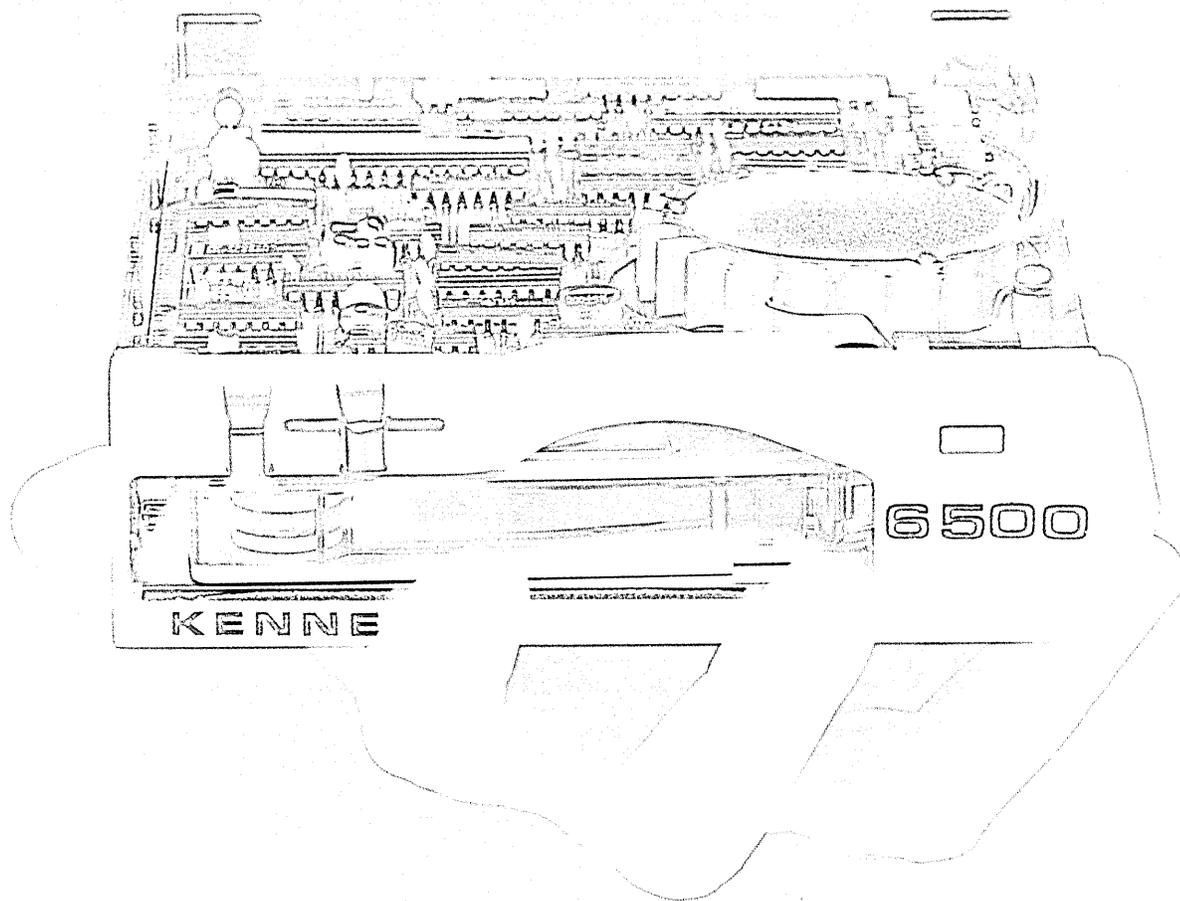


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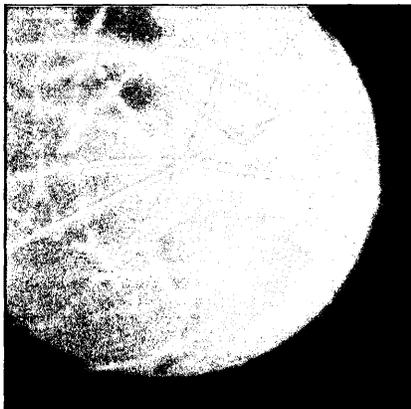
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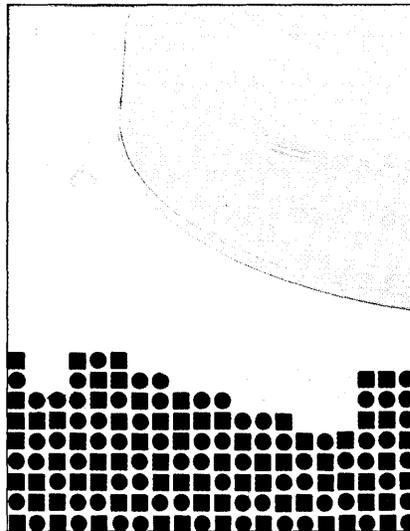
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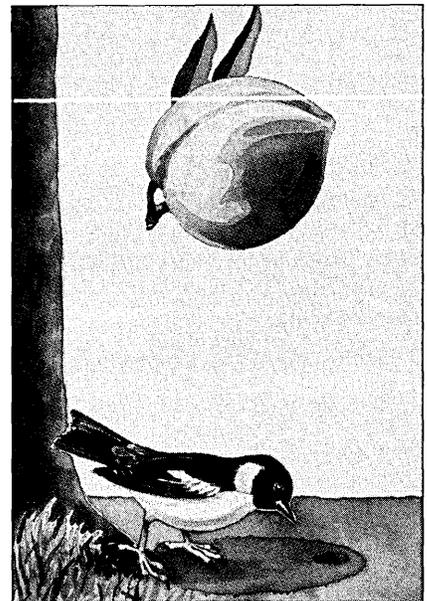


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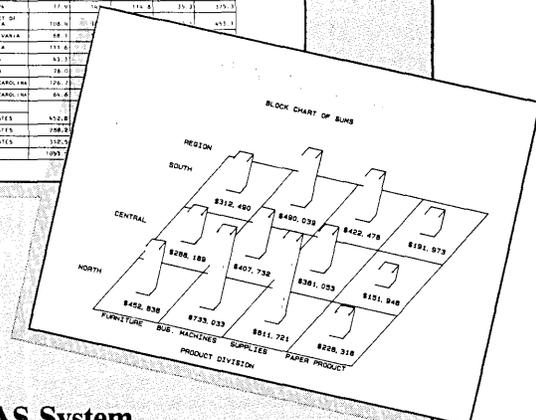
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SOUTH	FLORIDA	63.7	78.2	78.2	28.3	248.4
	GEORGIA	78.2	78.2	78.2	28.3	263.9
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REGION	ALL STATES	1057.1	1228.9	1407.0	572.2	4861.7

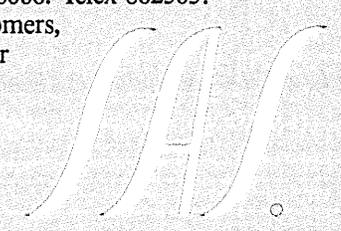
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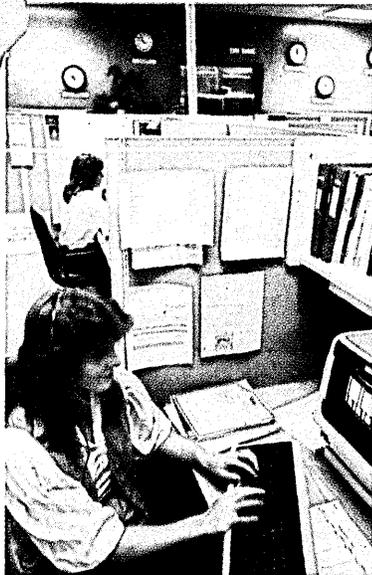




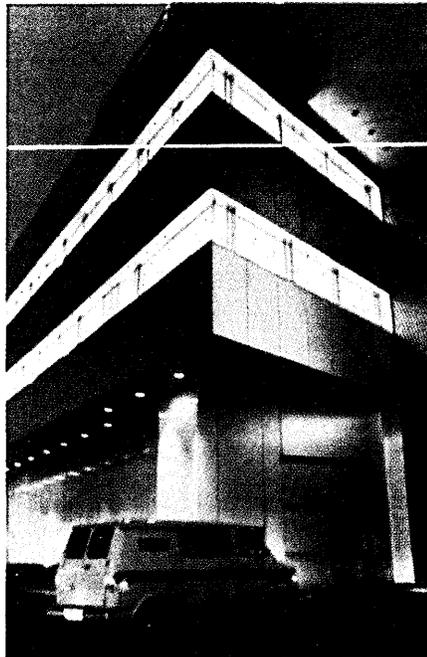
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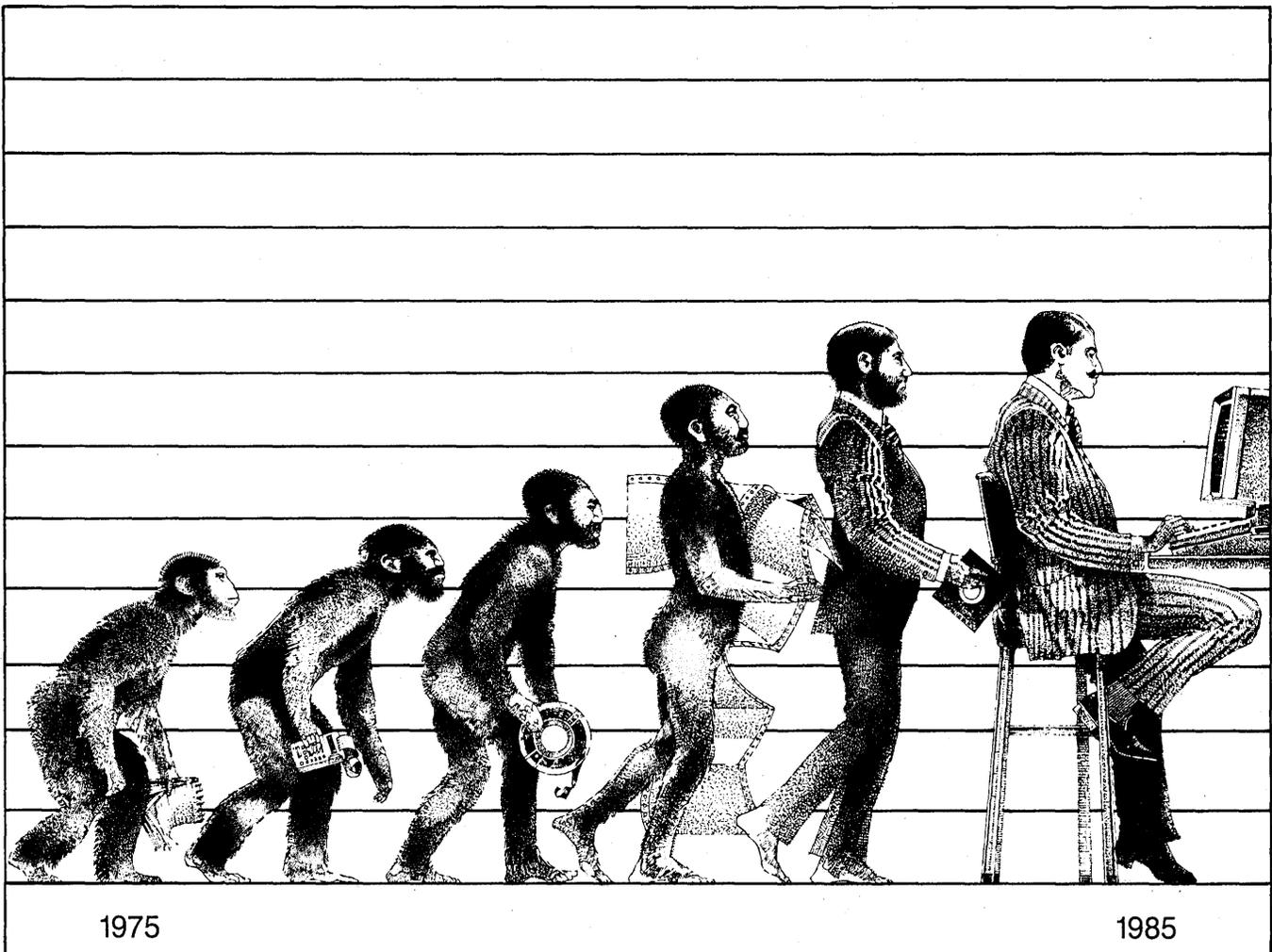
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1-2-3 ON LAN
COMING SOON

Look for Lotus Development Corp., Cambridge, to introduce this week a network version of its leading microcomputer software packages, 1-2-3 and Symphony. The company plans to provide a single copy of its software together with port protection devices for each licensed cpu, insiders indicate. The devices are supposed to prevent unauthorized use of the software, though a conceptually similar scheme from Ashton-Tate for users of network versions of dBASE II is easily circumvented. Lotus's action is expected to trigger attempts by other microsoftware vendors to offer corporate dp chieftains a way of installing popular packages on LANs and multi-user systems. Other pricing schemes under consideration by software vendors include 20% to 40% discounts for licensing fees depending on the level of support provided by network users.

4MIPS 4361
FROM IBM

Next year, Big Blue may announce a new series of 4300 machines to help fill in the 32-bit price/performance gap it suffers against Digital Equipment and Data General, contends computer industry analyst John Levinson of the New York brokerage firm Goldman, Sachs. He contends that since the 4361 model doesn't run the MVS/XA operating systems, a new high-end cpu wouldn't cannibalize its 308X line. Expect a 4MIPS to 5MIPS 4361 "within the next several quarters," he says, and "we would not rule out delivery of a dyadic version of the 4381 by year-end 1985."

MITI EYES
OSI STANDARD?

An industrial standards committee in Japan has pledged to adopt the open systems interconnection (OSI) networking specification promulgated by European dp vendors. The Ministry of Industry and Trade is expected to follow suit, along with the fifth generation computer project sponsors, thereby making the seven-layer standard first developed by the ISO into the de facto rule in Japan. Fujitsu has apparently already said it will support the OSI standard and MITI is promoting it to the other dp vendors in Japan.

APPLE JOINS
ARCNET

Apple Computer went searching for another local area network and apparently found it. Sources inside the Cupertino, Calif., firm say its Macintosh will become part of Datapoint's Arcnet within two months, supplementing the microcomputer firm's Applenet. The process will be similar to what Datapoint recently did when it patched IBM pcs into its network: a drop-in circuit board that involves format conversion rather than protocol

LOOK AHEAD

ON YOUR TOES

conversion. The product will debut as "the intelligent network." Rumors have it that Apple first talked to Ungermann-Bass and Sytek before inking the deal with San Antonio-based Datapoint.

Arete Systems Corp and NCR Corp. may be celebrating their hefty multimillion dollar deals to supply Sperry Corp. with superminicomputers, but the party may be short lived. While Arete claims Sperry is counting on the San Jose startup for products even beyond the three-year contract they signed in November, a Sperry insider warns, "We doubt that any of them will still have a relationship with us in five years." The key, of course, is for Arete, NCR, and Computer Consoles Inc. to continue leading the price/performance race in the Unix market. NCR may have more reason to worry than Arete; Sperry may not want to sell products made by its direct mainframe competitor any longer than it must.

CORRECTION

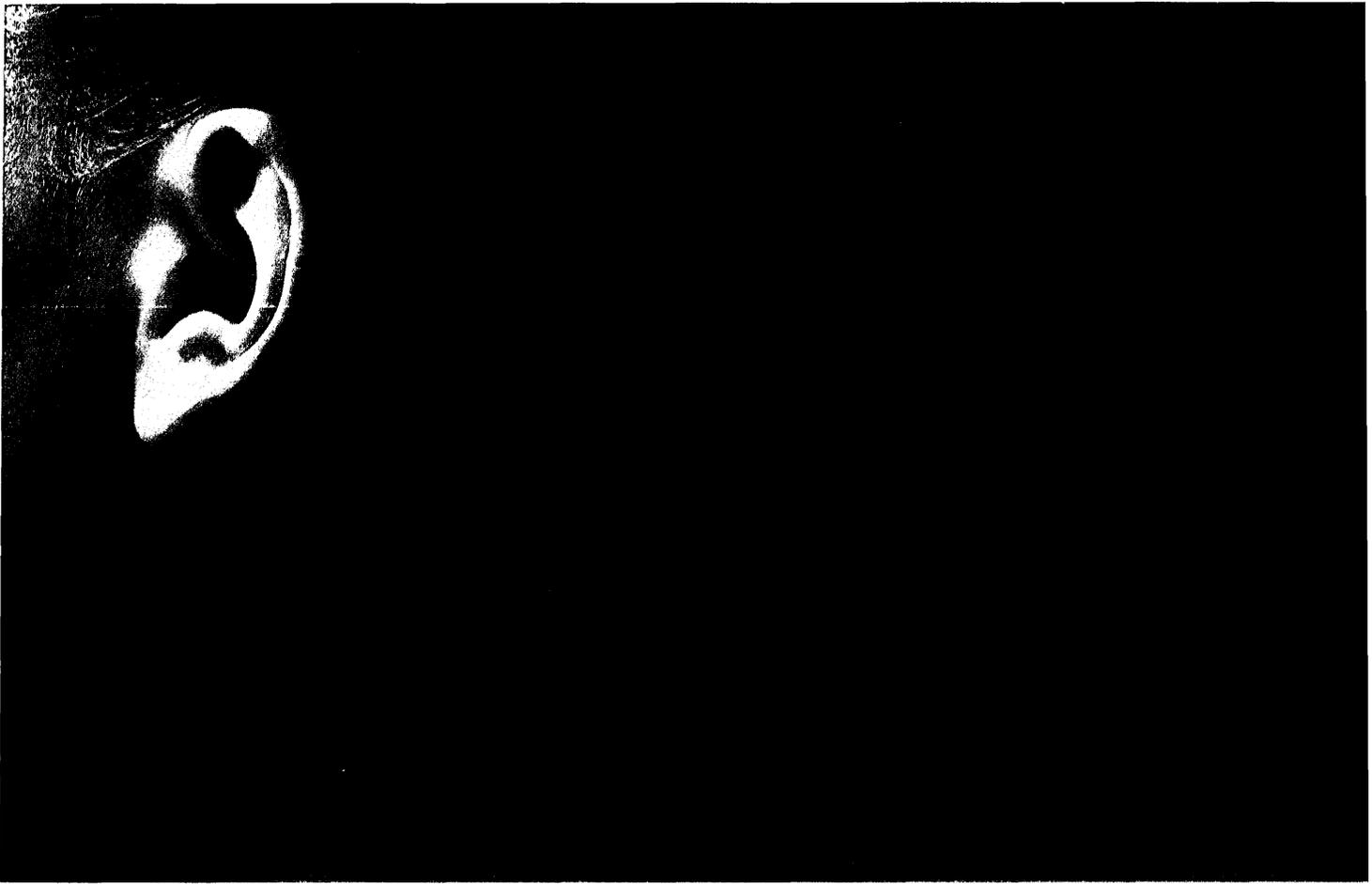
The value of a Tandem Computers Inc., Cupertino, TXP processor offered free to purchasers of 500 workstations is \$123,400, not \$500,000 as stated here in the Nov. 15 issue.

DEC, IBM, DG, HP TO OFFER RISC

IBM, DEC, Data General, and Hewlett-Packard are just a few of the industry's top names that are developing RISC systems -- high-performance hardware built around simplified instruction sets. HP's delayed "spectrum" is the most ambitious of these: a 32-bit architecture that encompasses its full line of products from desktop to data center. The HP project was initially staffed by former IBMers who worked on an IBM RISC machine based on its 801 processor, sources claim. The project is simultaneously under way at HP centers nationwide and that scale has supposedly led to problems, as insiders claim the architecture will not emerge for another 18 months to two years. DEC's Western Research lab in Palo Alto has also mounted a RISC project, but apparently is having difficulty running the VAX VMS operating system on the 32-bit RISC hardware. Unlike HP, DEC is focusing hardware development on its predominately technical customer base, sources indicate. Most RISC ventures stem from university attempts to build machines that execute the C language at high speed and reduce code maintenance; many of the emerging RISC architectures are therefore Unix based.

RUMORS AND RAW RANDOM DATA

Fortune Systems is in trouble again, a major software development effort having collapsed after the company spent more than \$3 million.



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The P-Series XQ gives you even more. Select data processing, compressed printing, and high speed draft printing. Compressed printing puts a 132 char-

acter line report on 11-inch paper, at full rated speed. And high-speed draft printing increases throughput by more than 33%, up to 800 lines per minute with the P600XQ.

