn't cost much more." In Germany, there is virtually no such thing as venture capital, so companies must often boostrap it and Herr Dietel provides a good example in this case.

Herr Dietel had had small business interests in textiles and movie theaters when he became interested in computers in the early 1960s. He taught himself the edp business and entered the business and funded his small company from within. Dietel uses three cpu's and the firm is active in three areas—computer graphics, engineering problem solving, and time-sharing.

In large German companies, the data processing manager virtually always works directly with top management. This is a new phenomenon, having occurred in the past two years. Before moving to the right hand of management, the edp manager usually worked alongside the accounting departments in German companies. —W. David Gardner



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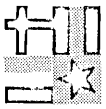
CIRCLE 31 ON READER CARD

The plan to simplify marketing of components in Europe may complicate matters for U.S. manufacturers

The Multipartite Accord

by Phil Hirsch, Washington Editor



"The Multipartite Accord is designed primarily to improve the marketing of electrical and electronic components in Europe. It should definitely not be considered a barrier to American exports."

The speaker was one of the managers of the Multipartite program, Dr. Hans Mayr, a slight, scholarly electrical engineer (Vienna Polytechnic, '32), who deftly parried this reporter's attempts to explore the trade barrier issue further. The issue was brought up because skeptics on this side of the ocean say the accord is really the foundation for a barbed-wire fence that will soon encircle Western Europe, festooned with signs reading "Yankee go home."

If the skeptics are right, the implications could be serious for the entire domestic dp industry.

Between 1970 and '71, while total shipments of U.S. dp equipment increased about 10% (from $4.7 billion to $5.16 billion), shipments to the 13 Western European nations comprising the Common Market and European Free Trade Association (EFTA) rose 57% (from $431 million to $677 million). During the past four years at least, our dp equipment sales to those countries have been increasing significantly faster, proportionately, than our total sales, and a number of recent projections suggest the trend will continue—assuming no trade barriers get in the way.

The 13 countries that belong to the Common Market and EFTA are the ones that have signed the Multipartite Accord, or are expected to. Nine countries are members so far, including England, France, and Germany—the biggest computer users in Europe.

Dr. Mayr works for CENEL, a standardization group embracing all of Western Europe. He is chairman of the CENEL Electronics Components Committee (CECC), which was set up, under the accord, to "harmonize" differences in the national standards programs of member countries. Hopefully, when harmonization is completed, a supplier will be able to sell his components in all the countries without having to get them certified in each one, as he does now. The process "takes forever, costs a small fortune, and is guaranteed to produce ulcers," says one who has made the effort.

The new scheme will also provide component testing and certification procedures so good that component buyers won't need to perform their own incoming inspections. That, at least, is the hope.

Most Americans who have been following standards developments abroad didn't get upset about the CENEL agreement until recently. They assumed that the accord couldn't seriously impact our export market until harmonized standards for solid state components were adopted, and these are still a long way off.

Apparently, they were deluding themselves. Within the past six months it has become obvious that the CENEL countries don't have to agree on specific standards for specific products; they can exclude outsiders by harmonizing "quality assessment procedures."

These procedures, basically, control the environment in which components are inspected and tested by the manufacturer to insure compliance with individual product specification standards. The procedures involve such things as the contents of test records, the methods used to segregate rejected product lots from approved lots, and the frequency with which test instruments are calibrated.

Members of the Multipartite Accord have harmonized a long list of quality assessment procedures. They've also appointed an organization in each country, called a "national supervising inspectorate," to check on compliance. And they've agreed to award a "mark of conformity" to suppliers whose components are approved. This is a kind of Good Housekeeping seal which will tell buyers that the component meets all of the applicable harmonized quality assessment procedures and standardized product specifications.

The procedures are stated in general terms, like the following: "The manufacturer shall demonstrate . . . that . . . his measuring instruments are periodically checked by an approved calibration service." This language enables each country to comply with the procedures immediately, since it doesn't have to change what it has been doing all along. On the other hand, by specifying that the national supervising inspectorate must be a centralized agency with nationwide authority, members of the CENEL club prevent the U.S. from joining immediately. We don't

have such an agency yet.

The French were possibly the first ones to exploit the commercial opportunities in this situation. Last summer, they advertised—in a widely distributed brochure—that "France is the first country in the world to supply high-performance electronic components with quality assessment as stipulated by the European harmonized system of CECC."

What bothers U.S. manufacturers much more than the brochure, however, is an agreement reached last spring by members of the accord; it states that their governments "should utilize the harmonized specifications so far as possible, for their own purchase of electronic components; and . . . should require their suppliers of electronic equipment to use components conforming to the harmonized specifications wherever possible." In Europe, government agencies are the biggest buyers of dp equipment.

Since then, the English, French, and Germans have ordered their government procurement agencies to buy electronic components, and equipment made from those components, wherever possible, only from suppliers who comply with national quality assessment procedures. IBM reportedly has been forced, as a result of the French order, to purchase components overseas for an air traffic control system being built for the French government. (The company, however, is unable or unwilling to confirm this rumor).

According to an official of the Electronic Industries Association, the English are now planning to amend their order, so that suppliers who comply with CENEL harmonized quality assessment procedures can be accepted, too. Once the English make this change, the others almost certainly will follow; for if they don't, English component makers wouldn't have the same freedom to sell in France and Germany that suppliers of the latter countries would have in England.

Meanwhile, according to another source, the French are awarding the mark of conformity to all French electronic parts makers who satisfy French national standards covering quality assessment and component performance. There is some question whether this is proper; the mark is supposed to designate compliance only with CENEL's harmonized standards, and there are none for components as yet—although the first two, covering resistors and capacitors, are about to be officially adopted. If the French practice is copied—and here again, this seems probable—it won't be long until *any* electronic component supplier in any of the three countries who satisfies the national specs will be free to sell his products in the other two countries without having to worry very much about competition from U.S. firms.

Even U.S. firms with plants abroad may have trouble getting certified because national quality assessment programs in Western Europe begin with "the first critical operation." Many of these firms perform this operation somewhere else, and limit their European sites to final fabrication and/or assembly work. One major American producer, who tried to get his U.K. plant certified, has already been turned down on this basis (although negotiations are apparently still under way).

Before we can join the Multipartite Accord, our standards program will have to be reorganized, drastically, so that it operates like the European scheme. It isn't likely that present members of the Multipartite club will accept any basic changes, considering that it has taken them roughly four years to develop the present organization. While there are rumors that some members believe the accord's rules are too rigid, England, France, and Germany are notably absent from the critics' circle, and these three countries wield the biggest influence.

In the U.S., standards are written and suppliers are certified by different agencies. The writing is done by something like 400 different organizations, which largely make their own rules. Although the federal government is frequently represented, it contributes little money and probably has even less influence. European standards work, by comparison, is central-

Head to head, how do programmers compare?

How do the American programmers compare with their U.K. counterparts?

While generalizations are impossible, it's easy enough to compare them on the basis of price.

Says one American veteran of European edp, "You can get a programmer here for 40% of what it would cost you in the States." To import an American would be foolish: "I can hire five Englishmen for what it takes me to bring over one American."

But the difference may be worth it in managerial spots, he feels. (Perhaps because that's the only way his U.S.-level salary can be justified.) Americans are needed in the beginning, he argues, to get things rolling. Why? "Because they're not so concerned with formality. They cut corners. They call a spade a spade. They are better planners: they can set down a schedule and see all the points that must be met."

The British? "They love to talk; it's a real art. But you have to push to get them to roll up their sleeves."

The top two men at one U.K. software house agree that a typical English programmer earns much less than his counterpart in the U.S. would. A "very good salary over here would be £4000 ($10,000)."

The difference, they feel, is not warranted by differences in talent. "American experience profiles appear first class," said one. "We've seen quite a bit of this," said his cohort. "But we've often been very disappointed in Americans in their mid-30s whose profiles looked staggering to me."

The two agree on the main difference: the American has worked as a member of a 50-man team on a minute part of a sophisticated system. The British bloke has worked on a team of three: he's been involved in the contract negotiations, dealt with the client. He has a better overview . . . but is not as technically knowledgeable.

"The mid-30s there compares with mid-20s here," they feel. Then: "There are no 35-year-old programmers here."

"That will have to change, won't it? Not everybody can be managers."

—RBF

ized, consolidated, and far more responsive to government policy.

Making over our standards program in the European image involves several problems, the biggest of which may be psychological—because joining the CENEL plan means that we would have to follow Europe's technical lead. The U.S. has been king of the hill so long that any indication of slippage is bound to be feared, and hence resisted. Also, since exports represent less than 15% of the U.S. electronics industry's total sales, many domestic companies couldn't be less interested in changing our standards program to fit the European model.

Some of this resistance/inertia surfaced recently, when the Department of Commerce submitted a bill to Congress aimed at laying the groundwork for us to join the Multipartite Accord. Basically, the bill (S1798 in the Senate, HR8111 in the House) empowers the Secretary of Commerce to identify international standards activities we should participate in, and "provide for appropriate participation" (i.e., put up the cash). EIA objected to the initial draft, partly because "there are still too many unknowns (and) . . . action is being taken without adequate information," as EIA president Jim Adduci told a Senate subcommittee.

The new draft

But informal discussion between EIA and the other interested parties has produced a new draft the association reportedly will support. The rewrite provides for greater industry participation. No one knows whether this change will make it more difficult for us to join the club, nor can anyone really predict whether industry standpatters will prevent the final program from moving fast enough, once it gets started. At the moment, the big problem is to get the legislation enacted. Because of accumulated delays, it now seems likely that the bill won't emerge from the Congressional pipeline until next year, instead of this year as originally planned.

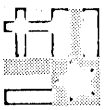
Meanwhile, a subcommittee of the International Electrotechnical Commission (IEC) is working on a harmonization scheme that could supplant the CENEL plan. Most of the particulars are now down on paper, and the main problem is to obtain the blessing of IEC's full membership. Since we belong to IEC, the U.S. would automatically be a member of the proposed standards plan—particularly since Americans have played the major role in drafting it.

CENEL has agreed that they will disband their club when the IEC plan is developed. However, there is some question whether S. E. Goodall, IEC's president, prefers to wait until the CENEL scheme has accumulated a track record before approving an IEC plan, or favors letting the two plans evolve in parallel. At a recent IEC meeting, he apparently supported both approaches at different times.

U.S. standards officials who have dealt with the Europeans accept CENEL's promise to disband with a certain amount of scepticism. "Sure, they'll probably break up eventually," says one source, "but not until *they* are convinced that the IEC scheme is fully operational. You can be sure they'll wait as long as possible, if delay gives European firms competitive leverage." ■

Once scorned as an evil capitalist device, the computer is now an integral part of Russia's future plans

Soviet Computing:



The Soviet Union's ability to match American computer strides has lain dormant since Sputnik days, awaiting an official impulse that would spark robust theory into assembly line production. Each year, as one country after another recognized the contribution of computers to its economy, Russian leaders remained silent while their computers slipped another notch on the scale of international competition.

Official silence was broken last spring during the 24th Congress of the Communist Party. Russia's newest five-year plan, a massive guide to economic growth from 1971 to 1975, was presented to the Party for rubber-stamp ratification. It contained directives to increase production of computers by 2.6 times. By September the computer plans were sufficiently clear for discussion with western computer manufacturers visiting Moscow. Officials at the State Committee on Science and Technology told Hugh P. Donaghue, assistant to the president at Control Data Corporation, that the computer increase by 1975 will be 18,000 and the total then will be 25,000. This means the Russians are counting close to 7,000 computers today. "They admitted that not all of the planned increase will come from their own production," Donaghue said. "They will be looking to Western Europe and the United States for those they can't produce."

The presentation of this plan with approval of no less a figure than Leonid I. Brezhnev, the top Communist, has been interpreted in the West as the long-awaited sanction of Russia's computer industry. But not everyone agrees with this view. Victor Zorsa is one who demands more evidence.

Zorsa, a recognized British expert on communism, is winding up a stint in Washington, D.C., at Georgetown Univ.'s Center for Strategic and International Studies, where he has been researching some social aspects of the new Russian computer plans. In an interview, he said that Brezhnev's approval of increased computer production does not necessarily amount to complete recognition. "I don't look for a single official action to conclude that the Soviet Union has approved complete development of a technology, as they did with space technology, but a series of steps. I believe they can catch up with the United States in computers if the political decision is made to do so, but I am waiting for more evidence before concluding that the decision has been made

a Giant Awakens?

by James Titus

with computers."

This caution is necessary for many reasons, one being the fact that Soviet officials control what is said in the newspapers and mete out firsthand information to visitors in official allotments. One American who saw some computer developments firsthand is Dr. Barry Boehm, head of the Information Sciences Dept. at The Rand Corp., who toured prominent Russian computer centers in October 1970 at the invitation of Russian scientists. Boehm reported the many organizational problems the Russians are having but said they have "the raw technical potential" to achieve something near parity in computing with the United States in ten years or so if their efforts are coordinated by "a tough-minded, pragmatic, technical man, like Korolev provided them for their rocket and space program."

Some observers give the inside track for state computer coordinator to Viktor M. Glushkov, director of the Institute of Cybernetics in Kiev, vice president of the Ukrainian Academy of Sciences, and a man whose power base has increased immeasurably in recent years. Boehm said a more likely candidate is A. P. Ershov, Russia's leading expert on computer software and the first person to be elected to the U.S.S.R. Academy of Sciences for contributions to computer science.

Assuming that a strong leader is appointed and is given a mandate to patch up Russian computing efforts, the task of matching American efforts is still a distant goal. Some communist experts say the Russians can do it, and it may seem presumptuous for anyone who does not constantly monitor this activity to argue with them. Evidence exists, however, that the Russians cannot reach parity by 1980—or even by 1985.

Despite the hazards of looking so far into the future, 1985 is really just 13 years away, and the Russians are nearly a full generation of computers behind the U.S. Rather than push off in their own direction, the Russians have decided to emulate American computers. This is a key point to consider. Notwithstanding isolated ingenuity in computer design and what Boehm describes as "a lot of very bright people working in the general computing area," they are patterning their most advanced machines after the IBM 360. This could mean that Soviet leaders don't feel the need to start a "computer race" with the United States.

There are reasons beyond a late start why the Russians can't afford to enter such competition at this time. Traditional lines between communism and capitalism are becoming more blurred each year, and the two superpowers find themselves drifting into each other's territory. They also are being joined by new superpowers—China, Japan, Europe's Common Market—that reduce the concept of bilateral confrontation.

The Russians have internal problems to worry about, such as the unprecedented citizen demand for more of the amenities of life. Such problems may be overcome to some extent by adapting a proven type of computer to their economy. All of these developments rob the Soviet Union of that single-mindedness that pushed it into the space race and allowed it to lead the world for a while.

. . . in many respects the Soviet economy is an artificial bloom, the product of a hothouse environment.

Along with these changes, the stifling Soviet bureaucracy continues to spread and entrench itself. A complete overhaul of that country's government would seem to be needed before it could begin to even think of challenging U.S. computer leadership. Just the idea of using computers for national purpose is a change in Soviet policy, a rejection of Joseph Stalin's idea that the computer is an evil capitalistic device. So is the new training program for government officials, which emphasizes such western ideas as systems analysis and management training. Possibly the government will be overhauled, but it will take years.

In the meantime, the economy that produced computer leadership is rooted in far different soil than the economy that is now trying to emulate the leading computer products. American computers are made by profit-driven corporations that leapfrog each other's innovations to entice the user to buy what is new and replace what is "obsolete." This is a basic form of competition in the computer industry. Another is the competition among users to keep up with their peers.

Elements of user competition exist in the Soviet

Union on a decidedly limited scale, and the dollar drive among producers is absent. Instead, Russian computers are made of the bureaucracy, by the bureaucracy, and for the bureaucracy. And the Soviet bureaucracy is a lumbering giant with arthritic joints. Cells of jealousy and introversion slow computer technology, resulting in different mainframes, different peripherals, practically no software the user can begin with, and no one to maintain the computer when it arrives. Often the same computer "series" contains incompatible machines, and designers have allowed for little, if any, feedback from the users. It all adds up to a computer industry with much foliage but little fruit.

The current five-year plan talks about regular production of "a new set of computers based on integrated circuits." This is the Ryad series, believed to be in production at the Minsk plant. The ASVT series, consisting of the M-1000, the M-2000 and the M-3000, was started earlier and almost qualifies as third-generation (there are some integrated circuits in it). But the most widely used general-purpose computers in Russia are transistor-model BESM machines. Wade Holland, editor of Rand Corporation's authoritative *Soviet Cybernetics Review*, has found little evidence that the higher end of the ASVT series is in general use. With the Ryad series not scheduled for delivery until sometime in 1972, the Russians therefore are just easing into third-generation computers.

Still their paper plans are big. During the next five years they are shooting for the following goals:

Wider development and accelerated application of econometric modeling and systems analysis.

Major stress of automation in the machinery, metal, petroleum, natural gas, coal, building, food, and medical industries.

Development of new devices for data conversion, collection, storage, transmission and processing.

Construction of a "unified automated communications network."

Establishment of a state-wide computer network for automated planning and management, a much-debated proposal that would strip authority for important computer operations from individual ministries if it were to become a reality.

Establishment of 1,600 automated management systems, a pet project of Viktor Glushkov that is discussed below.

Introduction of some 1,000 process control systems based on standard units and components.

"Decisive conversion" to microelectronic circuitry for computers, electronic instruments, and other automated equipment.

Planning five years ahead is based on past Russian performance, and Soviet officials claim they "overfulfilled" their 1966-70 goals for computer hardware. K. N. Rudnev, head of the Ministry of Instrument Construction, Means of Automation, and Control Systems, told this year's Party Congress that his ministry, which is responsible for most of the larger automation plans, increased computer output by 4.8 times in the last period. Possibly it did, but we don't know the output for the previous period. And historically the Soviet Union has not been successful in meeting the economic goals it sets itself. In the July-August 1971 issue of the *Harvard Business Review*, Marshall I. Goldman, professor of economics at Wellesley College, wrote: ". . . in many respects the Soviet economy is an artificial bloom, the product of a hothouse environment. Despite the ever more impressive announcements of each new year's production attainments, the Soviet economy yields some imperfect fruit."

To support his argument that Russian industry "has consistently failed to meet announced targets," Goldman lists the 1970 output of ten industries and contrasts them with projections for that year made in 1961 and 1966. Only one commodity—oil—reached the target set in 1966. Automobile production did not meet even half its goal, and goals were missed for several commodities that are essential to computer production and use, such as electric power, steel, and plastics. Further, the 1966 projections had been lowered from the 1961 projections in every case, sometimes drastically.

Equal opportunity for European edp women? Hardly . . .

Ever aware of the really important issues during DATAMATION's editorial invasion of Europe, our editors asked if women had an equal shot at jobs and opportunities in edp in Europe.

Nearly everywhere the answer was the same. "They have the same opportunities as men." But nobody was able to tell us the ratio of women college grads to male . . . although the head of one U.K. software firm told us that they interview women among the yearly crop of graduates. They offer both the same starting salary, he said.

"There are not a great many career women, here," said our veddy British friend. "They do tend to get married and get pregnant. There are very few examples—none in fact—of women in management positions. I don't think it's due to prejudice." His cohort chimed in, "We took on an American girl from IBM. But she got married . . . and is instantly immobile." He frowned.

The same sort of response was found on the Continent, where the women's lib movement lags much further behind its U.S. counterpart than computer development.

One exception we found was Memorex, where Stan Kemmeter, head marketing man in Europe, has hired two salesmen—oops, saleslades—one in Italy, the other in France. Evidently well motivated in search of La Dolce Vita, the Italian lady is one of the company's most successful salespeople . . . and Kemmeter uses this fact to try to shame the men into better performance. In Norway, Memorex has a lady maintenance engineer, who does, says Kemmeter, "an excellent job . . . technically and in terms of public relations."

Kemmeter, by the way, is an American.

—RBF

This forces the Soviet Union to look elsewhere. In the last ten years, according to Goldman, the Russians have purchased $60 million worth of computers from Britain's International Computers Ltd. alone (the figure is higher now). "The decision to bring in noncommunist technology in such a massive way is an acknowledgement that the Soviet economy finds itself incapable of mastering advanced industrial technology in any reasonable period of time," he said. "The Russians hope that, by relying heavily on foreign technology, they can leapfrog across the existing technology gap and pull abreast of the production capability of the developed countries."

Goldman also noted that the Soviet Union still imports 20 to 60 times as much machinery as it exports to various developed countries—almost the same ratios that existed 60 years ago before the Russian Revolution.

"It is as if the Russians had built a giant industrial structure in a sheltered hideaway that produces products unable to measure up to world standards of efficiency or quality," he said. "While such an economy looks good on paper and is capable of spectacular feats in space and in munitions, the accomplishments are tempered by the fact that almost everything else produced lags behind that of the rest of the developed world."

This sort of record makes the new computer production plans suspect, but there is still much to be concerned with in the current five-year plan. It contains a pet project of Viktor Glushkov that bothers many western observers. For many years Glushkov has envisioned a sweeping plan for using computers to control the Soviet Union's entire economy. Back in the '50s he was encouraged in his idea by Nikita Khrushchev. When Khrushchev fell from power, Glushkov's plans were eclipsed. Now the cybernetic-ist has again emerged from the technocratic pack with public backing of Brezhnev. Glushkov is in charge of setting up a network of automated management systems, called ASUs, that would contain data on all Russian houses, apartments, construction plans, communication lines, social information, etc. The systems would be based on 1,600 linked computers and would be used by Gosplan, the State Planning Committee.

The inclusion of "social information" worries many outside the Soviet Union. Though Glushkov speaks in terms of an "electronic forum," where computers would hold the citizens together in a permanent collection of public opinion by storing their answers to various questions, observers such as Britain's Victor Zorsa believe that Gosplan's ASU would simply computerize extensive files now kept by the KGB, the secret police. Zorsa said that "the most detailed files on every Soviet citizen" are kept from cradle to grave in manual form; computers would give the KGB a better means of retrieving and analyzing information on political suspects to squelch dissent. This, he says, would result in a "new totalitarianism," more like Aldous Huxley's "Brave New World" than Joseph Stalin's terror system, resulting in a compliant citizenry.

"How seriously should his scheme be regarded?" Zorsa asked earlier this year in a *Washington Post* article. "The Kremlin certainly takes him in deadly earnest. The Soviet government recently opened its own version of the Harvard Business School, where the top leaders of industry as well as of the party and government, up to the level of minister, get refresher courses on how to use modern methods to run the country. The inaugural lecture was delivered by the best man the Kremlin could find. He was none other than Prof. Viktor Mikhailovich Glushkov."

If Zorsa's suspicions about the Gosplan network are right, western computer exports to the Soviet Union may have to be governed by new rules. Few American computers have gone into the country yet (a Control Data 1604 and an IBM 360/40 at this writing), but interest in the Russian market has mounted since the green light was given to the sale of large ICL computers to the Soviet Institute of High Energy Physics at Serpukhov. An October office equipment show in Leningrad drew 14 American firms that produce computers, peripherals, and communications equipment. Go-between firms that line up clients with Soviet buying agencies are finding more computer firms at their doors. Old requests for exports to the Soviet Union are being dusted off and resubmitted for U. S. government approval.

Now that they know how many computers the Soviet government wants to import in the next five years, American firms are more eager than ever to slake their thirst after the long drought. But will they be allowed to sell to such markets as Gosplan, or any of the other ASU users in the Soviet government? The prevailing test on opposing an American computer export to Russia rests on its value to that country's military strength. Is Gosplan just economic? Or does civilian surveillance by secret police, if that is the actual Soviet plan, constitute a "military" operation? What the U. S. government decrees on this issue in the future will affect all western computer manufacturers whose country subscribes to the rules of the North Atlantic Treaty Organization, so the implications are international.

President Nixon's trip to Moscow next year will be closely watched by the business community for any signals that mean better trade relations. It is well known that the Soviet Union would like to sign a bilateral treaty with the United States that would give it most-favored nation status, which means that it would be treated as well in trade terms as any of our allies. But businessmen realize this is unlikely to happen for a long time. What they are looking for are diplomatic steps that can be translated into more liberal export controls at a later date.

If better trade relations are forthcoming between the United States and the Soviet Union, American computers will become realistic additions to the grand Soviet computer design. Rand's Wade Holland recently summarized the reasons why the Russians have no choice but a turn to western manufacturers:

"Most of the considerable effort devoted so far to management and process control systems in industry has been characterized by fragmentation, inefficiency, poor planning, and lack of standardization. The ninth five-year plan just getting under way takes note of these problems and should be devoted to establishing the basis for design and implementation of the required systems. But the pressure to implement, to get anything at all up and running, could result in more of the same. The outlook here is not as bright as the Soviets would hope." ■

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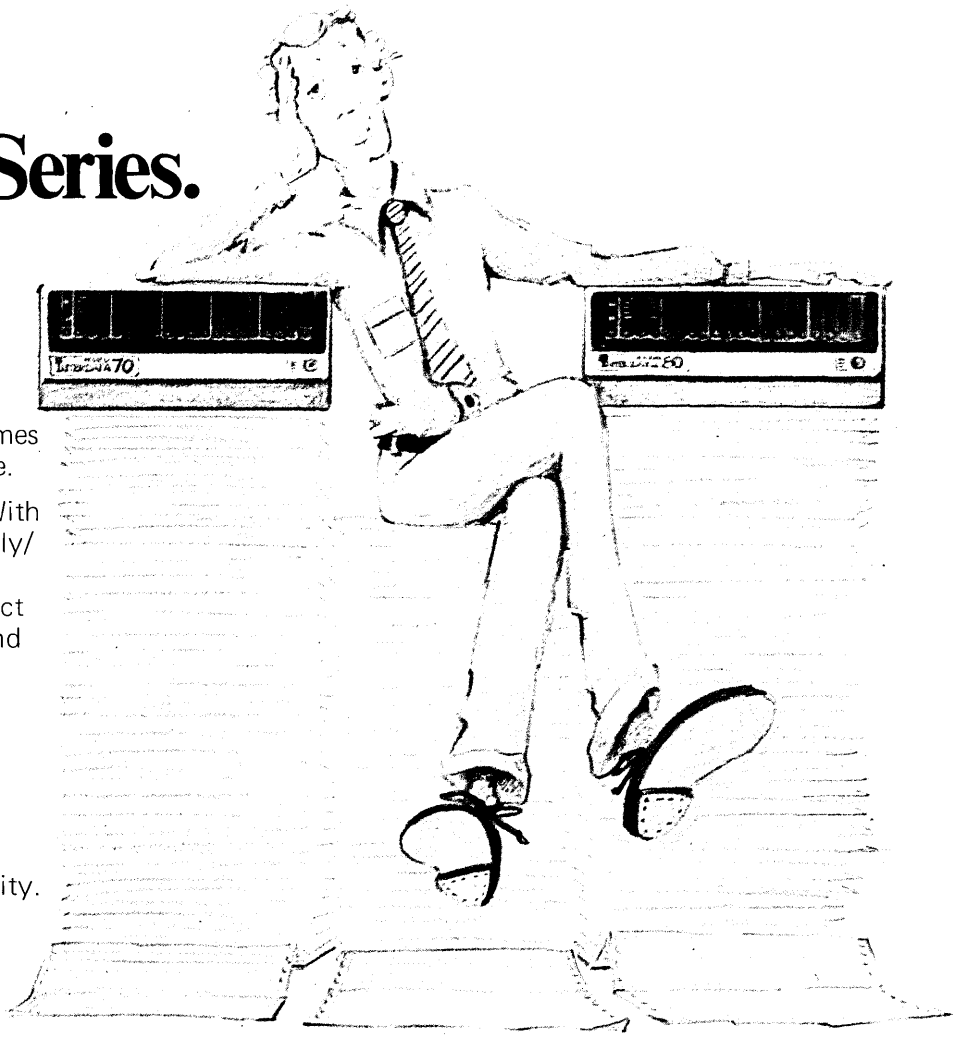

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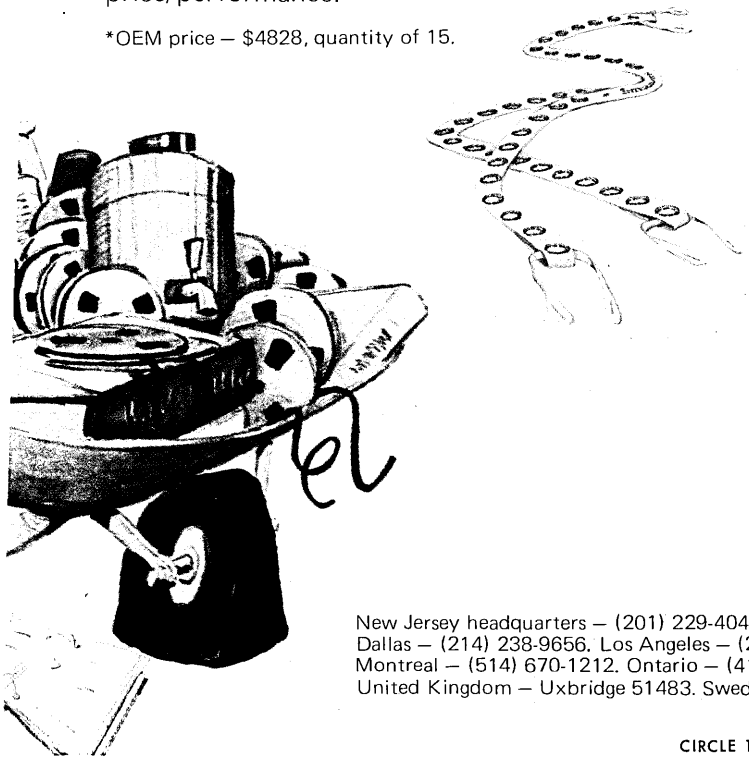

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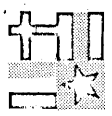
CIRCLE 12 ON READER CARD

Not since Marco Polo has there been so much interest in opening trade routes to the East

East-West Trade ...



"The current five-year plans of the communist bloc nations are the most exciting ever for computing," enthused an American marketeer for East Europe at the recent IFIP Congress in Ljubljana, Yugoslavia, this summer.

Talking to attendees from these nations and to many sales personnel at the congress, we found three main reasons for the excitement.

First, each of the seven nations—the U.S.S.R., German Democratic Republic, Czechoslovakia, Hungary, Poland, Bulgaria, and Rumania—have extremely ambitious plans for expanding the number and use of computers, particularly in management and control. (The latter is variously defined, sometimes including production and process control, which is not as highly computerized as reports have indicated, experts say.)

Second, the plan for production of computers involves all the bloc nations, with the exception of maverick Rumania. Coordinated under COMECON (Council for Mutual Economic Cooperation), the communist bloc's equivalent of the Common Market, the plan calls for the manufacture of 12-15,000 computers of the new 360-compatible Ryad series. At least that is what came over the Tass wire service, attributed to M. Rakovsky, the Russian deputy chairman of the state planning committee, Gosplan. Too, some nations are trying to develop their own lines, mostly in the small-to-medium range.

The third reason is that interest in buying computers from the West is higher than ever before, especially in large systems. And pressure is mounting to get the NATO Coordinating Committee for East-West Trade Policy (COCOM) and the U.S. government to ease their restrictions on computer sales to East Europe. U.S. firms in particular are chomping at the bit, because U.S. restrictions are the toughest and they fear that Western Europe and Japan will gobble up the market.

But there are difficulties in determining the exact scope and nature of that tantalizing, if murky, market. To begin with, the figures and definitions of computer installations are even more confusing than those in the U.S. Russia is said to have 5-7,000 computers—but it's unclear how many of these are obsolete systems or machines not normally classified as computers in the West, such as hard-wired process monitors.

Solid figures on the computer population of other bloc nations are equally difficult to come by. Zbigniew Drabek of the Polish Management Development Center said that 200 systems are installed in Poland, 30 of which are in data processing; by 1975 those 30 will expand to 500, he said. A Scientific American article by Ivan Berenyi (December 1970) puts this figure at 420, but does not identify his source of information. Dr. Sendov of Bulgaria told us there are 100 computers in his country; the Berenyi article says 30. One expert says Hungary has 85 computers today, another says 120, with 500 the goal by '75; Czechoslovakia, 120 or 200, with a goal of 430. East Germany is listed by Berenyi at 500 and Rumania at 50, although another source says the latter has 20.

Whatever the disagreement over computer population figures, all experts agree that the communist bloc nations have both the need and the desire for rapid and massive computer expansion. They further agree that the goals they have set for 1975 in their current five-year plans cannot possibly be reached without going outside the bloc.

Within the bloc, the major production effort is centered in the Ryad series. Although this is a cooperative, COMECON-directed effort by all seven nations, some western experts say the bulk of the production will be absorbed by Russia. Whatever the eventual outcome, plans call for peripheral gear to be produced by East Germany and Bulgaria, magnetic

U.S. restrictions are the toughest and they fear that Western Europe and Japan will gobble up the market.

memories and software by Hungary, small cpu's and components by Czechoslovakia, small-to-medium cpu's by Poland, with Russia making the larger cpu's and integrated circuitry. Rumania to date has chosen not to participate, appears to be trying to become independent of COMECON in general, and is establishing closer economic ties with the West.

Several of the other counrtires are trying to establish their own independent computer industries in addition to their COMECON efforts. To this end, several nations have licensing and know-how agreements

Trickle or Torrent?

by Angeline Pantages, Special Features Editor

with foreign manufacturers: Hungary's Videoton with France's CII; Bulgaria with Japan's Fujitsu; Rumania with CII; Poland's Elwro with Britain's ICL.

The ready availability of systems, software, and training from western firms continues to stimulate interest in buying from the West. (One IFIP Congress attendee quipped: "Of course we want to buy from the West—it's the only way we can get to travel abroad.") Foreign manufacturers are seen as a valuable source of education. "You say five people for training and they send 30," chuckled one salesman.

As desirable as it may be, trade with the West still presents major problems. For one thing, the communist bloc currency is not convertible, so bloc nations must pay for imports with "hard" currency

VILIBALD CVRK, director of the service bureau for foreign trade in Czechoslovakia, chats with Cmdr. GRACE HOPPER, U.S. Navy, at a Univac-hosted cocktail party at the IFIP Congress, Ljubljana, Yugoslavia.

produced by exports. (Of the bloc, only Hungary enjoys western credit.) Such hard-cash computer buys must be balanced against the total priorities of the nation. Alternatives are to trade their own products for foreign goods or to get the foreign computer firm to find a buyer for their exports. (Poland's Z. Drabek, commenting on this type of bargaining, noted that "IBM is the best car salesman in the world." And ICL has sold a few ships for Poland as well.)

The currency problem is, of course, one big reason why each time a computer contract is negotiated the communist government tries to arrange a licensing or know-how agreement in order to develop domestic production.

COCOM and U.S. government trade restrictions continue to be another major stumbling block. Most nations feel that the U.S. overuses its veto power in COCOM, the NATO committee which controls the sale of strategic goods to East Europe. This not only tends to stifle U.S. enterprise, they say, but is also frustrating to the other nations. One example was the U.S.'s long (19-month) delay in approving ICL's application to sell two 1906As to the Soviet Union. Testifying before a House of Commons subcommittee, ICL's Sir John Wall noted that "one day the Americans will be doing a lot of trade with Eastern Europe . . . We cannot help but feel—and we have evidence for saying this—that somebody is dragging his feet in Washington."

The "somebody" is the U.S. interagency committee which approves COCOM applications. As put by ICL, the Department of Commerce has "often looked sympathetically at an application from Britain," but "they operate under the absolutely democratic system that the State Dept., the Defense Dept., and the Department of the Treasury must agree unanimously," and that takes a "long time." Our sources say the Defense Dept. usually casts the veto, and because U.S. manufacturers are chafing under the restrictions, a movement is rumored under way to persuade Congress to decrease DOD power on the committee.

The restrictions are generally against both strategic applications and any advanced technology that can be construed as "strategic." In most cases, the U.S. government looks hard at any system over a 360/40, large (100-megacharacters plus) disc drives, sophisticated terminals, nanosecond memories, etc. Each application is considered on a case-by-case basis, with restrictions varying according to the political "liberalism" of the country involved. Yugoslavia (not considered in the bloc) and Rumania receive most-favored-nation treatment, followed by Poland, Hungary, Czechoslovakia, East Germany, and Russia, the last two being "least favored."

Unless restrictions are eased to allow the export of

What's our angle?

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But you can't count on that from everybody. In fact, anybody who makes a data entry system of one kind or another is naturally going to tell you his is best for your operation.

Anybody, that is, but Mohawk Data. Because now, we cover all the entry angles. Not just one.

Here's our newest. It's the 2400 Key Display System. The latest extension of System 2400 and the MDS line of data entry devices.

The most varied line in the industry.

This is the first key-through-disk-to-tape system with a tutorial display. By "conversing" with the operator, it tells her how to set up a job, locate keying and validation errors, and correct them.

It's the first significant answer to the trained operator shortage. Untrained girls learn to enter faster, more accurately, and with less supervision.

The display's easy to read, too. In plain English. Insignificant left zeros are suppressed, and the screen even shows negative numbers.

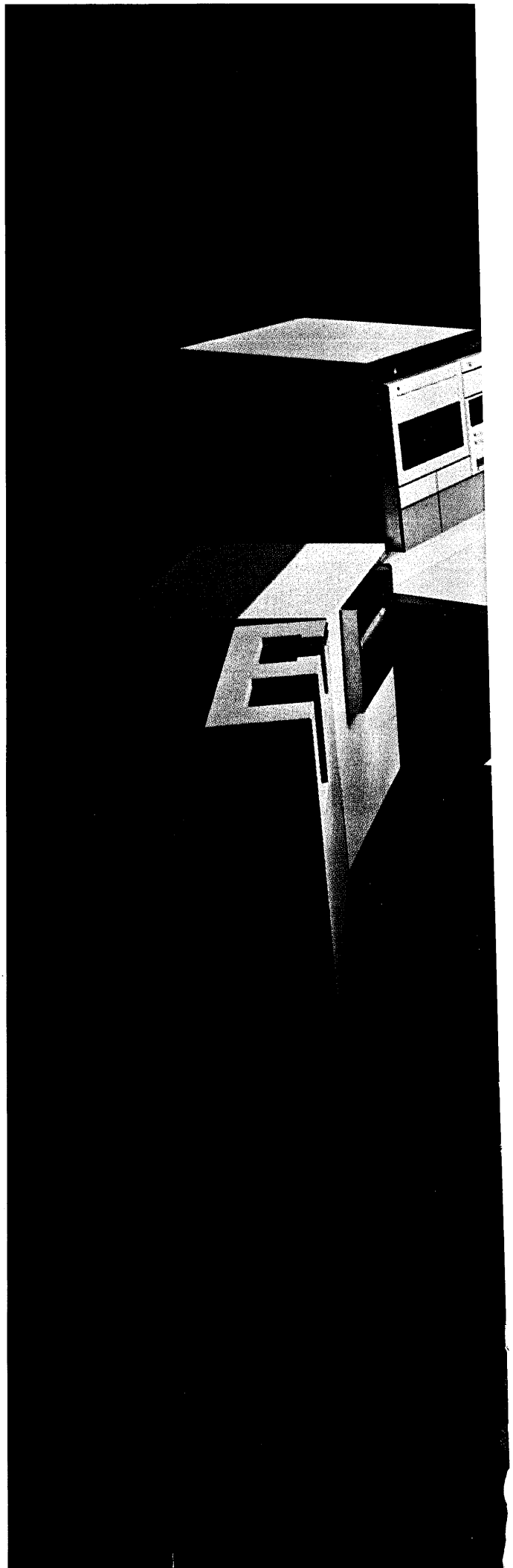
Configure your system any way you need it. As a large multi-purpose peripheral system, as shown here. With keyboards added on to your present System 2400 processor. Or as a dedicated cluster system for volume entry.

With one to twenty keyboards per system.

There's a lot more you want to know about System 2400. Write or call us collect. We'll see that you get the full story.

From all angles.

2400 Key-Display System.
It's got a lot to say for itself.



MDS

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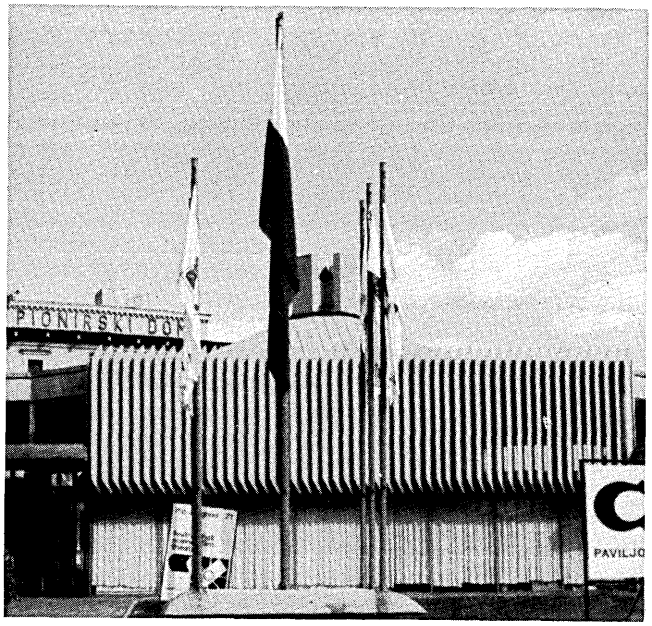
CIRCLE 76 ON READER CARD

larger systems to the U.S.S.R., U.S. firms won't have much of a market there. Michael Sanders, East Europe marketing manager for Univac in Vienna, noted that "there is no room for small systems." Academician A.A. Dorodnycin of the Moscow Academy of Sciences corroborated that statement in grand fashion. He told DATAMATION that the Soviet Union is not even interested in the CDC 6600, but would like to buy a 7600.

Needs of other bloc nations vary greatly. Vilibald Cvrk, director of MUZO, the service bureau for foreign trade in Czechoslovakia, noted they would like more disc drives for their developing MIS systems. Bulgaria's Dr. Sendov wants displays for research and training. And most bloc nations are eyeing with envy the IBM 370s, Univac 1106s, and CDC 6400s that are going into Yugoslavia for on-line use. (The U.S. cringes over on-line systems, because it can't control the application.)

Washington is currently entertaining numerous applications for sales of larger systems. CDC has orders for a 6200 for a Soviet nuclear research institute and a 6400 from a university in Armenia, and is trying to convince Washington to permit the sale of its oem peripherals as well, although most experts doubt the U.S. would give up that much control over the applications of the gear. Honeywell, which has 58 systems in Russia, signed a contract in August to sell a 600 series machine there.

IBM, Univac, Honeywell, and Control Data are the mainframers making the biggest push in this market now. IBM has about 350 people operating out of Vienna, which is several times the size of the ICL force; the other U.S. mainframers have 20-50 personnel. Smaller firms, like Hewlett-Packard and Mohawk Data Sciences, are building up their sales effort as well.



The main exhibition hall at the IFIP Congress, Ljubljana, Yugoslavia.

The life of the computer salesman in East Europe is not an easy one. "Any firm that looks to this market for its bread and butter is out of its mind. It's frustrating and difficult," said one veteran. In addition to his computer expertise, the salesman in this field must be politically and diplomatically sharp.

One can see why it is a difficult selling job just by learning how computers are selected in these countries. Univac's Mike Sanders, who has spent his whole sales career in East Europe, starting with ICL, briefly outlined it. Theoretically, he says, the manufacturer must deal with the foreign trade company at all times, although increasingly the suppliers are informally contacting the end user. In the selection hierarchy are also the union (each group of factories has a union) and the ministry in control. Thus the supplier must make himself known to all these parties—through seminars, exhibits, literature, etc. Just as in the U.S., each stage presents obstacles. Each of the levels may select a different manufacturer—because of technical preferences, or because a larger deal has been made by the union, or due to changes in long-range plans of the ministry. And even if all of those parties agree, the trade company may negate it because of cost.

"Any firm that looks to this market for its bread and butter is out of its mind."

A veteran of marketing in the Soviet Union complained of having to deal with too many departments and too many people—generally not the end user himself. In each meeting, he said, there may be up to 15 people and during the negotiations they are constantly changing, so you have to restart many times. "Plus you never know if they are serious or just want to gather information. You must be patient with them. We have negotiations that have been going on for two years."

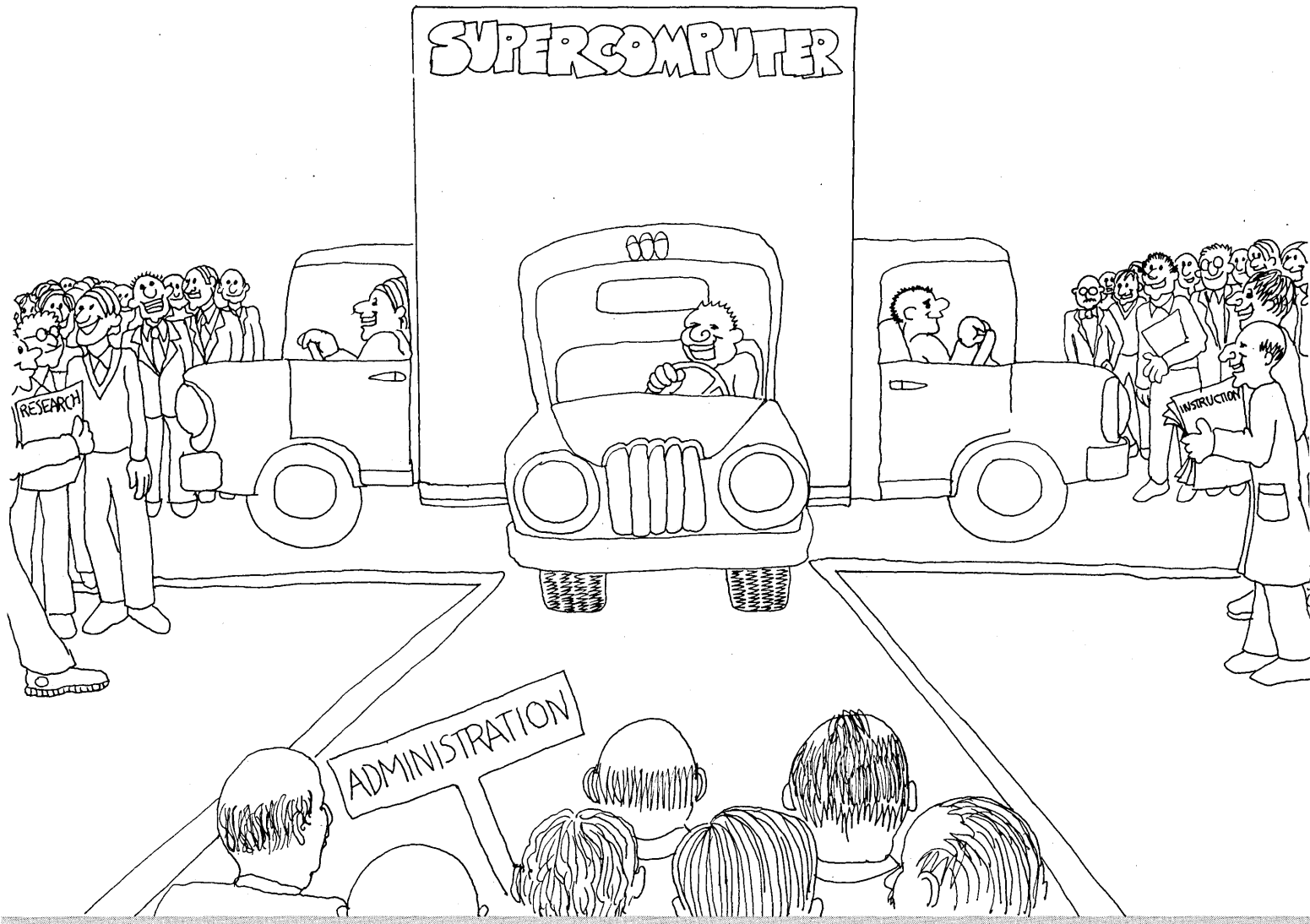
All the contracts are complicated legally, he added. "For weeks they may discuss one clause, using the strategy of changing people during the course of a single meeting which may last 15 hours. You are worn down."

Everyone remarked that all communist nations keep their part of a contract faithfully and expect the same of the seller. But "they always find the hard way to do things," said the veteran, relating how the Soviets contracted for a Fiat plant and six computers in one package—all to be operating the day the plant opened. The computers were on time, but the building was months late. "We kept telling them the guarantee would run out and the equipment would corrode."

That, of course, is not meant to reflect on the level of expertise and education of individuals in the communist nations—which is very high. The incident is an illustration showing that Eastern European management and organization must be improved quickly.

Observers are looking for more reports on those five-year plans and for a better analysis of the current level of use and equipment demand—something the Department of Commerce is currently researching.

And in 1975 world observers will be looking for reports on results to prove or disprove the comment that a command economy always asks for more than it is able to produce. ■



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Some computers do a great job on administrative work. Others are just fine for instruction. Still others come into their own on research.

But one computer can do all three at once. In a batch mode. Timesharing. And real time. All at the same time.

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Supercomputer has all the power and flexibility you need to keep everybody happy.

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A lot of schools are looking to replace two or three existing systems with a DECsystem-10. But you should take a look at one even if you don't have that many.

Because any way you slice it—lease or buy—DECsystem-10 costs half as much as equivalent systems.

Get the literature that describes DECsystem-10 and some of the 60-plus schools that have one. It reads like a Who's Who. Write Digital Equipment Corporation, 146 Main Street, Maynard, Massachusetts 01754. (617) 897-5111.

digital

CIRCLE 30 ON READER CARD

Never ask a printer off-line

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Talk to your CMC sales representative about DataPrint. He won't try to sell you another printer. Or a bigger computer to escalate your lease costs. Instead, he'll show you a solution to your printing problems with a system attached. And that's a whole lot better than some equipment with a solution attached.

Talk to us.

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A Fable for Our Time

by Bruce C. Whitener
with Illustrations by Henry Martin

Once upon a time in a distant land, a magnificent new hydroelectric plant had just been built (with the aid of a U.S. grant). Most of the people in this land had never heard of electricity, so it was with some surprise that one of the local merchants answered a knock on the door of his home one day, and found an "electric laundry processing" salesman there to greet him.

"Sir," said the salesman, "I bring you glad tidings of great joy. I perceive from the clothesline in your back yard and the scrub boards and tubs on your back porch that your household has not taken advantage of the new and exciting 'Electric Laundry Processing' System—we call it ELP—the greatest discovery of the ages!" The salesman went on to describe the numerous benefits of ELP. Said he, "Your clothes will be cleaner, and you can dry them even on rainy days. Furthermore, the smoke and dust in the air won't fall on your clean clothes since they are dried *inside* the machine. It's probably cheaper than what you're doing now. Let's say you pay your maid $3 an hour to wash and hang your clothes to dry. If your average wash takes three hours that's $9 you have to pay, plus water and the use of these tubs and scrub board.