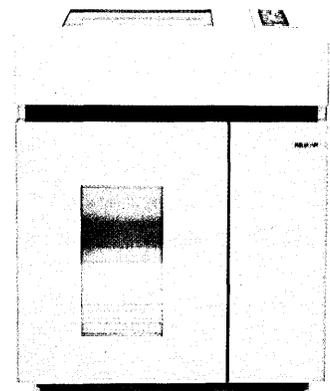
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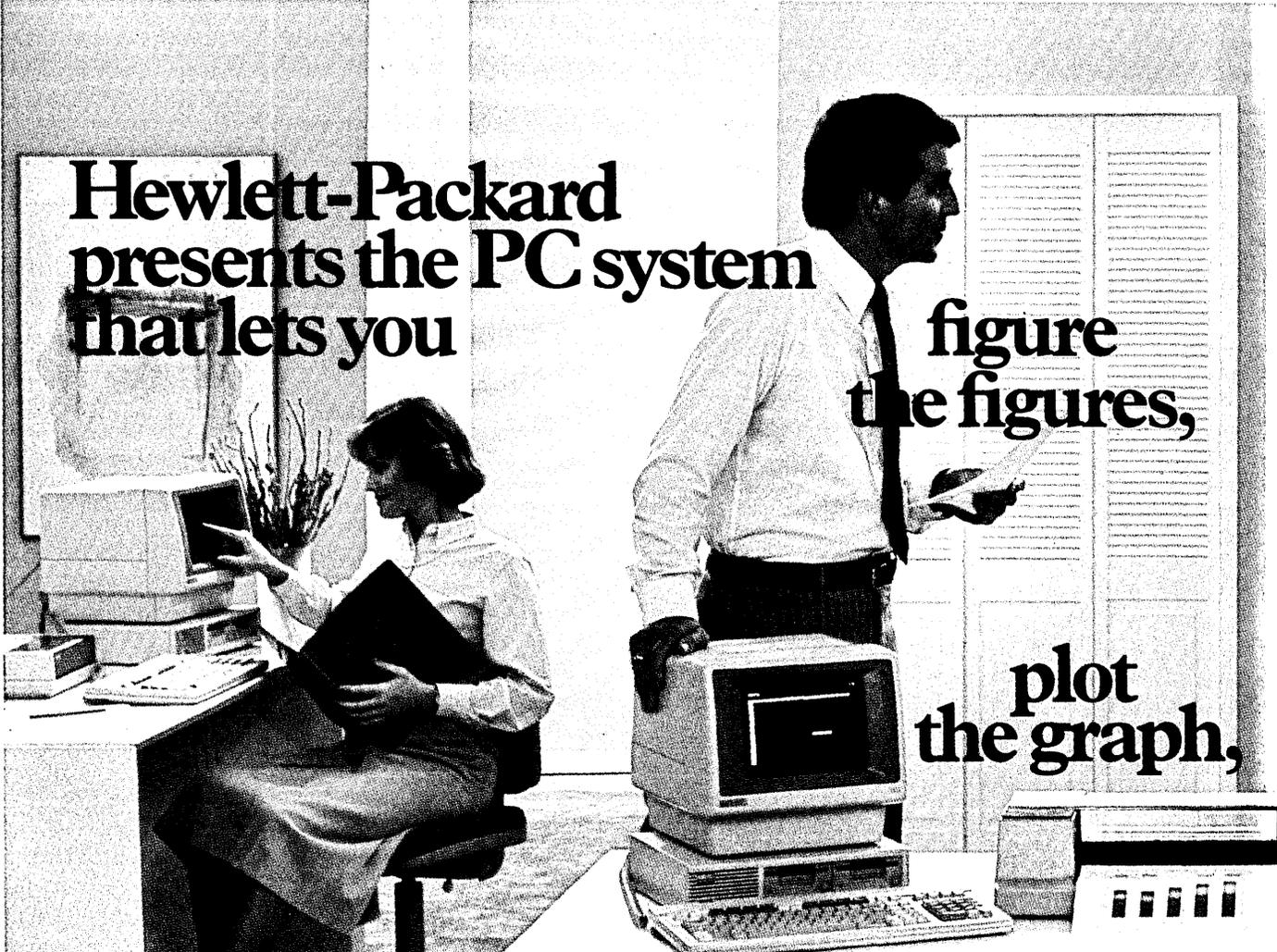
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It's all matched and designed to work brilliantly together.

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It all starts with two of our Hewlett-

Packard personal computers.

We call one the HP Touchscreen and the other (because it can do even more) the HP Touchscreen MAX.

The first comes with two double-sided disc drives that give you 256K bytes of main memory, expandable to 640K bytes.

The HP Touchscreen MAX has even more capacity, with the added power of a 14.8-M byte Winchester disc drive.

And both have DSN/Link, to let you set up a direct line of communication between them and your HP 3000 Department Computer.

As the names imply, you can actually change things on either screen just by touching the screen.

That makes the Touchscreen PCs easier to use. And a lot easier to learn.

The system also includes two printers

many people think are simply the best around.

Our Hewlett-Packard LaserJet and ThinkJet printers are both breathtakingly fast and refreshingly quiet.

The ThinkJet printer runs at a rapid 150 characters per second.

Yet because the ThinkJet paints each character with a small jet of ink (instead of smashing the paper with keys), it's as quiet as a sigh.

At 300 characters per second, our LaserJet printer is even faster.

Ten times faster than the best daisy-wheel printers. Yet the image is as sharp as you'll get from a printing press. Amazing.



and when you get to your hotel, change everything.

Two different plotters are also part of the HP personal computer system.

Both create full-color graphics. One with two pens, the other with six for even more detail.

If you like, the system can be knitted together through a LAN.

It lets a number of HP personal computers link up, talk to each other, share printers, and exchange information.

By the way, there can be a lot of information to exchange. That's because there are more than 500 business software titles available. For word processing, accounting, spread sheets and graphics. You'll find the big names there, too.

1-2-3™ from Lotus.™* WordStar.®** MicroPlan.™*** And the whole catalogue of software from HP.

Finally, when you travel, you can take the system with you.

Hewlett-Packard's portable personal computer turns your hotel room (or your den at home, or your customer's desk) into another part of your personal computer system.

The Portable has plenty of capacity; 272K bytes of RAM and 384K bytes of ROM. And with its built-in modem, it can link you with your office printers and plotters. Not bad for a computer that weighs just nine pounds and can fit into a briefcase.

The system is all linked up, all on the same programs, all designed to work together, and all ready to go.

And all, from Hewlett-Packard.

Just dial 800-FOR-HPPC, toll free, to find the name of a Hewlett-Packard dealer or sales representative near you.



**HEWLETT
PACKARD**

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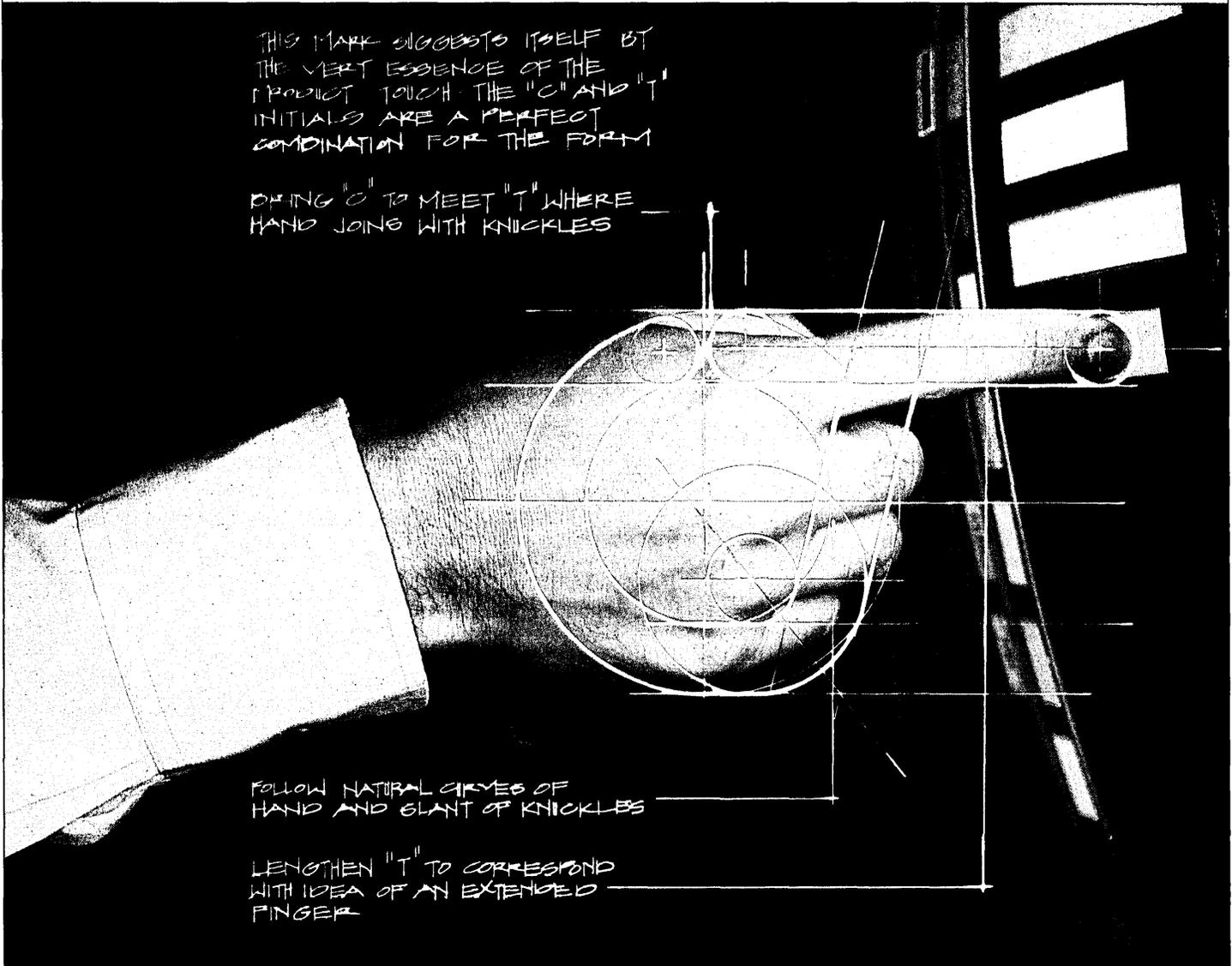
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FOLLOW NATURAL CURVES OF
HAND AND GLANT OF KNUCKLES

LENGTHEN "T" TO CORRESPOND
WITH IDEA OF AN EXTENDED
FINGER



LETTERS

SPLIT HAIRS

Herbert F. Spirer (Letters, Sept. 1, p. 15) unjustly accuses Karen Elder (Letters, May 1, p. 16) of bad logic. The use of an intensifying adverb (in this case, "very") before the adjective "incorrect" is merely redundant. Redundancy is logically neutral.

While we're splitting hairs, let us note that Professor Spirer's initial statement ("A statement is either correct or incorrect") is false. Even without resorting to paradox (e.g., "This statement is incorrect"), it is possible to find statements whose accuracy falls between absolute truth and utter falsehood (e.g., "The earth is large").

STEVEN K. JOHNSON
Alexandria, Virginia

A REAL INTELLECT

In "Easy Does It" by Jan Johnson (News in Perspective, June 15, p. 48) several features of Intellect, a natural language system from Artificial Intelligence Corp. (AIC), were severely misrepresented.

The beginning of the article mistakenly states that "Intellect does not have direct access to the databases." A major feature of Intellect is that the user does have access to a variety of database systems and file structures. These currently include ADABAS, IDMS, SQL, FOCUS, and VSAM. It is important to note that more than half of our client base does access its information directly.

Later in the article it is stated that another of Intellect's weaknesses is "the need to index the data field to enhance performance." It is important to understand that the indexing of data fields to enhance performance is not a requirement but a feature of Intellect. Indexing is simply a means of fine tuning the query system and underlying database structure to the needs of the organization. It allows the organization to optimally mix the system resources and the human resources required for retrieval purposes.

The last paragraph of the article

states that "the company in the strongest marketing position is Mathematica," due largely to the 1,200-strong installed Ramis base. When one considers the installed base of AIC's three largest marketing partners, namely IBM, Cullinet, and Information Builders Inc., it is easy to assume that Intellect will continue to be the leading natural language query system in 1984. With its partners and a proven product (initially available in 1981), Artificial Intelligence Corp. is in the strongest marketing position.

We at AIC feel that it is critically important that the capabilities of Intellect be presented accurately. The facts that Intellect does access databases directly and does not require indexing are important features of our product.

CHARLES HAMMEL JR.
Vice President, Customer Support
Artificial Intelligence Corp.
Waltham, Massachusetts

MORE IN FRONT

"Front-End Programming Environments," (Aug. 15, p. 80) by Nicholas Zveintzov, presents a clear description of the purpose and requirements for front-end programming environments. The systems profiled, however, do not include a powerful system specifically designed for this marketplace.

The Dialogic/One System consists of specialized software and the Dialogic/10 MidFrame computer, a front-end processor that provides an IBM ISPF-like MVS/TSO programming environment. It can be configured to perform at anywhere from 5MIPS to 10MIPS. Several systems are already installed in Fortune 1,000 environments.

The D/10 provides efficiency improvements in the form of host offload, subsecond response time, and the lack of need for end-user retraining. The D/10 provides specialty of function with its advanced browse and edit tools, a knowledge-based COBOL editor that performs dynamic syntax checking and cross-refer-

encing, as well as zoom capability and enhanced window manipulation.

Any mainframe that runs MVS thinks the D/10 computer is a 3274 terminal controller. The user, however, sees a single system image and an extended ISPF environment with single-user multi-tasking session management tools (such as the agenda).

The Dialogic/One System, including the D/10 MidFrame computer, host software, and MidFrame software, sells for under \$5,000 per programmer workstation (one third to one half less expensive than the systems profiled in your article).

WILLIAM R. LECKONBY
Vice President of Sales
Dialogic Systems
Sunnyvale, California

SOFT NEWS

It is not clear to me when and how the term "software" came into general usage with its present meaning. Your readers may be interested in my early experiences with the term.

In late 1946 or early 1947, when I was working with the War Department General Staff in Washington as a civilian scientist with an appointment as expert consultant to the Secretary of War, I was asked to prepare a broad policy statement to guide the newly established Research and Development Division. General Eisenhower was then Chief of Staff for the War Department, and Major General Henry Aurand served directly under him as director of the Research and Development Division. The division had been organized in 1946, at the urging of Dr. Vannevar Bush, as an important move to help maintain good relationships between the scientific community and the military. I reported to General Aurand, through a deputy director, with the title assistant deputy director.

Several of us in the division, and especially Brigadier General Georges Doriot who was a deputy director under

LETTERS

General Aurand, had been pushing hard for more emphasis on "nonhardware" research and development under the War Department. I coined the term "software" for use in the policy document that I drafted, for contrast to "hardware," and both terms appeared frequently throughout the draft document. Although the term software had been included only after arguments with fellow staff members and with little enthusiasm on their parts, the document was allowed to go on for approval at the top.

The document was reviewed by General Eisenhower and returned to me for revision, with the firm guidance from General Eisenhower that "there will be no software in this man's Army." At least that was the message from the Chief as reported verbally to me by General Aurand.

We revised the document simply enough by replacing "hardware" everywhere with "material" and "software" with "nonmaterial." At this time I was certainly neither greatly surprised nor disappointed by the turn of events, although I had come to like the term software!

I made another effort to get the term software used in a context much closer to its present usage, again without great success. In late 1949, while I was employed by the Rand Corp. as project officer for logistics, I reported my experience with General Eisenhower at a meeting of the Rand senior staff. I said then that I thought the term software fit well the kind of analytical studies in progress at Rand—where very sophisticated computations were made regularly using the then advanced computers available. There was some interest in using the term, after a brief discussion about spell-

ing it "softwear," but I must say that General Eisenhower's attitude helped us to be less than enthusiastic about using the term—perhaps in part because Rand's financial support came entirely through the Air Force under the War Department.

Actually, I am not aware of much use of the term software for several years after I left Rand in 1952. Perhaps others can report on the way in which software came to be used so widely with reference to computer programs.

MERRILL M. FLOOD
La Jolla, California

FORTRAN TO UNIX

I'm sure the Aug. 1 issue served to enlighten many readers as to the development and capabilities of C (under Unix) language. I was disturbed, however, by the view expressed by many of the issue's authors that although C language offers much to users, there is a serious lack of readily available applications programs.

Today, users do not have to wait or go to the expense of writing new programs in C if they have applications programs already written in FORTRAN. Rapitech Systems Inc.'s FORTRIX-C translation program will convert FORTRAN to C in a matter of hours—not the six-plus months companies usually budget when they must write a new program.

FORTRIX is not machine limited. It works under any Unix or Unix look-alike system. It has already been modified to run on Apollo, Convergent Technologies, Gould, Pyramid, Sun Microsystems, Vax 780, Wicat, and a dozen others.

HENRY WEISS
Vice President
Rapitech Systems Inc.
New York

PRODUCTIVITY REPORT

A recent ad in DATAMATION for a windowed terminal asks us to:

"Imagine, for example, while a program is compiling in one window, you edit the source code in a second window, check output in a third window, and send and receive mail concurrently in a fourth window."

Okay, I've been trying to. Really trying.

It's midmorning, a crisp fall morning, and I'm concurrently drinking coffee while a program is compiling in one window. It's version 215 of my QQXXZZ routine.

Thanks to my windowed terminal, I am simultaneously editing the source code in a second window, QQXXZZ version 216. I peek into the third window to check the output, while concurrently listening to WGBH and reading DATAMATION. Since version 215 hasn't compiled yet, it must be the output from version 214 that I'm checking. While I edit, I concurrently send mail:

"From: Dan Smith

To: System Manager

Re: Productivity increases due to windowed terminals

Bob,

I agree with you that 'lines of code' is not an accurate measure of productivity. We prefer ERPVs (extensively revised program versions). You will be interested to know that thanks to windowed terminals we now routinely achieve up to three ERPV/hour, a productivity gain of about 200% over conventional terminals."

Oh, hell—the output from version 214 looks okay. Well, thanks to my windowed terminal, it shouldn't take long to undo my last two revisions.

DANIEL P.B. SMITH
Eye Research Institute
Boston, Massachusetts

MISSING PERSON

In "Poison in Paradise" (News In Perspective, Aug. 15, p. 30), Charles Howe quotes some statistics about an accidental discharge of hazardous solvents attributed to Fairchild. The article continues:

"A spokesman for Fairchild would neither confirm nor deny this figure. 'You would have to read all the newspapers and look at all the figures they gave,' she said."

Apparently surgeons are not the only ones performing sex change operations these days.

ED LANGHOLZ
Plainview, New York

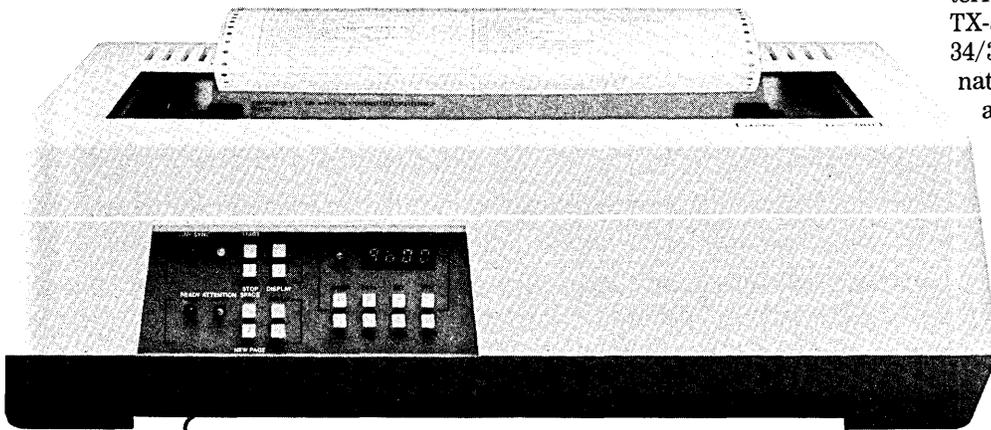
With the gloomy precedent of "chair" standing in for "chairman," do you suggest we call her the "spokes"? —Ed.



Instant replay

CARTOON BY LEO CULLUM

Your IBM 34/36/38 Will Think This Is A \$17,000 Printer.



For all your IBM 34, 36 or 38 knows, your new Datasouth TX-5180 is an IBM 5225—an overpriced, underfeatured copy cruncher the size of a washing machine. It might even think your Datasouth is an IBM 5224 or a 5256, both of which are just as clunky and cost upwards of \$4500.

But you know better. You know your TX-5180 is a perfect 34/36/38 dot matrix printer that costs a fraction of what IBM wants you to pay for one of their printers. You also know your TX-5180 even beats its third-party black box competitors. Because it doesn't come with a black box. Or dipswitches. Or any of the other old-fashioned inconveniences that clutter most of the printers in the 34/36/38 market. Instead it comes with a list of features that make you as happy as your accountant.

Like parallel *and* IBM twin-ax interfaces (so you can hook up your TX-5180 to a PC as well as your IBM 34/36/38). Cable-through and terminate capability. Bidirectional printing at 180 cps. Six different character pitch settings. The most complete, friendly and ergonomic front panel controls in its class. And legendary Datasouth reliability.

So treat your computer and your accountant to the best printer a little money can buy: your new Datasouth TX-5180. It's only a toll-free call away. Make that call today.



Your Accountant Will Think It's A Miracle.

AUDITOR'S REPORT

We have examined the Datasouth TX-5180 and found its features and characteristics exceed accepted expectations for IBM 34/36/38 printers. A partial list follows.