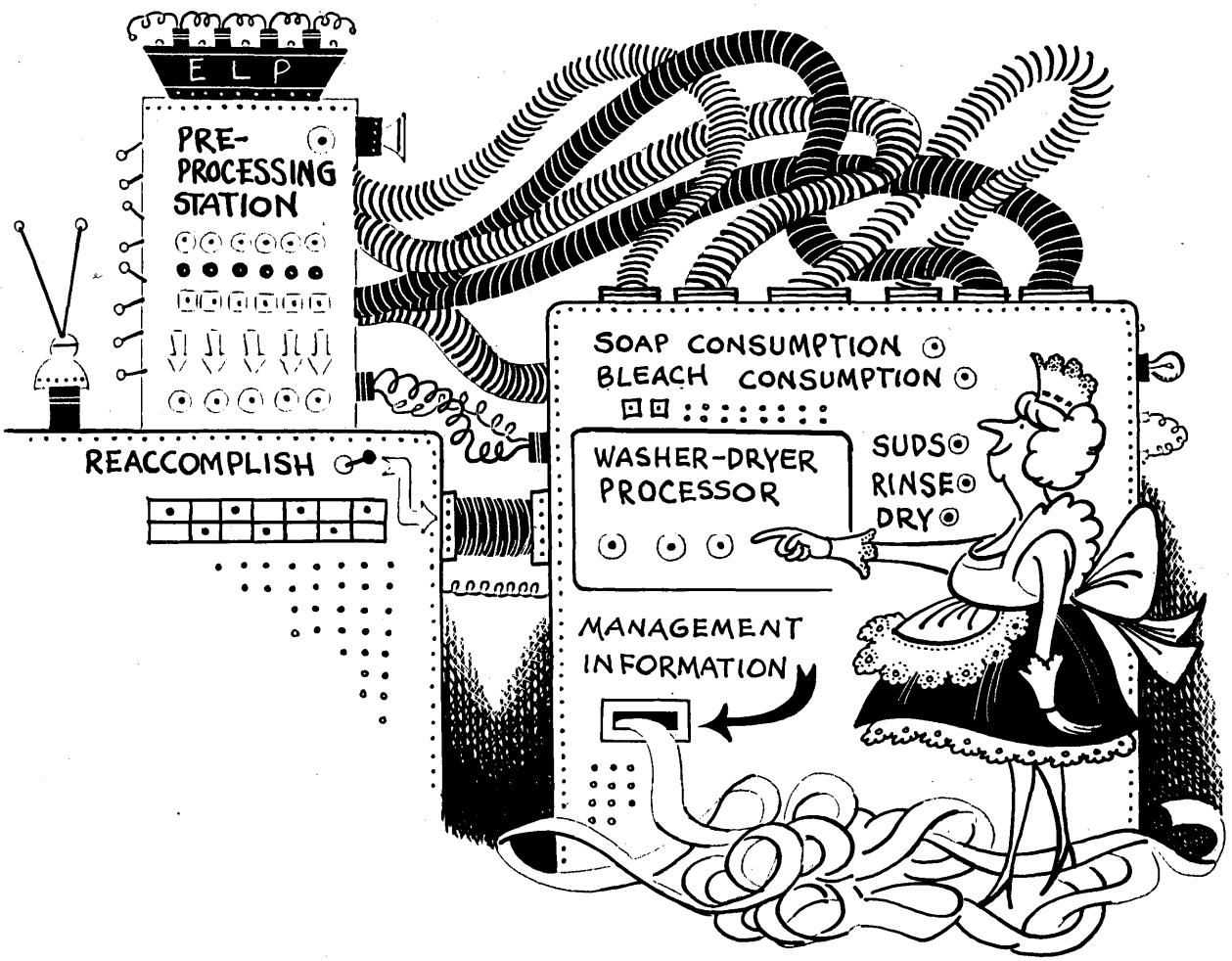
"But we get the water out of the river free, and those tubs and scrub board cost only a few dollars—and that was 10 years ago," said the businessman.

"Well," said the saleman, "let's say—just for the sake of argument—that ELP *won't* save you money. Wait til you see *this* feature."

He drew forth a glossy brochure of the ELP hardware from his 1½-inch-thick attache case, nostrils quivering with excitement. There, right on the washer/dryer processor, was a group of dials and nixies, and a massive set of toggle switches.

"See these displays?" said the salesman. "They provide *management information.*" Here the salesman paused dramatically, waiting for the reaction from the prospect.

"What does that mean?" said the businessman.



"What that means," said the salesman, "is that you can get daily and year-to-date, budget vs. actual summaries of amount of water used, soap utilization, cost-effectiveness of chlorine bleach vs. enzyme soakers, and here's the stopper—a report of clothing and miscellaneous items sorted by type within fabric! And this automatic post-processor automatically routes each dried and folded garment to its storage bin or dresser drawer! At small extra charge, this real-time clock keeps track at all times of the status of each garment as to whether it is awaiting processing, in the various stages of production or in inventory in the proper storage area."

"Well . . . I don't know," said the merchant, "if I can use all of that information. All I really need is for the laundry to get clean—and the maid I have has been doing an adequate job for about 20 years now."

"But *everyone*, and I mean *everyone*, is buying this system," said the salesman. "Our market research people say that the market for ELP will be over two billion dollars in 1975—or was it five billion in '72—well, it's clear that everybody is doing it. Tell you what I'm going to do. We'll put in one of these dudes for . . . " (here the salesman looks around furtively and whispers a figure in the businessman's ear). "You pay *only* for the time you use—it's part of the third-generation philosophy. You realize that this is *below* our cost and we're only doing it because you are a leader here in this town."

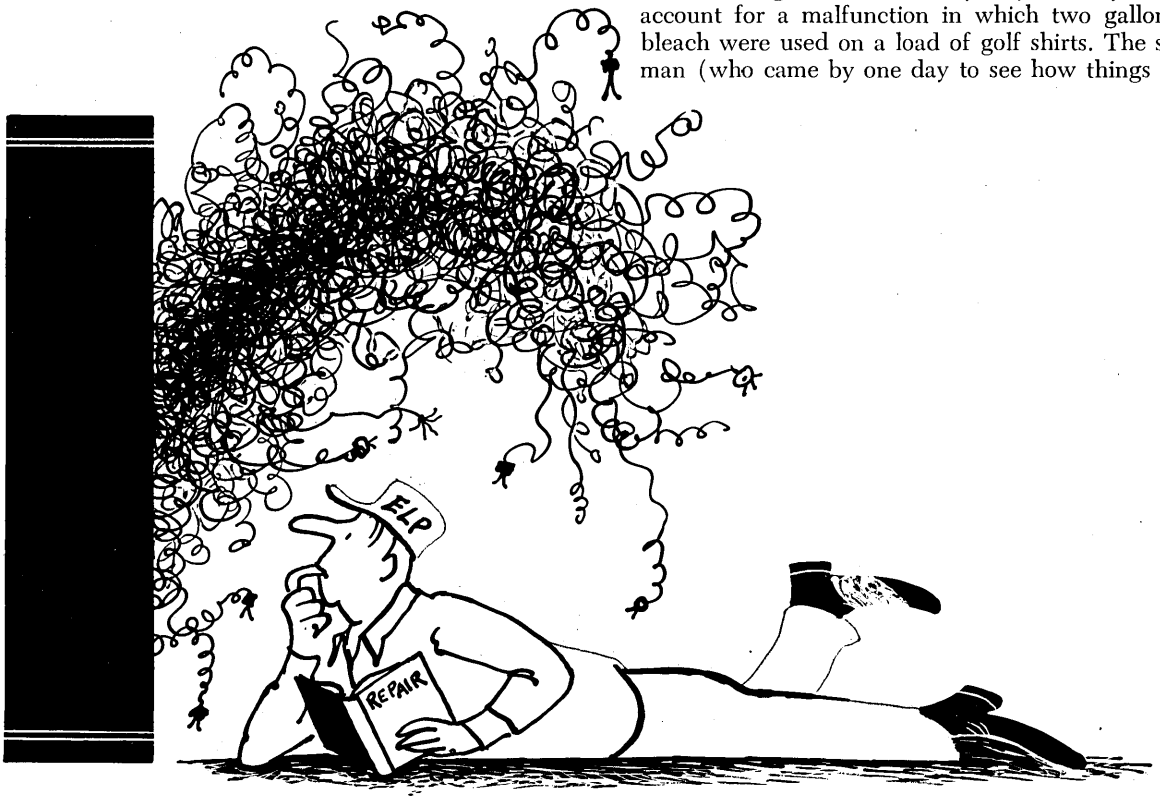
"Well, O.K., it's a deal," said the businessman. "I'll tell my maid not to come anymore, as she won't be needed with this fabulous new—ELP, is that what you call it?"

"Actually," stammered the salesman, "you'd better have your maid stand by for a few weeks—you've got to have somebody to operate this thing, heh, heh. One of our men will show *her* how to run it—free of charge, naturally. Oh, one other tiny little detail. The clothes must be put in the right sequence, and we'll have to filter this water to insure that the delicate

mechanisms are not clogged. But you'll get used to that very quickly and will find, I'm sure, that ELP will actually prove beneficial to your normal procedures—a little order and discipline has got to be a good thing for all of us, right?"

"Well, I guess I can get used to it," said the businessman.

A few weeks later the equipment arrived, and the technical representatives arrived a few days later. They showed the maid how to operate the system and how to filter the water and to sort the clothes for the washer/dryer processor, and even ran a few sample loads through. The system did indeed clean better than the scrub board, and was very fast. Occasionally, it would malfunction and rip to shreds some of the sample garments the technical representatives had brought. But finally the ELP system was pronounced ready to go "on the air," as the technical representatives said in their clever jargon.



Things went smoothly for a few days except for some garments that were routed to the wrong drawers (wrong switch settings, according to the tech reps). Then one day, as the businessman was rushing to dress for a luncheon with the King, he discovered that not only were his clothes in the wrong drawers, but that he had no dress shirts at all! Infuriated, he discovered that a power failure had interrupted the previous day's work and all of his shirts had been returned automatically to the pre-processing station. The salesman informed him that, even with ELP, he must expect "once in a great while to have to 'reaccomplish' the work."

Occasionally, the machine would not work at all, and a repair man would have to come and fix it.

"Gee, look at all them wires," said one as he opened the back of the console. "This is nothing like the ones we fixed in our training course last week." The maid marveled at how such a young man could learn to fix such a complicated mechanism in such a short time.

Each weekend, the businessman received a printed report of the previous week's work. A typical report showed that ELP had processed 8 pairs of wash-and-wear trousers, 2 dress shirts, 32 pairs of socks, 98 diapers and 148 miscellaneous items during the past week. Average soap consumption was 4.37 ounces per load, and bleach consumption 2.082 ounces per load, the latter figure automatically adjusted by ELP to account for a malfunction in which two gallons of bleach were used on a load of golf shirts. The salesman (who came by one day to see how things were going) suggested that the reports would have more meaning if the "miscellaneous" category could be further broken down.

A crisis arose when the businessman received his first bill for ELP, which was much higher than he had expected, partly because of reasons for which he felt he should not have to pay since it was not his fault that the machine had malfunctioned. He also winced when he thought of his beautiful red "Ban-lon" golf shirts, now bleached to a sick-looking pink. He discovered, too, that he was now paying his maid for six hours a day instead of three since the preparation of the clothes for processing was crucial and had to be rechecked. In addition, she was asking for a raise in pay, since the new work was more "professional" and required greater skill.

So it was with a sense of both sadness and relief that the businessman wrote a letter canceling the ELP service. For a while there it was exciting to be on the new frontier of technology.

"There must be a better way of doing the laundry than the scrub board," thought he. "I wonder if anyone will ever think of it. . . " he mused as he signed the cancellation letter and slid it into his out box. ■

NEW....
SIGNAL STREAM MULTIPLEXING
....THE LOW-COST APPROACH TO SYSTEM COMMUNICATIONS!

RECEPTOR's unique communication technique reduces all interconnection to a single shared twisted-wire pair.

Here is a totally new low-cost technique, Signal Stream Multiplexing, that allows up to 256 devices to communicate over a single twisted-pair wire, telephone line or radio link! Sensors, controllers, data-entry devices, displays or computers... individual plug-in circuit boards at each device on the line convert the data into the desired form, including analog to digital and digital to analog.

*Your total turn-key system cost — *customized to your application—including minicomputer, terminals and programming, completely installed and operating, could cost as low as $10,000!*

Here are some of the reasons Signal Stream Multiplexing can reduce your total system cost:

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- The terminals are light in weight, low-power and have mounting convertibility that eliminates all installation problems.

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- **Security monitoring**

Is data comparison or data referral a requisite? The Signal Stream Multiplexing communications technique permits the recording of all data on the communications channel with an inexpensive, entertainment grade, cassette magnetic tape recorder! The recorded tape can be played back into the data display terminal for inspection at a later time.

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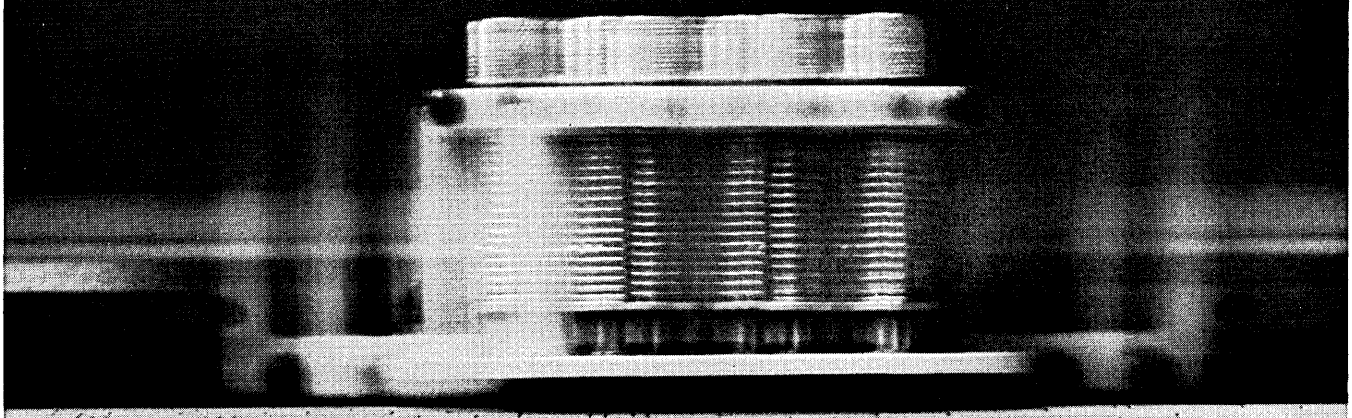
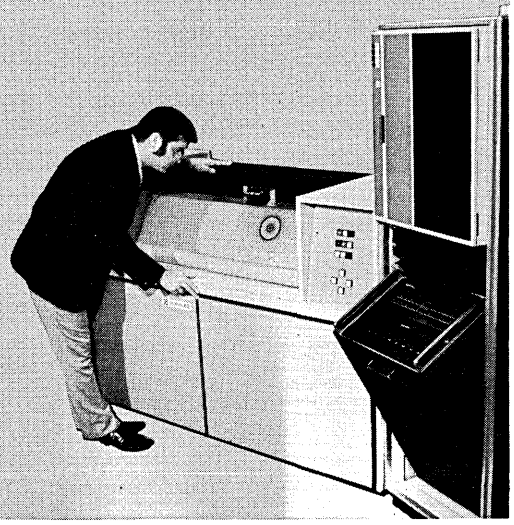


The new Gerber Model 462 Drum Plotter draws at speeds of over 2000 inches per minute, and reaches 2000 inches per minute in just 30 milliseconds. The 462 draws with drafting machine quality. Previously such accuracy, fine line capability and plot quality were available only from flatbeds. If you're in the market for a drum plotter with exceptional throughput, see the Gerber 462. It's at least three times faster than existing drum plotters and, we repeat, provides drafting machine line quality. Call 203-644-1551, extension 462 for quick answers, quick action.



THE GERBER SCIENTIFIC INSTRUMENT COMPANY
P.O. BOX 305, HARTFORD, CONNECTICUT 06101

The Moment 'Fore Abend

Words of divine inspiration transcribed
after wandering for forty days and nights
through the wilderness of an OS Systems course.

by Paul F. Frommherz, IBM (Writer and jolly good) fellow

'Twas the moment 'fore ABEND when all through
main core
Not a GETMAIN was stirring—we needed no more.
The traces were hung in the table with care
Because big St. Nick-O-S SYSGENed it there.
The pointers were nestled all snug in their DEB's,
To IOB, DCB, extants they led.
And 'GO' in high core, and some SVC's
Had been GETting and FREEing MAIN quite
merrily
When out of the nucleus 'rose such a roar—
My program's ABENDed—it ain't there no more!

Away to the dump I hightailed like a flash,
Tore open the pages with manners quite brash.
The fluorescent light on the CVT glared.
I added and pointed—the problem's somewhere.
When, what to my watering eyes did appear
But a monstrous trace table with formats unclear,
And a little task transfer, so lively and quick,
I knew in a moment 'twas writ by St. Nick.
As minutes before the tight target date fly
When faced with a bug that all notes doth defy,
So down the trace table the SVC's flew
With a sprinkling of interrupts—SIO's, too.
There's four words of goodies on each little line
But how do I read 'em, and how do I find
Some pertinent info concerning my bug?
I poured a tall cool one and then—chug-a-lug.
As I drew in my head and was turning around,
The words of my guru, Great Warren, I found.
They covered the pages in four books on notes
And interspersed, sometimes, with drawings of
boats.
A bundle of droodles were drawn on the back,
But somewhere in there is the knowledge I lack.

Scanning the trace table now, after this,
Was a little bit simpler, but not really bliss.
More rapid than eagles the SVC's came,
And I whistled and chortled and called them by
name:

"Now EXIT, now EXTRACT, now GETMAIN and
TASKBUMP,
"Now WAIT, now OPEN, now ABEND and
BLITZDUMP.
"To the top of main storage, to the top of the table,
"You'll find the bug now, if you really are able."

My droll little mouth was drawn up in a frown
As I pulled on my beard—a quite mellow brown.
The stump of a pencil held tight in my hand
As I decoded entries and, saying "How grand!"
Began to behold the big wizard of OS
Rather, he and my job as the core really was.
He's chubby and plump—a right jolly old kludge
And I laughed when I saw him in spite of how
huge
A wink of his eye and a twist of his head
Affected my program—I've nothing to dread.
He spoke not a word, but kept straight at his work
And said to the scheduler, "ABEND this jerk!"
I had tried to OPEN the printer, you see,
But something was lacking in its DCB.
So putting a thumb upon his hairy nose
OS wiggled his fingers and cried "Out she goes!"
He sprang to ABEND, to ABDUMP gave a whistle
And out my job flew, like the down off a thistle.
But I heard him exclaim, as he stopped for PM,
"Happy debugging all and to all an ABEND."

PERSPECTIVE

an interpretive review of significant developments

California PUC May OK Direct Connection of Foreign Attachments

California's Public Utilities Commission has ordered Pacific Telephone and General Telephone Co. of California to keep hands off independently made terminals connected directly to their dial-up lines pending hearings on a complaint by one independent maker which could lead to a permanent order by the commission that the phone companies allow direct connection as a regular thing. The temporary order and the decision, should it come, involve only intrastate service but will have far-reaching significance, especially since a second independent terminal maker currently is petitioning the California commission for a similar ruling.

For more than three years, ever since the FCC handed down its Carterfone decision in the summer of '68, independent terminal makers and users have been trying to connect directly to the interstate dial-up telephone network. They haven't been very successful. The Carterfone ruling eliminated the blanket ban on use of foreign attachments that existed previously, but the carriers subsequently convinced the commission that these attachments could harm the switched network and degrade service. To prevent this harm, the commission allowed the carriers to insist on insertion of a "connecting arrangement" between every independently made terminal and the telephone line. This coupler, obtainable only from the phone company, has to be rented. Independent terminal makers say the connecting arrangement is unnecessary in many cases, costs the user far too much, and imposes technical limitations on independently made terminal devices that deprive users of valuable benefits and enable Bell and other carriers to maintain their long-established monopoly position in the modem and data/voice terminal market.

A Hint of Harmlessness

Last summer the FCC appointed an advisory committee, representing all affected parties, to develop interconnection standards for independently made PBX equipment, plus procedures for testing, certifying, and inspecting this equipment to assure that it meets the standards before and after being installed. A recommended program has been drafted by the committee, but several participants are unhappy. Their objections were summed up neatly in a letter which BEMA's telecommunications expert, Jim Holmes, recently wrote to R. Y. Sims, one of the advisory committee's task force leaders.

"Our review thus far indicates that for many systems and equipments . . . the proposed procedures would be sufficiently complicated, lengthy, and economically burdensome that, in a practical sense, they would place the independent suppliers of equipment at a significant disadvantage compared with the offerings of the regulated common carriers," said Holmes.

The California PUC's recent action is worth its weight in gold to foreign attachment makers in the light of the advisory committee's apparent failure to develop a consensus.

For the first time, a regulatory commission has hinted that an independently made terminal can be connected directly to the dial-up network, without a connecting arrangement, and the network won't be adversely affected. Independent manufacturers have been saying essentially the same thing to the FCC since before the Carterfone decision, but now they have a measure of confirmation from an outside source whose objectivity can't be questioned. This is powerful ammunition, for it creates a possible precedent that the FCC could use to justify direct connection of at least some terminals to the interstate dial-up network.

The California decision involves the "Phonemaster 1040," a device made by Phonetele, Inc., Van Nuys, Calif., which automatically restricts outgoing calls to specified exchanges or exchange areas. Early this year, Collins Food International, Inc., in Culver City, Calif., connected a Phonemaster unit directly to the facilities of General Tel of California. The phone company threatened to cut off service unless the device was removed. Phonetele complained to the state PUC, which ordered a hearing and told the phone company to continue providing service until the case was decided.

In July, the California commission issued a final order. It required General Tel to allow connection of the Phonemaster " . . . through, or by means of, a terminal block, and without any protective interface other than that provided in the said Phonemaster 1040."

The commission said "the evidence is clear . . . that the Phonemaster . . . is not in any way detrimental to the telephone network as respects network signaling, harmful voltages, or noise and crosstalk, three of the basic criteria which (must be considered) in evaluating the attachment of COAM (customer-owned and maintained) equipment to the telephone network."

Reasonable Standards

The commission went on to say that "this opinion and order should in no way be interpreted as being in the nature of a 'landmark' decision applicable in general terms to the connection of COAM equipment to telephone utility lines." But immediately following this statement comes another which will almost certainly be presented to the FCC by those seeking direct connection of independently made terminals to the nationwide dial-up network. "Our only general observation," says the California commission, "in view of the proliferation of COAM devices now being marketed, is that protection of the public's interest in having an adequate and reliable telephone service requires that the *reasonable* standards of the telephone industry shall be met." (Italics in original text.)

In August, shortly after Phonetele won its decision against General Tel, it asked the California PUC to issue a similar order requiring Pacific Tel to allow direct connection of the Phonemaster. Phonetele's complaint alleged, among other things, that three Phonemaster users had con-

nected the device to Pacific Tel's dial-up network for periods of six months to a year; "during this time, Pacific Telephone has never cited any problems caused by the Phonemaster 1040 at any of these locations," added Phonetele.

Significantly, in its answer to this complaint, Pacific Tel said the California commission "is without jurisdiction" because Phonetele "seeks an order which would allow the connection of (its) equipment to the nationwide network . . . (A) primary purpose of (Phonetele's) equipment is interstate toll restriction, and Pacific (Telephone and Telegraph Co.) . . . believes . . . that the equipment . . . referred to in the complaint restricts interstate toll traffic . . . Pacific alleges that the conditions under which interconnection takes place must be consistent for the numerous systems which comprise the nationwide network . . . This commission should withhold action on interconnection pending the development of interconnection proposals for nationwide application."

Last Oct. 26, the California commission ordered Pacific Tel to continue servicing the three Phonemaster users named in Phonetele's August complaint while the commissioners listen to pleadings from both sides. The order also requires the phone company to supply connecting arrangements, free of charge, to the next 10 Phonemaster users who want to link up with the Pacific's switched network. General Tel's objections to the earlier Phonetele decision will be reconsidered while the commissioners are exploring the complaint against Pacific Tel.

Meanwhile, Telephonic Equipment Corp. (TEC), Santa Ana, Calif., has filed another complaint with the California PUC. This one involves the Telepatcher, a device that enables key telephone equipment to become a switchboard "by allowing conference telephone calls to be conveniently made therefrom, and (by) allowing the forwarding of calls received at the instrument's location to another location, with appropriate supervision."

According to the complaint, Pacific Tel cut off service last August to a Telepatcher user who refused to link the device to the dial-up network through a phone-company supplied connecting arrangement. The complaint also says that:

Pacific Tel rents Telepatchers to its switchboard customers "but permits its key customers to use Telepatcher KTS-500 units only if they are purchased by the customer and then connected to defendant's network by means of defendant's interface device, requiring the key customer to pay installation fees and extra monthly charges therefor . . . "

Since 1966, Pacific Tel "has permitted direct electrical connection of switchboard models of the Telepatcher KTS-500 to telephone answering switchboards through a connecting arrangement that does not employ a voice coupler."

TEC's direct electrical connecting arrangement, used in linking the Telepatcher to Pacific Tel Lines, is similar to those which interconnect the Telepatcher to the General Telephone Co. and Continental Telephone Co. networks in California, "and similar to (the connection arrangement) used by defendant to link Telepatcher equipment to switchboards at telephone answering services."

This complaint was still awaiting commission action as we went to press.

Related developments:

Joint Control

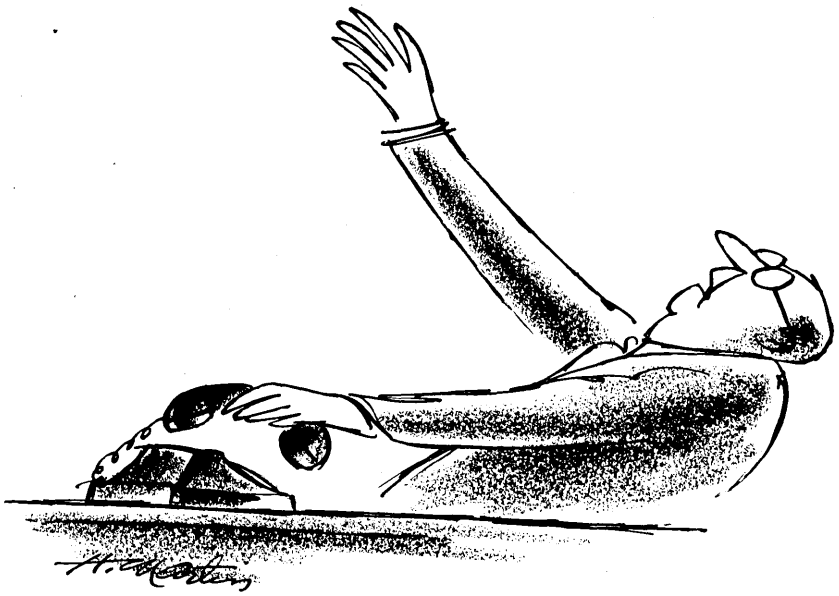
The National Association of Regulatory Utility Commissioners has asked the FCC to put the interstate interconnection hassle under the control of a special federal-state "joint board." The advisory committee appointed by the FCC last summer would report to this joint board instead of directly to the commission.