- Tabletop, impact matrix serial printer
- 180 cps bidirectional printing
- Tractor feed forms: 3"-15"
- Cartridge ribbon
- Cable-thru and terminate
- Push button programming
- Twin-ax and parallel (ASCII) interfaces

The TX-5180's ratio of value to price is exceptional. Purchase of the device is highly recommended.

datasouth

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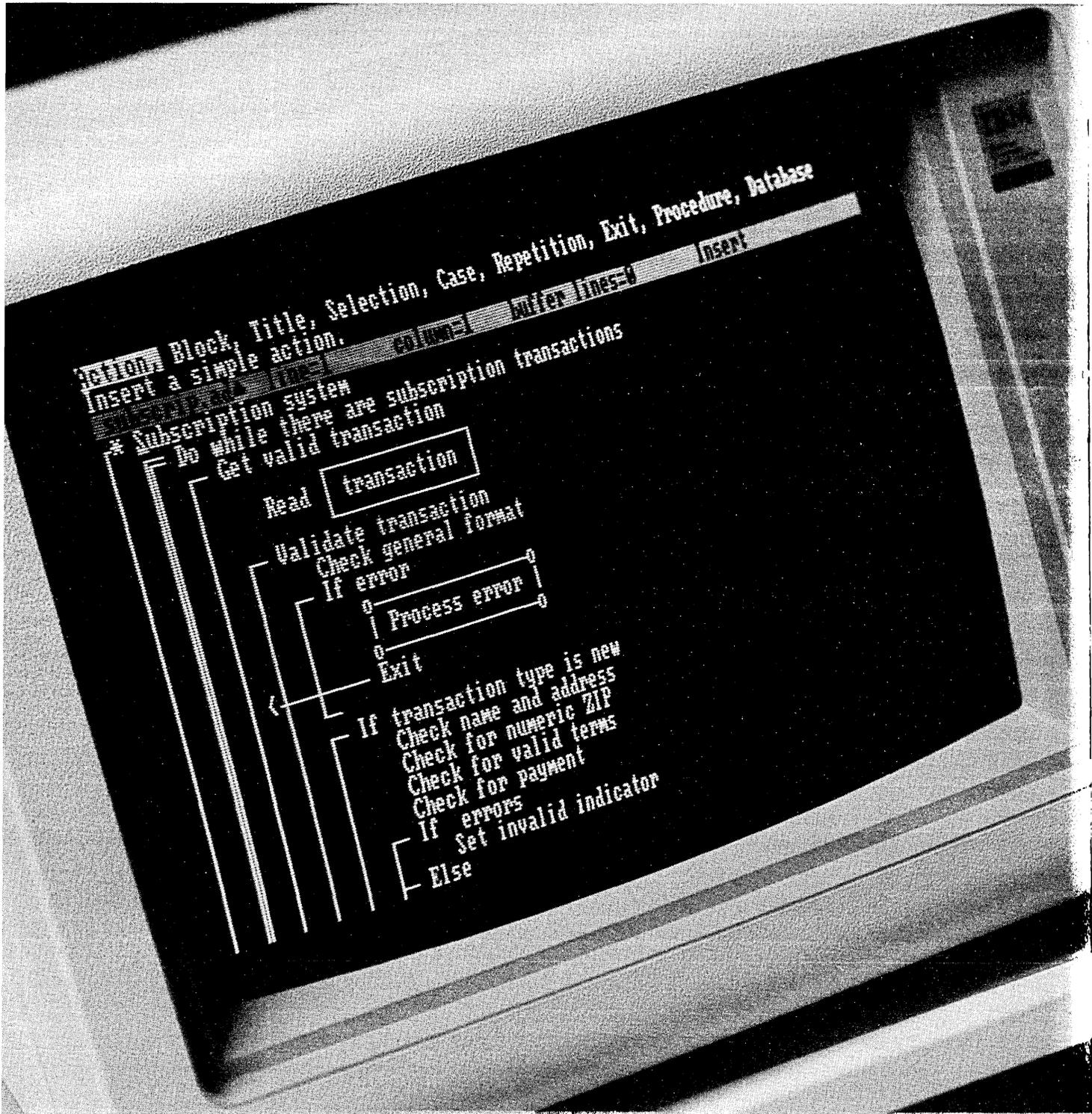
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James Martin gives you the method... now DDI gives you...

the tool for structured



programming.

While doing research for their recent book,* James Martin and Carma McClure reviewed seventeen diagramming techniques and came to one overwhelming conclusion:

Action diagrams are the simplest and best method of representing structured programs.

Action diagrams combine graphic and narrative notations in a rigorous but easy-to-understand technique. The method is applicable to any size program. In almost any language.

When used to sketch out program logic, action diagrams encourage correct structured thinking. Logic errors become more apparent. Communication improves among programmers, analysts, and end users. And top-down design is enhanced, because action diagrams handle any level of logic, from systems overview to detailed program code.

* *Diagramming Techniques for Analysts and Programmers*
Prentice-Hall, 1984

Fast, full-screen editing with ACTION DIAGRAMMER™ and an IBM PC.

Working closely with James Martin, DDI has developed an action diagram editor for the IBM Personal Computer and 100% compatibles. The Action Diagrammer™ editor lets you create and update action diagrams right on the screen. You draw brackets with a single keystroke. Manipulate text with all the power of a visual editor. And expand or contract to focus on any level of detail you choose.

The net result: faster application development

With Action Diagrammer you can develop designs and programs faster, and with fewer errors. Maintenance is easier too, because Action Diagrammer enforces logic structure and provides excellent documentation.

The price is easy too — only \$495

The Action Diagrammer software package sells for \$495 and comes with a complete user guide, which includes a thorough overview of the action diagramming method. No serious programmer or analyst with access to an IBM PC or compatible should be without it.

Even more features

Represents logic hierarchy with nested brackets for all constructs such as sequence, selection, case, and repetition. Can also represent database actions and subprocedures

Automatically supplies control structure syntax in English, COBOL, PL/I, FORTRAN, C, Pascal, and many 4th generation languages including FOCUS, RAMIS, NOMAD, MANTIS, IDEAL, NATURAL, and ADS/O

Offers one-stroke commands and user programmable function keys

Shifts mainframe software development to PC's

Allows color coding of diagram sections through user control of text and bracket colors (for users who have a color monitor)

Includes ample help messages and other on-line documentation

Produces hard copy of action diagrams on any IBM PC-compatible printer. Graphic output on IBM graphics printer, or HP7470A plotter

```
SUBSCRIPTION_SYSTEM: PROCEDURE OPTIONS (MAIN);
  /*
  /* SUBSCRIPTION SYSTEM TRANSACTION PROCESSING
  /*
  /* Variable Declarations */
  ON ENDFILE (DATA_FILE)
  EOF_DATA_FILE = YES;
  OPEN FILE (DATA_FILE);
  DO WHILE (NOT EOF_DATA_FILE);
    /* SET TRANSACTION */
    READ FILE (DATA_FILE) INTO (TRANSACTION);
    /* VALIDATE TRANSACTION */
    CALL CHECK_FORMAT (TRANSACTION, RC1);
    IF RC = ERROR THEN
      CALL PROCESS_ERROR (TRANSACTION, RC, NO, NO, NO, NO);
    SELECT
      WHEN (TRANSACTION.TYPE = 'NEW') DO
        CANCELLATION = NO;
        CALL CHECK_NAME_ADDRESS (CUSTOMER, RC1);
        CALL CHECK_ZIP_CODE (ZIP_CODE, RC2);
        CALL CHECK_TERMS (TERMS, RC3);
        CALL CHECK_PAYMENT (PAYMENT, RC4);
        IF (RC1 | RC2 | RC3 | RC4) = ERROR THEN
          STATUS = ERROR;
        ELSE
          STATUS = NO_ERROR;
        END;
      WHEN (TRANSACTION.TYPE = 'RENEWAL') DO
        CANCELLATION = NO;
        RC1 = NO_ERROR;
        RC2 = NO_ERROR;
        CALL CHECK_TERMS (TERMS, RC3);
        CALL CHECK_PAYMENT (PAYMENT, RC4);
        IF (RC3 | RC4) = ERROR THEN
          STATUS = ERROR;
        ELSE
          STATUS = NO_ERROR;
        END;
      WHEN (TRANSACTION.TYPE = 'CANCELLATION') DO
        STATUS = NO_ERROR;
        CANCELLATION = NO;
        END;
    /* PROCESS VALID TRANSACTION */
    IF STATUS = NO_ERROR THEN
      SELECT
        WHEN (TRANSACTION.TYPE = 'NEW')
          CALL NEW_SUBSCRIPTION (TRANSACTION);
        WHEN (TRANSACTION.TYPE = 'RENEWAL')
          CALL SUBSCRIPTION_RENEWAL (TRANSACTION);
        WHEN (TRANSACTION.TYPE = 'CANCELLATION')
          CALL SUBSCRIPTION_CANCELLATION (TRANSACTION);
      END;
  END;
END;
```

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Prove it yourself with our \$25 demo diskette

If you're not already convinced, order our demo diskette. You can try out all the features and functions of Action Diagrammer with a step-by-step demonstration guide. (The demonstration diskette does limit your use to 50-line diagrams.) Your \$25 can be credited to purchase of the full version of Action Diagrammer.

Two ways to order

You can order the demo diskette or the complete Action Diagrammer editor in either of two ways:

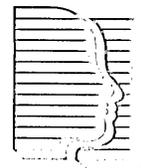
(1) CALL: 1-800-237-1977, EXT. 4100

Call our toll-free line between 8 am and 8 pm EST Monday thru Friday. VISA, MasterCard, and American Express credit card payments only. In Michigan call 800-447-3556, Ext. 4100.

(2) SEND CHECK OR PURCHASE ORDER

Send your check or company purchase order and specify quantity of Action Diagrammer or Demo Diskette. Add \$2.50 shipping and handling for each item. Michigan residents add 4% sales tax.

Address to: Database Design, Inc.,
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101 Union Street, Plymouth, MI 48170.
Allow 4 weeks for delivery.

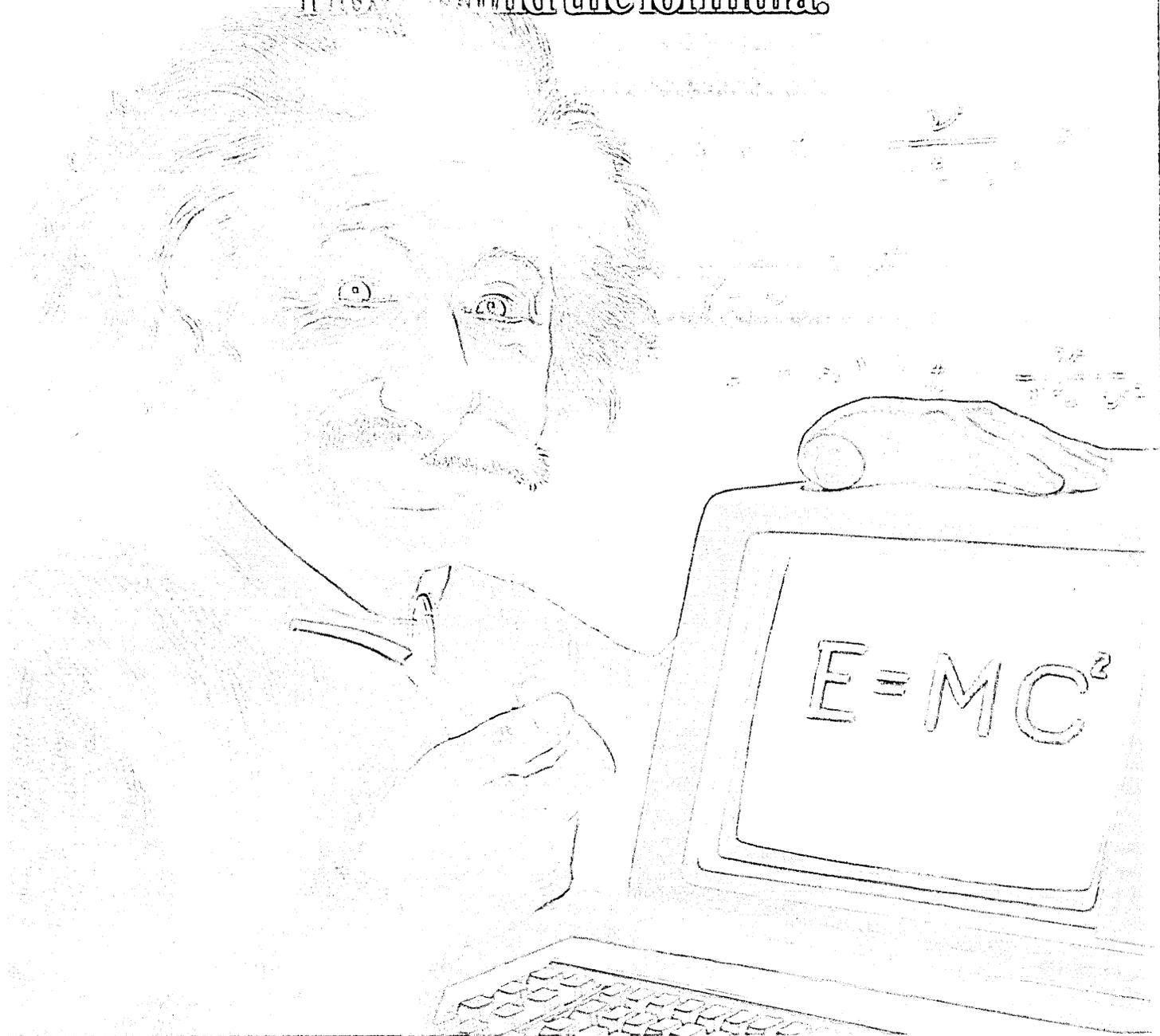


Database Design, Inc.

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Software Tools
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How to find the formula.



INQUIRE/Text: Helps you find what's buried in your database.

You don't have to be an Einstein to realize that numbers are only part of the data your organization needs in order to be effective. As often as not, the information you need consists of a few key phrases buried inside a mountain of written documentation.

Until recently, accessing this information was a nightmarish task, largely dependent on paper filing systems and relatively fallible human memory.

But with INQUIRE/Text, it's easy. Powerful search commands zip through everything from research reports to correspondence—extracting vital information faster

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EDITORIAL

THE EARLY BIRD GETS THE BIRD

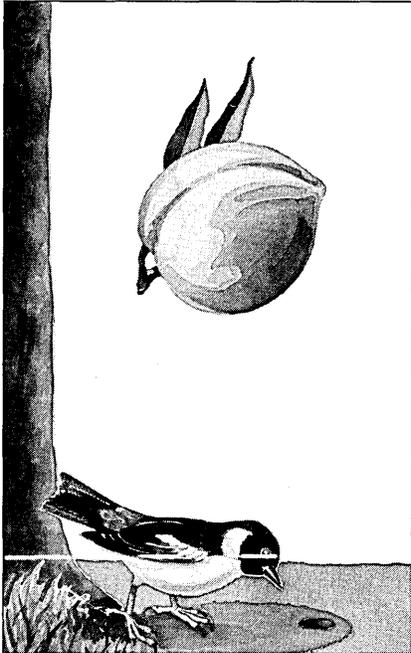


ILLUSTRATION BY DORIS EITLINGER

Few things can be as ruinous as a good idea when the timing is bad. And timing is usually the difference between sheer genius and utter foolishness. Peachtree, at least as an offspring of MSA, is a perfect example. As the early-bird systems software company in the micro software market, MSA now gets the bird and not the worm.

The charismatic John Imlay has dazzled this industry time and time again. There was the live tiger on stage, the mock funeral with which he announced the death of the minicomputer, and the impossible dream finale at last year's National Computer Conference. But through it all, beneath the flash and the tinsel, Imlay's company, MSA, continued to generate the real glitter of ever-increasing revenues and profits.

Now, MSA's dream of one-stop, micro-to-mainframe software shopping has tarnished. The Peachtree acquisition, widely hailed a few years back, has proved a snare and a delusion. In spite of heavy advertising and a broad line of products, Peachtree has been little more than a drag on MSA.

In this industry, when a part of a company goes bad, the usual scenario calls for a cosmetic change—the realignment of management, the elimination of R&D, and the firing of an advertising agency. A slightly cynical view, one acquired after years of watching data processing companies, would suggest that blame is usually placed everywhere except where responsibility must finally sit—with top management.

But Imlay, as usual, has done the unusual—he has shouldered the blame for the Peachtree blight. We ought not have been surprised, but it was still a refreshing eye-opener to read John Imlay's answers to questions posed by our reporter, R. Emmett Carlyle (see "Vendor Outlook Bleak," p. 36). In essence, Imlay says he gave it his best shot and it didn't work, so it's time to fold the tent and go away.

Hindsight experts are offering many theories to explain the Peachtree collapse. Limitations on dealer training and support are often mentioned, but most observers focus on IBM's entry into the world of microcomputer software. At best, these are only partial explanations as seen from a classic after-the-fact view.

While Imlay's refreshing honesty and open acceptance of personal and corporate responsibility is good reading, what really bothers us is the suggestion that no independent software house can build a loyal, multidealer, multiproduct business. The general feeling we get is that there's a healthy market for this product or that one, but nobody has yet figured out just how to cascade a one-shot success into an ongoing business. While customers may love 1-2-3 and dBase II, no company can keep a business running for long on the sales of a single product.

There is a lack of stability in this world of microcomputer software. Everything seems based on today and today's needs. Nobody seems to be having much success building long-term loyalties with either end-user customers or dealers.

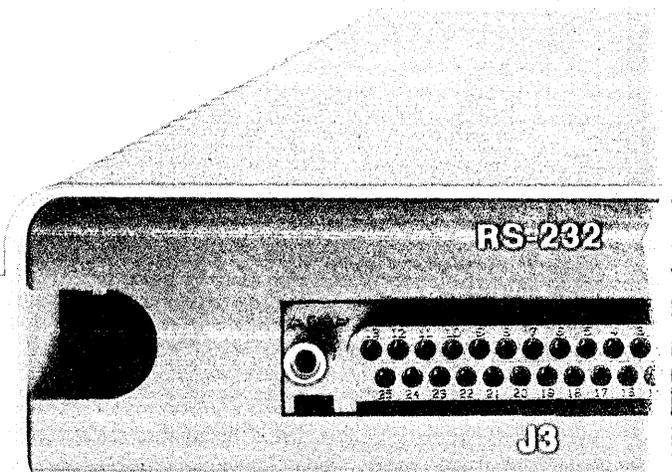
We can't help but contrast this short-term approach with the historic IBM answer to marketing. Customer loyalty, account control, and the building of a tight relationship with key buyers has been IBM's standard. Aren't the makers of microcomputer software playing right into IBM's hands?

That's not what Imlay thinks. Indeed, Imlay's frank answers to our questions show he makes no attempt to shift responsibility to others—not even to IBM. A decision had to be made, it was done, so be it.

While MSA's earnings have been bruised and some egos have been deflated, we certainly haven't heard the last of the company—or of John Imlay. Imlay won't stop climbing just because he once got caught with his pants down. As Imlay himself tells it, "The higher up the tree the monkey climbs, the more of his ass you can see." ●

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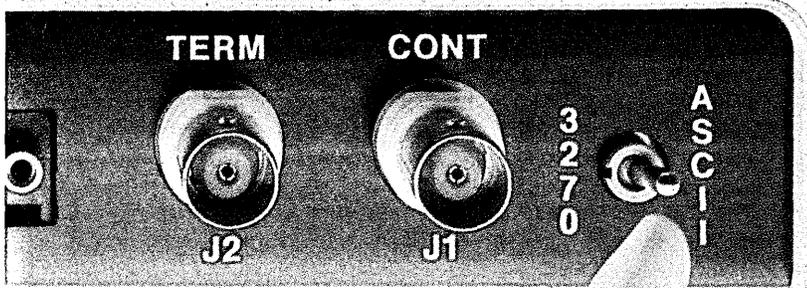
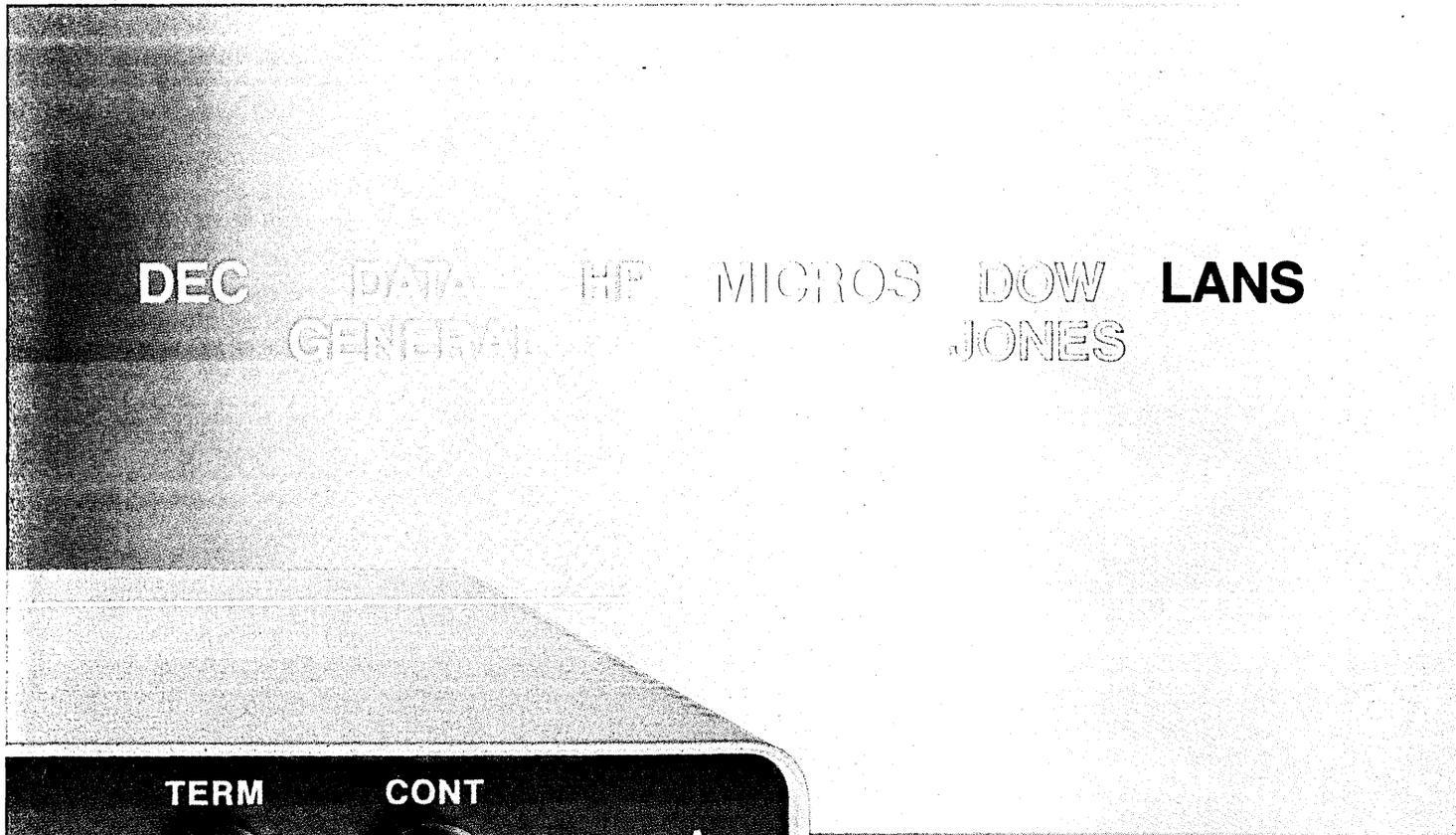
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NEWSFOCUS

GETTING AWAY WITH MERGER

What looks to investment bankers like a heavenly marriage can be hell in the computer room.

by Laton McCartney and Joe Kelly

A quick quiz regarding the impact of a corporate merger or acquisition on the MIS departments of the companies involved. Answer true or false.

1. When companies merge, the databases of both organizations are carefully integrated and the best hardware and software programs from each system are retained.

2. When company A acquires company B, the MIS people from company B can be assured of job security and will retain the seniority and status they enjoyed in their old company.

3. The MIS departments from companies that have merged share files and documentation willingly, and frequently go bowling together after work.

4. The Wall Street money boys who wheel and deal behind the scenes so that XYZ Chemicals can take over RST Industries spend a lot of time worrying about what will happen to the respective MIS departments after the acquisition.

If you've answered true to any of these questions, be advised to steer clear of three-card monte dealers and used car salesman who've got just the deal for you. It's a rough world out there, and as anyone who has been caught in the middle of a corporate merger can attest, the rules of logic, fair play, and good fellowship don't necessarily apply when your company's in the midst of being snapped up by some corporate predator.

Horror stories about mergers and their impact abound. One classic tale concerns the ill-fated consolidation of the Pennsylvania and New York Central railroads.

Hailed as a bold stroke that would revive rail transportation in the Northeast and bring an end to costly, wasteful competition, the 1968 merger was instead an operational disaster. Train routes were changed without any notice to the classification clerks who supervised dispatching. Cars were dispatched willy-nilly, usually to the wrong yards. Individual cars, even whole trains, were sent on their way with no waybills to explain their routing or destination. Overwhelmed yard superintendents dispatched trains

just to get rid of them.

Two and a half years after the merger was approved, Penn Central suffered the biggest bankruptcy in American history. In 1970 alone the \$4.7 billion corporation lost \$430 million.

The immediate cause of the bankruptcy was that year's dramatic economic slowdown and chaotic bond market. But what many people remember 15 years later is that those two big railroads couldn't get their computer systems to talk to each other.

If all mergers went as badly as the Penn Central, it undoubtedly would have brought this time-honored practice to the timely end many wish for it. Such is not the case, however. There were some 2,365 mergers, consolidations, and acquisitions in 1983, with a total price tag of \$53.3 billion. Since 1981, mergers have been on the upswing, reversing a trend that prevailed through much of the 1970s. The last big merger wave was in the late 1960s when the conglomerate kings enjoyed their heyday.

The factors behind the current merger wave are as diverse as the industries in which it is rolling. Banks were the most active mergers in 1983. Mergers offer banks a way to expand their customer base (particularly where interstate banking is allowed) and to compete more broadly in the financial services market. In bank mergers, consolidating the two data processing departments is usually a top priority.

In the oil business, which ranked fifth in merger activity in 1983, buying a company and acquiring its reserves is cheaper than going out and drilling for oil. This was the case in January when Texaco announced the largest merger in history, the \$10.1 billion acquisition of Getty. Despite the tactics that pushed up the price of the Getty shares—including a

The factors behind the current merger wave are as diverse as the industries in which it is taking place.

tender offer and threatened proxy fight by Pennzoil, a leveraged buy-out by Gordon Getty and Pennzoil, and finally the Texaco bid—in the end, Texaco paid only \$4 a barrel for Getty's oil. Even in today's glutted market, with oil selling for around \$15 a barrel, that's not a bad profit.

Overall, however, the biggest factor behind the current merger wave is the economic recovery. Rising profits last year left many corporations with available cash and a wandering eye. More than half of all mergers in 1983 involved takeovers of small, privately held companies, according to W.T. Grimm & Co., which follows U.S. merger activity. When a

ILLUSTRATION BY GLENN DODDS



IN FOCUS

company makes an acquisition in the same line of business, merging the two dp departments is almost always a top priority. When the new subsidiary is in another business and is bought primarily for its investment value, however, the dp operations will generally be left untouched. Because the main objective in an oil merger is to keep overhead to a minimum, consolidation of the two dp departments is usually a top priority. "When Gulf was merged into the Standard Oil Co. of California, the market was flooded with résumés from Gulf's dp people," reports one consultant.

"You really can make dp go anywhere you want," observes a Wall Street dp executive. "It all depends on what direction you want to take the business in."

How does a merged company avoid the fate that befell Penn Central? Good planning. Careful analysis. Enlight-

"When Gulf was merged into Standard Oil Co., the market was flooded with résumés from Gulf's dp people."

ened personnel policies. Clear, intelligent management directives. A willingness to compromise. These are some of the suggestions that emerged from interviews with dp consultants, executives, and staff employees who have experienced mergers firsthand. What is clear is that in the highly charged atmosphere that prevails in most mergers—even friendly ones—the potential for conflict in data processing is enormous.

"In a merger situation the acquiring company feels they've been shrewd enough to make the acquisition and that they will be equally shrewd in managing it," observes John Arnold of ExecuTrak Inc., a Waltham, Mass., consulting firm that specializes in helping companies in merger situations. "A we-they atmosphere emerges. Data processing can be like a lightning rod for tensions that are building up throughout the company."

Even when two companies are not actually merging dp, the relationship can sour very quickly if the parent company begins to make special demands on its new subsidiary's dp resources. According to Arnold it's not unusual to find the dp department in an acquired company doubling or tripling its operating costs just to keep up with the corporate control and accounting reports required by its new parent. He cited the example of a paper company that acquired a string of offshore paper mills and then became disturbed at the operating losses that were being incurred.

"We stepped in and found that the parent company was demanding that the subsidiaries produce some 42 financial

control reports every month." Arnold succeeded in cutting the number of reports to a more manageable eight. "More than anything else it was a morale booster," recalls Arnold. "It cut the we-they tension considerably."

Good planning is always cited as the key to a successful merger. Unfortunately, this is often not possible nor is it necessarily a panacea. One of the almost comic ironies of the Penn Central merger is that a planning committee consisting of staff from the two railroad lines had been meeting off and on for 10 years before the merger took place.

Most mergers are not conducted at such a leisurely pace. More often, time is short, negotiations are complex, and secrecy is essential. Deals are struck at breakfast meetings or over drinks, with the terms outlined on napkins or the backs of envelopes. Computers may be considered for all of five minutes.

"I'll get a phone call," says William Bautz, senior vice president in charge of dp at New York-based Shearson/Lehman American Express, "And someone will ask, 'Can you handle 40 more branches, some kind of training, a little of this and a little of that?' I'll say yes, and a few weeks later I'll find out who we are merging with."

Some companies conduct premerger audits of the dp operation in the company being acquired. A study by the Diebold Group Inc., based on an analysis of 10 leading corporations and their acquired subsidiaries, concluded that a decision to conduct a premerger audit should not be made lightly and that it should be brief and carried out only at the top management level. The appearance of a task force of strangers in the computer room asking a lot of questions can be terribly damaging to employee morale. The Diebold study cited one merger that was actually called off after a premerger audit caused half the staff at the target company to leave for other jobs.

Diebold recommends that a premerger audit be conducted only if:

- a negative finding in and of itself would be enough to squelch the entire merger;
- the computer organization of the acquired company will have special value to the acquirer; and
- a major policy decision on the consolidation of old and new computer resources will have to be made shortly after the merger.

Unfortunately, without the kind of in-depth look that is virtually ruled out in a merger situation, it is impossible to accurately assess a dp operation. Even a company that is highly knowledgeable in the world of computers would be hard-pressed to make an accurate judgment. This appears to be true, for example, of

the recent merger between General Motors and Electronic Data Systems. EDS is going to help spearhead GM's move into the computer business and will also take over GM's internal dp. "I don't think either party understands the magnitude of what they are doing," says an observer close to both. "It is going to take them at least six months to reevaluate the various roles they will have and how they will be implemented."

When two companies decide to merge their dp operations, the disposition of the hardware is the most predictable aspect and comparatively unimportant financially, according to the Diebold report. Far more important are the quality of the documentation in the company where the computer system is being converted, the cost of records conversion and staff retraining, and the costs of lowered staff morale and higher turnover.

The toughest mergers are those in which there are incompatible hardware systems. The costs of conversion and staff training will be quite substantial. The fact that most dp operations tend to be underdocumented rather than overdocumented only adds to the difficulty.

Even in situations where the dp operations are similar, if not exactly compatible—two companies in similar lines of business, for example—problems inevitably arise. "Functionally similar organizations whose dp resources are to merge seem to have added morale problems because the commonality of systems allows

Good planning is always cited as the key to a successful merger. Unfortunately, this is often not possible, nor is it necessarily a panacea.

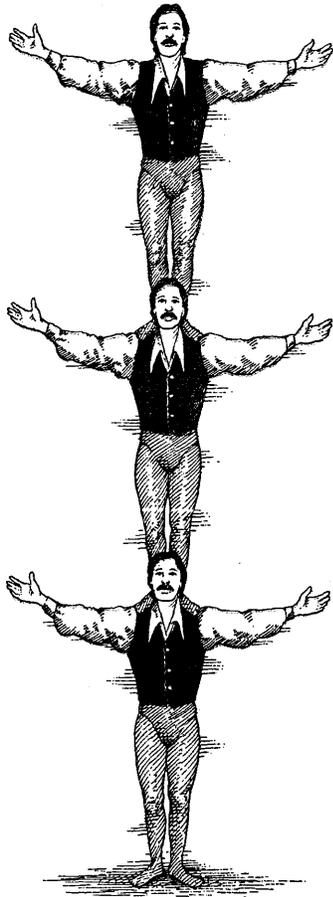
more scope for professional conflict," according to Diebold.

The outcome in such a situation is not unexpected. "Usually the side that is politically powerful wins," the report states, "even if the losing side has the technically better solution."

According to Robert Patrick, a dp consultant based in California, the best possible merger situation is one that involves two growth-oriented companies that are compatible in terms of their product lines and services. "Talented dp people in the merged company will have a greater chance for career growth than they might have in their own smaller, somewhat stagnant shop," according to Patrick.

The various elements within a shop pose different challenges in terms of consolidation. In most cases, data communication is very amenable to consolidation and offers a large opportunity for cost savings. Merging applications, how-

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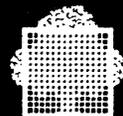
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ever—even when the two companies being merged serve the same industry—will typically prove more troublesome.

When Shearson Lehman/American Express acquires another company, questions about what applications will be continued from the acquired company are decided immediately: as a company policy, they all end up in the circular file.

"We don't merge applications," says Bautz. "When we took over Lehman they could have argued that their trading reports were better than ours. Well, now we'll just have to make the trading reports that we have been using better."

Now second in size only to Merrill Lynch, Shearson has been through enough mergers and acquisitions to fill a textbook full of case studies. Originally founded in 1960 as Carter, Berlind, Patoma & Weill (the Weill is for Sanford Weill, now president and ceo of Shearson Lehman/American Express), by 1970, with two acquisitions under its belt, it was CBWL-Hayden Stone. By 1974, after three more acquisitions, it was Shearson Hayden Stone. By 1979, four more firms were added, plus Loeb Rhoades Hornblower & Co., making it Shearson Loeb Rhoades. In 1981, American Express bought the firm. Five more acquisitions followed, including the most recent one last spring of Lehman Kuhn Loeb.

Through the years, Shearson has honed the one ground rule that determines its approach to dp: everything will be done the Shearson way.

"Consistency is the most important thing in a merger. You need to have it right from the start," says Fred A. Robbins, first vice president of systems and

The appearance of a task force of strangers in the computer room can be terribly damaging to employee morale.

programming. "When we take over a firm we flood the place asking every kind of question. You have a lot of people out there making decisions and it has to be done quickly. You don't want to have to stop and have little powwows along the way. We know what we want to do before we go in. It's a question of how."

The case of the Loeb Rhoades Hornblower merger is of particular interest because Loeb Rhoades had a better dp operation. "No one would argue Loeb wasn't better," says Bautz.

"They were further ahead in systems, in applications, and they had more staff in some areas. In dp the temptation is always to say this or that is better. But your goal should be to merge the system and control it, not have the neatest dp."

An example was Shearson's decision to take the 3270 display terminals in

the Loeb branch offices and replace them with the older IBM 3767 teleprinters that Shearson used at the time. "Eventually we went back to the 3270," Bautz says. "But sticking with the teleprinter at the time was the right decision because it was consistent."

The logistics of the Loeb Rhoades merger were staggering, considering that everything had to be kept up and running while the merger was taking place. The 125 Loeb Rhoades branches were converted over a 180-day period. Plastic curtains were hung around Shearson's two IBM 370/158s so that the walls could come down in order to triple the size of the data center. Plumbing had to be installed to accommodate new water-cooled IBM 370/168s. The only serious snafu occurred when a workman stumbled amid the rubble and fell against an off switch, shutting down the system (but not the trading room) for several hours. To convert Loeb Rhoades files and records to its system, Shearson used some of the 50 conversion programs it has developed over the years.

Actually, the Loeb Rhoades merger was comparatively slow. Bautz says an eight-week period has typically been required for most of Shearson's mergers. A key factor behind the speed with which Shearson accomplishes a merger is the fact that at any time it has the flexibility to sustain a 40% growth in trading volume over a 60-day period.

This is particularly important on Wall Street. A year before the Shearson merger, Loeb Rhoades & Co. acquired Hornblower, Weeks, Noyes & Trask. An unexpected upswing in trading volume caught the new company without enough computer capacity. Error rates rose dramatically because back office people were inadequately trained. Profits fell sharply.

Nearly everyone who has experienced a merger firsthand agrees that personnel considerations outweigh the technical problems involved in a dp consolidation. "In a merger situation, the apprehension goes through three stages," says Thomas G. Ash, senior executive vice president at Sun Bank Service Corp. in Miami. "The first stage is when the merger is announced and everyone asks, 'What's going to happen to me?' Then management makes a statement explaining what will happen and everyone calms down. As the actual merger date approaches, apprehension begins to build again. That's the second stage. Then the actual merger takes place and you have another whole round of apprehension. At any stage you can lose good people."

Dp consultant Patrick recalls a merger situation in which a Chicago-based corporation acquired a company in Los Angeles and asked the dp people

there to relocate to the home office. "The dp people in L.A. didn't want to move and they refused to cooperate in the merger. Documentation and files began to disappear and the good people left, leaving behind the 'culls,' the third-rate people."

To avoid this kind of problem, Patrick recommends that management offer incentives in the form of bonuses and paid vacations to dp people who stick around until the end. "Management has to do it," says Patrick. "In a merger, the dp people have them over a barrel."

Employees who have seen mergers through to the end, only to find themselves on the unemployment line, tend to

Shearson has honed the one ground rule that determines its approach to dp: everything will be done the Shearson way.

view such situations with a more jaundiced eye. As one put it: "The top executives got a golden parachute and we got the shaft."

In mergers in which he has been involved, Ash of Sun Bank Service Corp. says the largest staff reductions are in computer operations. "In programming you will need more people, but you still won't need two staffs. If the merger is between two operations with a similar computer environment, you may need 10% to 15% more programmers—more if the environments are different."

Diebold recommends keeping employees informed at all times in a merger even when there is really nothing to tell them. "The shorter the period of employee uncertainty the better," the report concludes.

Savings achieved through the elimination of redundant jobs and equipment are among the chief gains to be derived in a merger. But there are also gains from the synergy that results from the marriage of two organizations.

Patrick gave as an example a merger involving two trucking companies. Merging the two data centers provided a single center for dispatching all trucks. While it was inevitable when both companies were operating separately that some trucks would be dispatched half-filled, having one computer center keep track of the merged companies maximized the number of instances in which shipments could be combined. "The benefits of combining the computer centers ultimately transcended the actual costs savings of the centralized center by several orders of magnitude," says Patrick.

When two \$500 million banks in Little Rock, Ark.—the First National Bank and the Commercial Bank—merged their operations last year, they

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were able to reduce the size of the data communication network from 19 lines to three, explains Robert Thomason, executive vice president of the combined bank, First Commercial. "Before, we couldn't have afforded the concentrators that we needed to consolidate those lines," he says, "but as a billion-dollar bank we could."

Thomason also advises merging companies to keep watch for opportunities to gain savings by switching to third-party vendors at the time of the merger. "A year before, when you think the merger is going to happen, you freeze everything. But as soon as you know what the new ball game is going to be, look for savings." Thomason says he was able to save

"Your goal should be to merge the system and control it, not to have the neatest dp."

\$100,000 by obtaining disk drives from a third-party vendor. "You're all wrapped up in getting your two databases together and there's money lying on the table."

The ideal example of synergy resulting from a merger occurs when two companies together can offer a product to their customers that neither one of them could have provided independently.

Ideally, service to the customer should be the chief factor in the decision to use one system over another. Too often this ideal gets lost in the political jockeying that takes place during a merger, and is then forgotten completely once the dust settles. This is particularly true when two companies in the same line of business merge. "Management is always looking for the benefits from synergy," comments Ash. "But management is hard-pressed to recognize that in the best possible situation, synergies take at least a year to 18 months after the merger is announced."

The benefits from synergies are often more evident when two companies from different backgrounds merge for a specific reason: Sears Roebuck's acquisition of Dean Witter is a case in point. The merger pushed Sears into the financial services business and also allowed Dean Witter to provide services that would have been beyond its reach prior to the consolidation.

Dean Witter now offers a Central Asset Account to its largest customers. The CAA functions like a national bank: investors can deposit funds in any Sears or Dean Witter office and have their account credited instantly. According to Joseph T. Marchese, first vice president of Dean Witter/Sears, without access to the

national telecommunication network of Sears, Dean Witter could have never offered the service. Now, however, it is just one more service offered over the Sears network. It does not have to justify itself based on profitability when the stock

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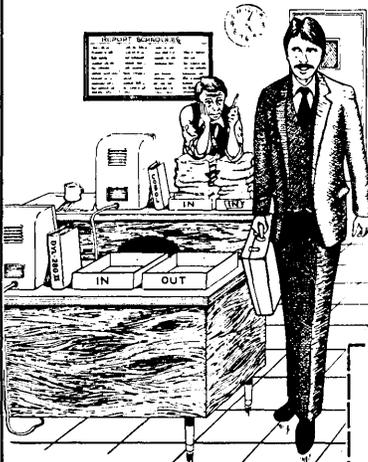
market is low and volume drops off.

"If Dean Witter were operating on its own, the telecommunication use could not be justified," said Marchese. But by piggybacking the cost on Sears' existing capabilities, the cost is not all that critical."

For Marchese, so far, so good. Talk of averaging resources, career advancement, and the other benefits that may accrue from a merger or acquisition can make all this shuffling of corporate ownership easier to take. As Jonah is alleged to have commented from the belly of the whale, "It's not so bad once you get used to it." ©

Laton McCartney and Joe Kelly are New York-based free-lance writers.