NARUC's request, which was made by president F. J. Riordan, included the statement that "any interconnection policy fashioned by the FCC will have a tremendous impact . . . upon the rates paid and the quality of service received by the intrastate and local users of communications service. The states are especially concerned with what effect the profits of unregulated suppliers of interconnection devices will have upon the rate burden to be borne by these millions of intrastate and local users across the nation."

The last sentence alludes to what is probably the key issue in the whole interconnection fight — i.e., how much revenue the carriers will lose if they allow direct connection of independently made terminal devices, whether they're entitled to hike line charges, and if so, who should get stuck.

Among Riordan's nominees for the proposed joint board is California PUC Commissioner William Symons, Jr., who has participated in the Phonetele case and will probably do likewise in the TEC case.

—Phil Hirsch



"Oh, great spirit of the Telephone Company, hear my plea! Connect me with 921-6423."

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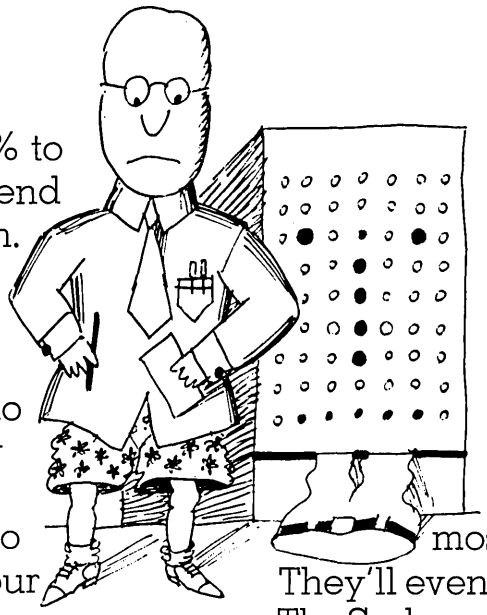
It's a hell of a note.



Most 360 users waste 20% to 50% of the money they spend on core. Month after month. Year after year. And that, by anyone's definition, is one hell of a note.

Fact: CorPak costs 20% to 50% less than the memory that came with your CPU. And you're perfectly free to use it, whether you rent your 360 or own it. Some dp managers don't know that.

CorPak is plug-to-plug compatible with most 360's: Mod 22, 30, 40 and 50. It's built to military specifications, and it will match or beat the environmental specs on your CPU.

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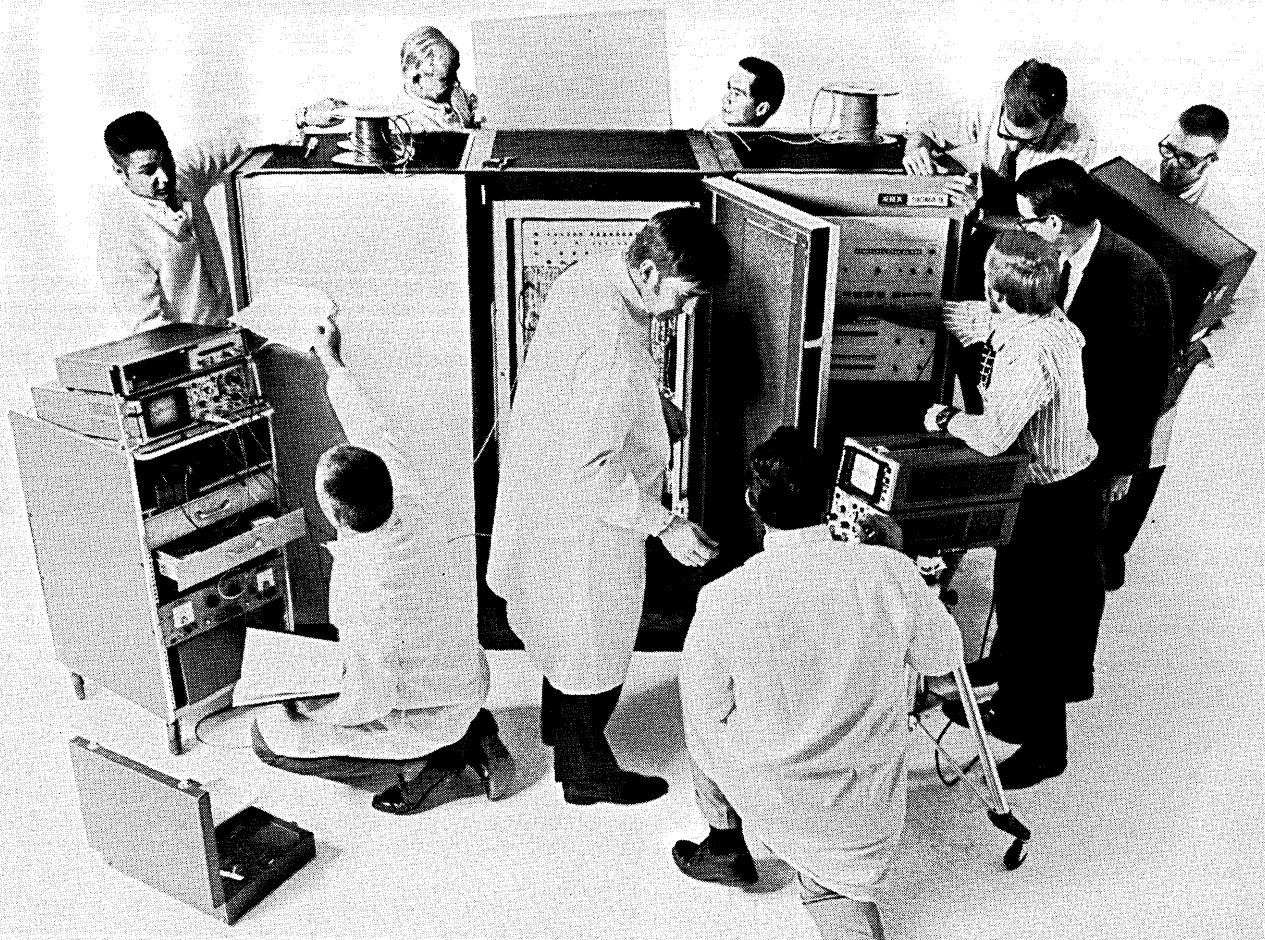

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CIRCLE 65 ON READER CARD

NEWS SCENE

Yugoslavia on "Enviable" Course

While the international computer community is keeping an eye on the growing market in East Europe and Russia, it should also examine the dynamic and rapidly modernizing nation next door — Yugoslavia. It has some of the same problems as many communist bloc nations — a currency that's not fully convertible, an unhealthy balance of trade, a demand for a higher standard of living, need for better management, shortage of trained edp personnel, etc. It has the same awareness that computers will help speed industrial and economic growth.

But Yugoslavia is not aligned with Russia and is struggling to make a success of a liberal political structure and controversial economic reforms. The West, and the U.S. in particular, is anxious for that success — as an enticing example to USSR satellites as much as anything. Yugoslavia is not fettered by the NATO and U.S. restrictions on communist bloc trade.

So Yugoslavia is proceeding on a course of computer implementation that many of its eastern neighbors envy. The official tally of 340 installations as of mid-'71 by the *Praksa* publication is not very impressive, since it yields a lot of ancient systems and small computers falling in size below the IBM 360/30. But at IFIP Congress 71 in Ljubljana in August, we found the marketeers boasting orders and bids that show a boom beginning in medium-to-large systems. This includes the likes of the 370/155 and 165, Univac 1106, CDC-6400, and applications with on-line information retrieval, remote batch, and time-sharing.

Internal Cooperation

One of the reasons for a spurt in orders for larger systems is that various sectors or businesses are getting together to share a system — its people, costs, and resources. People and money are in critically short supply.

A good example of such sharing is the cooperative computer center being established in the republic of Slovenia. According to Dr. Milan Osredkar, director of the Jozef Stefan Institute, the center will be shared by the Univ. of Ljubljana, the electronics firm ISKRA, the Slovenian government, and several educational, worker, and business associations.

"It is the only way all of these sectors can connect to a big system," he noted, plus it will provide a "valuable interchange of knowledge and ideas." The CDC-6400 to be used, slated for delivery last November, actually supersedes a 3300 shared by the university and government; so the center is not starting from scratch. (A U.S. professor consulting to the center says that the phasing in of applications has been excellently planned.) It will be primarily a remote batch operation which ultimately will include a network of perhaps a few dozen "smart" terminals like the CDC-200 and small IBM computers, like the 1130 and 360/20.

Osredkar noted that lines have already been tested with "good results." Slovenia has an automatic exchange and most of the cable lines have been laid in the last few years. An example of line quality was demonstrated by CDC at its IFIP exhibit, which had a terminal linked to a CDC-6600 in Bologna, Italy, during the six days of the conference. While it took a few harrowing months to make the arrangement between the Italian, Austrian, and Yugoslav exchanges, CDC's Yugoslav marketing director Bob Walan reported that the terminal was down briefly for line failure only twice.

The concept of sharing is widespread. The republics of Croatia and Bosnia have ideas similar to Slovenia's. And in fact — with a show of the fierce competitiveness that exists between the nation's six republics — a computernik from Croatia claimed to a salesman, "Ours will be bigger than Slovenia's." Being noncompetitive, businesses within various industries, like insurance, metal working, lumber, and dairies, are also forming cooperative centers. Honeywell, for example, has sold an H-2015 to a 14-company association. Of course, as one marketeer said, with that cooperation come all the problems of forcing the companies to organize in the same way to use the system efficiently.

Big Orders Pending

Other examples of new and pending installations, according to M.F. Zeleznik of Intertrade, IBM's uncharacteristically informative representative, are a 370/155 due at the Zagreb city government offices last month (on-line use in registry, taxes, etc.), several 135s and 145s at banks, and a 145 at the Yugoslav Railway. "I don't know why *Datamation* made such a fuss about the railway's 145," he said referring to a news story. "We had four or five 145s on order before that one." IBM is also bidding a 165 to the Univ. of Zagreb, for on-line use by the faculties and for library information retrieval. This system, with about 30 terminals, "will be the biggest in Yugoslavia," he claimed.

Faioni of Honeywell Information Systems Italia noted that at least four universities are looking for large systems; HISI is bidding H-6000s at two of them. And recently HISI won an order for a 6000 from an insurance company. Univac has been hitting paydirt with the 1106, one going to a steel company and two to Energoprojecto, an international civil engineering firm. The first 1106 at Energo will be used initially for engineering projects, contract scheduling, and other internal tasks. Later it hopes to sell time and time-sharing on it. The second 1106 there is earmarked for on-line control, phased in over a few years, of the blue Danube's Irongate Dam. The dam provides electrical power to both Bulgaria and Yugoslavia.

Encouraging Foreigners

HISI's Faioni asserted that if Yugoslavia can resolve its financial problems, the computer market should continue to grow at a 27-30%

COMPUTING ABROAD

Much of this News Scene report is devoted to a review of trends in computing businesses overseas. These include a report on computer procurement trends in Yugoslavia on this page; time-sharing in the U.K. (page 65); computer leasing (page 69); Japan's Big Six computer makers, and a look at the Australian marketplace (pages 71-72).

rate — as it has in the last two years. It is certainly providing incentives, such as the elimination this year of all import duties on computers and related equipment. And it is giving favorable treatment to any foreign manufacturer that will make a technical collaboration or manufacturing agreement with one of its companies. Yugoslavia, like most developing nations, is hungry to start its own edp manufacturing and stave the outflow of dollars for the mammoth computer investment needed.

Honeywell Information Systems Italia has signed just such an agreement with Elektronska Industrjia (EI), a 25,000-man electronics firm. HISI is in the process of transferring peripherals know-how to the firm, whose first product will be printers for the Honeywell line. EI will sell them in East Europe as well as domestically.

It is the first real edp manufacturing the nation will do, although another firm does some subassembly work for CDC now. And HISI is, in effect, the first U.S.-owned computer manufacturer into a communist nation; some firms hope this will be a stepping-stone into the more "favored" nations of the communist bloc, like Rumania. (Certainly West European and Japanese companies are already into the bloc with such agreements.)

Honeywell will undoubtedly enjoy a "favored manufacturer" status in Yugoslavia. It is hard to tell what that means, especially since IBM employs 400 Yugoslavs and has almost half the installations there. But perhaps the Burroughs experience with its calculators will give some indication. According to Franc Wrizl of Hermes-Burroughs, when Yugoslavia started manufacturing the Olivetti calculator under an agreement, the government imposed the requirement for a special license to buy a foreign-made product. Thus, Burroughs' calculator sales have been discouraged, and it is turning, for the first time, to computer sales (B-2500 and 3500) and other products. It's plain HISI will at least get a boost.

Census

Going back to the *Praksa* tally noted earlier, one gets an idea of how the Yugoslav market is split up. (It was, however, compiled early in 1971 and does not contain many of the orders noted above. Also we have eliminated machines listed as "classical" and not identified, since they are said to be either very old or not computers.) IBM has its customary lion's share, developing since 1954: 128 systems, including 75 360s, two 370s, and 31 System/3s and 1130s. It has just under half of the 266 nonclassical systems listed and the value is variously said to be 60-70%. Univac has 40 in or on order, including seven 9000 series; one 1106; and 22 1004s, 1005s and 1050s. Value is put around 10-14%. Honeywell has 32 systems, including 7 H-200 series, 7 GE-100 and 400 series, and 18 very small GE and Gamma systems; value is 10-14%. NCR has 21 installations, including 5 Century series; value is put at 5%. ICL has 10, and the rest are split among CDC, CII (France), Zuse (W. Germany), Aritma (E. Germany), and Mihaljo Pupin Institute (six special-purpose machines, Yugoslavia). As said, Burroughs is beginning its push there, but will have an uphill climb, since it is known by the old-line management that bought its accounting machines and not by the younger computer-knowledgable people.

Decision-making Process

Despite the demand, selling is not easy. The manufacturer must stock parts; IBM, for example, has $1 million worth there (certainly a discouragement to any compatible peripherals manufacturer that can't compete on that level). He has to buck a system that doesn't replace equipment easily, since 90% of the installations are purchases; rentals have been allowed just in the last year or two. And he is subjected to a rigorous selection process that, in theory, U.S. management ought to emulate: The management decision to buy must be brought before the worker council, which theoretically controls the company. Once they agree, management negotiates with the supplier. The selection then goes for approval to the worker council, to the government if the buyer does not have his own hard currency and must borrow, and to a management committee. The last is most interesting; it comprises a company executive, a university edp expert, and two people from different companies that have computers not made by the manufacturer selected. This is to insure impartiality.

And if that isn't enough, the manufacturer must understand Yugoslavia itself, a fiercely independent nation of 21 million diverse peoples in six republics and two provinces. Its task, as *The Economist* (Aug. 21) put it so well, is to "reconcile economic efficiency with Marxist doctrine, the concept of self-management with modern methods of business control, and the satisfaction of local ambitions with the need to ensure that all the republics and the provinces get a fair crack of the whip so that none can harbour envy of its neighbor. Fortunately, the problem is not one of stagnation but one of growth . . . "

—Angeline Pantages

U.K. T-S Story: The Plot Is Familiar

The United Kingdom's time-sharing vendors seem to be going through some of the same agonies as their U.S. counterparts were a year or two ago. From mid-1967 until the last quarter of '70, the U.K. time-sharing market was growing at an accumulated annual rate of 240%.

But from then through last spring, the market has flattened, says Dick Davis, managing director of Time-Sharing Ltd., one of England's first vendors.

Davis underscored the severity of this by noting that 50% of the vendors in the U.K. began operations within the past year and a half. Some 20 firms are scrambling after a $10 million market, he said. None has gone under, partly because it takes two years to file, and most aren't that old. "Omens are that several will go within a year's time," he said. But it won't be the same disaster as in the U.S. because most t-s firms in the U.K. are subsidiaries. Time-Sharing Ltd. (TSL) is one of the few independents. Honeywell (ex-GE) has about 51% of the market. TSL has 27%, currently running at $2-2.5 million annually. ITT Data Services has declined from 12% to 10%; IBM has grown 7 to 8%. Davis puts the cost of entry into time-sharing today at $10 million, vs. $250K five years ago. "You have to buy your market; a 5% share is not enough . . . a 30% market share is a bare minimum."

Davis said the development of the

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neered at Bell Labs, digital transmission is better not only for data but for many other services as well.

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time-sharing customer in the U.K. is similar to that in the U.S. It started with the engineering and scientific bit, progressed toward applications for that market, then to management science applications like corporate planning, operations research, and forecasting. Now it is going towards data processing tasks, production scheduling, inventory control, etc., for the medium-size businesses. Among major differences between U.S. and U.K. marketing, according to Davis, is that U.K. business is in the hands of a much smaller number and the tendency toward in-house systems among U.K. customers far greater.

For example, electronics firms constitute the biggest time-sharing market. GEC, which employs thousands of engineers and scientists, just put in its own time-sharing system. Philips Electric Ltd. and Plessy are doing the same. So there goes four-fifths of the electronics market for time-sharing. That brings up a rule universally true, Davis said: You always have to keep one jump ahead of big firms, providing new services they can't get internally; and you have to move to medium-sized firms that won't ever develop much in-house computing.

Referring to the growth of business time-sharing firms like Keydata in the U.S., Davis allowed that the dp marketing in the U.K. is "two orders of magnitude larger than the problem-solving market." The problem is leverage. A design change an engineer can make by using a computer may mean a savings of $50-60,000, he said, but the leverage with billings is low. Right now, the labor costs are far less than in the U.S., and it is cheaper to use manpower than a computer for payroll, accounting, etc.

"You have to go down the middle between the extremes. Our solution is going after applications package markets in scientific, engineering, and management sciences," said Davis.

He was very candid to admit that following 11 profitable months in 1967, TSL fell into the red, plagued by mismanagement, unfulfilled vendor promises, and trouble with communications lines. The story sounds painfully familiar. TSL began with PDP-7s and graduated to PDP-10s in January 1970. But the 10s were a year late because of Digital Equipment Corp.'s technical problems; and TSL had a building, people, and lines waiting and costing. But now, Davis says, all that is past, and TSL has been profitable for several months.

Leasco Unit Is Finding Good Fortune in Europe

Leasco Europa, Ltd., with revenues of $25-30 million, expects a whopping $5 million profit, managing director Peter Stevens told us in a London interview.

Three years had passed since we last talked. At that point in 1968 the U.S. leasing business was in its heyday, and the ex-CDC marketeer had just been appointed to head the first big push into Europe by an American leasing firm. Stevens was backed by a $15 million loan agreement from a European banking group. And this fall, sitting in well appointed offices on the fashionable Knight Bridge Road in London, he talked to *Datamation* about the track record amassed by the European operations.

Leasco has fared better abroad than in the U.S. Revenues are coming from leasing, a software service company, and batch and time-sharing computer centers. Another $14 million is being gathered by Leasco-owned Inbucon Ltd., a 1,200-man management consulting firm.

Leasing accounts for half Leasco's revenues. It has 100 systems valued at $130 million installed in seven countries. Most are IBM 360s, with a few ICL and Univac systems. Leasco also has options on $65 million worth of 370s, which it ordered just before the British government abolished its 20% investment grant. Even though the lessor hasn't bought most of the systems, it is still entitled to the grant, Stevens said. He said sales are slow in 370s and only a few have been leased.

Most of its installations — in the U.K., Germany, France, Italy, Switzerland, Holland, and Belgium — are 4-6 year leases, and in a majority of the contracts, Stevens claims, better than 100% of the computer costs are recouped. Half of Europe's top 150 companies are clients, but not Rolls Royce. Stevens, smiling, said a U.K. bank lost nine months' rent on a 360/65 it had leased to that ailing company.

"If there were no financing problems in these countries, we'd have a company that is three times bigger," Stevens asserted. (One must borrow in local currency.) France, for example, would be the "biggest market in the world" if it weren't murder to get money there. The U.K., though constituting 40% of the leasing market in Europe, has a conservative attitude toward leasing, and financing is difficult. Germany has "easy money," but it looks at leasing as "parasitic."

Where to next? Ireland, Sweden, Scandanavia, and Austria. Stevens would really like to go to the Iron Curtain countries, "but I don't want to start a major campaign and get rebuffed in Washington," he said, commenting on U.S. restrictions on trade there. If East Europe didn't have to pay cash, "we could do a tremendous amount of business here. We'd go in as a computer service company, taking deferred payments, providing full systems engineering, installation, and application programming support. We've had feelers from East Germany and another country."

Leasco appears to be doing in Europe what several leasing companies dreamed of in the U.S. a few years back, but few accomplished. It has surrounded the leasing operation with a complement of 250 software personnel in the U.K. and Holland and two service bureaus. The software operation is profitable on $3 million in annual revenues. Some of the revenue comes from services to leasing customers that are packaged into the leasing price.

The service bureaus include a year-old time-sharing operation with four Hewlett-Packard systems which seems to have benefited from the costly errors made by Leasco Response in the U.S. a year before the U.K. start-up. That operation has grossed about $300,000 in '71 and will more than double in '72, Stevens claims. A 360 batch operation also is run in the U.K. and includes services for travel tour operators. It has a 360/40 batch center for bookkeeping, payroll and ocr services, and will go to time-sharing in '72.

Stevens noted that to do business in Europe, "physical presence and credibility" is needed. Leasco has a mixed reputation, he admitted, because of its fiasco in trying to acquire

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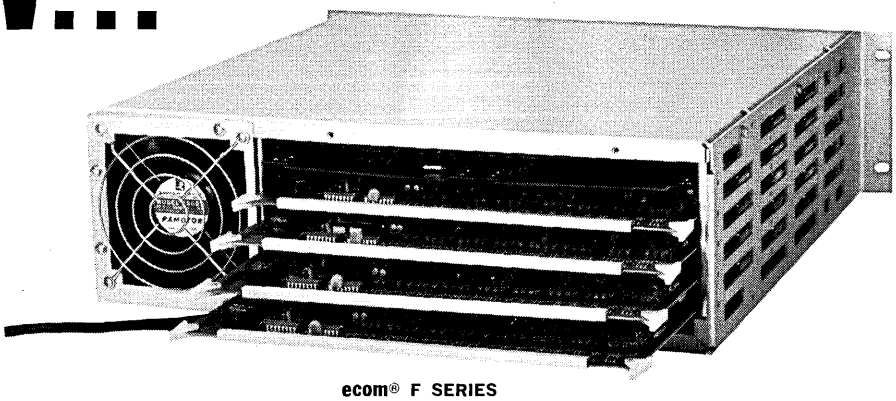

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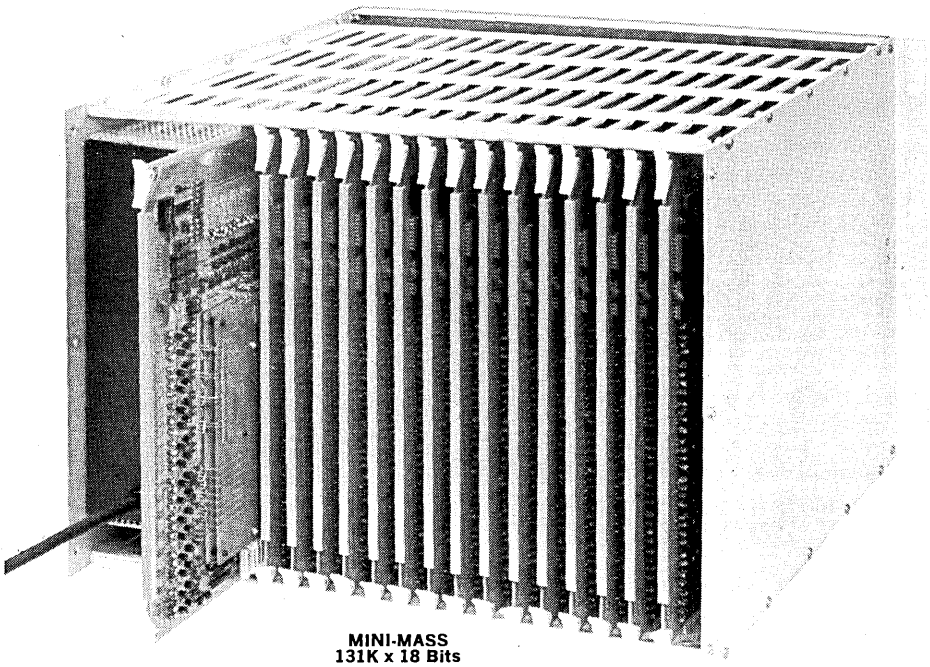

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CIRCLE 19 ON READER CARD

Pergamon Press. Leasco had bought out the firm because of figures showing a profit that ultimately were found to be false. This led to a very un-British fight between the two that hit the press and left Leasco with little more than millions in lawsuits and a reputation for being loud and foolish. This hurt the service side, but not leasing, Stevens said. And the company is anxious to see this part of its past die.

$250 Million Market Seen for Australia

Computer orders in Australia, as elsewhere, had been growing annually. That is, until 1971. The value of such orders, based on the Australian dollar, had been on the order of $55 million in 1968 and '69, risen to $75 million in '70, and had been expected to reach $81 million this year. Instead, it will fall short by $35 million, according to Brendan Birthistle, business planning executive with International Computers (Pacific) Pty. Ltd., subsidiary of the British ICL.

As for the rest of the 1970s, he added: "All things considered, a more sedate annual growth rate of 15% in the value of computer orders is forecast to 1980." In that year, he said, orders will reach $250 million.

Industry employment in Australia, he continued, was 16,500 in 1968 and would reach 35,000 in '75, going up to 60,000 in 1980. At that rate, by 1981 it will represent 1% of the total working population, projected at 6.9 million.

Tempo Picks Up Among Japan's Big 6

A year ago, no one would have guessed that it was possible. And yet it apparently is; it comes as a complete surprise, and therefore it is a breakthrough typical of the Japanese. This nation's six major computer manufacturers may shortly be reorganized into three, a move whose rapidity is astonishing, especially when one considers the lengthy wrangling that goes on in Europe.