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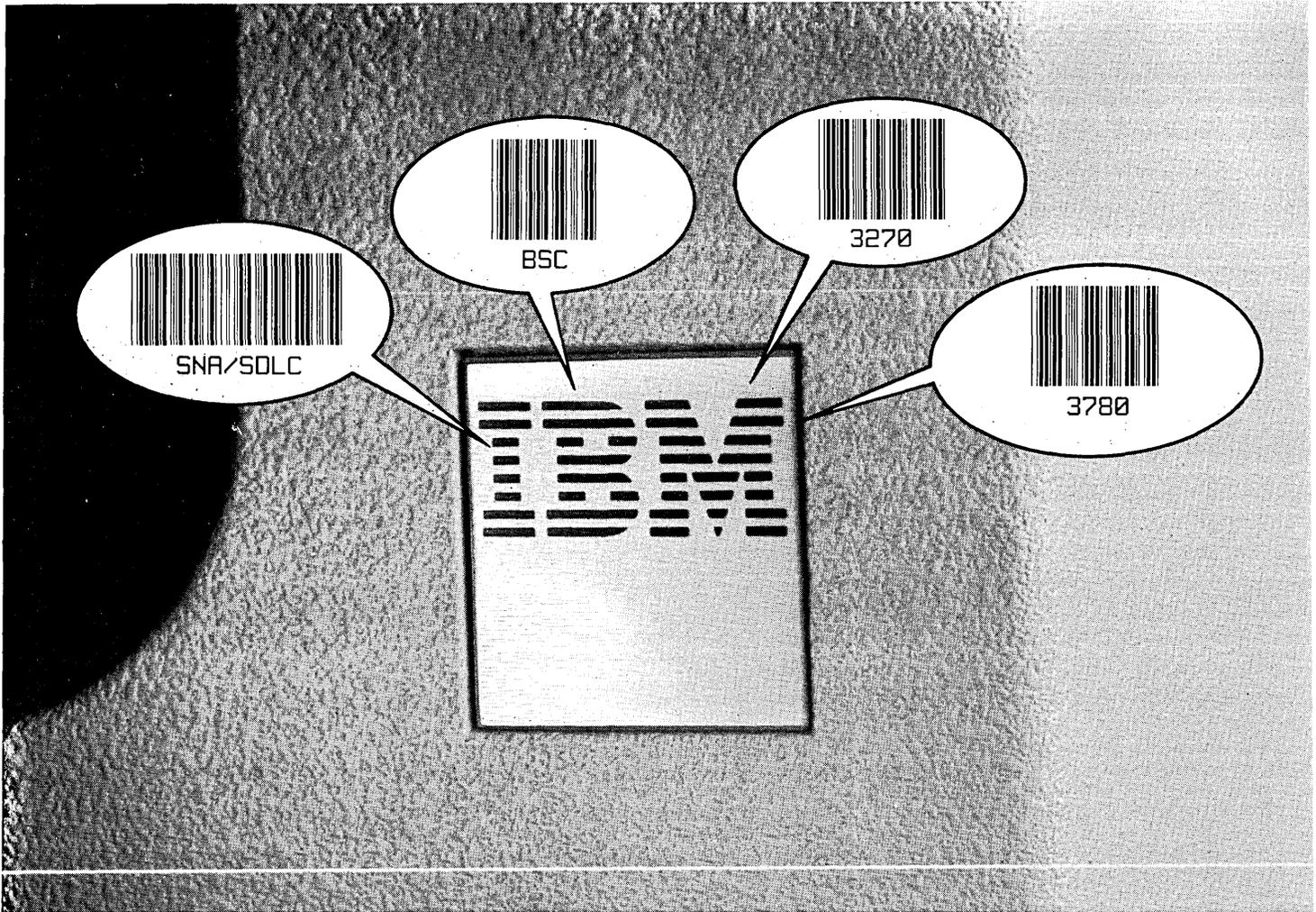
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A black and white photograph of a computer monitor. The screen is dark, and the text is displayed in a light, monospaced font. The text reads: "SORRY, I'M HAVING A BREAKDOWN_".

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NEWS IN PERSPECTIVE

MICROSOFTWARE

VENDOR OUTLOOK BLEAK

If MSA can't succeed in the microcomputer software business, can anyone?

by R. Emmett Carlyle

Unlike the more spectacular failures of the microcomputer hardware world, the Osbornes and the Victors, software companies don't generally go bankrupt; as the saying goes, they just "fail soft" by failing to grow at projected rates, and usually go on to be acquired.

Size is no guarantee against failing soft, as Management Science America recently discovered to its dismay. The Atlanta-based corporation is trying to shed its retail microcomputer software operation after a bruising year, while everybody else is trying to figure out whether there's a future in the microcomputer software industry. The answer may be to avoid the retail market and concentrate on selling micro products through existing direct sales channels.

Apparently, the largest independent software company in the U.S. last year couldn't hack it in the retail sphere, only months after a major announcement of 25 new software products. The for sale sign at MSA/Peachtree's headquarters is not so much due to IBM's presence or any other external force but to inadequate resources and management mistakes, according to company officials, customers, and observers.

Peachtree's customers are especially critical. Seymour Merrin, founder of the Computerworks chain in the New York City area, says that MSA was too intent on building a brand name and acting like a big company. He notes that MSA/Peachtree didn't listen to the dealers and failed to offer adequate support. David Wagman, chairman of the industry's biggest software distributor, Englewood, Calif.-based Softsel, adds that MSA would have succeeded in the microcomputer software business if it had put half its advertising spending into training and support of the dealers. Curt Monash, software industry analyst for Paine Webber, the New York City brokerage firm, was one of many leading observers who zeroed in on poor management—"or at least good management too late"—and talked of MSA's "slow-reactive approach

MSA'S ROTTEN PEACH

Though the industry usually sees his jovial side, John P. Imlay is not one to shy away from tough decisions. Last year, he mesmerized a National Computer Conference keynote audience with a sparkling multimedia display to show one side of his character: charismatic showman, industry prophet, and champion of the independent software industry. Thirteen years before, he had revealed another side of his personality when he took over the reins at the ailing Management Science Atlanta, where he set about pruning its 800 people and 20 software lines down to 40 people and one software line. Since then he has steered the company, now known as Management Science America, from \$2.7 million total sales to \$145 million last year—the largest independent software company in the U.S.

When asked why he'd embarked on the risky acquisition of the Peachtree microcomputer software operation in 1981, he replied that it was the "strategic thing to do to ride the intelligent workstation wave of the future." Imlay and his top managers predicted Peachtree would top \$35 million in revenue this year and help push MSA's total sales closer to the \$200 million mark.

Sadly, a year that promised a fairy tale ending for MSA has turned out more like a horror story—a year when all its expectations seem to have been halved by a treacherous and fickle market. MSA will make little more than half the predicted 35% increase in sales, and half the earnings it was hoping for.

And now, only a few months after Peachtree's major launch of 25 new software products, Imlay has shocked the industry by announcing he is abandoning his retail "experiment" because the market has turned against him with a vengeance. Once more he finds himself having to revert to the clinical side of his nature to make a tough management decision. As a result, Peachtree—and its portfolio of 78 wide-ranging software products—is on the seller's block. Just before this candid Q&A with DATAMATION's Boston bureau manager R. Emmett Carlyle, he said, "Ask me in one year if I made the right decision."

DATAMATION: Last year, you were the largest independent software company in the U.S. Now you are telling us you can't make it in the retail business—that you shouldn't even be there.

Imlay: Yes.

DTM: What does that mean for the rest of the independents? For the other mainframe software companies, for example?

Imlay: That's for them to decide. Our micro software retail division has over 70

products in home, business, and education. Somebody could pick it up and make it work, but it'll take more money and time than we can give it to do it right.

DTM: One buyer for the whole division?

Imlay: Possibly. But it's more likely that we'll sell it in parts. The education or home software is attractive to a big publisher with extensive distribution channels, for example.

DTM: Like McGraw-Hill?

Imlay: It's too early to name names.

DTM: What if you can't sell the division?

Imlay: We'd probably spin it off and seek outside funding.

DTM: Your mystery buyers apart, who else from high tech could make it on the retail side if you can't?

Imlay: IBM's entry is serious. They waited for the personal computer business to establish itself before entering, and now they've done the same with its software. Even when they make mistakes, as with PCjr., they have the wherewithal to correct them. There's also a place for high fliers with hit records and knowledge of vertical markets. Having had 1-2-3, the dealers are waiting expectantly for 4-5-6.

DTM: One could argue that your gamble in entering the retail sphere was unwarranted because you lacked a hot piece of software from the beginning. The Peachtree line, though broad, never had a hit.

Imlay: That's easy to say with hindsight. But we started in 1981, before the hit record syndrome, before 1-2-3, dBase II, Multimate, and all the rest. So our strategy of establishing a brand name for a wide

array of products was sound. It still is, for somebody with greater resources and retailing expertise than we have.

DTM: Dealers claim you were so intent on building up a brand name and acting like a big company that you failed to listen to your dealers and offer them adequate support.

Imlay: Over the past year we pushed hard to expand our dealer support team. I guess we didn't do a very good job.

DTM: Maybe your effort came too late. Dealers point out that, unlike your main-frame customers, they have no sense of loyalty; they're a very unforgiving bunch.

Imlay: Yes, obviously.

DTM: So dealers turned against you?

Imlay: The market turned. We not only found ourselves in a fight for shelf space and hit by price erosion, our whole oem business [ill-fated micro companies like Osborne, Eagle, etc.] dried up to nothing.

DTM: Is there a market for accounting products—the core of Peachtree and contributor of 44% of its \$22 million in 1983 revenues—sold through the retail stores? Or has that dried up too?

Imlay: IBM obviously thinks there's a market. But look at the increased levels of training and support it is having to offer to dealers. We would have to match that. And in addition, IBM will be upgrading its accounting series to run on the PC AT. We would have to pump in further R&D to match that effort, also. Our sales don't warrant such further spending.

DTM: A major micro software distributor, Softsel, told us if you had put half

your ad dollars into training and supporting dealers you wouldn't be in this mess.

Imlay: More hindsight. Suddenly, everyone has his own version of what our "one biggest mistake" was: you know, mismanagement, Imlay screwed up, etc. All I can tell you is that we gave it our best shot. We launched 25 new products in the spring, primed our dealer and remote support operations, and sat back, and waited, and waited. By September it was clear that most of the products were still sitting on the shelves. I had to make a decision, and quickly: play or fold. Sometimes you have to fold.

DTM: Informed sources put your losses for the first nine months of 1984 at \$12 million, with \$10 million coming from your microsoftware retail operation.

Imlay: That sounds about right.

DTM: We're told that your retail side contributed only \$9 million in sales over the three quarters, and will do only \$15 million by year-end—\$20 million less than you and all the analysts expected.

Imlay: Maybe a shade more than \$15 million. But essentially your numbers are correct as far as we can tell at this point.

DTM: How much did you pay for your micro software operation?

Imlay: That depends on whether it's sold in parts or one lump. We've no way of knowing at this time.

DTM: Some observers say you will be lucky to get your original stake back because of the absence of any single outstanding product.

Imlay: I don't agree. Our education and home software lines have broad appeal to a mass market outfit. We have good distribution channels established for the rest of the line. Experts say our Back to Basics accounting package is very good. The program has been converted to run on the Apple Macintosh, and the feeling is that any software that runs on the Mac right now is in hog heaven. We also have ongoing revenue streams from the so-called less interesting products.

DTM: You're noted as a communicator and predictor of industry events. Did your crystal ball cloud over? Did you for once, as they say, screw up?

Imlay: Well, I assume full responsibility. But I defend my decisions all the way down the line, as I defend this one. Three years ago when we bought Peachtree we were "courageous." I was a hero. And each year, as revenue grew—\$3.3 million in '81, \$9.4 million in '82, and \$22 million last year—they all applauded my foresight. Now suddenly I'm a bum. But if you ask me one year from now whether I made the right decision this time, I think you'll find I did. ©



ILLUSTRATION BY ANTHONY SCHIANO

NEWS IN PERSPECTIVE

to a fast-changing business." Others just talked of "disorganization."

For all of this, MSA chairman and chief executive John Imlay takes some of the blame, but says his critics are enjoying the luxury of hindsight. "We gave it our best shot," he told DATAMATION (see "MSA's Rotten Peach").

Success in the microcomputer software business, contend the dealers, appears to require skills the independent mainframe and minicomputer software vendors have not yet developed. The vendors claim they can develop those skills, and perhaps circumvent the retail channel through direct sales to dp execs.

Frank Chisholm, executive vice president at Cullinet Software, Westwood, Mass., MSA's biggest competitor in the mainframe software domain, says a software sale is a software sale, and all businesses are the same. Yet, he adds, when it comes to microcomputer software, "you need mass merchandising talent in-house, and they [MSA] don't seem to have it."

The industry now boasts so many vendors and products that it is difficult to differentiate one from another. As a result, brand recognition, advertising, and promotion—all the characteristics of consumer goods marketing—are now taking top priority. Consequently, several of the leading microcomputer software companies recruited a new breed of executive, one who formerly was equally adept at selling soft drinks, cigarettes, or soap.

"The business, increasingly, is being permeated by packaged goods specialists," said John Beruer, former group marketing director at Pepsi-Cola and now director of marketing for the Computerworks chain. As an example of this breed, he cites John Sculley (also from Pepsi), who is Apple's president, and Henry Cardello (formerly with Coca-Cola), now director of marketing for the largest microcomputer software company, Lotus Development Corp., of Cambridge, Mass.

The most compelling reason for MSA's problems was not a lack of a Proctor and Gamble marketer on staff, but the most simple and obvious one. The retail world demands a hot product, one that screams off the shelves, and MSA didn't have one. "All MSA's slick marketing and all the tricks couldn't make up for the lack of a major product," says Frank Dodge, cofounder and ceo of McCormack and Dodge, Natick, Mass., another leading MSA competitor.

As one industry wag described the deficiency of MSA/Peachtree's exotic "scratch and sniff" ad campaign, which included ads that exuded a fruity peach aroma: "It takes more than sweet-smelling software."

"In the retail microcomputer soft-

ware world of today," says Cullinet's Chisholm, "the dealers display no vendor loyalty. The best, the most functional product, always wins out." He added that this was in marked contrast to the mainframe software world, "which exhibits high degrees of loyalty."

In this manner, a series of "de facto hits" have won out over the competition, starting with VisiCalc six years ago and progressing through such popular disks as Wordstar, 1-2-3, dBase II, and Multimate. Now a new phase in the microcomputer software business is approaching, due in part to the rapid rise of the pc and demand to tap into the corporate database. Ironically, these pressures may bring some order out of the chaos and play into the hands of the mainframe software vendors. "Out of these trends is emerging the need for greater MIS management control and standardization," notes Dodge. "Now the MIS manager is looking for a superset of all of his end users' functional requirements in one prod-

MSA was too intent on building a brand name and acting like a big company, says retailer Merrin.

uct. Standardization is flowing in the wake of central MIS control."

The evolution of the micro marketplace, with greater MIS control, may place the dealer in a secondary role in the future distribution process. Dodge predicts that this shift would have a tendency to "shut out" the retail stores.

"They know how to sell simple, more generic applications such as spreadsheets and word processors," he adds. "But when it comes to more arcane business needs like general ledger and accounts payable, the dealers are forced to rely on the software vendors' promotional skills and expertise."

Many mainframe software companies are thus well placed to bring their traditional business software expertise to bear at the workstation level—if they can develop the vital micro-mainframe links.

In fact, the rewards of doing this can be sudden and unexpected. "Within six weeks of our November 1983 launch of PC Link, we'd reaped \$1.6 million worth of business. And sales have continued to boom all year," contends Dodge.

Cullinet has adopted a similar approach, and has acquired relational decision support software for the workstation, its so-called Goldengate.

"Strange as it may seem," says Cullinet's Chisholm, "a good mainframe software company is now one of the best placed to succeed in the microcomputer software business." The key, he adds, is that Cullinet and the others are now in a position to offer additional avenues of

purchase, in some cases more convenient and more in line with MIS plans.

"Though I don't believe," he is quick to add, that "this eliminates the need for the retail store. On one side are the more generic productivity tools, such as spreadsheets and word processors. At the other side are the business applications, like accounting or inventory control. We have the expertise in the latter case; the retailers have the edge in the generic sphere. They have spawned a number of hit spreadsheets—a product their store personnel find relatively easy to sell—but they haven't the faintest idea how to sell and support a general ledger system.

Imlay says he had sensed, for several years, that this shift to central control and standardization would occur. And despite his costly education in the retail area, he claims his company stands to gain more than most.

The one thing of value extracted from his Peachtree "experiment," says Imlay, is the Peachlink micro-mainframe connection and related applications, which he says MSA will not sell off. Thus the new MSA strategy is to compete head-on with the retail dealers for the big MIS purchases.

MSA, Cullinet, McCormack & Dodge, and the other leading mainframe software companies will now attempt to cut out the retailer with the proposal that the MIS manager buy his software direct through their well-established sales and support operations—which, as things stand now, are more familiar to the MIS manager.

Imlay admits to selling at least \$400,000 worth of hot packages like Lotus 1-2-3 every month as a value-added reseller through his mainframe software sales force. "It's only the beginning," he says of his one-stop shopping plan for MIS managers.

McCormack & Dodge is angling to strengthen its micro software presence, sources reveal, by negotiating to buy a micro software company. But, according to Dodge, the company has backed out at a very advanced stage in the acquisition talks. Did Peachtree influence his decision? "No, IBM entry into the PC software business did," he responds. "We've decided to wait and see how that turns out." Pulling away from the retail side may have been the right thing for MSA to do, but should a retail involvement by the other mainframe software companies be ruled out?

"No, I don't believe so," says Cullinet's Chisholm. "I don't know that if we had a hit record we wouldn't be tempted. We certainly don't rule the retail sphere out. We leave it as an open question for now." ©

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SPEAKING IN CODES

The Treasury Department has ordered all banks to use the Data Encryption Standard in electronic funds transfers with the government.

by Edith Myers

A Treasury Department mandate concerning electronic funds transmissions to the government is meeting with a mixed reaction among vendors and bankers. The directive, issued internally in August, requires that all government agencies use the National Bureau of Standards' (NBS) Data Encryption Standard (DES) to initiate or receive electronic funds transfer transactions after June 1, 1988.

"I think it's great," says William Maroney, president of the EFT Association, a Washington, D.C., organization of companies involved in the development and implementation of automated payments services and systems. His group includes commercial banks, retailers, EFT networks, thrift institutions, finance companies, brokerages, insurance companies, telecommunications providers, manufacturers, and data processors. "Encryption is good," says Maroney, "and if you have to go this way, this is the least disruptive way to do it."

The American Bankers Association (ABA) is not so sure. In a letter to Treasury Secretary Donald Regan, the ABA expresses "certain reservations about the ramifications" of the directive. The association says that while it appears initially to apply only to government agencies, "it would eventually affect all banks that send EFT transactions to these government agencies. Banks would find themselves being required to comply with a standard designed to be voluntarily adopted."

The ABA says most bankers support the standard but that they "bridled at the notion of a voluntary standard being imposed on industry users." Two bankers privately acknowledge they were surprised by the directive. They feel the Treasury Department should have worked more closely with banks before issuing the order.

In its letter, the ABA objects to the directive being issued with no advance notice and without any bank participa-

tion in the decision-making process. It says the directive could impose "significant costs on smaller banks" that may not be able to justify the cost of a message authentication system because of a low volume of Treasury payments.

Maroney doesn't see cost justification as a problem. "If a bank can't do it, if it would be technologically burdensome, there are other ways. Banks can find other people to do that job for them, such as service bureaus or other banks."

Maroney says most EFT Association members were ready for DES implementation before the rule was put out. "With them it's been a question of finding a vendor and saying 'roll it in here, we're ready.'"

Critics have begun proposing ways of taking the sting out of the directive. The ABA has called for the establishment of a government/industry committee, formal or informal, to cooperate in putting the DES into effect. And the Federal Reserve Board, which has opted for a somewhat different system of encryption, has asked the Treasury Department to defer its directive to permit a full study "to determine the likely effect on financial institutions." The Fed says such a study should include both operating and cost considerations of the proposal.

Several vendors, meanwhile, have jumped into the fray with products aimed at providing banks with encryption services using the DES model. Analytics Inc., of Willow Grove, Pa., has a system called Sherlock, which is based on the DES algorithm. It has installed the system in more than 300 banks, including two Federal Reserve Banks.

Another vendor, Techland Systems Inc. of New York, is in the process of implementing DES for the Fed. At

The Federal Reserve Board has asked the Treasury to defer its directive in order to study the directive's effect on financial institutions.

Comdex last month, Techland introduced an NBS-approved DES processor based on technology developed for that work.

Harris Landgarten, president of Techland, says the Treasury directive has "established an awfully big market for us. The technology is here. It's easily implemented and is one of the most secure solutions."

Landgarten says Techland's product is for security of data both along communications lines and within personal computers. On the communications end, a micro-to-mainframe communications link can have data encryption added as an option as if the micro were a standard IBM data encryption terminal, he says.

The DES was issued by the NBS in January 1977 as the official algorithm for use by federal agencies that encrypt non-classified data transmissions. It has since been accepted by the American National Standards Institute. The DES issued by the NBS is similar to one proposed to the standards body by IBM, and the industry leader is generally acknowledged to dominate the DES product market.

Techland hopes to dent this domination. Landgarten says his company is offering a \$2,000 data encryption option for its 3270 emulation line. He says it includes an IBM 3680 feature that allows a micro to talk to IBM mainframes with data encryption installed.

Carolyn Cook, vice president of marketing and sales for Dylakor, of Granada Hills, Calif., sees the Treasury direc-

The First National Bank of Boston "looked into encryption in the past and found problems."

tive as something that will encourage competition for her firm's DYL-Security, a software implementation of the DES introduced in January. "It [the directive] is obviously going to create a demand and there are a lot of people now in the software business who are going to want to get on the bandwagon," she says. "But we already have our product in place."

Jim Farrell III, manager of technical information at Motorola in Austin, Texas, believes the Treasury directive will "open up a nice market" for his company's NBS-approved M6859 DES chip. Motorola has been producing the M6859 for five years. It is a monolithic MOS integrated circuit designed to be implemented in a wide range of equipment requiring protection of data via cryptographic measures.

William Synott, senior vice president and head of the Information Systems Division at the First National Bank of Boston, believes that encryption will ultimately be provided as a matter of course by systems vendors. "We'll protect everything," he predicts.

Farrell agrees with him. Motorola sells its chips to systems manufacturers, and he sees them "gearing up" to meet the demand created by the Treasury directive. Many of them will decide on the Motorola chip, he says.

Synott, in late October, had not seen the Treasury directive and was unsure of its potential impact on his bank. "We've looked into encryption in the past and found problems. We've found it's impossible to do some things without the cooperation of a lot of other people."

He says his bank encrypts data internally and in communications between the bank and the Federal Reserve in

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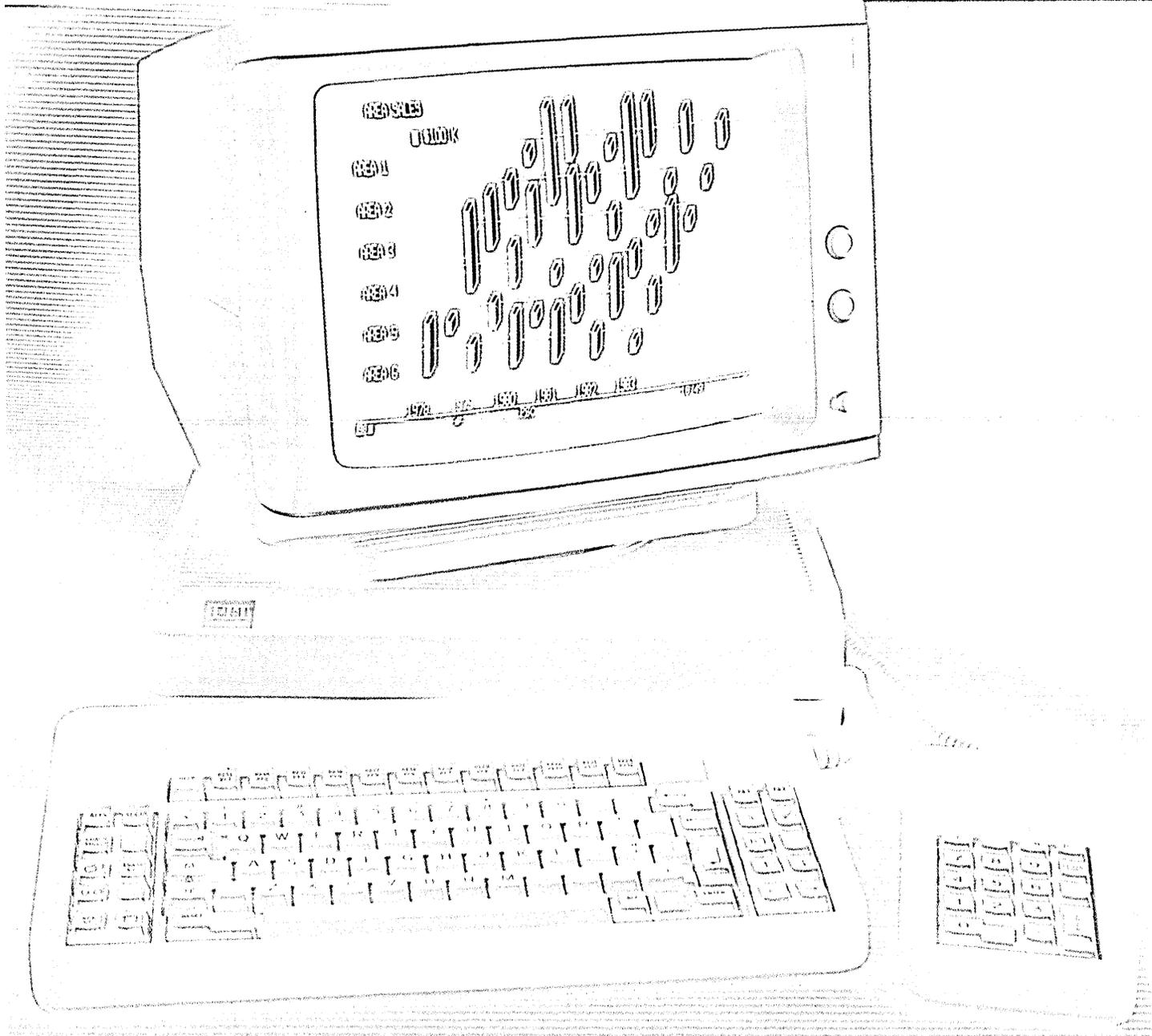
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NEWS IN PERSPECTIVE

Washington. "We're not using it on Bankwire [a banking network operated by Payment & Telecommunications Services Corp., an operating subsidiary of Payments and Administration Communication Corp., New York] because everybody on Bankwire would have to have it and they don't." The bank also uses encryption in its automated teller machines; he says, "everybody does."

Synott does not believe that encryption, through the DES or some other standard, will become universal overnight. "We have to do it in pieces." Of the Treasury's four-year time frame, he says, "Yes, that's reasonable."

John Hancock, senior vice president of corporate systems at the Wells Fargo Bank in San Francisco, says Wells Fargo uses the DES "selectively," but he won't go further than that. "It's a matter of corporate policy not to talk about security."

Six of the nation's biggest banks say they are working on implementing the DES as soon as possible. They are Citibank, Chase Manhattan, Chemical Bank, Manufacturers Hanover Trust, Bank of America, and Security Pacific Bank.

Security Pacific began to specify back in 1977 the incorporation of the NBS algorithm in any terminals it purchased. ©

SUPERCOMPUTERS

HIGH STAKES AT NSF

The grand prizes in the National Science Foundation's sweepstakes are multimillion dollar supercomputer centers.

by Willie Schatz

Welcome to the high-tech version of keeping up with the Joneses. They used to play it for new television sets. Now they're playing it for supercomputers.

Want to be the first kid on your block with one? Just apply for a piece of the National Science Foundation's (NSF) \$18 million Advanced Scientific Computing Centers pie, then sweat it out. Some 22 groups have already done just that. The winners—anywhere from one to three—will get government money to build supercomputer centers. The losers will get to try again.

The field of 22 will be trimmed, probably to six or eight, following the recently completed review of the proposals by NSF's Technical Review Committee and a nationwide group of researchers. Site visits will be made to those applicants deemed worthy of such attention, although their identities will officially remain a secret. The winners won't be announced until February. The winning supercomputer centers are scheduled to begin operations July 1, 1985 and continue under NSF funding for five years. The NSF hopes to open 10 centers by 1990.

Odds are, though, that two awards will be given to proposals involving Cray machines and one to a proposal involving a Control Data Cyber 205 or higher-level machine, such as ETA's GF-10. "There is a sizable population of people at universities who have access to supercomputers now, but they're pretty much entrepreneur sorts," says a computer science professor at a major Eastern university. The professor's school is part of the 12-member Consortium for Scientific Computing, a competitor for one of the NSF grants.

"It's not easy for the general university population to obtain access," he adds. "The field is very restricted. There's inadequate communications capability to remote centers, and the facilities are

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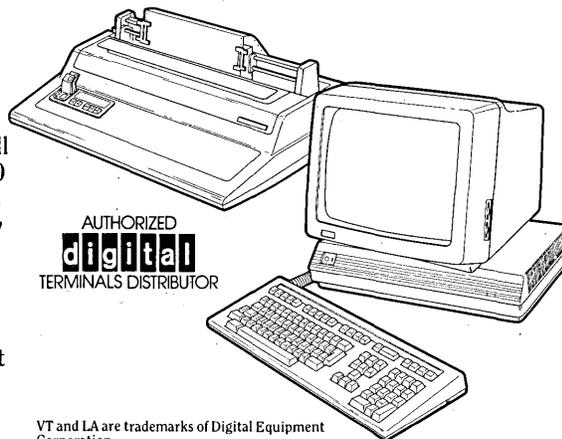
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vily overloaded.

"The major goal of the NSF program is to open up supercomputers to people who are knowledgeable but can't use them right now."

This source's favorites to make the cut are the professor's group, the University of Illinois, a group led by General Atomic Inc. (the West Consortium), and a combination of the National Center for Atmospheric Research (NCAR)—which already has a supercomputer—and the University Corporation for Atmospheric Research. The second tier of contenders includes Cornell University; a Washington consortium of Boeing Computer Services, the University of Washington, and George Washington University; a Hous-

"The capacity of today's supercomputers is orders of magnitude too small for problems of current urgency in science and technology."

ton Area Research Consortium (HARC), which hopes to use the supercomputer as the basis for a high-tech center; the University of Minnesota, which currently has a Cray and a Cyber 205; Purdue University, which owns a Cyber 205; the University of Michigan; and a consortium of Carnegie-Mellon University and Westinghouse Corp.

The main competition, not surprisingly, is between Cray and CDC. Ten proposals involve Cray machines, ranging from the smallest X-MP to the high-end Cray 2. The seven applicants requesting Cybers are HARC, Colorado State University, Purdue, Minnesota (which has also requested a Cray), the University of Georgia, the Consortium for Scientific Computing, and the West Consortium. Other machines suggested by potential participants include two Floating Point Systems boxes driven by IBM front ends, three Denelcors, and one Amdahl.

At least one of the vendors isn't taking any chances. CDC, despite the other requests for its machines, has submitted a proposal for \$3.5 million per year for a supercomputer center that could be shared by many universities that currently are not able to get their hands on supercomputers.

Indeed, restricted access has been a fact of supercomputer life almost since the machines hit the planet. In this business, time is money. Lots of money. The problem has been obvious at least since 1982, when the Lax Panel on Large Scale Computing in Science and Engineering, sponsored by NSF and the Department of Defense, issued a report charging that "important segments of the research and defense communities lack effective access to supercomputers; and students are

neither familiar with their special capabilities nor trained in their use."

The panel added that "access to supercomputers is inadequate in all disciplines. The capacity of today's supercomputers is several orders of magnitude too small for problems of current urgency in science, engineering, and technology. Nevertheless, the development of supercomputers, as now planned in the U.S., will yield only a small fraction of the capability and capacity thought to be technically achievable in this decade. Computer manufacturers in the U.S. have neither the financial resources nor the commercial motivation in the present market to undertake the requisite exploratory research and development without partnership with government and universities."

Enter the NSF, which has wanted to play this game all along but was held back by a lack of money. Congress's fiscal year 1985 appropriation of \$40 million was the first time it heeded the NSF's cries for help. Before, the foundation had been one of many voices crying in the wilderness.

"The NSF has realized for two years that the residents of the academic community don't have the access to supercomputers that the federal laboratories have," says Larry Lee, program director for supercomputer centers at the NSF. "These grants should provide the research community with supercomputer centers of excellence. They will be major nodes on a future national network. That will enable researchers to share codes, share model results, and perform many of the other vital functions they have been unable to do because of the lack of access.

The NSF program is important to maintaining U.S. leadership in the development of supercomputers, Lee says. "This program widens the marketplace for useful scientific tools. It will directly assist the development of supercomputers. It will also provide a larger base of trained individuals in the use and applications of supercomputers and the development of software tools. And industry will clearly benefit."

Just what industry wants to hear. It has almost everything it needs—the technology, the brains, and the know-how—to put supercomputers on the streets tomorrow. It is only missing one ingredient: price. A Cray goes for anywhere from \$4 million to \$14 million. Toss in another \$1.5 million to \$5 million for peripherals, depending on their sophistication. Don't forget the substantial capital investment required for startup costs, such as site preparation. Then add another \$30,000 per month for the service contract. And you wonder why they're not flooding the market?

It's not because the demand isn't there. It is, in spades (see "Amdahl's Super Cpu Gamble," Nov. 1, p. 36). It's the supply side that's lacking. The only American universities offering shelter to the supercomputer homeless are Minnesota, Purdue, and Colorado State.

"We're clearly behind in the number of installations we have, compared to Europe and Japan," says Marcelo Gumucio, Cray's executive vice president of marketing. "We fell asleep. We're a little late in this game. The NSF is trying to make up for it, and I think we're going to catch up."

"The number of people trying to use the supercomputer is far more than the number of people actually using one," says Kenneth Wilson, the Cornell University Nobel laureate and professor of physical science. "People who wanted to use supercomputers had to beg, borrow, or steal the time. That's why this NSF program is so important.

"It's also extremely crucial to industry. Industrial users are very dependent on universities. They can train students, thereby giving industries a head start. Universities provide homes for beta tests. Basic research in the universities is very important."

Even Congress recognizes that. "Congress really stuck it out," Wilson says. "So there's a lot of pressure on the NSF. If they were only giving one award, everybody would have known what proposal to put in to win. With three awards, the NSF is going to get a reasonable picture of what universities are capable of doing, even from the losers. What's really

"The industry will benefit because the program will provide more individuals trained in the use of supercomputers and the development of software tools."

needed is to formulate a program of the 40 top universities to deal with the supercomputer revolution. The NSF can get information from that through this program."

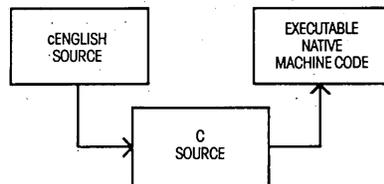
"It's absolutely essential that the NSF take a very bold viewpoint with the communications issue," says Steven Orszag, an engineering professor at Princeton who pioneered the benchmarking of a Cray X-MP and a Fujitsu 200 (see "The Japanese Supercomputer Challenge," May 15, p. 112). "It's very important to make the access user friendly. It must be state of the art. It's incumbent upon them to do a first-class job."

The NSF plans to do that. "We've wanted to do this for a long time," the foundation's Lee says. "But we weren't in a position to because we never had the funds. Now we do. The centers will be

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SAMPLE cENGLISH PROGRAM

```

IDENTIFICATIONS
MODULE: Mininame
AUTHOR: bcs
DATE: 8/29/84
REMARKS: Sample cENGLISH program that adds first
names to a file
END IDENTIFICATIONS
  
```

```

GLOBALS
FIXED LENGTH 1 ans
FIXED LENGTH 15 Fname
END GLOBALS
  
```

MAIN PROGRAM

```

BEGIN
CLEAR SCREEN
SET ECHO OFF

USE "NAMES"
VIEW BY "ID_FNAME" ASCENDING
  
```

```

AT 23,1 SAY "Add a record? Y or N"
AT 23,25 ENTER ans USING "!"
  
```

```

WHILE ans EQ "Y"
CLEAR GETS
AT 6,1 SAY "Enter first name"
AT 6,20 GET Fname
READ SCREEN
  
```

```

INSERT
Fname = Fname
END INSERT
  
```

```

AT 12,10 SAY "Welcome to cENGLISH," & Fname
WAIT
AT 14,10 SAY "HIT ANY KEY TO CONTINUE"
STORE " " TO ans
STORE " " TO Fname
AT 23,1 SAY "Add another record? Y or N"
AT 23,30 ENTER ans USING "!"
CLEAR ROW 1 THRU 23
  
```

```

END WHILE
  
```

```

AT 12,10 SAY "That's all for now!"
UNUSE "NAMES"
SET ECHO ON
  
```

```

END PROGRAM
  
```

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NETWORKS

BRITAIN BUILDS BIG

What should be Europe's biggest on-line system is being developed to handle income taxes in the U.K.

by John Lamb

Governments around the world are taking large doses of dp to cure the headaches caused by the increasing complexity of administration. Although the full impact of data systems has scarcely been felt in the day-to-day work of running a country, the bureaucrats are having to face up to difficult problems of systems design and management, many of which affect the structure of government itself.

The British government, for instance, is spending \$1.4 billion on two massive computer projects. One, involving the computerization of the country's personal tax system, promises to be the largest on-line system in Europe, while the other, an ambitious scheme to introduce new technology into the creaking machinery of the welfare system, carries a price tag of close to \$1 billion.

Both projects are designed to reduce staff, improve the service received by British taxpayers, and widen the options open to their political masters. But doubts are already being raised about the assumptions—financial and technological—that underly these prestigious dp developments.

One recent report, produced by the influential Public Accounts Committee, a parliamentary watchdog on financial matters, voiced concern about the whole area of government computing, which will cost an estimated \$350 million this year for hardware and software alone. The committee criticized a lack of forward planning by government departments, poor project management and systems design procedures, a 25% shortfall in computing staff, and overoptimism

about the benefits of computing projects.

"The potential financial and operational benefits of computerization are vast, the risks are significant, and the penalties of failure and delay are high . . . We were not satisfied that enough had been done . . . to secure necessary improvements in controlling the total resources involved," notes the report.

The committee singled out the Department of Health and Social Security (DHSS) for special attention. Two years ago the DHSS revealed a \$1 billion operational strategy for computing involving 14 major projects to be implemented over 15 years. The department estimated the projects would save some \$2.6 billion over 20 years, mainly by allowing it to shed up to 20,000 staff. Nearly every aspect of the welfare state would be computerized including state pensions, child benefits, unemployment benefits, and supplementary benefits.

But the DHSS has already begun to backpedal on its estimates of savings. A key part of the project involves installing 34 terminals in each of the 500 local offices at which claims for benefit are made. The terminals would be connected to three large centers, which would hold databases of information about payments. Due to be installed over the four years from 1987 to 1991, the \$280 million system was originally intended to save some \$530 million by cutting out 6,000 staff. Now the DHSS says it will only cut 4,000 staff and save \$92 million.

"When you get closer into a project and you actually design it in detail and do the precise costings, you get into a different area of figuring," explains Sir Geoffrey Otton, second permanent secretary at the DHSS.

The DHSS project began last autumn with a pilot scheme that involved equipping 14 local offices with personal computers to help in the business of assessing benefit claims. The small machines will eventually be phased out once the mainframe system comes on stream.

In the meantime, civil service unions have not taken keenly to their first brush with new technology. In a report on the personal computer trials, they are critical of the standalone systems. But the unions' biggest bugbear is the loss of jobs.

"Our policy is that we welcome the introduction of new technology provided it is used to improve services and that staff share in its benefits, which means no staff reductions," says a spokesman for the Society of Civil and Public Servants. The spokesman adds that the union does not accept the idea of reducing staffing levels by attrition—that is, leaving unfilled vacancies created when staff retire or leave their jobs. The DHSS has yet

to reach agreement with its unions on the computer strategy.

The unions claim that the DHSS is already desperately short of staff. That shortage has been created in part by Britain's extraordinarily high unemployment rate, which has increased the number of people entitled to supplementary benefits. DHSS employees say they would like to see the new systems used to reach more potential claimants rather than to reduce staffing levels.

"My view of the strategy is that one of its main objectives is to provide a better service to the public through the local offices," says Sir Geoffrey. "That means more accurate payments. It could mean better takeup in some cases in the sense that staff will be able to get things right.

"If that results in rather more money going into people's pockets, I do not know what the view of the Treasury [responsible for government finance] would be about this. But it is our job to deliver the system for which we are legally responsible, as efficiently as we can."

Exactly when the DHSS will deliver its system is in some doubt, however. The original timetable for the 14 projects has already slipped, although the DHSS points out that its original plans were never hard and fast. Contracts for the first of these projects have yet to be signed and they may well have to be changed anyway in the light of a current review of the whole structure of social security. The DHSS is adamant that there be no holdup in its

The tax system has come under scrutiny, and criticism, of several watchdog agencies.

plans. The personal computer project will go ahead next year together with a separate system to handle the payment of unemployment benefits, followed by the local office system. "We have confirmed the validity of our proposals and set up an infrastructure to carry them out," says a spokesman.

The government's other large investment in computing, a system for handling personal tax, is well ahead of the DHSS scheme. Last July, Nigel Lawson, chancellor of the exchequer, gave the project the go-ahead after completion of successful trials.