Admittedly, Europe doesn't have a powerful central-government body like Japan's Ministry of International Trade and Industry (MITI). Some years back, MITI saw that six mainframe makers for such a small nation were too many, that two or three were far preferable. So, it decided to award a joint contract for the development of a major system — one company to come up with the cpu, one to provide tape drives, another the card equipment. Alas, through a lack of coordination, the finished product never performed as expected and the project is considered a dismal failure.

MITI also thought about restructuring the industry into one producer of large systems, one for medium-scale systems, and one for small. That comes to three companies, and that's better than six. Or, how about a manufacturer of business systems, one for scientific ... ? Well, none of these came off, either.

By mid-'71, thanks to MITI's close control, the industry looked about like this: IBM had some 30% of the market; Hitachi, an RCA licensee, had 17% based on the value of installations; and another 17% or so was accounted for by Fujitsu, the only domestic maker without an alignment to a U.S. firm. Then there was Nippon Electric, a Honeywell licensee with 11%; Oki with 5% and licensed with Univac; Toshiba with 4% and licensed with the late GE; plus lowly Mitsubishi Electric, licensed with Xerox Data Systems and having a mere 1.5%.

The temblor that shuffled them into some saner order was President Nixon's announcement in August, discontinuing the redemption of dollars for gold and proposing a 10% surcharge on imports to the U.S. The Japanese call it the "dollar shock."

Adding to the trauma experienced by the Japanese industry these last few months was RCA's announcement that it was dropping out of the general-purpose computer business. It was a decision that hit most directly at Hitachi. Perhaps equally significant, this blow set off the next incident — a start toward the restructuring of the industry.

"I don't think there is a single computer-related company in Japan that will not, in one way or another, have to make some adjustments because of what's going on here," says one close observer. And the resulting adjustments, he adds, will be felt all the way down the line.

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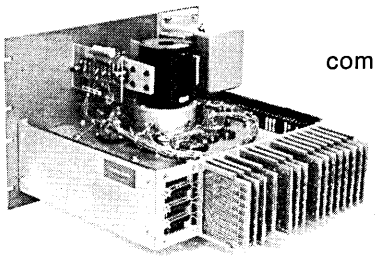

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CIRCLE 7 ON READER CARD

Predictably, the two largest firms were the first to announce a link-up. This takes the form of a joint enterprise (see Dec. 1, p. 45). According to one source, MITI encouraged and speeded this decision with a contract to develop the large-scale computer that the phone company will use for its on-line services. This operation, called DIPS (Dendenkosha Information Processing System), is the government-backed phone company's own time-sharing network and the only such service available to the public. Plans are to link some 6,000 terminals to it in a few years.

Of the four remaining companies, Oki-Univac and Mitsubishi have announced a tie-up, but no details have been released. These two have cooperated extensively in the past, especially with sales. Mitsubishi sells Oki-Univac's large systems, having none of its own, and Oki sells Mitsubishi's smaller systems.

That leaves Toshiba and Nippon Electric, which reportedly are still negotiating. Sooner or later, it's expected, these will get together. Should this restructuring occur, it would be a major accomplishment for MITI, producing a strengthened industry with much greater hopes of competing in world markets. This, in turn, might be the shock needed to prod disparate European mainframe makers into an alignment that would enable them to become strong contenders.

Sci-Tek Sues Univac for $150 Million

Sci-Tek, Inc., has filed a $150 million antitrust suit against Univac and University Computing Co. alleging violation of the Sherman and Clayton acts. The complaint grows out of Univac's refusal, in effect, to permit use of a system called "Speedpak," developed by Sci-Tek at the Navy's 1108 installation at China Lake, Calif. (Nov. 1, p. 50). The system uses an independently made memory manufactured by Weismantel, Inc., of Minneapolis. UCC owns the 1108 at China Lake, which is maintained by Univac, and also has a 10% interest in Weismantel, which is in the midst of Chapter XI bankruptcy proceedings.

Sci-Tek is a systems developer and service bureau operator headquartered in Wilmington, Del. The complaint charges that Univac, besides killing Sci-Tek's chances of bidding on the China Lake system contract, has also used unfair methods in competing with Sci-Tek's service bureaus. Specifically, Univac's manufacturing arm allegedly sells equipment to its service bureau arm at greatly reduced prices, enabling the bureaus to charge far less for machine time than competitors like Sci-Tek, which must acquire equipment at market prices. Sci-Tek is owned by W. Henry du Pont.

In the China Lake dispute, Univac argued that the 1108 interface specs are proprietary and therefore don't have to be disclosed to either the government or other suppliers. The company insisted that, if forced to reveal this data, it couldn't fulfill its responsibilities under the China Lake maintenance contract. Subsequently, the

Datacraft has killed the concept of the **maverick** computer line.

So you can now plan ahead

Navy withdrew the rfp on which Sci-Tek wanted to bid — which covered enhancement of the existing system — and announced that it was going to invite bids on a system replacement. Sci-Tek, in its antitrust complaint, alleges that it is locked out of this new rfp.

All other major cpu makers agree with Univac regarding disclosure of interface data. IBM was charged several months ago by independent peripheral spokesman Richard Caveney with re-engineering the I/O interface on the 370 to shut out competition from independents.

The Sci-Tek suit comes at a time when GSA is reportedly developing changes in federal contract language that would enable the government, at its own option, risk, and expense, to attach other makes of peripherals directly to cpu's leased from mainframe manufacturers. A semifinal draft of a new language was being written as we went to press. Meanwhile, the Computer Sciences and Engineering Board, a constituent of the National Academy of Sciences, is said to have recommended that dp system suppliers disclose I/O interface specifications whenever they announce new systems or controllers. The recommendation was being evaluated by the National Bureau of Standards at press time; a decision was expected momentarily. An NBS source said the Justice department's antitrust division was among the agencies being consulted.

A spokesman for Congressman Jack Brooks thought the feds should require disclosure of interface data on existing leased systems as well as new ones. "After all, who is paying whom?" he asked. "No supplier should be able to keep the U.S. government from optimizing the use of a computer system so long as the system isn't damaged."

LAPD Hopeful of Big Federal Grant

The Los Angeles Police Dept. was hopeful last month of receiving some $45 million in federal funds for its most ambitious advanced system to date, an Emergency Command Control Communications System (ECCCS) which would cost $58 million over a four-year implementation period.

Police chief Edward Davis was to go to Washington in mid-November to work out details of the funding, but a department spokesman said Davis was assured by Attorney General John N. Mitchell in early November "not to worry, you'll be getting the financing, but because of the size of the amount it will have to come from several sources."

Some $200,000, of which $93,000 was a grant from the Law Enforcement Assistance Administration (LEAA), already has been spent on design and development of the system. Hughes Ground Systems, prime contractor for the design and development phase, has a mock-up of the system up and running at its Fullerton, Calif., plant.

There has been widespread interest in this project among state political leaders on both sides of the political

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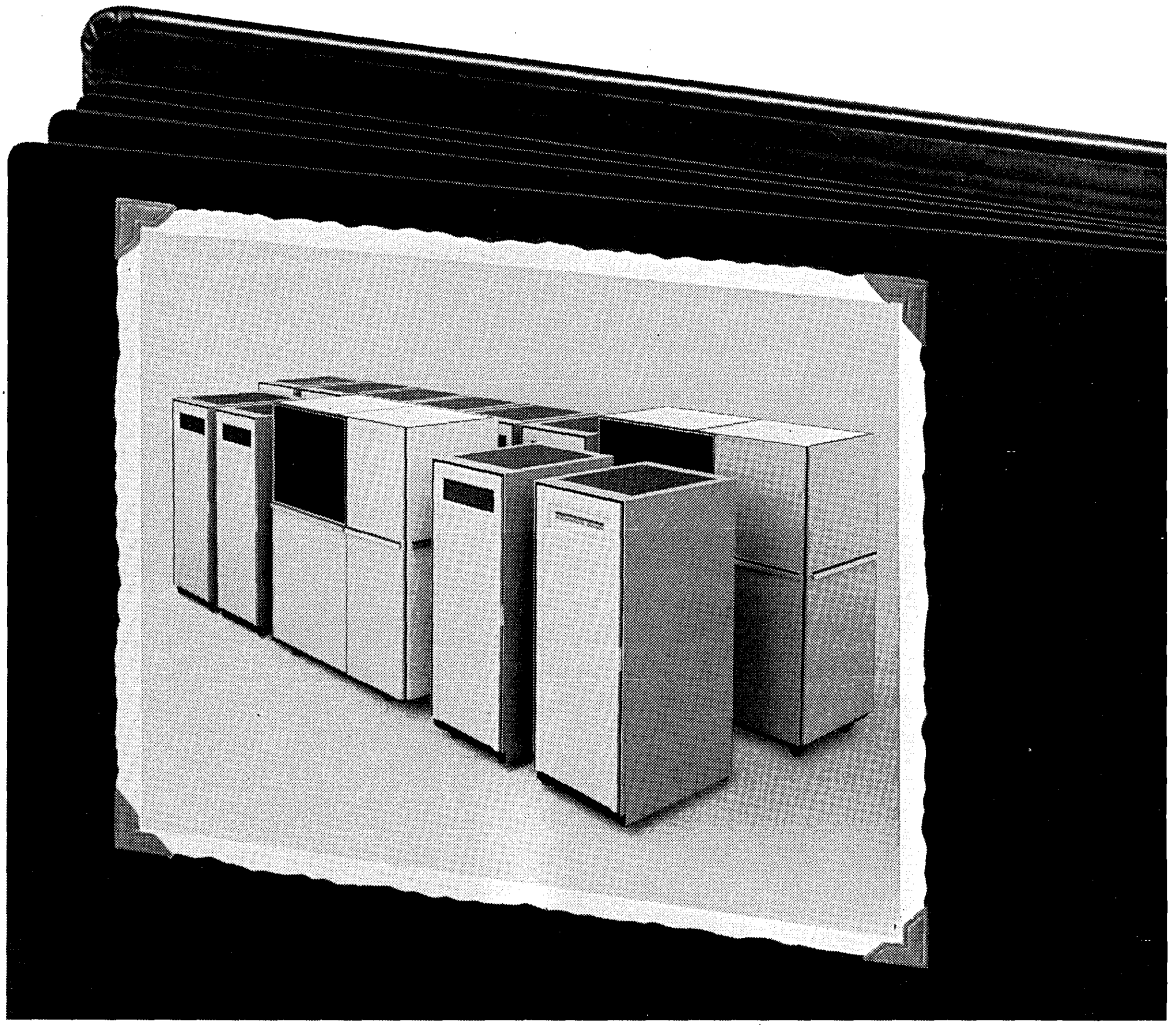

CIRCLE 8 ON READER CARD

fence, as it's felt it could be a boon to the state's ailing aerospace industry. It's the kind of a system that could make use of technology developed by aerospace firms, said Lt. Clyde Cronkhite of LAPD Advanced Systems. If the funding comes through, an rfp will be issued next spring which will benefit one prime contractor and a number of subcontractors, he said, and all of these could be aerospace firms.

He said the new system over a 10-year period would save the city $33 million in actual cash plus $44 million in field time. One saving would be in radio frequencies. Expanding the existing communications system over the next 10 years would require 20 new frequencies. The new system would need only five. The present manual system, expanding over 10 years, said Lt. Cronkhite, would cost $112 million as opposed to $78 million for ECCCS.

The proposed system would serve both the police and fire departments, giving their field vehicles the capability of direct communication with appropriate computer files. Electronic vehicle locating devices would automatically transmit car locations to a centralized communications center to permit proper selection of units for dispatching purposes. An added goody would be a device the size of a pen through which police officers could call for help when away from their cars. The device would communicate to the car which would communicate with the computer which would dispatch the closest back-up unit. Lt. Cronkhite said this is a particularly valuable feature of the system since LAPD averages some 600 assaults on police officers a year.

Each officer would have a Teletype terminal in his car which would reduce by 70% the number of voice calls now handled in the manual communications system, Lt. Cronkhite said. It also would mean officers would no longer have to keep logs, as their communication via Teletype would enter all necessary information into the system.

RCA Users: The Breach Wasn't There

A San Francisco Bay-area facilities management firm which, at the time of RCA's September announcement considered the RCA Computer Users Assn. "too weak and vendor dominated" to become a legitimate voice for users as a whole, has changed its tune.

Computer Synergy Inc., Oakland, was prepared to "step into the breach" by forming an RCA Interest Group, a separate nationwide alliance of RCA users "to be a source of information on the impact of RCA policies and to define and examine technical alternatives." It withdrew from this plan after the October RCA CUA meeting in San Francisco. "The users' group has taken a mature and reasonable posture, splitting off from RCA and moving into a niche we thought wouldn't be filled," said Computer Synergy executive vice-president Philip Carvilfe, "so what we had planned isn't needed." He said his firm will "serve as a sort of mini-clearing house for RCA users, making available any information we have gathered for the asking."

Computer Synergy polled 400 users by mail on its abandoned plan and received 18 responses, "mostly from the larger, multiple-cpu users." Among the services they could per-

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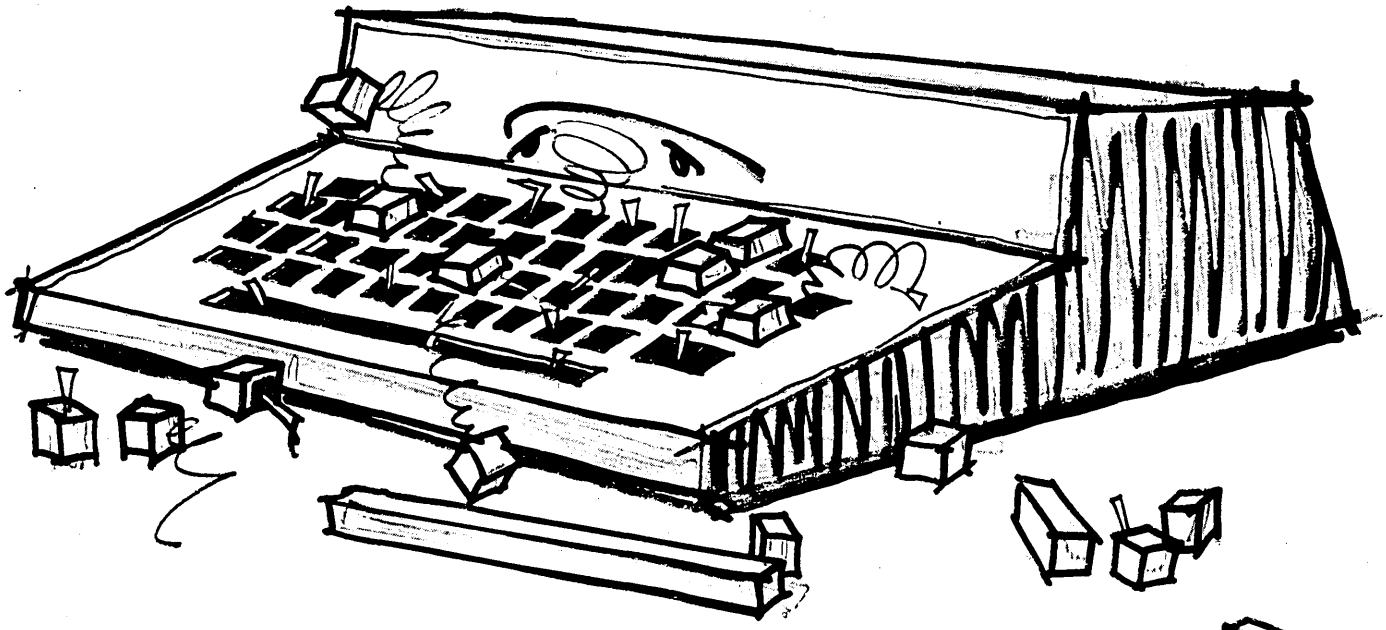

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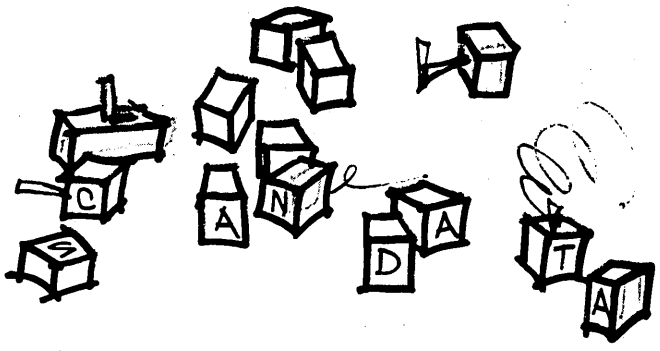

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form, said Carville, would be putting a user in touch with others with the same or similar problems.

"How to Do It" One or Many?

California daily newspapers early last month were hinting scandal when personal relationships were uncovered between state Assemblyman Kenneth Cory and officers of financially troubled American Computer Resources, Inc., which had a $200,000 contract from Democrats in the state Assembly to prepare computer profiles and analyses of voter precincts in the state, for use in reapportionment of legislative and congressional districts.

The contract was let without competitive bidding, a factor criticized in some quarters and defended by Michael Berman, a staff member of the Assembly Elections and Reapportionment Committee with, "Clearly there was no other company that had any notion of how to do it."

This might be news to the state Senate's reapportionment committee which let a similar contract to System Development Corp. after issuing an rfp to 33 companies of which 10 responded and were evaluated. Heading the list was IBM. Others besides SDC were Autocomp, which had done similar work in Illinois; Computing and Software; Brady Tower, Inc.; the Institute for Government Studies of the Univ. of California at Berkeley; Decision Making, Inc.; Executive Computer Systems; Westwood Research, Inc.; and Computer Sciences Corp. Presumably these 10 companies would disagree with Berman's evaluation.

NEWS BRIEFS

Million Dollar Leasing

Third party leases of IBM 370 equipment is adding up to lots of dollars. Computer Systems of America, Inc., Boston, last month said it had arranged for the lease of three 370/165s to Manufacturers Hanover Trust Co., New York City, for a total lease value of $12 million. Alanthus Corp., Fort Lee, N. J., said it had concluded a lease with Ford Motor Co. covering some $4 million of 370 equipment,

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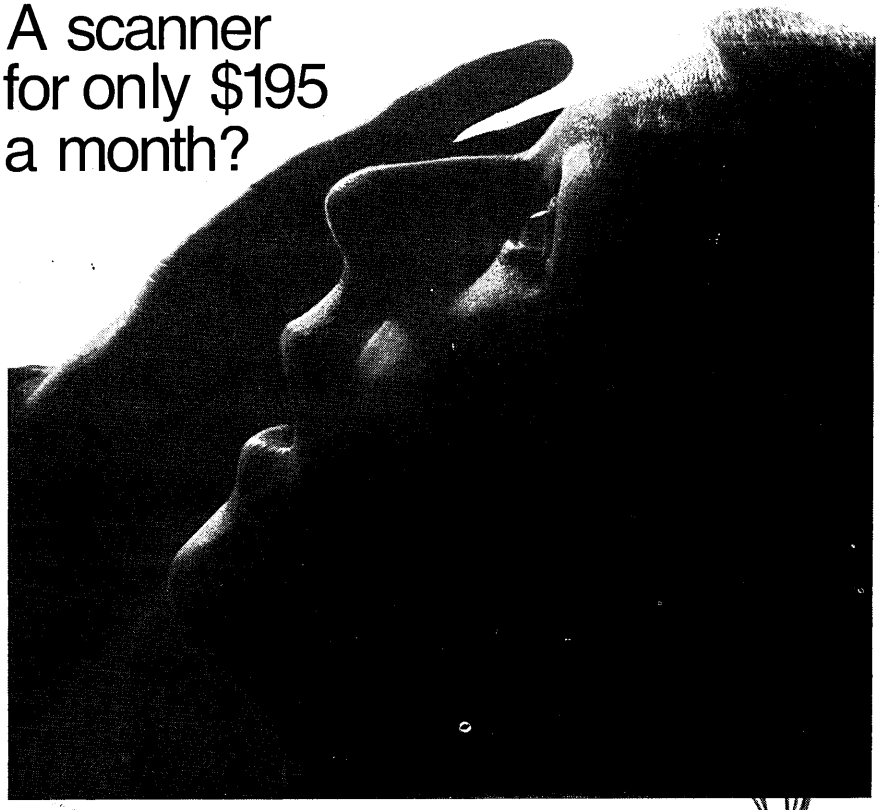

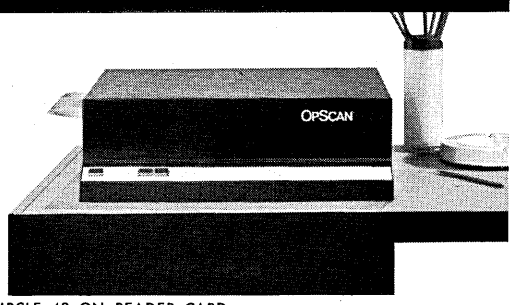

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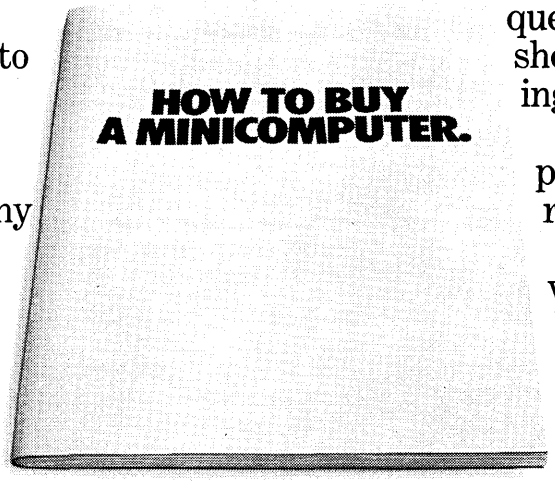

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Assignment in Rio

The problems and challenges of computer education for developing countries will be tackled next Aug. 6-12 in Rio de Janeiro, Brazil, in a symposium on Computer Education for Development, cosponsored by the Brazilian Academy of Science, the Intergovernmental Bureau for Informatics-International Computation Center, Rome, and several associations. Purpose, say organizers, is to "expose some of the problems faced by a developing nation attempting to make giant strides through the use of computers." Information is available from Professor L. Martins, Director, Riodactacentro, Pontifical Catholic University of Rio de Janeiro, Rua Marques de Sao Vicente 209.263 - Zc20, Rio de Janeiro, Brazil.

Peripherals Market

Computer peripheral sales accounted for $5 billion of the $8 billion computer industry market in 1970, according to the New York research firm, Frost & Sullivan, Inc. A 150-page study just published by the firm projects peripherals sales to increase to $12.6 billion by 1978.

IEEE Looks at OS

The Institute of Electrical and Electronics Engineers (IEEE) has formed a new technical committee within its Computer Society to study the theoretical and experimental aspects of operating system design. Dr. Thomas H. Bredt, assistant professor in the Electrical Engineering Dept. of Stanford University, chairman, said the committee will focus on "multiprogramming, resource allocation, scheduling, memory management, input/output control, file systems, time-sharing, protection, measurement, performance evaluation, system reliability, modelling, analysis, simulation, and implementation languages. Membership is open to all with an interest. Dr. Bredt can be contacted at: Digital Systems Lab, Stanford University, Stanford, Calif. 94305.

SHORTLINES

Europe's data communications traffic and equipment will be analyzed by Quantum Science Corp. of Palo Alto and New York and PA International Consultants Ltd. of London under a $1 million study contract awarded by a consortium of post and telephone ministries from 15 European countries ... Scan-Optics, Inc., East Hartford, Conn., delivered its first 20/20 system in Europe and moved into the Japanese market via a verbal agreement with Mitsui & Co. which will give Mitsui exclusive marketing, distribution, and service rights to the 20/20 for three years ... Pertec Corp., Chatsworth, Calif., signed up Mitsubishi Office Machinery Co., Ltd., as Japanese distributor for its 2700 computer output microfilmer ... Leasepac Corp., Cleveland, exhibited its disc packs last month at the second Solo Exhibition of the United States Dept. of Commerce in Sao Paulo, Brazil, and has begun active marketing of the packs in the South American country ... Computer Dynamics, Inc., Oak-

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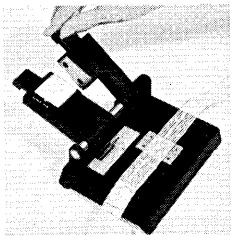
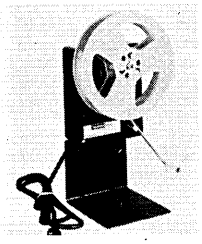


SPLICERS



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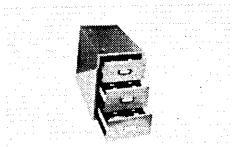

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land, Calif., signed PRA Data Management Resources, Ltd., Montreal, to lease its computer programs in Canada ... The 15 Canadian chapters of the Data Processing Management Assn. have formed the "Canadian DPMA Institute — Institut Canadian De L'Acfor." ... Control Data Corp. moved into the real estate investment field via its Commercial Credit Co. subsidiary which has formed a new subsidiary of its own, Commercial Credit Development Corp. It will seek joint venture projects with developers, contractors, and/or financial partners on a limited basis ... Courier Terminal Systems, Inc., formed a new systems development division to "design and install complete systems using Courier's IBM-compatible crt terminals, in addition to equipment acquired from other manufacturers, to satisfy the customer's complete terminal system requirement." ... Photo Magnetic Systems, Inc., Chicago, self-described as "the pioneer in use of the standard telephone without modification as a means of transmitting data direct to computer," has snacked while looking for a meal. Talking with "a number of companies" re acquisition, Photo Magnetic completed the purchase of Be-Mo Foods, Inc., Kalamazoo, Mich. (maker of potato chips, popcorn, and other snack foods) and will incorporate its "Comput-A-Phone Translator" in Be-Mo's data processing systems ... Two Delaware Valley-based facilities management firms, National Information Systems Corp. and Investments & Leasing Corp., have agreed to merge ... Computer Dimensions, Inc., Dallas has acquired Church Systems, Inc., Houston-based provider of on-line services to churches; an interest in the credit union services of CTC Computer Corp., Los Angeles; and the communications division of NCS Computing Corp. of Dallas ... Lowrance Electronics/Oktronics, Inc., Tulsa, Okla., acquired manufacturing and marketing rights to Honeywell's circular magnetics and paper tape readers and handlers ... Weston Leasing Co., Hudson, N.H., was named distributor in East Coast markets for Centronics Data Computer Corp.'s printer and data terminal product lines ... The National Broadcasting Co., gearing up for the 1972 elections, has ordered some $100,000 worth of data communication equipment from Computer Optics, Bethel, Conn.... Compu-Time, Inc., Daytona Beach, Fla., and United Computing Systems, Inc., Kansas City, entered into a marketing agreement whereby each will market the services of the other in its marketing area. Both are time-sharing companies ... Wolf Research and Development Corp., Riverdale, Md., was named to provide software support for NASA's Multi-Satellite Operations Control Center ... Boeing Computer Services, Inc., purchased "certain software, customer rights, and associated operations" of MegaSystems, Inc., NYC t-s company ... GTE Information Systems Inc. entered the third-party maintenance field with announcement of "a rapid build-up in service operations to penetrate the equipment maintenance market." ■

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CIRCLE 53 ON READER CARD

Some things are better slowowowowow. But not assembling.

PICA....*the cross assembler for the PDP-11 and SPC-16.*

Assembling on a PDP-11 or SPC-16 can be just plain painful. Without a high-speed printer or even a card reader, assembling can go on interminably. Consider PICA from Programmatics. If you have access to a host IBM 360 (OS or DOS) or a System 3, PICA allows you to cross assemble with PDP-11 or SPC-16 as the target. In minutes. PICA is an assembler, cross reference and link editor. In addition, PICA is a relocatable assembler with a powerful macro language. Naturally, from Programmatics, creators of PIFORT, PISORT and other unique software products.
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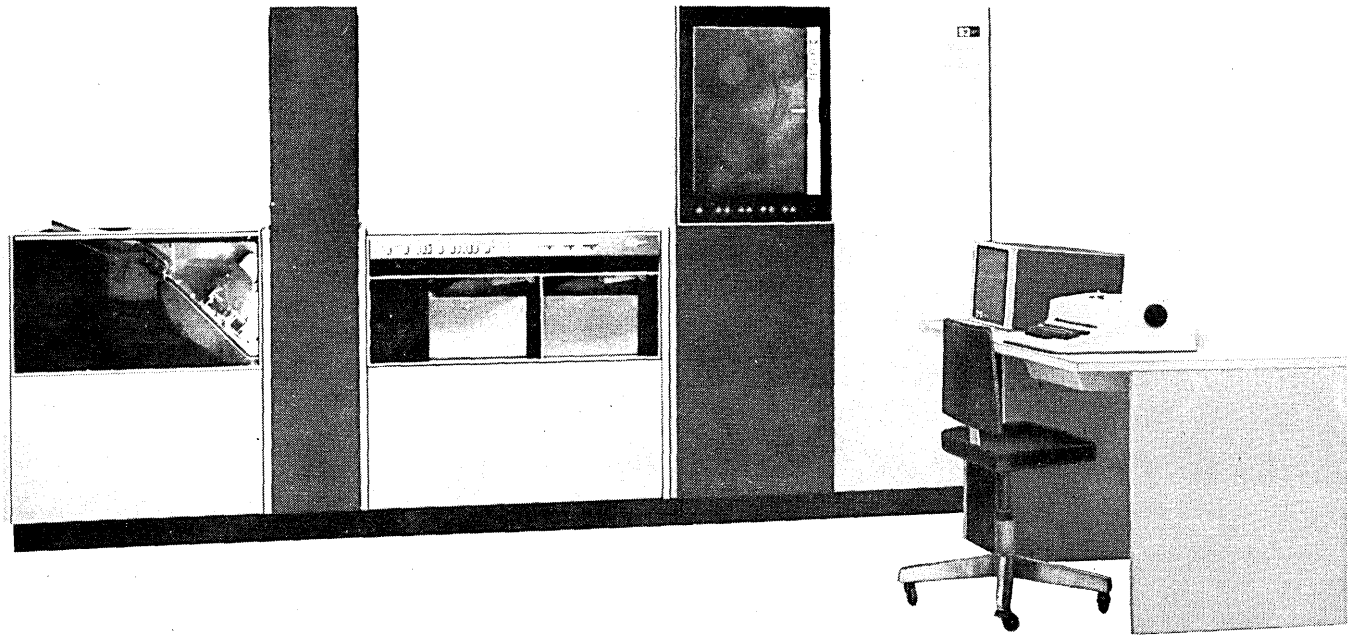

input?

Problem: At least 30% of your data processing dollar is spent on input. The key to solving your data input problem is not keypunch, or keydisk, or key verifier, or keytape, or key anything else. The real key is the Scan-Optics 20/20™, the versatile, high-thruput, low-cost Page/Document optical character reader.

The 20/20 is the off-line, direct data input system that not only obsoletes keyboard systems . . . but has a Cost-Performance ratio that practically obsoletes all other readers.

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Scan-Optics Inc

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Send me all your 20/20 info.

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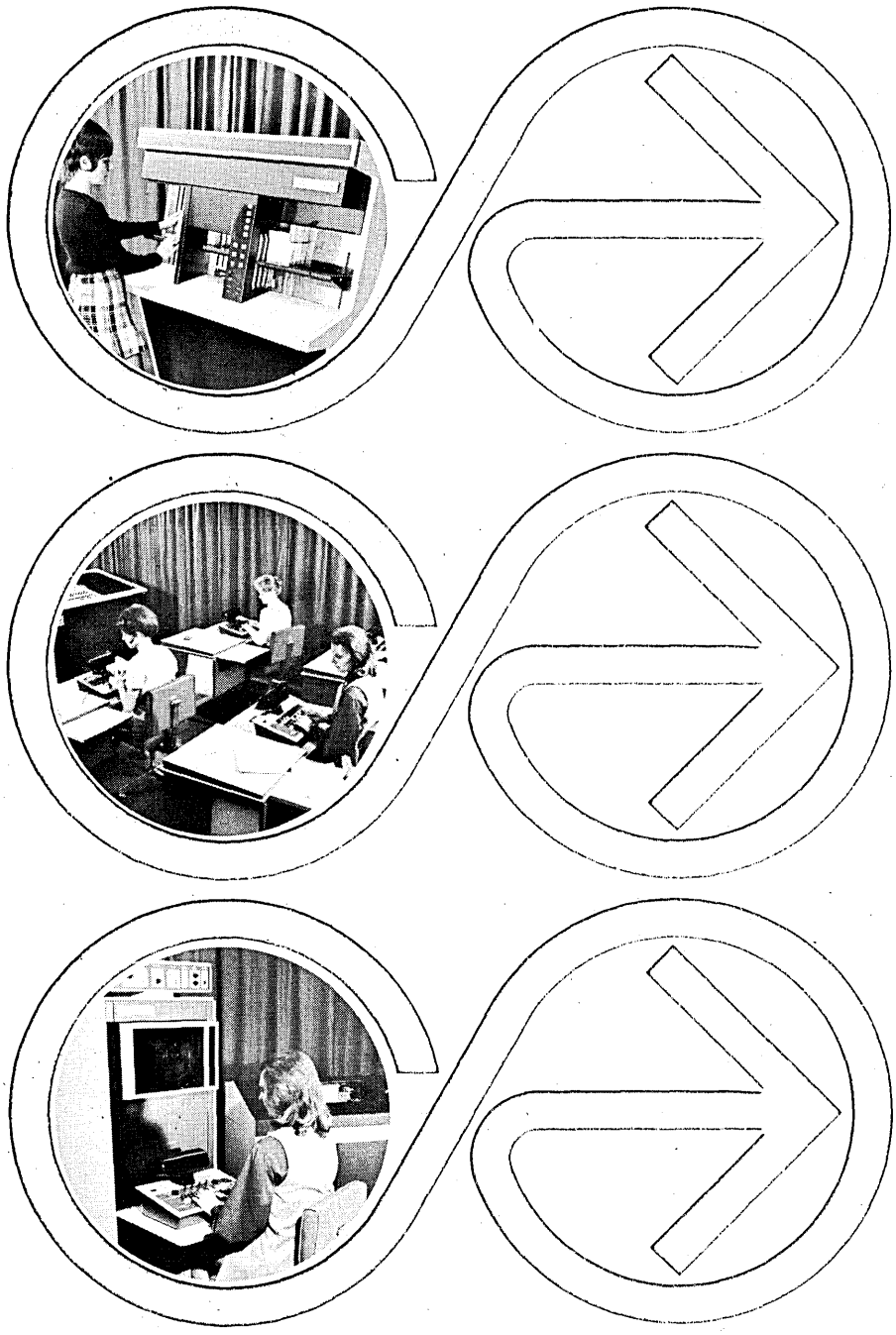
COMPUTER ENTRY SYSTEMS'

TRIUMPHANT NEW TRIO!



"We're working to solve basic widespread data entry and communications problems, not just build replacements for existing devices."

Brian Cunningham,
President,
Computer Entry Systems Corporation

7300 BRAND NEW
OCR Document Reader

Finally, a *low cost* OCR Document Reader with the right combination of performance, simplicity, and ruggedness. For $395 per month, it can be interfaced to either of the two CES Data Entry Systems described below to provide compatible tape output. Or, for $595 per month a complete stand-alone reader with punch card output is available. Monthly billing for utilities, loan payments, insurance premiums and retail credit are among the many profitable applications for 7300 processing.

8200 BRAND NEW
Key-to-Cassette System

All the economy and productivity of a multi-terminal time-shared system PLUS the versatility of single station devices PLUS the flexibility of cassettes . . . at the lowest cost per entry available today. Cassettes make it easy to keep jobs separated and eliminate bulky card and tape reel handling. Up to 8 stations share the buffered memory, giving each variable record length from 20 to 400 characters. The 8200 combines manual key input with automatic readers to provide a totally new concept in data collection.

8500 BRAND NEW
Multiple-Input/Communications Terminals

Not just simple, single station units, the family of terminals that make up the 8500 Series offer high-volume, high-speed data entry and communications capabilities to everyone who must feed batch data from remote offices or plants to centralized EDP installations. The 8500 is capable of accepting both manual keyed input and automatic input via OCR, punch card, mark sense, and other CES input readers. The data is then transferred to point of utilization at 3600 Baud over voice grade phone lines.

SYSTEMS APPROACH CES believes there is no one solution to data entry problems. That is why we make a family of products that can be configured to meet *your* individual requirements. And with each is available a wide range of options—automatic program loader, punch card reader, mark sense reader, check digit, high and low speed printers, communications to 3600 Baud, OCR reader, CRT display, 7 or 9 track compatible tape output. The ability to combine key data entry and source data automation in the same system makes the CES solution unique.

Get all the facts about these new input outperformers from CES. Contact:

COMPUTER ENTRY SYSTEMS CORPORATION
2141 Industrial Parkway
Silver Spring, Maryland 20904
(301) 622-3500

CIRCLE 10 ON READER CARD

360/65 Memory Add-on

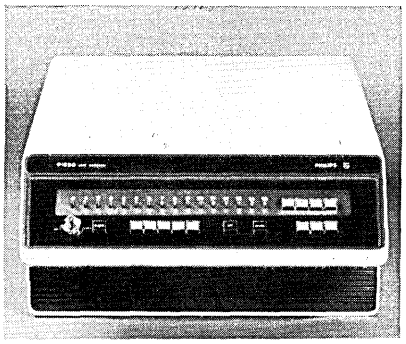
Attention 360 model 65 owners, lessors, and renters. For you, Christmas comes a bit early this year in the form of a 360 main memory add-on that might make you send back your 2361 LCS (or plug-compatible vendor's equivalent). Compare what you are paying for your 65 memory to these figures: *two* megabytes of 750-nsec core (double the current maximum ration) for $25K/month on a two-year contract (or $22K/month if you sign for four years). One megabyte plus a 256K chunk runs $19,440/month. That price is just about what IBM gets for 512K of main memory. The memories are also for sale, and the first customer takes delivery in March. If that isn't enough to convince you, how about claims that the added memory makes the 65 a pretty good performance contender against the 370/155? FABRI-TEK, INC., Minneapolis, Minn. For information:

CIRCLE 525 ON READER CARD

Minicomputer Family

With prices starting around $2K, there's bound to be more than passing interest in the P850, P855, and P860 minicomputers from cost-conscious oem's worldwide. That price is for the P850, with 512 (16-bit) words of 3.2-usec core expandable in 512-word increments up to 2K. It has a real-time clock, digital and analog I/O, and power fail-soft.

If something more is required, one might choose the larger P855 with its 4-16K of 1.6-usec memory. This model has DMA, a multiplex channel running at up to 120,000 words/second, and three types of communication line control units, among other features. Prices here start at about



$3400.

Top of the MSI/TTL-line is the P860 with its 840-nsec cycle time, 4-32K of store, a multiplex channel that runs twice the rate of the 855's, an MICM (Memory Increment Data Break) channel, plus the features of the smaller models of the series. There are over 100 instructions in the cpu, 14 general-purpose registers, an instruction counter, and a stack pointer. Prices for this version start at $4350.

A standard line of peripherals is offered. For software the series gets a choice of a 1K exec, a 4K single-task supervisor, an 8K real-time monitor, or an 8K DOS; several assemblers; ANSI FORTRAN in 4K and 8K versions; plus linking loaders, peripheral drivers, a mathematical library, editing routines, diagnostics, and utilities. NV PHILIPS-ELECTROLOGICA, Apeldoorn, Netherlands. For information:

CIRCLE 516 ON READER CARD

Mini System

System 75 is the single name applied to a variety of customized computer systems built around Data General Nova and Supernova minicomputers. Available systems can operate standalone or on-line to System/360 or 370 cpu's. Applications include use as a communications front-end and for preprocessing of data. Software includes an operating system and a subset of PL/1 dubbed PL/75. System 75 is the result of joint work by the vendor and Mark Computer Systems, a firm which previously marketed the System 70, a communications system. The price range of the System 75 is $50-500K. One system valued at more than $500K has already been sold to Uni-Card for credit card processing. It includes two Supernovas and 40 crt terminals plus audio response capability. GENERAL INSTRUMENT CORP., Hicksville, N.Y. For information:

CIRCLE 524 ON READER CARD

Nova Paper Tape

The Tally model R 5000 photoelectric paper tape reader is now available with an interface for the Data General line of minicomputers. Designated the N105, the peripheral responds to all paper tape commands and loads programs "50 times faster" than the ASR 33 tty will. The 500-cps reader is compatible with standard Nova software when in the incremental mode. Additional modes under program control are forward slew, forward wind, reverse incremental, reverse slew, and rewind. Speeds are 300 cps for incremental, 500 cps for slew, and 1200 cps for rewind. With 7½-inch reels, the price is $2495. For fan-fold tape, the price drops to $2195. Delivery is 60-90 days ARO. PIVAN DATA SYSTEMS, INC., Lincolnwood, Ill. For information:

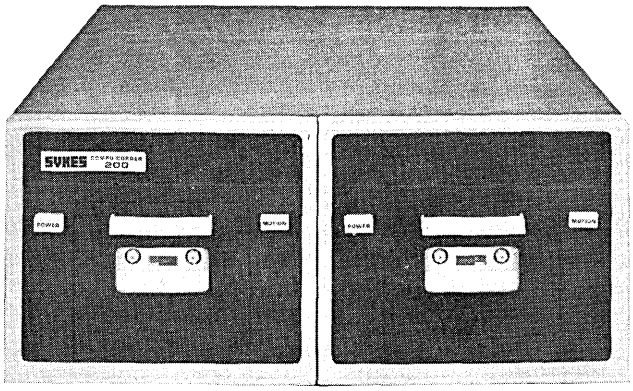
CIRCLE 521 ON READER CARD

Calculator Disc Storage

Programmable calculators continue to proliferate, providing computer-like functions; and now this vendor is providing disc storage for its 700 series. The model 710-1 disc unit provides 256 kilobytes of storage using two 128K discs, one fixed and the other removable, for storage of both programs and data. The 710-1 operates under keyboard or program control. Delivery is six months ARO, and the price is $6K. WANG LABORATORIES, INC., Tewksbury, Mass. For information:

CIRCLE 520 ON READER CARD

GET THE MAXIMUM



FROM YOUR MINICOMPUTER... OR TERMINAL

Would you like fast access to recorded data with high-speed data transfer and greatly expanded storage capacity?

Then you should own the Sykes COMPU/CORDER 100®

A Magnetic Tape Cassette Device that is available in one, two, three or four deck versions and which . . .

- **Provides high-speed direct access** to data in both forward and reverse direction. An average search takes only a few seconds.
- **Offers fast data transfer.** Can load a full 4K program in less than 15 seconds.
- **Offers additional memory** of 360,000 words per cassette . . . an extra 3,600,000 bits.
- **Is sold complete** with interface and software for use with all Data General computers, the Digital Equipment Corp. PDP-8 family, the Varian 620 and H-P 2100 series, and the Microsystems 810 minicomputers.

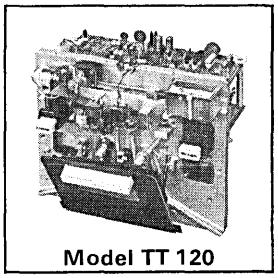
AND

- **Has proven its versatility and reliability** in systems installed worldwide.

FOR OEM's AND SYSTEMS BUILDERS:

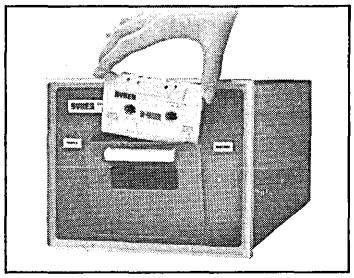
Features:

- **Low cost** combined with rugged reliability of Compu/Corder 100®
- **Versatile** synchronous or incremental recording and high-speed search capability



Model TT 120

SYKES TAPE TRANSPORT



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SYKES

SYKES DATATRONICS INC.
375 ORCHARD STREET
ROCHESTER, NEW YORK 14606

Modular Computer

Recently we have seen some very interesting machine architectures turn up in unexpected places—the low-cost end of the computer spectrum. The MULTUM is one such computer, offering a layout similar to a Burroughs B 6500 or Univac 1110, using 16-bit words. Processors come in three different potencies, all having hardware multiply and divide (and even hardware program protection on the larger versions).

Up to eight of the cpu's talk with up to four storage blocks simultaneously through a processor/store multiplexor capable of supporting 8-megabyte data rates. Each storage block is expandable from 4-64K of either 650-nsec core or optional MOS memory.

What all this adds up to in the larger configurations is a machine said to outperform a 360/50 in Gibson mix comparisons—though that really isn't the market place the MULTUM will first be seen. It's more likely to see duty as a communications front end in fairly saturated environments, or in real-time applications that have heavy traffic. To that end, the mainframe components of the MULTUM connect to a multiplexed I/O processor with an aggregate data rate of up to 500 KB for support of up to 128 devices, or to a programmable asynchronous communications controller for handling up to 128 slower speed devices. A full complement of peripherals is offered—but if your favorite isn't on the list, ICS promises to interface "almost anything" in 90 days.

MULTUM will debut with a FORTRAN IV compiler and an executive for multiprogramming in the multiprocessor environment. Other compilers planned are ALGOL 60, BASIC and CORAL. There are also loaders, utilities, and an assembler for handling SUL (Source Usercode Language).

The pricing schedule looks very attractive. Cpu's start at $12,945 (each), and things like I/O processors are only about $5520. With all the hardware boxes having uniform interface connections, one can see why system prices can vary from a minimum of about $13K to perhaps $500K for a full-up version. MULTUM will be available initially in the U.K. for delivery 90 days ARO, but the machine will also be shown in the U.S. soon—and if it's liked, it will be offered to that market, too. INFORMATION COMPUTER SYSTEMS LTD., London, England. For information:

CIRCLE 522 ON READER CARD

360/40 Add-on Memory

The ARM-40 can be attached to any 360/40 user's machine above the 64K-byte native core level, and taking it up to 512K if desired. The 2.5-usec memory is available 60 days ARO, and a 64K module rents for $1280/month on a two-year contract. There are no extra-shift charges. AMPEX CORP., Culver City, Calif. For information:

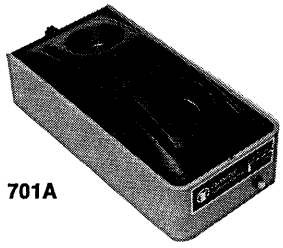
CIRCLE 523 ON READER CARD

10,000

Omnitec reliability begins with 10,000 customer proven installations

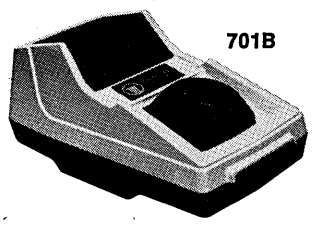
Over 10,000 Omnitec acoustic couplers in use today add up to an impressive testimonial for Omnitec reliability. And, this outstanding performance record didn't just happen by chance. Omnitec acoustic couplers are the product of intensive engineering development that has brought about the quality, flexibility and operational features called for in today's demanding data coupler requirements.

Model 701A
The industry standard
No other coupler on the market has proven more economical and reliable for a broad range of data terminal applications than the model 701A. Offering data rates in excess of 300 Baud, (30 cps ASC11) acoustic or hard-wire (DAA) line



coupling, high sensitivity-greater than — 40 dBm in acoustic mode, simultaneous TTY and EIA (RS23S) output, and half-duplex and full-duplex operation, the Omnitec model 701A provides the degree of systems interchangeability necessary for standardization.

Model 701B Compatible for high speed conversion terminals
This is a fourth generation coupler designed for terminals



operating at extreme high data rates. The model 701B combines a high speed capability, in excess of 450 Baud (40 cps ASCII), with ultra-high sensitivity: 50 dbm in acoustic mode, acoustic or hard-wire (DAA) coupling, simultaneous TTY and EIA (RS232) output and half-duplex and full-duplex operation to provide maximum flexibility and interchangeability in a single unit.

For complete technical information on Omnitec 701A and 701B acoustic couplers use this publication's reader service card or phone or write directly to Omnitec, Phoenix, Arizona.

OMNITEC
CORPORATION
903 North Second Street
Phoenix, Arizona 85004
Telephone (602) 258-8246

CIRCLE 39 ON READER CARD

Cybermatics introduces "canned" software.

You buy it like you buy a can of soup. Software and hardware in one package, called the "Tin Can."

The soup in our Tin Can is a series of pre-cooked on-line software systems.

Off-the-shelf computer systems for sale at Cybermatics Inc., Fort Lee, N.J. Phone 201-461-6171.

There's a recipe for just about every kind of data communication.[1] The can is the hottest computer in the business.[2]

Whatever recipe you pick, you'll find it hard to beat the Tin Can system's speed and capacity.[3] It's certainly the most accommodating system yet designed.[4] And you can mix any or all of the recipes in the one can without spending a bundle.

Because the Tin Can system is a stock item, the purchase price or rental is low; you can have one working for you in a few months instead of the usual year or two; and we can demonstrate one for you right now.

In fact by getting a Tin Can system from Cybermatics Inc., you benefit from all the experience we've had designing on-line systems for giants like ITT and Western Union. But you don't have to foot a giant bill.

1. The basic systems are Message Switching, Front End, Concentrator, On-Line Inquiry and Data Distribution and Collection.

2. Tin Can hardware is Digital Equipment Corporation's PDP 11 series of mini-computers, with all the peripherals you could need and Cybermatics' Real-Time Executive Operating System.

3. The basic Tin Can systems handle 64 lines. Deluxe models up to 300. The basic model switches messages (for example) at 2.5 KC per second.

4. We know of no common-carrier service or terminal arrangement that Tin Can systems can't work with. They interface with public and private networks and handle all transmission languages, at whatever speed they're spoken.

Tin Can

Cybermatics' software/hardware package.

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Business Computers

The L series of small computers has been extended upward with the L 7000 series of three machines: the L 7500 magnetic record computer (handling magnetic stripe cards), the L 7400 accounting computer, and the L 7300 accounting computer. Each has memory ranging from 2,560 to 8,704 words, each word containing 15 digits plus sign, or eight alpha characters. Paper tape and card handling peripherals and application programs are available as options for the L 7000 machines, which support COBOL. Rental ranges from $408 to $1677/month; or if you want to buy them, they range from $16,350 to $52,950. Deliveries are 30 days ARO. BURROUGHS CORP., Detroit, Mich. For information:

CIRCLE 518 ON READER CARD

PDP-11 Add-on Memory

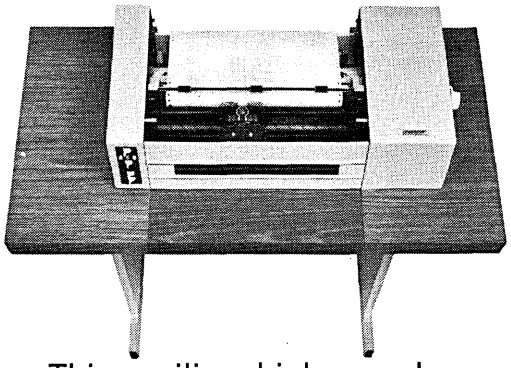
Up to 32K of 750-nsec memory is offered to the growing number of Digital Equipment PDP-11 16-bit minicomputer users and to oem buyers planning to serve that market in the future. Field-expandable in 4 and 8K increments, the ECOM F-11 pricing starts at $4500 for the 4K package, with 16K set for $8500. Delivery averages 60 days ARO. STANDARD MEMORIES, INC., Sherman Oaks, Calif. For information:

CIRCLE 519 ON READER CARD

Time-sharing Plotter

The 7202A graphic plotter accepts serial ASCII input at switch-selectable speeds of 10, 15, and 30 cps; generates the absolute coordinates of the vectors; and then plots them on an 11 x 17-inch surface that can produce plots up to 10 x 15 inches in size. Each point is plotted independent of the accuracy of preceding points, so the plotter is kept on registration even if one coordinate pair is too garbled to decode. There are 10,000 coordinate points along each axis, and each point takes just over one-half second to plot. The plotting accuracy is .03 inch, and the resettability, .007 inch. Pens are of the disposable type and come in four colors. Interfaces for EIA or Execuport 300A requirements and supporting software routines are offered as options. The 7202A is available 30 days ARO for $3575. HEWLETT-PACKARD CO., Palo Alto, Calif. For information:

CIRCLE 517 ON READER CARD



This auxiliary high-speed printer, for use with Novar buffered terminals, provides upper and lower case printing of a 96 character set at speeds up to 50 characters-per-second. 50 cps on-line too! Ask about the Novar 5-80 Auxiliary Printer.

novar

Novar Corporation • 2370 Charleston Road
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GTE INFORMATION SYSTEMS INCORPORATED

CIRCLE 14 ON READER CARD

"What do you do at work, Daddy?"