The Inland Revenue, which collects British taxes, will build a network of 12 centers equipped with ICL mainframes to which 25,000 terminals sited in local tax offices will be linked. The system will be used to administer the Pay As You Earn (PAYE) tax, under which employers deduct tax from their employees' salary checks and forward it to the Inland Revenue. The system involves a great deal of



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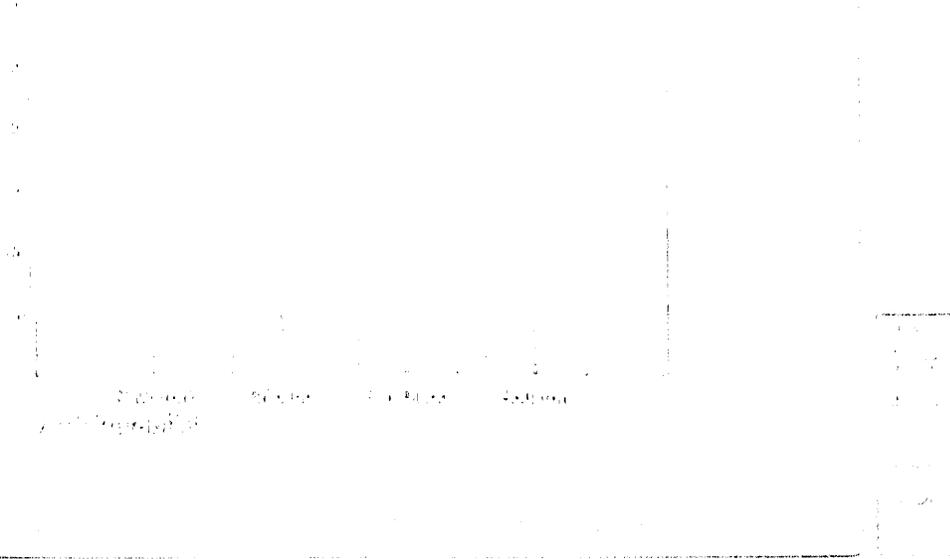
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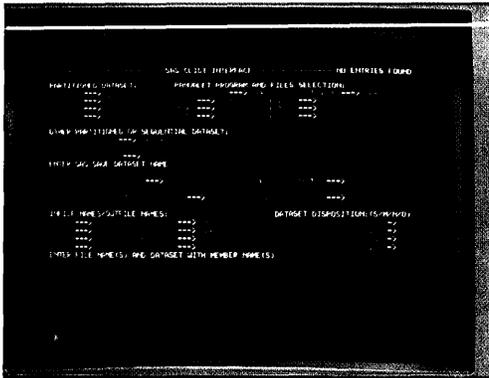
Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
Sales	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260
Units	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260
Units	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260

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Familiar 3270 IBM-style alphanumeric output is fully emulated on all CX4100 terminals. Enhanced IBM-style keyboard is part of the package.

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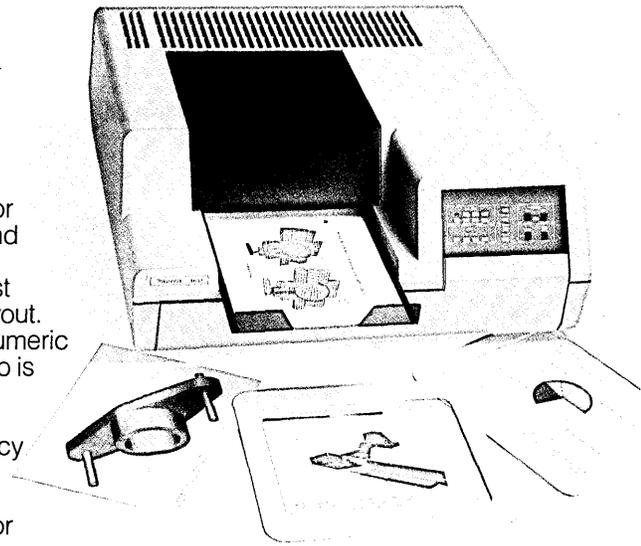
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clerical work in assessing what money is due from taxpayers and tracking them as they move from job to job.

The \$364 million network, which will eventually include the tax returns of the self-employed as well as the PAYE data, is due for completion in 1989. The system will provide "greater accuracy, a quicker turn round, and greater reliability," says Chancellor Lawson. It will also be the largest on-line system in Europe, containing over 30 million records on a total of 217GB of disk storage. Some

350,000 lines of COBOL application code will be required for the system, while the Inland Revenue is budgeting for 900 telephone circuits serving 600 district offices.

In return for its investment, the government is looking for savings from an estimated 6,000 job losses, representing 13% of the cost of the project. Remaining Inland Revenue staff will concentrate more on reducing the level of tax evasion in the country, said to represent between 6% and 8% of the gross national product. "The system will allow

staff to concentrate on the black economy," says Chancellor Lawson, referring to uncollected taxes.

Those hunting the tax dodgers will be equipped with CAFS, database searching circuitry for disk drives made by ICL, which greatly speeds ad hoc retrievals. The system will be used to trace taxpayers even when only incomplete information is available.

Remarkably, the computerization of PAYE, or COP, as it is called, has so far come in on time and under budget. "When we started the computer experts told us that all major projects slip by one year and that this one could slip two years," says Inland Revenue chairman Sir Lawrence Airey. "It hasn't slipped at all."

Most people involved in COP agree that this is due to the personal qualities of the project's controller, Steve Matheson. "He is a hard taskmaster," says deputy controller David Powell, "It is a question of getting the commitment of people to plans and targets and not accepting that they are going to change. Slippage is not a word that is accepted round here." Matheson is so highly regarded that the building that houses the project development center in Telford, Shropshire, has been named after him: Matheson House.

Motivation of management at the center and at the 11 main contractors for the project has been crucial, says Powell. High morale, he adds, has enabled problems, particularly with changing software specs, to be overcome. On the software side, a decision to tax unemployment benefits, made by the British parliament after the system had been designed, resulted in 18 man-months of extra work for the development team. "When things like that happen, we throw bodies at it and work through the night," says Powell.

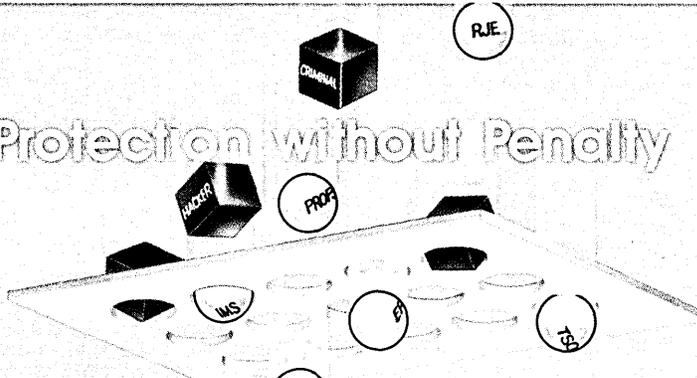
Development staff have been helped to keep within budgets by two things. First, generous contingency funds, and second, a reorganization program by the Inland Revenue, which enabled the number of mainframe centers needed to be reduced by one.

The work has also been eased by the determination of the Inland Revenue to produce a replica of the existing manual system. Clerical procedures are being transferred from paper to computer screen.

Some observers claim that the Inland Revenue has slipped up on the technical side, though. The Institute for Fiscal Studies, a research organization, recently published proposals for the reform of social security in which the institute explores the possibility of integrating the tax and social security systems.

The authors of the proposals claim

Protection without Penalty



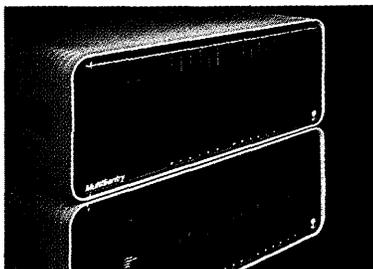
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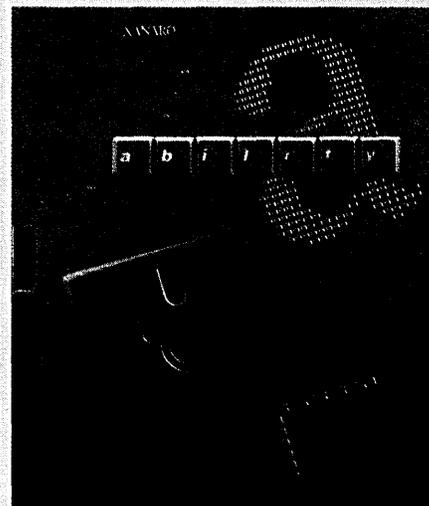
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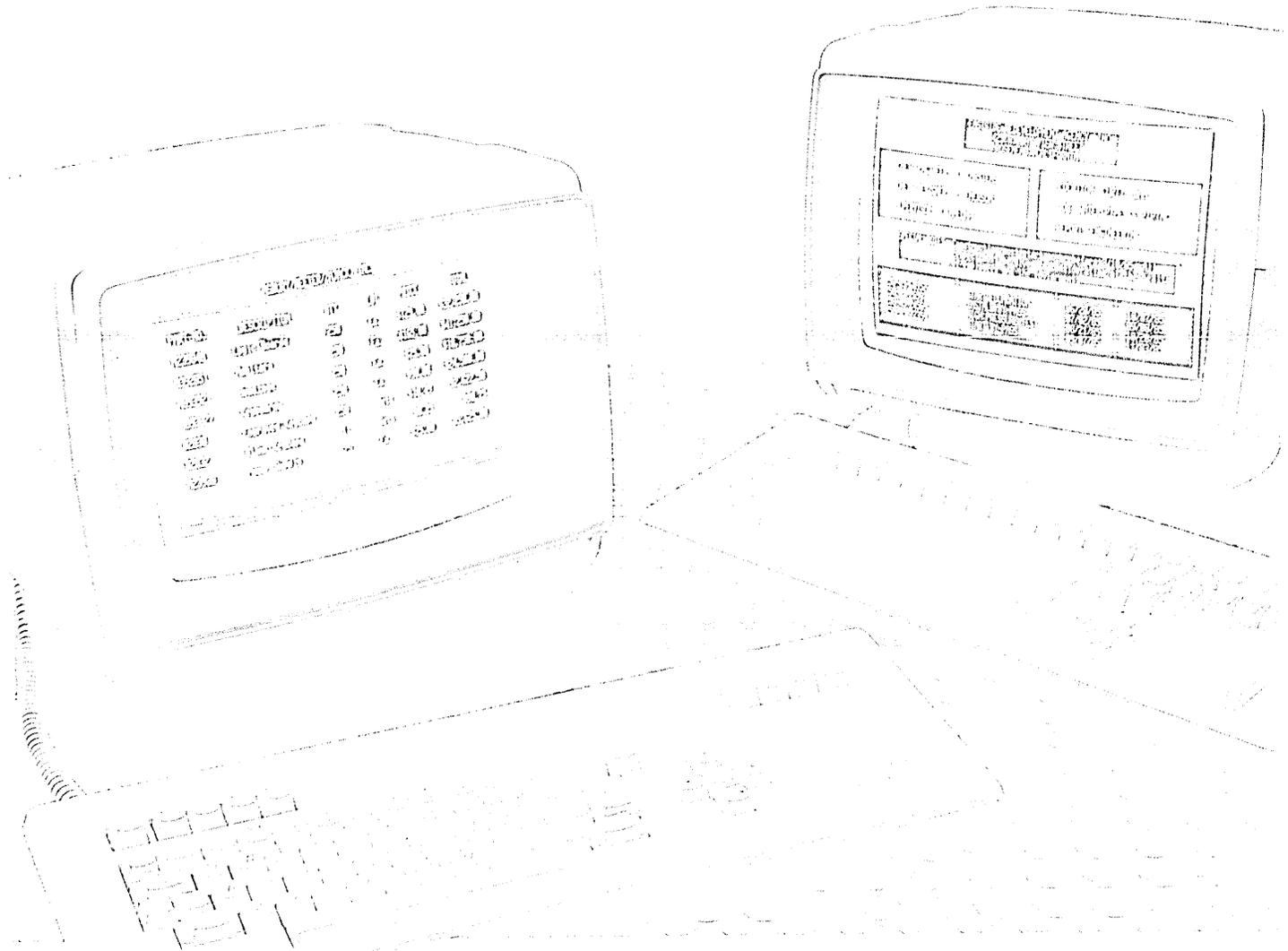
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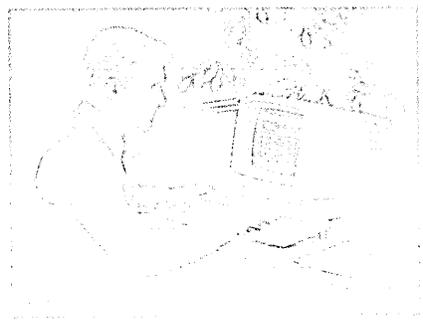
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that "although computerization of the income tax system is long overdue, it is less clear that the particular form of computerization that has been chosen is the most appropriate for the future." They maintain that the Inland Revenue and DHSS systems are a "potentially serious obstacle to sensible reform" because it will be too expensive to integrate the two systems. The institute says the Inland Revenue could make do with microcomputers or just one or two central systems if taxes were integrated with social security.

Chancellor Lawson is keen to dispel any doubts about the compatibility of the two systems and to scotch the idea that the PAYE system could be run on microcomputers. "The main objective was to plan COP on a flexible basis and to make changes workable on a technical level," he says. "It is more flexible than having micros in each office."

The Central Computer and Telecommunications Agency, a body that advises government departments on computing matters, admits that there are problems in defining large projects like the PAYE and DHSS systems. "It is very easy to criticize the big systems for using old technology," says Bob Paynter, "but during implementation of a system there are changes in technology and direction." The CCTA has tried to improve project planning by insisting that projects cannot go ahead unless they use two standard project control methodologies called SSADM and Prompt. The CCTA has commissioned tools to be used in conjunction with these methods. "In all big projects you need good men, but you also need good methodologies," says Paynter. ©

DATABASE SYSTEMS

UP FROM THE ASHES

Value Computing sold for the fire-sale price of \$1 million, and its new owners got no bargain.

by Michael Tyler

The scene was set. Value Computing Inc. had all the symptoms of an old gladiator ready to collapse into the dust. The firm's flagship product, the DCMS data center management system, was a dozen years old; sales were flat; competitors were claiming almost all new customers; and almost a third of the work force had left without replacement.

"The past six months have been very demoralizing," Terry Hughes understates. A marketer with nearly four years' tenure at the Cherry Hill, N.J., company, Hughes adds, "We had no sense of direction."

As the company's financial picture and morale worsened, customers became jittery. "They complained bitterly about the falloff in customer service in the past few months," Hughes says. "It's no secret. We really suffered."

Company founders Vincent J. Bannon, Jim Garrett, and Hank Heidler decided last spring that reviving the nearly moribund firm was hopeless. Enter Jerry Wagner, Harvey Kimmel, and Ira Brind, three South Jersey businessmen who had money and the desire to fix a broken company. Wagner had founded Execucom, the Dallas firm that created the IFPS financial planning language for IBM mainframes. Kimmel had rescued a Beatrice Foods division and later managed the transition from startup to stability at Execucom, gaining in the process a reputation as a corporate turnaround artist. And Brind had built and then sold to McDonnell Douglas a substantial truck leasing concern four miles from Value's headquarters. Of the three, only Wagner was experienced in the software industry.

The trio learned that Value was for sale in the usual ways of suburban Philadelphia bedroom communities: neighbors and mutual friends connected the sellers and the would-be buyers. "It's a singular deal for me," says Kimmel, the firm's new president. "I live down the street and I like to sleep at home nights." Kimmel and his associates were able to buy the firm at fire-sale prices. Value had fiscal 1984 (ending Sept. 30) revenues of \$7 million, most of which came from DCMS maintenance contracts and sales of its year-old DCDS data center report distribution system. The year also saw Value's first loss since its inception 14 years ago, although the company does not publish specific financial information. Still, Kimmel says, "The company was a cash cow for over 13 years until this past year's downturn."

Kimmel's group put up just over \$1 million for the company. "That was a very depressed price," one employee says. "Our maintenance revenues alone, which stay constant from year to year, were \$3 million."

Explains Kimmel, "We are a group of private investors looking for opportunities in the industry to invest both money and time in order to rejuvenate small private companies that have run out of gas. We are not directly involved in the industry or the technology, but in the corporate reorganization." Kimmel is the only one of the three major investors on

the firm's payroll. Wagner and Brind, together with Kimmel, form the company's board of directors.

"We're in this for the long-term capital reward, not a short-term profit," Kimmel says. "Wouldn't it be marvelous to have a good solid return and use the profit to look for other opportunities to bring into a software group? I see Value Computing as potentially a flagship of related small companies."

That may be the goal, or at least the aspiration, but Kimmel has his work cut out for him just keeping the company afloat. "We have to focus on today issues. When we arrived, I saw no real sense of survival," he says, "and I'm not sure they approached survival in a very intelligent way."

The impact of the sale has already been felt throughout the firm's headquarters, a two-story prefab structure utterly undistinguished from the many other aging office and light industrial parks in Cherry Hill. "This is a real sea change," Hughes says. "Last year, for example, the sales forecasts were not very scientific. We just thought that DCDS would enable us to double our revenues, and that wishful thinking became our forecast. Now we have consultants up the wazoo."

The primary mission of the consultants and of the new owners is twofold: restore the company's sagging market share and improve service to existing customers. When DCMS was introduced in the late 1960s, it was one of the first production control systems available for IBM mainframes, and customers still regard it as one of the best. Yet it now has only about a 12% share of the installed base of similar products; UCC-7 from Uccel Corp. in Dallas has over a 50% share despite a much more recent introduction, and two products from Computer Associates International in Jericho, N.Y., have an additional 8%. (One of the two was originally sold by Johnson Systems Inc., which CAI acquired in June.)

"We suffered a big decline in share in 1984, and CAI may even be ahead of us at this point," Hughes admits. Total installations of DCMS have remained constant at about 1,200. Only about a third of all MVS installations have any kind of production control system installed, according to Kimmel's consultants. "The real marketing challenge is to crack the other two thirds of the MVS base before CAI or Uccel does," Hughes says. "They can support big marketing pushes because they have revenues from wide product portfolios. We don't have other products to support DCMS marketing costs."

Yet sales of new systems is still not Kimmel's top priority. "If one area is crucial," he says, "it's that of supporting our installed base. That's our bread and but-

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NEWS IN PERSPECTIVE

ter, and we've really, really let that erode. Our biggest task is to let people know we're a more involved management."

To do that, Kimmel is setting up user panels nationwide, each of which is composed of about two dozen longtime users, so that he can spread the word of Value's resuscitation. He is also participating in sales calls at customer locations, and in establishing a permanent advisory board of users.

"The reality of it is that it takes some time to restore customer service," Kimmel says. "We have no reason to say, 'give us a chance,' but we're asking anyway. That's why I have to spend two days a week in the field visiting customers and having lunch with them. We have to let them know we're trying."

Value has to clean up its act internally as well. The firm's payroll has dwindled to about 50 employees, and the attrition has left "everyone in the doldrums," one employee says. And Kimmel, despite his reputation as a hard-nosed corporate "doctor," apparently has been well received by employees. "The most important thing is that he's around and he's available," the employee says. "The previous owners centralized all the decision-making and second-guessed us too often. What we desperately needed was someone who was around and who recognized his limits."

For his part, Kimmel says, "I think our great strength is our people. It's important to create an environment for people to grow in. I don't understand why we can't have a wonderful work environment in Cherry Hill. The employees aren't worried about salary or perks; they want growth in their jobs, training, an opportunity to contribute, and a chance to learn and grow as people."

Kimmel obviously believes what he preaches. He and Wagner first met eight years ago when they delivered a series of lectures on "the human side of management," and Kimmel participates in the Friday afternoon beer sessions. "I'm going to wear a Halloween costume, too. I believe in having fun."

Despite the fun and challenge, Value is still primarily an investment opportunity to him. "There's always the option to sell if someone comes along with the right price." As it is, he is already evaluating candidates to succeed him as president of the firm, "so I can do more typical chairman-type things and look for other deals."

That, however, is still a year to 18 months down the road. In the meantime, Value has significant problems to overcome, with no guarantees of success. As Kimmel says, "The bloom has come off the rose in this industry. You can't win just by playing." ©

BENCHMARKS

KODAK'S PUSH: The camera and film maker has undertaken several major steps toward entering the processor market and increasing its toehold in the floppy disk market. The Rochester, N.Y., firm invested \$20 million in cash in Sun Microsystems Inc., a maker of microprocessor-based Unix graphics workstations. The deal gives Eastman Kodak about 7% of Sun, which is privately held. The deal is related to oem negotiations between the two firms.

Although Kodak has yet to bring forth a product based on the Sun engine, the firm has continued to emphasize the importance of integrating data processing into its KAR 4000 optical document storage and retrieval system. Separately, Kodak formed an Electronic Media Manufacturing Division to build and market microcomputer floppy diskettes. Until the division can ramp up its own products, it plans to remarket diskettes made by Dysan and Xidex. The Rochester-based EMMD will also work with Kodak's Spin Physics Division in San Diego to build and develop 3.3MB floppy diskettes using a new coating technique. Kodak is manufacturing the 196-track 5¼-inch drives under license from Drivotec Inc. Xidex, meanwhile, agreed to buy Dysan for about \$214 million. Dysan will continue to operate as a separate entity, according to Bert Zaccaria, president of Xidex Magnetics, a Xidex subsidiary. The only change of note, other than some consolidation of duplicated projects, will be that Dysan will now buy its raw materials from Xidex rather than 3M. Dysan's business accounted for 40% of 3M's business last year.

MORE MAINFRAMES: IBM rolled out two mainframes that analysts said fill gaps in the giant's product line and take some of the sting out of Digital Equipment Corp.'s VAX Venus announcement. The new 4381 model group 3 becomes IBM's most powerful intermediate processor, running at 1.7 times the rate of the 4381 model group 2, or approximately 4.6 MIPS. The model is air cooled and has two cpus running a single MVS/370 or VM/SP operating system, with or without the high-performance option in System/370 mode. Each processing unit has its own channels and high-speed buffer, and shares a common main storage. The dyadic processor uses 256Kb dynamic RAM memory chips to provide from 8MB to 32MB of main storage, and connects with up to 18 channels. The model will be ready for shipment in the second quarter of 1985. With 8MB of main storage and 12 standard channels, it will sell for \$825,000. The purchase price for an up-

grade from a model group 2 to a 3 with equivalent channels and memory, installed in the field, is \$250,000. IBM also announced the 3083 model CX to fill the low-end void of its 308X high-end computer line, giving the line a tenfold increase in upgradable performance from the CX to the top-end 3084 QX. The CX is available with 8 or 16 channels and up to 32MB of main storage in 8MB increments. It runs at approximately three fourths the instruction execution rate of the 3083 model EX. Purchase price for the 3083 CX, including cpu, 3082 processor controller, 3087 model 1 coolant distribution unit, 8MB of main storage, and 8 channels is \$830,000. It will be available the second quarter of 1985.