Bugs & Looops®: The Computer Game, is your best answer. It's an amusing computer primer, if you will. The object is action, not a BUG (something went wrong!) or LOOOP (it keeps on goingggg . . .). Instructions and explanation of computer fundamentals included.

Christmas is coming: this is the great game for 1972! Quantity and educational discount on request. Money back guarantee. Send for your sets now: (Suggested for "adults" over 12 yrs.).

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PRINTERS. PRINTERS. PRINTERS. OUR CUSTOMERS ARE BUYING THEM BY THE HUNDREDS.

Centronics has become one of the world's largest independent manufacturers of line printers.

The unique matrix printing mechanism of the Model 101 and 101A makes our printers quiet, reliable and low in cost. They operate at speeds from 60 to 200 lines per minute in either the serial or parallel mode, and the print quality is excellent, even on the fifth copy.

Our printer easily interfaces to all minicomputers, terminal systems, and mainframes . . . and applications are limited only by the customer's imagination.

Single unit prices are $3,935.00 with excellent OEM discount schedules available.

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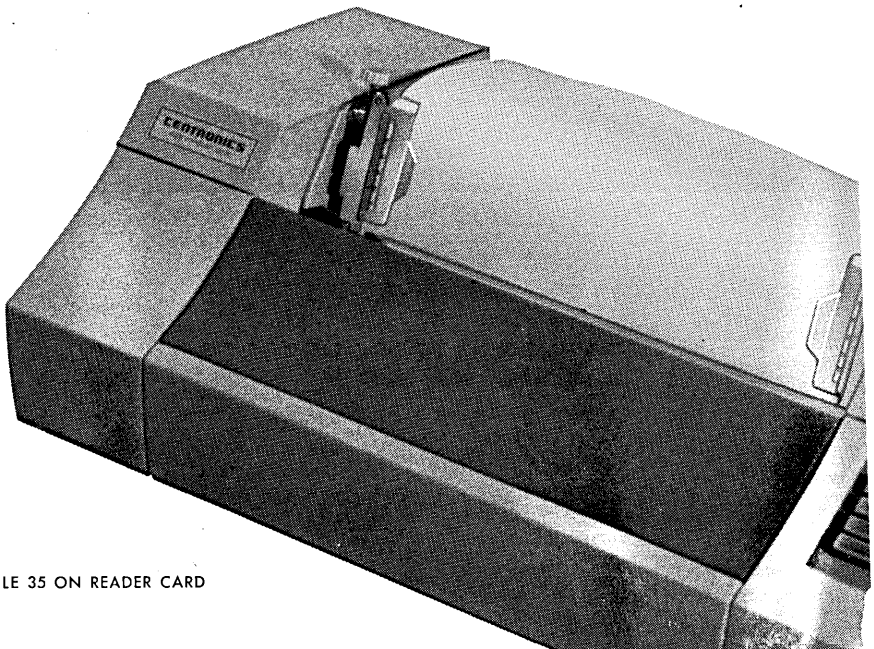


Write the Marketing Department

CENTRONICS

Centronics Data Computer Corp.
One Wall St.
Hudson, N.H. 03051
603-883-0111

CIRCLE 35 ON READER CARD

Report Generator

EAL-PILOT is the short name for the "Eastern Air Lines Programmers aid to Input and data base manipulation via powerful Logic switches and Output control for all media Through easy-to-use flexible parameter driven file and report generator facilities." What it is is a file and report generator with its own compilation capabilities. Versions are available for System/360 models 30 and above with minimum 64K bytes of memory, DOS or OS. The price of $5200 includes installation, training, and a year's maintenance. If you're short of cash, it can be financed at $5.76/day on a minimum 36-month contract. EASTERN AIR LINES, INC., Miami, Fla. For information:

CIRCLE 527 ON READER CARD

DOS Spooling Module

Two basic programs constitute the Sprint system: Sprint1 for tape spooling, which requires 2-4K of foreground partition memory; and Sprint2 for disc spooling, which needs at least 6K, but not more than 10K. Since the spooler is interrupt driven, it is not active when crunching is going on and therefore doesn't degrade system performance. A 30-day free trial is offered; and if the user is satisfied, the rental is $95/month. JASON DATA SERVICES, Manteca, Calif. For information:

CIRCLE 532 ON READER CARD

Tape Library Control

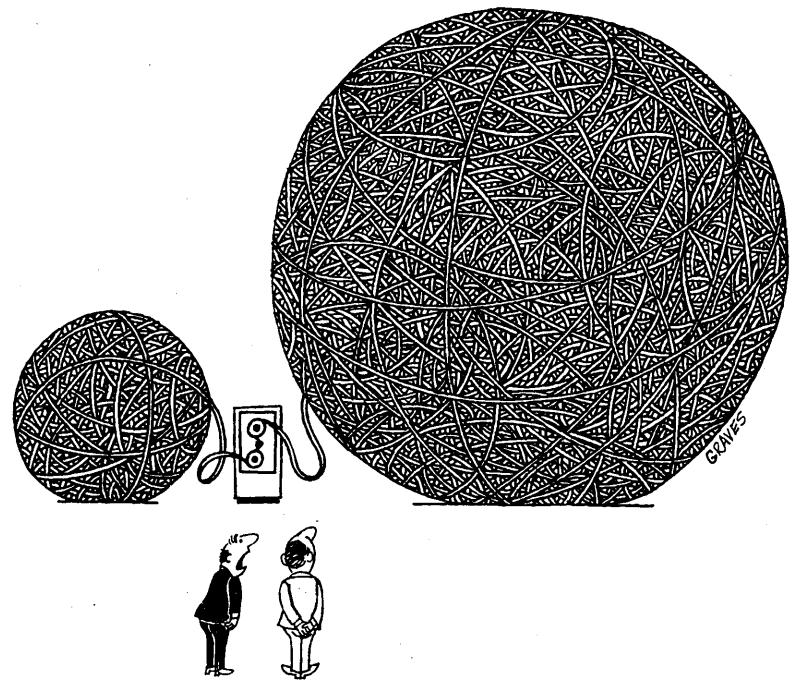
Absolute control over the tape library is the goal of the Tape Library System. It calculates retention dates, schedules tape cleaning, directs tapes to and from off-site storage, lists production tapes by application and debugging tapes by programmer, and monitors the availability of scratch tapes. It has been in use by the developer since February, controlling a library of 7,300 tapes. The price is $2K for the package, available in COBOL and PL/I versions for System/360s with at least 64K of storage. GTE SYLVANIA INC., Camillus, N.Y. For information:

CIRCLE 531 ON READER CARD

PDP-11 Sort/Merge

The TLM sort/merge program for use on DOS-equipped Digital Equipment PDP-11 computers sorts in ascending or descending sequence on either ASCII or binary key fields (presently limited to four). Records containing up to 255 words are handled, with sort parameters input through a tty, or, when the sort/merge program is incorporated into the system as a subroutine, through a parameter list supplied by a calling program. Input and output files may be on disc or tape. Priced at $800, the program is supplied in DECtape form and includes a user's manual. Periodic updates are sent for a small preparation fee. TLM SYSTEMS ASSOCIATES, INC., Wakefield, Mass. For information:

CIRCLE 529 ON READER CARD



"We need more tape units."

© DATAMATION ®

City Planning

Cityplan is intended to fulfill the needs of urban planners. It consists of program modules that perform such functions as file generation, file maintenance, report generation, cross-tabulation, mapping, geocoding, sorting, and bar charting. These functions can be performed individually or integrated to run as systems under a submonitor program. A typical package including the submonitor, report generation, cross-tabulator, and mapping and bar charting capabilities is about $400-500 per month. Cityplan runs on System/360-70 under OS, DOS, or the Model 67 Cambridge Monitor System. Core requirements vary from about 16K up. It's written in BAL with some graphic routines in FORTRAN IV. URBAN DATA PROCESSING, INC., Cambridge, Mass. For information:

CIRCLE 530 ON READER CARD

The most flexible teletype-replacement CRT display you can buy.

Or rent.

It's the Bendix 4380, far and away the most versatile CRT display ever offer to replace teletypewriters in man-computer applications like yours. 4380 is incredibly flexible. A host of options enables it to keep pace, change for change, with your communications needs. More about those options in a moment.

Let's start with buying the 4380. You can rent it instead. $78 a month and it's yours. And you can cancel on 90-day notice. You can lease a 4380. There's even a lease/purchase plan.

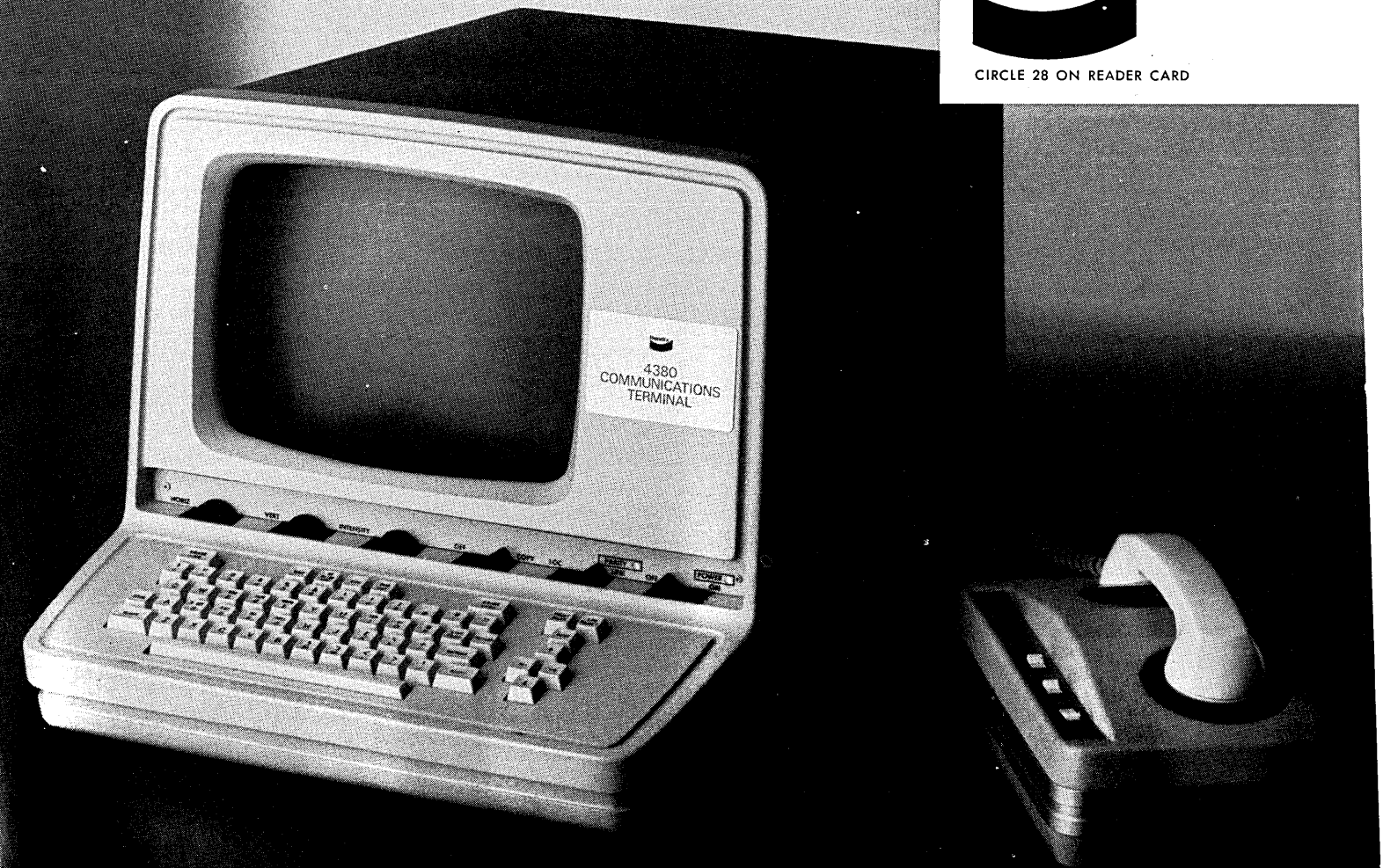
Now, about those options. Choose from either 40 or 80 cpl in 10 or 20 line displays. Choose, too, from optio like block transmission. Upper and lower case and light pens. Plus interfaces to other peripherals like printers, and acoustic couplers. Eight options in all.

And what about service? The new 4380 is backed by a Bendix engineerir and service organization that's really top-notch. This means we can meet al your CRT display terminal needs. All your real-time computer system needs, too.

And who are we to make such bold promises? The Interactive Terminals Corporation, a subsidiary of The Bendix Corporation. Write or call us about the 4380 soon. Bendix Center, Southfield, Michigan 48076. (313) 352-6035.

Bendix

CIRCLE 28 ON READER CARD



Financial Management

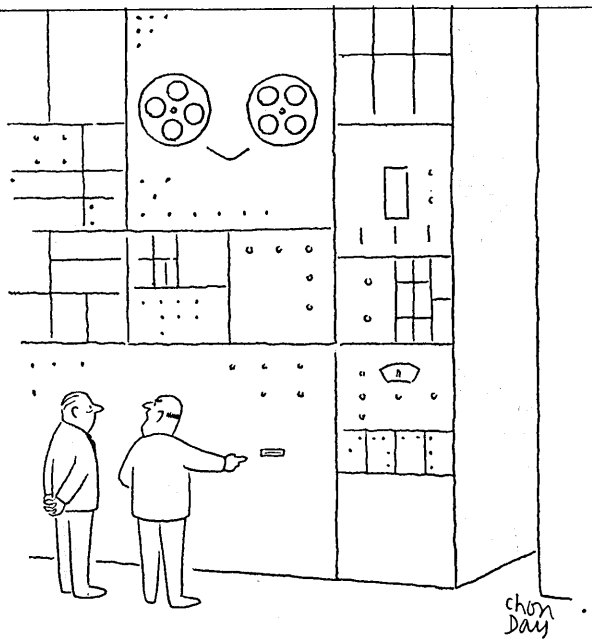
Here is an integrated accounting system for large and small businesses marketed on the assumption that most users will install it in stages. Accordingly, MaCS is broken down into accounts payable, invoicing and accounts receivable, payroll and labor distribution, general accounting, and inventory management functions. An input processor is also part of the system, handling transaction data for all modules, validating and editing the data as required by the other modules, and incorporating master file creation and maintenance routines. MaCS is said to simulate basic hand recording accounting principles to ease the effort and time required for conversion to the system. The system is set up to run on DOS and TOS 360 model 30s, 40s, and 50s; Honeywell Series 200 equipment; and Univac 9400 computers, requiring typically 32K bytes of memory. Installation usually requires 30 days, and typical systems will run in the neighborhood of $50K. The first customer installation is already running. MANAGEMENT COMPUTER SERVICES, INC., Phoenix, Ariz. For information:

CIRCLE 526 ON READER CARD

Commo Monitor

The CyberCom system provides binary synchronous communications between System/360 cpu's with minimum use of core. CyberCom I is essentially a BTAM replacement, yet it requires only 6K, compared to 12K for BTAM. It operates under OS or DOS and can be used on a system with as little as 16K of memory. The price is $10K for OS or DOS versions, and $12,500 for both purchased concurrently. CyberCom II includes its own supervisor so that it becomes a standalone system. It operates in 12K of memory and sells for $15K. Both packages provide double buffering, verification of block numbers, deletion and subsequent reinsertion of blanks, and checkpoint/restart facilities. CYBERNETICS & SYSTEMS, INC., Louisville, Ky. For information:

CIRCLE 528 ON READER CARD



"The machine then selects the likely equations from a complicated pattern of theoretical probables. It calculates these, and the correct answer is printed on a card. Then our Miss Swenson files them God knows where, and we can never find the damn things again."

Drawing by Chon Day © 1971 The New Yorker Magazine Inc.

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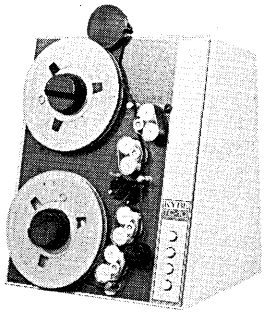
CIRCLE 20 ON READER CARD

The Tape Cleaner that pays for your Mistakes.

Now you can eliminate 90% of your "permanent" tape errors and save on costly computer retries. ▫ With the new Kybe TC-10 Tape Cleaner/Rewinder. ▫ The TC-10 removes the surface dust and oxide deposits that make computers back space, retry and skip. That means a net savings in computer time of up to 87 cents per tape hang (based on independent user study). ▫ The TC-10 is the most reliable and efficient cleaner/rewinder you can buy. It super cleans and perfectly rewinds a full 2400 ft. reel of tape in under six minutes. Automatically. ▫ It features the exclusive Enduron sapphire cleaning blade, five times more durable than any blade offered before. And a new stacking wheel that prevents costly tape edge damage with a perfect wind. ▫ That's the new TC-10 from Kybe. Send for detailed information on the TC-10 and our other tape management systems. ▫ They pay for themselves. And more.



The TC-10 tape cleaner/rewinder.

KYBE

Offices & representatives worldwide

KYBE CORPORATION / 132 Calvary St., Waltham, Mass. 02154 / Tel. (617) 899-0012

CIRCLE 15 ON READER CARD

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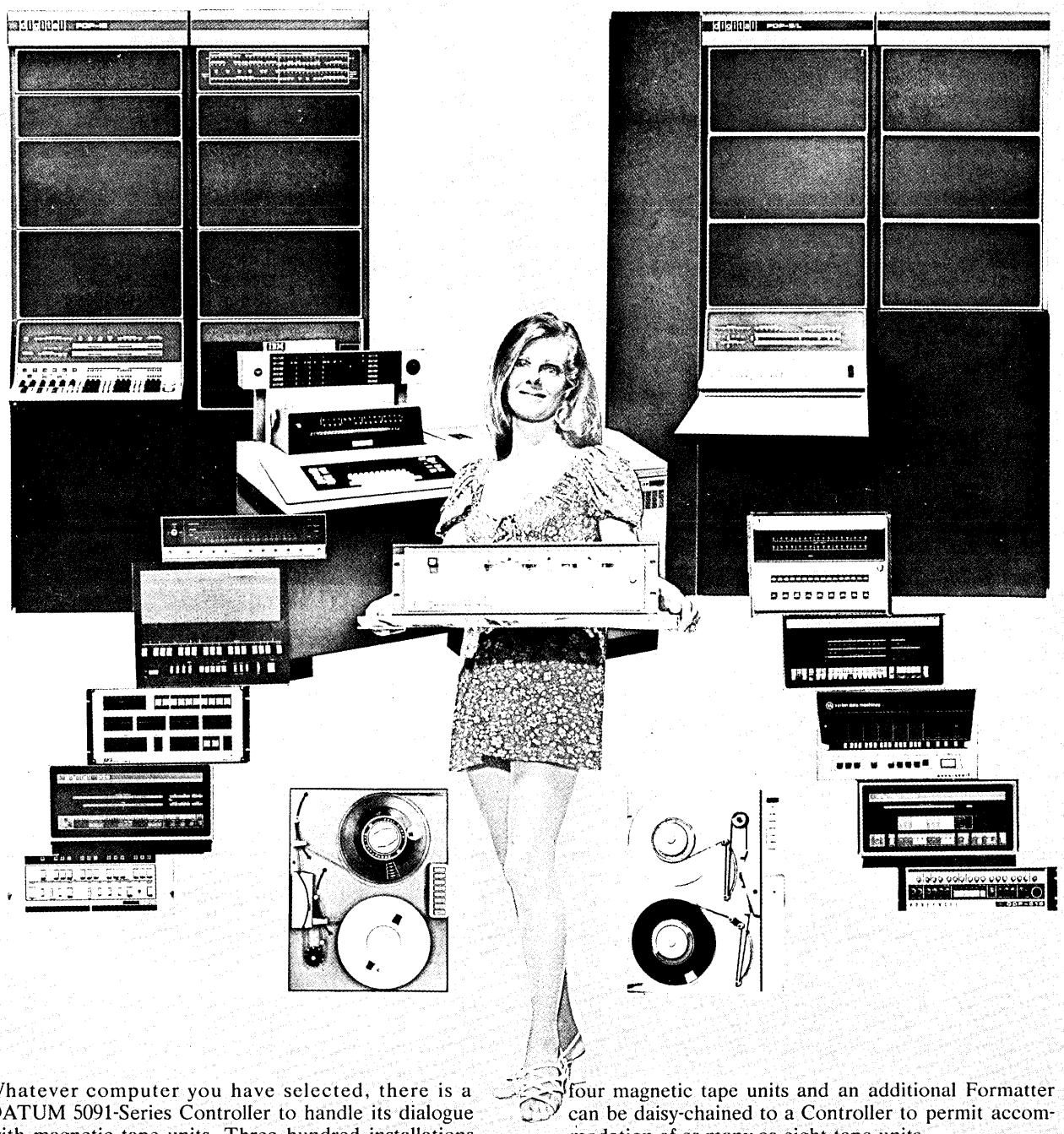

Whatever computer you have selected, there is a DATUM 5091-Series Controller to handle its dialogue with magnetic tape units. Three hundred installations have provided on-the-shelf-hardware and software to accommodate 90% of all commercially-available mini-computers.

DATUM Series 5091 Controllers generate and read IBM-compatible NRZ and/or Phase Encoded format. For seven- and nine-track tape units they permit a mix of any two tape speeds. For seven-track units, Series 5091 permits a mix of different high/low density pairs of tape units. Each Controller will handle as many as four magnetic tape units and an additional Formatter can be daisy-chained to a Controller to permit accommodation of as many as eight tape units.

Series 5091 Controllers are available for quick delivery, complete with software package and all necessary cables and instructions. For more detailed specifications, write or 'phone today.

DATUM PERIPHERAL EQUIPMENT DIVISION

the mini-peripheral people

170 E. Liberty Avenue, Anaheim, California 92801. Telephone (714) 879-3070, TWX (910) 592-1289.

LITERATURE

Computing in Japan

This latest edition of "Computer White Paper—1971," in addition to reporting on progress made by the Japanese in the development of hardware and software, focuses on the social and economic value of information and the role of computers as an information processing tool. As in past annual editions, the volume has a computer census, and cites a government forecast of 38,000 installations in Japan by 1975. It also reports on the liberalization of communications circuits, discusses the necessity for standards, looks at educational efforts, and covers the government agency whose charter it is to encourage the awareness and distribution of existing software packages. Prices are $10 by sea mail, $13 by air mail. COMPUTER AGE CO., LTD., Kasumigaseki Bldg., P.O. Box 122, 3-2-5 Kasumigaseki, Chiyoda-ku, Tokyo 100, Japan.

Disc Memory Systems

Sixteen-page brochure describes vendor's Fastrack disc memory line as "the highest density machines delivered and operable at this time." The fixed head-per-track discs achieve data access at an average of 16.7 msec and are modular in design, permitting expansion from 1.2 million bits to 153.6 million bits. PACIFIC MICRONETICS INC., San Diego, Calif. For copy:

CIRCLE 502 ON READER CARD

Computers and Crisis

More than 2,000 pages of transcript from the Association for Computing Machinery's (ACM) 1970 conference were edited and summarized to produce a 400-page volume titled "Computers and Crisis." Editors said the title was suggested by "recurring examples of how computers are being used to solve major technological and social problems facing society today." Paperbound copies are available at $7.50 and hard-cover versions at $15. ASSOCIATION FOR COMPUTING MACHINERY, 1133 Avenue of the Americas, New York, N.Y. 10036.

System/3 Card Reader

Fact sheet on an 80-column card reader that is plug-to-plug compatible with IBM's System/3 tells how the reader, Model 8063, permits System/3 users to continue to use 80-column cards rather than repunching programs to 96-column cards. The unit is said to read 80-column cards 20% faster than System/3 original equipment readers at $300/month less in cost. BRIDGE DATA PRODUCTS, INC., Philadelphia, Pa. For copy:

CIRCLE 503 ON READER CARD

Do-It-Yourself Security

Bulletin describes a workbook guide called "SAFE: Security Audit and Field Evaluation" as "a practical new do-it-yourself technique to check out and measure security exposure for computer facilities and information systems." The guide contains a checklist of more than 360 items to be considered in a security audit. FIREBRAND, KRAUSS & CO., INC., East Brunswick, N.J. For copy:

CIRCLE 504 ON READER CARD

"Arise, Senior Systems Analyst."

© DATAMATION ®

Three Short Courses

Three short courses on data and forms are described in a four-page brochure. The courses are Forms Design (four weeks), Forms Control (three weeks), and The Nature of Data (one week). They are designed to provide on-the-job training by mail with weekly guidance and feedback. SYSTEMATION, INC. Colorado Springs, Colo. For copy:

CIRCLE 505 ON READER CARD

Voice Response System

Four-page brochure contains technical specifications and a system block diagram for a voice response system with a basic 36-word vocabulary to which 27 additional words or phrases can be added. The system comes with modems, interfaces, and buffer storage. CUBIC CORP., San Diego, Calif. For copy:

CIRCLE 506 ON READER CARD

Used Computer Prices

Fall issue of "Computer Price Guide," better known as "The Blue Book of Used Computer Prices," reflects a 6% drop in the prices of used

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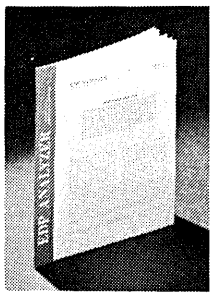

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CIRCLE 24 ON READER CARD

...LITERATURE

360/30s since the summer issue and a 10% drop in prices for used 360/40s. TBI EQUIPMENT DIV., Elmsford, N.Y. For copy:

CIRCLE 507 ON READER CARD

Uninterruptible Power

"Static Uninterruptible Power Supplies 15-150KVA" is a 16-page book described as "an introduction to the latest fourth-generation static inverter technology." It describes a variety of load and battery configurations. STATIC PRODUCTS, INC., Garland, Texas. For copy:

CIRCLE 508 ON READER CARD

CRC Described

Twenty-page brochure on Cyclic Redundancy Check (CRC) character recognition covers the nature and function of the CRC character for designers of 9-track tape systems and describes a simplified code generation technique which it says is simpler and more economical than the standard IBM approach. PERTEC, Chatsworth, Calif. For copy:

CIRCLE 509 ON READER CARD

Terabit Memory

Brochure describes vendor's Terabit memory (TBM) system, a modular system which uses videotape recording methods to store from 90 million to 3 trillion data bits on-line for random access. AMPEX CORP., Redwood City, Calif. For copy:

CIRCLE 510 ON READER CARD

Research Bibliographies

Two bibliographies of research publications, one in the field of computing technology and one in computer simulation, contain abstracts of work done between January 1963 and August 1971 and are complete with order forms for copies of the publications. THE RAND CORP., Santa Monica, Calif. For copy:

CIRCLE 511 ON READER CARD

Microprogramming

The 25-page "Microprogramming Implementation Guide" outlines third-generation computer architecture and lists advantages and methods of implementing microprogramming. It also explains the development of a microprogram in a typical central processor. DATAPAC INC., Santa Ana, Calif. For copy:

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Providence: 400 Turks Head Bldg.	(401) 274-8700
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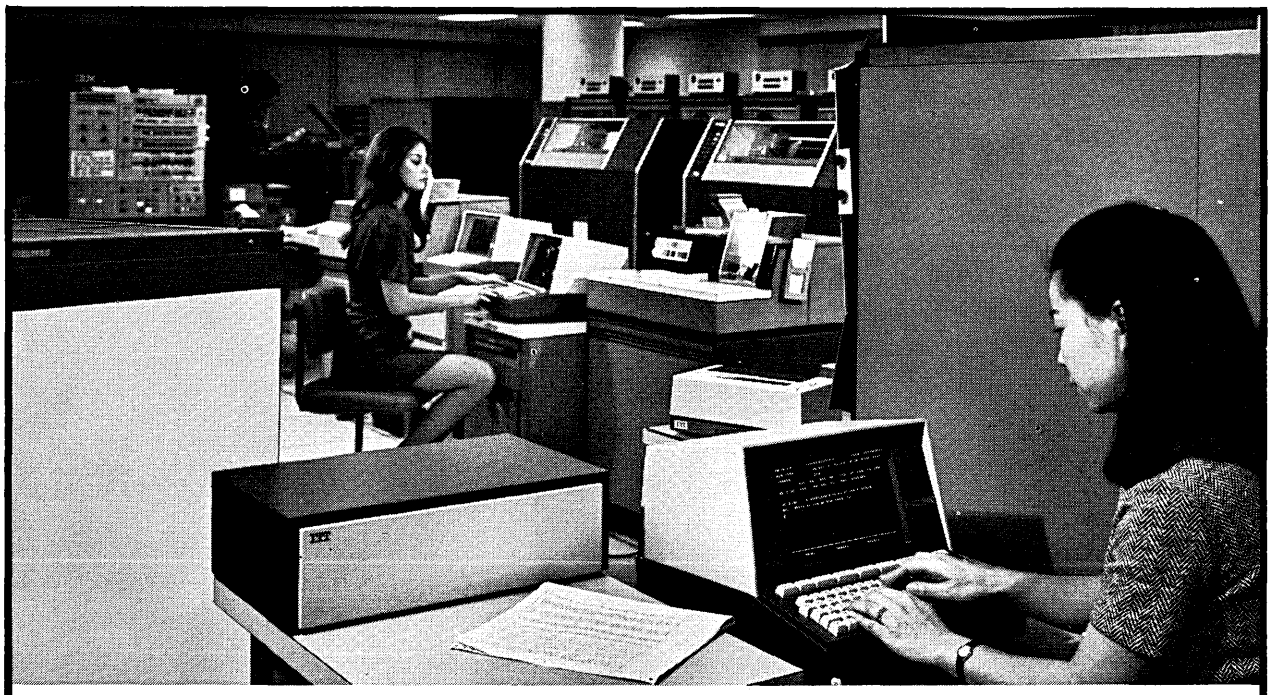
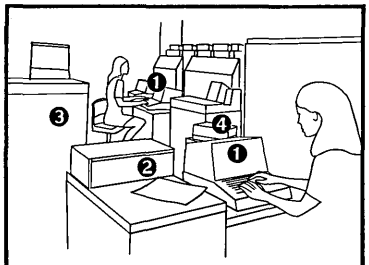
San Jose: 675 North First St.	(408) 293-9040
Stamford, Conn.: 111 Prospect St.	(203) 325-4158
Washington, D.C.: 7316 Wisconsin Ave. N.W.	(301) 654-1850

CIRCLE 304 ON READER CARD

ITT Alphascope* display systems for your 360/370. They'll save you more than money.



ITT Alphascope system installed at Zale Data Processing Service facilities in New York City, where it successfully helps serve more than 1,200 retail jewelry outlets, and also provides data processing services to the New York business community.



ITT Alphascope systems components: (1) Alphascope displays, (2) Modem, (3) Controller, (4) Data Printer.

They'll save you money right from the start. Alphascope* display systems can save you up to 25% on annual lease. What's more, we guarantee no price increase for the full 12 months of the lease period.

And ITT savings don't stop there. We save you installation, start-up and programming costs because the Alphascope system is fully compatible with IBM 360/370 hardware and software. And we can be your single source for display terminals, serial printers, high-speed modems and low-cost 2701 replacements—all supplied as a total package.

We also save you the uncertainties of dealing with unknowns. You know International Telephone and Telegraph Corporation is a world-wide leader in telecommunications. Now we've extended this know-how to data communications. And every system is backed by ITT's seasoned service network.

To discover all the reasons why ITT Alphascope systems are your new "best buy" in data display systems, just complete the coupon.

*Trademark. U.S. patents pending.

ITT

DATA EQUIPMENT & SYSTEMS DIVISION
East Union Avenue
East Rutherford, New Jersey 07073

Yes, I want full details on ITT Alphascope and the following related systems equipment:
☐ Gralphascope™ Graphic Display, ☐ Data Printers, 10 or 30 cps,
☐ Modems up to 2400 baud, ☐ Data Adapter (2701 replacement)

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Company _____

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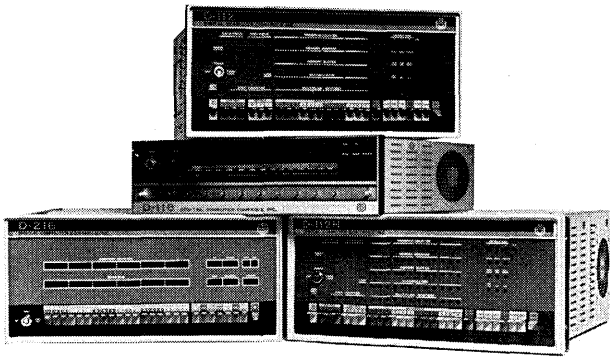
City _____ State _____ Zip _____

D/12

CIRCLE 40 ON READER CARD

Our minicomputers may be compatible, but it's their prices that are really easy to live with.



Select from one of our four minis. They offer a wide range of capabilities, are completely plug-program compatible with "8", "11" and "1200" type machines, and offer you considerable savings.

For example. Our D-116 is a 16-BIT LSI/MSI minicomputer. It features a 1.2 microsecond cycle time, is completely compatible with 1200 series machines, and is available in either a 5-¼" or 10-½" chassis. The easy-to-live-with price? Only $2400.

Or consider our D-112. A 12-BIT MSI minicomputer, with a 1.2 microsecond cycle time, it is completely compatible with "8" series machines. In everything but price, that is. (Only $3990.)

Or our D-112H. With expanded "8" series instruction set, solid-state 200-300 nanosecond RAM (optional), and a 1.0 microsecond cycle time. You'd expect it to cost a fortune. It doesn't. (A mere $5400.)

Or our D-216. A 16-BIT MSI minicomputer. A cycle time of 1.2 microseconds. A price that'll do your heart good. ($2600.)

Ask us about our minicomputers. You won't get over the reliability and the speed. And the competition will never get under our prices.

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Ruislip, Middx HA 4 7DW
England
Phone: (08956) 36066
Telex-934728

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Corporate Headquarters
Digital Computer Controls Inc.
12 Industrial Road
Fairfield, New Jersey 07006
Phone: (201) 227-4861
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CIRCLE 58 ON READER CARD

COMPUTERWOCKY*

'Twas digital, and the binary bits
  Did gyre and gimble in the core:
All mimsy were the registers,
  And the main-frame outbore.

"Beware the Computerwock, my son!
  The bugs in bytes, the cards that patch!
Beware the GI-GO bird, and shun
  The frumious Bandersnatch!"

He took his on-line pen in hand:
  Long time the mini-max he sought—
So rested he by the logic tree,
  And programmed it in thought.

And, as in uffish thought he stood,
  The Computerwock, with console lights,
Came whiffling through the I/O queue,
  And burbled bits to bytes!

One, two! One, two! And through and through
  The input pen went snicker-snack!
He left it dead, its dump unread
  And went galumphing back.

"And hast thou slain the Computerwock?
  Come to my arms, my beamish boy!
O frabjous day! I/O! Overlay!"
  He chortled in his joy.

'Twas digital, and the binary bits
  Did gyre and gimble in the core:
All mimsy were the registers,
  And the main-frame outbore.

—Shannon Brunjes

**The light-pen is mightier than the vorpal sword!*
With apologies to Lewis Carroll

Want to sell a computer?
Market a software package?
Promote a new terminal?
Offer a line of computer forms?

You need new leads . . . accurate leads to sell equipment, services and supplies to computer users.

And we have them . . . over 6,000 in the brand new *COMPUTERS 72* series of D.P. installations in New England and the Middle Atlantic States.

KLH Associates has just finished the most extensive survey of computer users ever undertaken in the United States. In our COMPUTERS 72 series — four directories covering New England and the Middle Atlantic States — we can give you hard facts on over 6,000 D.P. installations.

Want to know who has purchased fourth generation computers; where Systems 3 installation have been made; what companies have installed scanners, digital display, key/dik, key/tape? We have it all in the COMPUTERS 72 series. And more important, we have the names of key personnel at each site who are involved in purchasing D.P. equipment, services and supplies.

Use the COMPUTERS 72 series for new sales leads; for direct mail campaigns (it's zipped and indexed by geographic area). Use all four directories as a data base for your market research efforts. As employment guides for programmers and systems specialists, our directories are essential.

I have included my check ☐ or purchase order ☐ for COMPUTERS 72 of Connecticut and Southern New York - $30 ☐ or COMPUTERS 72 of New Jersey and Long Island - $30 ☐ or COMPUTERS 72 of New York City - $30 ☐ or COMPUTERS 72 of New England - $30 ☐ or all four directories - $100 ☐ *(No directories mailed without check or purchase order.)*

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Through television eyes.

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PEOPLE

Century Data Systems' new tape drive operation is being headed by **John J. Ring,** manager, tape drive development, who joined the company this summer after 10 years with ICL, most recently as manager, magnetic tape systems development . . . **Carle C. Conway** has been named senior vp of Ultronic Systems Corp. and head of the new Service Div. of GTE Information Systems. He comes to GTE from Aerojet-General Corp., where he was vp and group executive of the Advanced Products Group . . . **Jerome Kleinfield** has resigned from Alanthus Corp., for reasons not announced, and has been succeeded as president by **Alan E. Shalov,** chairman and chief executive officer. Alanthus, nee Efficient Leasing Corp., has recently gone into the leasing of 370 systems. Executive vp **James H. Conole,** formerly with DPF&G, is in charge of the new program . . . **Jerry L. Koory,** *Datamation Industry Directory* operations manager, AFIPS activist, and former consultant, has joined HW Systems, Los Angeles, as vp, operations . . . **Bernard Goldstein,** president of United Data Centers, was reelected president of ADAPSO. Other new officers include **T. J. O'Rourke,** president, Tymshare; **Robert W. Olsen,** president, Computer Services Corp.; and **Gordon Taubenheim,** chairman of the board of Champion Service Corp. . . . **Philip J. Kiviat,** former president of Simulation Associates, has joined Systems Control, Inc., Palo Alto, as manager of the Simulation Techniques Div. . . . **Clinton DeGabrielle** has been appointed director of planning for Infonet, Computer Sciences Corp.'s time-sharing service, and will be responsible for long-range business planning. He had been serving as president of five Occidental Life Insurance Co. subsidiaries and was a founder and president of Call-A-Computer . . . **Cloyd Marvin,** a founder of Four-Phase Systems, has left to form Achates International, a venture capital management company, in San Francisco . . . Burroughs has appointed **Irwin R. Rector** president of Burroughs Business Machines Ltd., Canada. He replaces **Kaj Dichow,** who requested reassignment and is now serving as vp and a director of the company . . . **Harold H. Hammer,** Control Data Corp. director and executive committee member who announced last summer that he is resigning at the end of this year (Aug. 15, p. 61), has been elected to the board of DATA 100 Corp., Minneapolis, and "will assume an active role in the financial planning and management" of the terminal maker . . . Housing Data Corp., Dearborn, Mich., has announced the appointment of **John E. Stanton** as president and chief executive officer. He succeeds **M. Bruce Campbell,** who remains as board chairman of the company, which offers computerized services to the mobile home and recreational vehicle industry . . . **Ken Collins** has been appointed vice-president of engineering for Bright Industries, San Francisco, where he will have full responsibility for the company's line of peripherals. He had been with Litton Industries . . . **Eugene B. Power,** microfilm industry pioneer, has joined the board of Infodata Systems, Rochester, N.Y. Power is the founder of University Microfilms, which he sold to Xerox in 1962, and was a director of the firm until 1968. Among his many other professional affiliations, Power was a founder of the National Microfilm Association . . . **Dr. David N. Freeman** has been appointed director of university computing and information processing at Rutgers, where he will be responsible for all academic and administrative computing, which was recently consolidated into a single center . . . **John T. Potter, Jr.,** will control all operations of Potter Data Products Corp., the leasing subsidiary of Potter Instrument, as director of administration. Most recently he was portfolio manager for First Investors Management Corp. . . . **Dr. Reginald A. Kaenel** has joined the central technical staff at AMF Inc., New York, and is specializing in electronics and computer applications. Kaenel, the holder of 34 patents on electronic devices and subsystems, had been serving as supervisor, device development, at Bell Labs . . . Microform Data Systems, Mountain View, Calif., has appointed **Hugh J. Kelly,** former controller at Image Systems, as vp, finance. Two new board members also were announced: **B. Jack Brooks,** president of Booth Computer Investment Corp.; and **George M. Dean,** a former AT&T executive. The company manufactures microfilm data storage and retrieval systems. ■

NEW ZEALAND

AUCKLAND REGIONAL AUTHORITY

SENIOR SYSTEMS ANALYST

The Auckland Regional Authority is the largest local body in New Zealand (over 1700 employees) situated in N.Z.'s largest and most progressive city.

It is regionally responsible for Planning, Water Supply, Parks and Reserves, Roading, Urban Passenger Transport, International Airport, Drainage and Civil Defence.

The Senior Systems Analyst will establish an E.D.P. Section with the Authority and will be responsible for the Planning, Organisation and performance of this section.

This position will be a challenging and rewarding career for a professionally qualified engineer or scientist majoring in Mathematics who has proven experience in computer techniques and some experience in management.

Salary of approximately N.Z. $10,000 is negotiable. Reasonable travel expenses and temporary housing will be provided by the Authority.

Conditions of Appointment obtainable from the Secretary, Auckland Regional Authority, Private Bag, Auckland 1. New Zealand; with whom applications close on 31 January, 1972.

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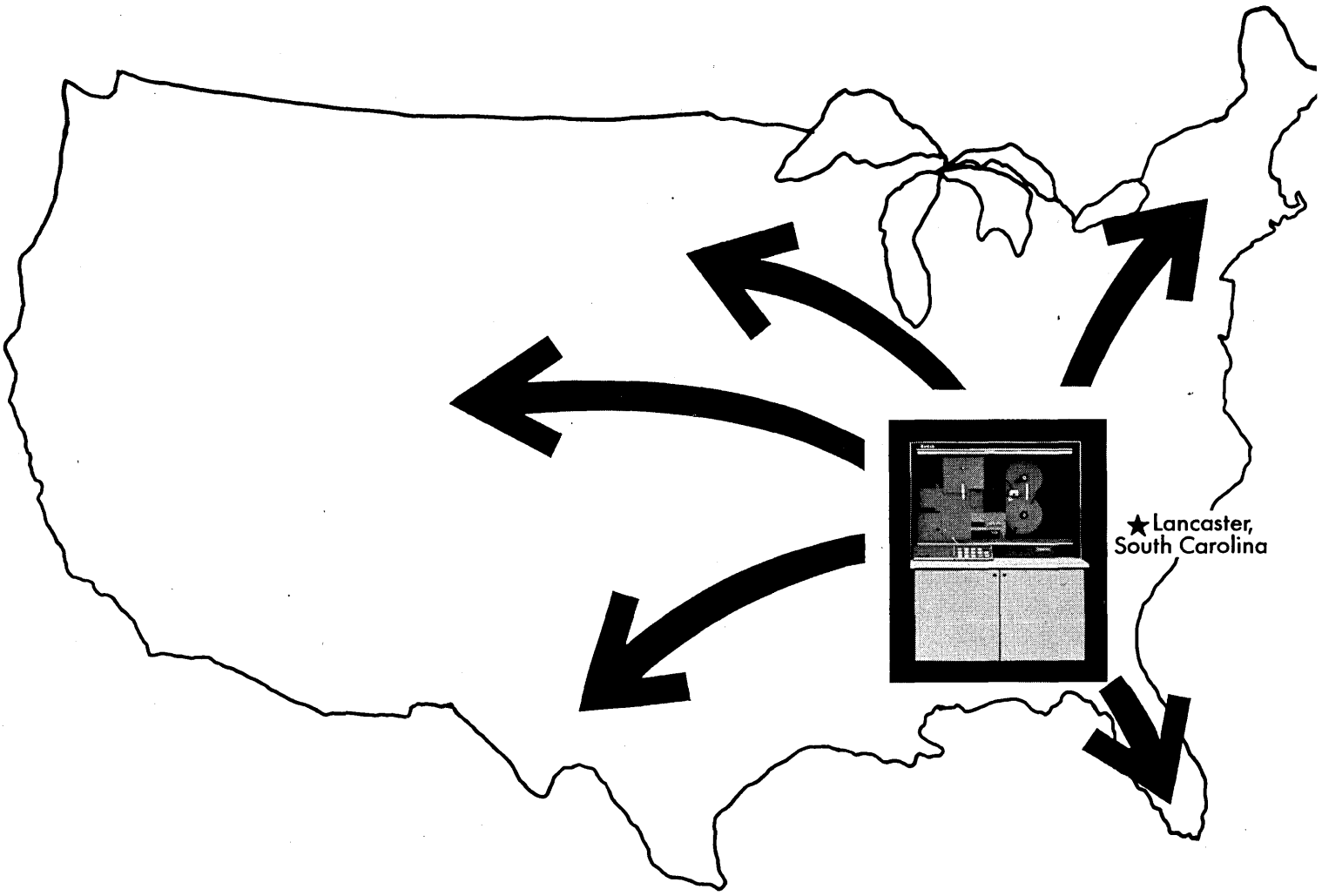

Kodak's COM system makes data move faster for Springs Mills.

At the Springs Mills Customer Service Center in Lancaster, South Carolina, a vast five-computer data processing center stores information vital to the company's operations throughout the country.

To produce this data faster for those who need it, Springs Mills uses a Kodak KOM-90 microfilmer, which puts computer tape data directly on microfilm with incredible speed, and at a fraction of the paper cost.

The result: Big savings in time and mailing costs, faster information retrieval, better customer service, and far greater security. Fact is, Springs Mills is so pleased, they're investigating additional Kodak microfilm systems.

For fast details write Eastman Kodak Company, Business Systems Markets Division, Dept. DP601, Rochester, N.Y. 14650.

Kodak Microfilm Systems

EDP FOREIGN AFFILIATES PLAN 34% SPENDING HIKE

Edp equipment manufacturers expect a 34% increase in the capital spending of their foreign affiliates during 1972, up to $1.7 billion from an estimated $1.3 billion in 1971, according to a Commerce Dept. survey. Most of the 1972 plant and equipment outlays will be in Europe ($1.2 billion), while spending in Canada is expected to reach $203 million, and in Latin America, $137 million. Commerce approached 752 firms in the first year of its edp "global marketing" program, and 347 are reported to have taken steps to begin selling abroad. Meanwhile, a new bill introduced by Sen. Warren Magnuson (D-Wash.) proposes clear antitrust exemption for U.S. firms that team up in export. The proposal (S. 2754) would create "chartered export associations," licensed on a five-year renewable basis by the Commerce Dept. and the Federal Trade Commission.

MORE LIGHT ON THOSE EDS TEXAS MEDICARE CONTRACTS

Social Security Administration officials told a House GovOps subcommittee that a contract with Texas Blue Shield covering Medicare claims processing brought Ross Perot's Electronic Data Systems an estimated 76¢/claim, but only cost the firm about 32¢ in machine time, manpower, and maintenance. Hearings revealed that Social Security told EDS that an inspection of records clause was necessary in its Blue Shield contract, and yet EDS went ahead without one in a 1968 agreement. The Intergovernmental Relations subcommittee was told that Social Security spent $250,000 developing the EDS Medicare system but did not obtain the right to use it. Committee members also voiced concern over lack of competition in contract bidding. Committee recommendations are expected in March.

NEW BILL WOULD REGULATE CRIMINAL DATA SYSTEMS

Justice Dept. recommendations insuring privacy of criminal justice information systems operated by the Law Enforcement Assistance Administration have been incorporated into parallel bills in the House (HR 10892) and Senate (S. 2546). The measures limit access to these data systems only to law enforcement agencies and authorize individuals to inspect their own dossiers and challenge inaccuracies. Individual records would be removed from active files after rehabilitation. Meanwhile, support is growing for HR 854, which would require federal agencies to notify individuals on whom files are maintained and permit them to challenge the dossiers. A GovOps subcommittee will hold hearings in January on this bill and on HR 8903, prohibiting distribution for commercial purposes of lists of persons registered or licensed by U.S. agencies. . . System Development Corp., Santa Monica, has a $45,000 contract to study the Senate's legislative record keeping system and recommend ways to automate it. The Senate also has given an order to Computing & Software to automate its payroll and personnel record system on a 360/40.

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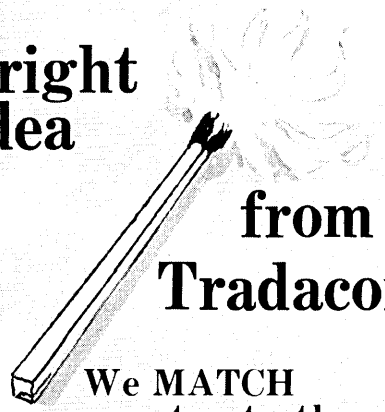

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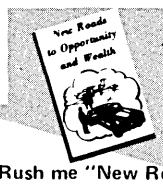

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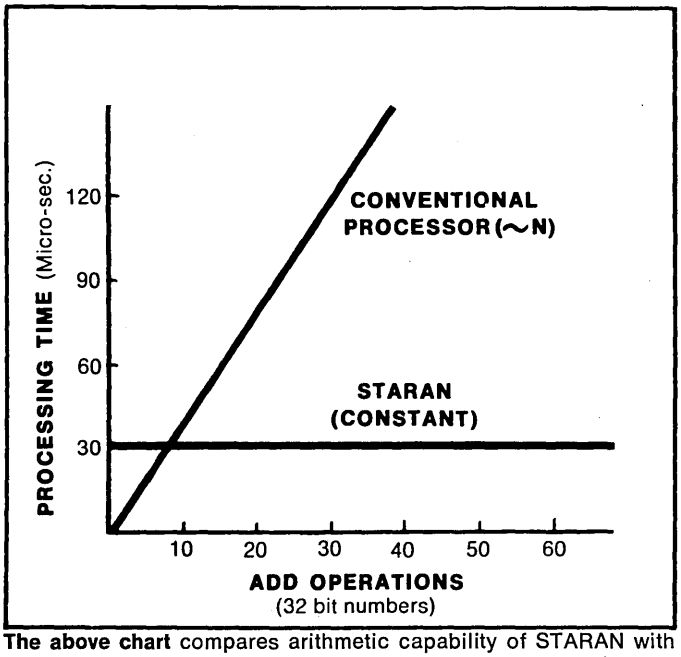

The above chart compares arithmetic capability of STARAN with Model 50 of a common computer line. It shows that regardless of the number of operations, STARAN processing time remains constant. Processing time utilizing sequential techniques in the conventional computer requires increasing amounts of time . . . proportional to the number of items processed.

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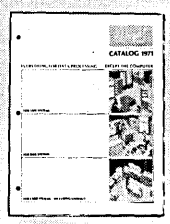

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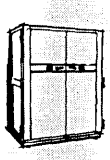

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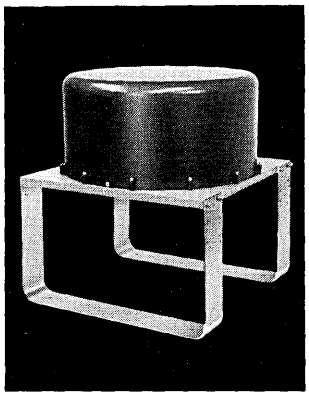

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