PROVIDES ACCESS: In addition to its product announcements, IBM also issued statements of direction indicating its intention to provide the following functions for its recently introduced Office Systems Family: access to System/36 and System/38 library and distribution services for Personal Services/PC users; access to DISOSS/370 library services for Personal Services/36 and Personal Services/37 users; access to DISOSS/370 library and distribution services for Personal Services/PC users attached to an IBM PC network or other IBM networks supporting the network BIOS interface; and Personal Services/370 capabilities for users attached to a processor running MVS/TSO. The Office Systems Family is a series of programs with complementary functions, including new additions to the DisplayWrite text processing programs, that can be used on the IBM PC, System/36, and 370 family computers. The series permits the exchange of programs in networks of these systems and other IBM office systems. "[These] announcements build on existing IBM architectures and significantly enhance the capabilities of our office systems," says Joseph M. Guglieme, vice president of general and office systems marketing for IBM's National Accounts Division.

IBM also announced a new PC AT/370 version of the mainframe series. The unit functions as three workstations in one: a 370 CMS processor, a 3278/79 display attached to a host computer (which is also now available on the XT/370), and a standard PC AT or PC XT. The AT/370 processes host computer programs up to 119% faster than the current XT/370. Other products released include a small computer printer, display console, and new S/36 programs. The new release of DISOSS/370 3.3 allows for the exchange of final form documents between host systems with DISOSS/370 MVS and PROFS/VM, although editable documents still cannot be exchanged. ©

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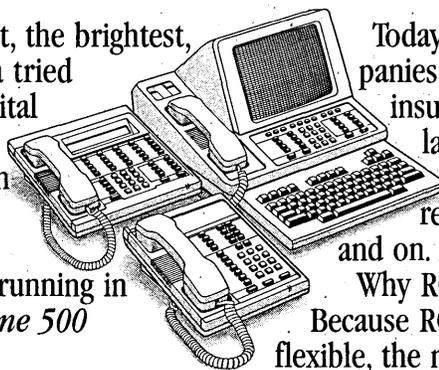
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THE INTEGRATED SERVICES DIGITAL NETWORK

by William Stallings

The lines have blurred. The similarities among computing, switching, and digital transmission equipment are more apparent than the differences, and the same digital techniques are being used for data, voice, and image transmission. Merging technologies coupled with increasing demands for efficient and timely collection, processing, and dissemination of information are leading to the development of integrated systems that transmit and process all types of data. The ultimate goal of this evolution is something its proponents—some of the most powerful forces in the computing and telecommunication industries—call the integrated services digital network (ISDN).

The ISDN will be a worldwide public telecommunication network that will deliver a wide variety of services. The ISDN will be defined by the standardization of user interfaces, and will be implemented as a set of digital switches and paths supporting a broad range of traffic types and providing value-added processing services. In practice, there will be multiple ISDNs, implemented within national boundaries, but from the user's point of view, there will be a single, uniformly accessible worldwide network.

The impact of ISDN on both users and vendors will be profound. To control ISDN evolution and impact, a massive effort at standardization is under way. Although ISDN standards have not yet been issued, both the technology and the forthcoming implementation strategy are now well understood.

The evolution of the existing telecommunication network, specialized carrier facilities, and value-added data communication networks from separate entities into an ISDN is based on two technological developments: digital transmission and digital switching.

Both of these developments are, of course, well established. The first digital T-carrier system was introduced into commercial service by AT&T in 1962, and the first large-scale, time-division digital switch, the Western Electric 4ESS, was introduced in 1976.

More important than the benefits of either of these two technologies, however, was the revolutionary idea that the functions of transmission and switching could be integrated to form an integrated digital network (IDN). The idea was proposed as early as 1959 and is in the process of being implemented worldwide.

To understand the implications of an IDN, consider Fig. 1. Traditionally, the transmission and switching systems of a telephone network have been designed and administered by functionally separate organizations. The two systems are referred to by the operating telephone companies as outside plant and inside plant.

In the analog network, incoming voice lines are modulated and multiplexed at the end office and sent out over a frequency-division multiplexed (FDM) line.

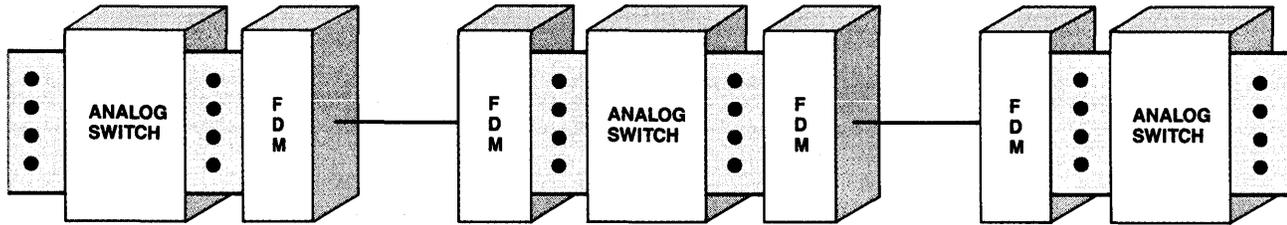
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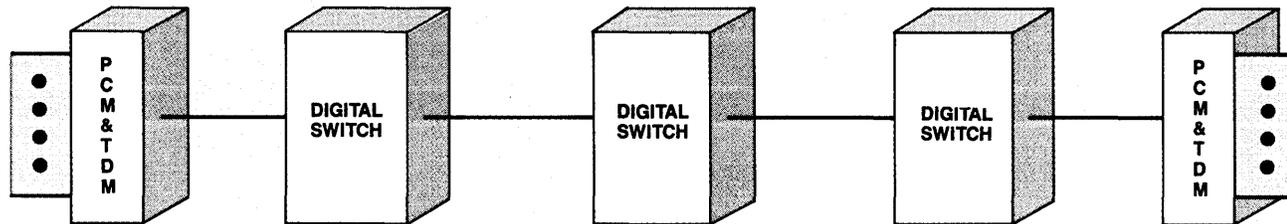
The conversion of telecommunication networks to digital transmission and digital switching is well under way.

FIG. 1

THE INTEGRATION OF TRANSMISSION AND SWITCHING



(a) NONINTEGRATED



(b) INTEGRATED

The constituent signals may pass through one or more intermediate switching centers before reaching the destination end office. At each switching center, the incoming FDM carrier has to be demultiplexed and demodulated by an FDM channel bank before being switched by a space-division switch. After switching, the signals have to be multiplexed and modulated again to be transmitted. During this repeated process noise and cost accumulate.

When both the transmission and switching systems are digital, integration can be achieved (see Fig. 1b). Incoming voice signals are digitized using pulse code modulation (PCM), and multiplexed using time-division multiplexing (TDM). Time-division digital switches along the transmission path can switch the individual signals without decoding them. Furthermore, separate multiplex/demultiplex channel banks are not needed at the intermediate offices, since that function is incorporated into the switching system.

The conversion of telecommunication networks to digital transmission and digital switching is well under way. Much less well developed is the delivery of digital service to the end user. Telephones still send analog data to the end office where they must be digitized. Lower-speed (less than 56Kbps) end-user digital service is commonly available via leased lines at

present, and higher-speed leased services are being introduced. The provision of switched digital service over the local loop will eventually lead to an end-to-end switched digital telecommunication network.

ECONOMIC EXCHANGES THE GOAL

This evolution has been driven by the need to provide and maintain economical voice communication. The resulting network, however, is also well suited to meet the growing variety of digital data service offerings. The further evolution of the IDN will combine the coverage supplied by the geographically extensive telephone network with the data-carrying capacity of digital data networks. It will be called the integrated services digital network (ISDN), integrated referring to the simultaneous handling of digitized voice and a variety of data traffic on the same digital links and by the same digital exchanges. The key to ISDN is the small additional cost for offering data services on the digital telephone network, while incurring no cost or performance penalty for voice services already carried on the IDN.

Fig. 2 is a conceptual view of the ISDN from a user's point of view. The user has access to the ISDN by means of a local interface to a digital pipe of a certain bit rate. Pipes of various sizes will be available

to satisfy different needs. For example, a residential customer may require only enough capacity to handle a telephone and a videotex terminal. An office will undoubtedly connect to the ISDN via an on-premises digital PBX, and will require a much higher capacity pipe.

While the pipe to the user's premises has a fixed capacity, the traffic on the pipe may be a variable mix of traffic and services up to the capacity limit. Thus a user may access circuit-switched, packet-switched, and other services, in a dynamic mix of signal types and bit rates. To provide these services, the ISDN will require complex control signals to sort out the time-multiplexed data. These control signals will be multiplexed onto the same digital pipe.

An important aspect of the interface is that users can, at any time, employ less than the maximum capacity of the pipe, and be charged according to the capacity used rather than for connect time. This will significantly diminish the value of current designs that optimize circuit use with concentrators, multiplexors, private packet switches, and other line-sharing arrangements.

The national governments, data processing and communication companies, and standards organizations that are betting on the ISDN share certain common ob-



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PROSPECTS FOR THE ISDN

AT&T and the Bell operating companies are gradually replacing the aging analog plant of the national telephone network with digital equipment. At the same time, rival long-haul communications carriers are relying heavily on digital technology. How rapid this evolution toward digital technology takes place depends on two factors: 1. the cost savings to be achieved by converting from analog to digital equipment, and 2. the demand for ISDN services. The first factor is setting a pace that should digitize most of the communications plant by the end of the century. The second factor is an unknown.

Some conclusions about the prospects for ISDN-related equipment and services in the U.S. can be drawn, however. The industry and market can be divided into four segments: long distance transmission and switching equipment, local communications facilities, customer-premises equipment, and ISDN services.

In the long distance arena, the one to watch is, of course, AT&T. This giant has made moves in the past few years that suggest it is anticipating an early market for ISDN-style facilities.

AT&T has introduced a number of high-speed digital transmission services

that allow customers to connect locations with either permanent or on-demand high-speed links. In 1982, the Bell Labs-designed No. 5ESS Switch was introduced. This switch can be used both for long distance switching offices and by the BOCs for metropolitan area exchanges. The switch was designed with the ISDN in mind and, after a big push by AT&T, it is achieving market acceptance. At the same time, other carriers, like SBS, are offering an increased variety of digital transmission services, and other vendors, like Northern Telecom, are also selling successful integrated digital switches.

An equally active area is that of customer-premises equipment. The key to providing an ISDN environment to the business customer is an integrated voice-and-data, on-premises telephone exchange: the digital PBX. Companies like Rolm and Northern Telecom have marketed such products for several years. Recent significant events are AT&T's introduction of its first digital PBX, the Dimension System 85, and IBM's strategic move to purchase Rolm. AT&T has also proposed a PBX-to-computer interface standard that is likely to influence the ultimate CCITT standard. Today, most PBX

systems are analog, but the conversion to integrated digital PBX systems should be rapid.

Thus the equipment to support ISDN for long distance carriers and on the customer's premises can be expected to evolve rapidly. The prospects in between—the metropolitan area—are less clear. The BOCs must convert not only their exchange equipment but also the service provided to the customer's premises via the local loop. With rates regulated by public utilities commissions, the BOCs may have to spread out their investment over many years. The slack may be picked up by providers of bypass technologies that allow the customer to do without the local phone company.

Finally, there are the ISDN services, such as teletex, videotex, and facsimile. The success of these services depends in large measure on the introduction of the equipment and facilities discussed above. In turn, the rate of introduction of the equipment and facilities depends in part on the perceived demand for those services.

One is left with the feeling that there will be an ISDN someday; when and in what form remains to be seen. —W.S.

jectives. There are, of course, other objectives, but these are among the most important and widely accepted, and help to define the character of the ISDN.

- **Standardization.** It is essential that a single set of ISDN standards permit universal access and the development of cost-effective equipment.

- **Transparency.** The most important element to be provided is a transparent transmission service. This permits users to develop applications and protocols with the confidence that they will not be affected by the underlying ISDN.

- **Separation of competitive functions.** It must be possible to separate out functions that could be provided competitively as opposed to those that are fundamentally part of the ISDN. In most countries, a single, government-owned entity will provide all services. Some countries desire (or require, in the case of the United States) that certain enhanced services be offered competitively (e.g., videotex, electronic mail).

- **Leased and switched services.** The ISDN should provide dedicated point-to-point services as well as switched services. This will allow the user to optimize the implementation of private switching and routing techniques.

- **Cost-related tariffs.** The price for ISDN service should be related to cost, and be independent of the type of data being carried. One type of service should not subsidize others.

- **Smooth migration.** The conversion to ISDN will be gradual, and the evolving network must coexist with existing equipment

and services. Thus ISDN interfaces should evolve from current interfaces and provide a migration path for users.

- **Multiplexed support:** In addition to providing low-capacity support to individual users, multiplexed support must be provided to accommodate user-owned CBX and local network equipment.

ISDN'S PRINCIPAL BENEFITS

Cost savings and flexibility will be the principal benefits of ISDN to the user. The integration of voice and a variety of data on a single transport system means that the user does not have to buy multiple services to meet multiple needs. The efficiencies and economies of scale of an integrated network allow these services to be offered at lower cost than if they were provided separately. Further, the user will pay only the expense of a single access line in order to receive these multiple services.

The requirements of various users can differ in a number of ways, among them information volume, traffic pattern, response time, and interface types. The ISDN will allow users to tailor the service purchased to their actual needs in ways not possible at present.

Besides supporting existing voice and data applications, the ISDN will provide a variety of services as well as providing for applications now being developed. The most important ones will be:

- **Facsimile service** for the transmission and reproduction of graphics, and handwritten and printed material. This type of

service has been available for many years, but has suffered from a lack of standardization and the limitations of the analog telephone network. Digital facsimile standards (CCITT Group 3) are now available and can be used to transmit a page of data at 64Kbps in five seconds.

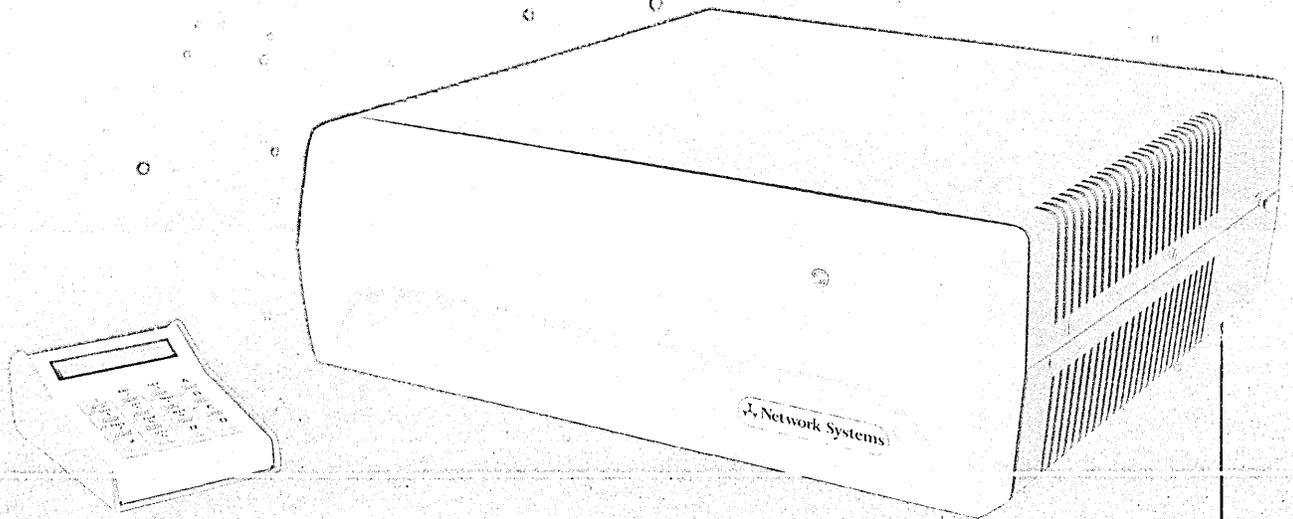
- **Teletex service** that enables subscriber terminals to exchange correspondence. Communicating terminals are used to prepare, edit, transmit, and print messages. Transmission is at a rate of one page in two seconds at 9.6Kbps.

- **Videotex interactive, page-oriented, retrieval service** accessible to terminals and tv sets equipped with a special decoder. A page of data can be transmitted in one second at 9.6Kbps.

Fig. 4 shows the type of services that could be supported by ISDN. These services fall into the broad categories of voice, digital data, text, and image. Most of these services can be provided within a transmission capacity of 64Kbps, the standard ISDN rate offered to the user. (Some services require considerably higher data rates and may be provided by high-speed facilities outside the ISDN, like cable tv distribution systems. Even these higher-speed services, however, may intersect with the ISDN and make use of high-capacity ISDN links for part of a transmission path.)

Fig. 3 is a block diagram of the ISDN. The ISDN will support a completely new physical connector for users, a digital subscriber loop or link from end user to central or end office, and modifications to all central office equipment.

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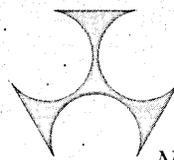
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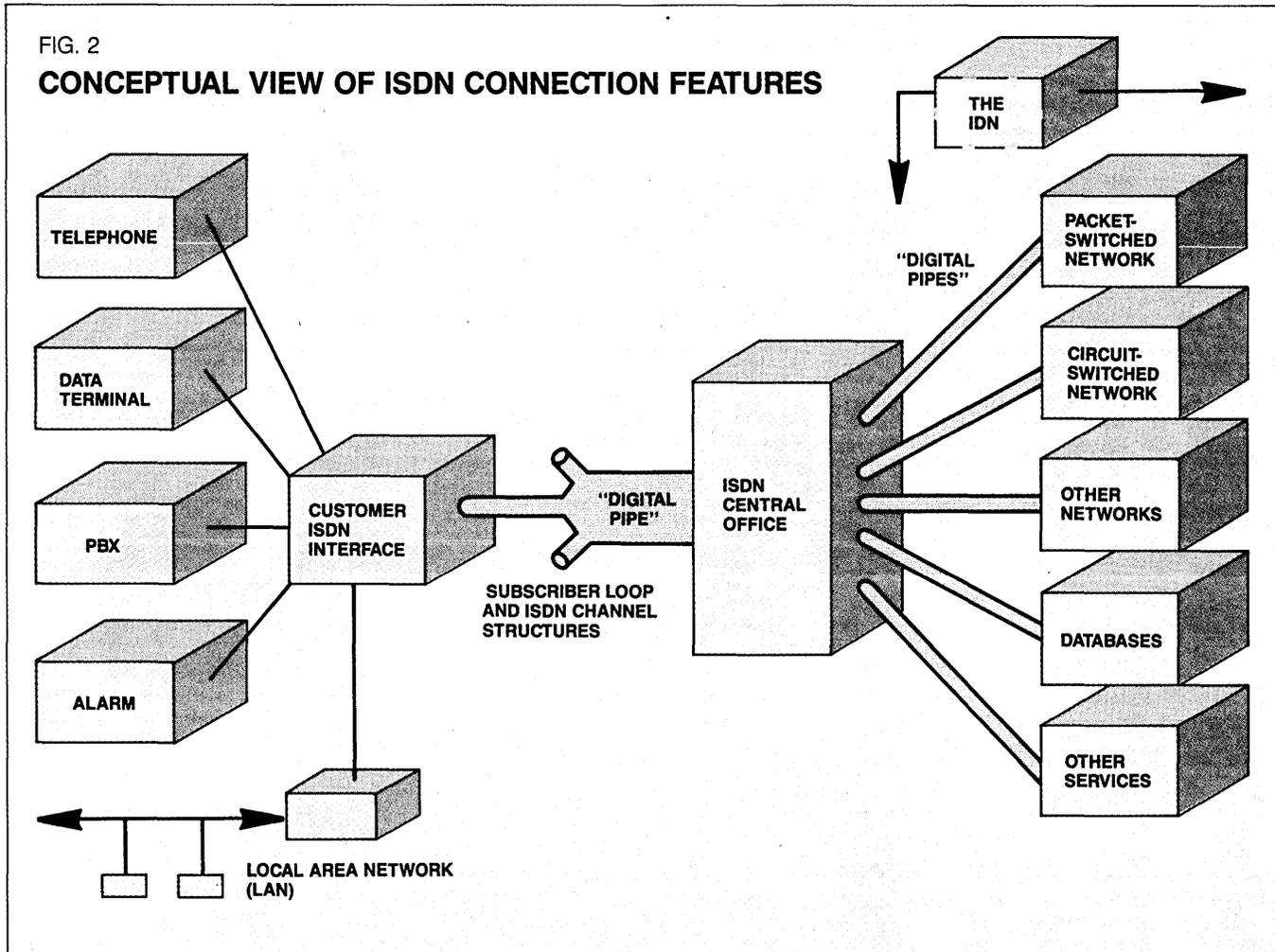
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By 1990, second-generation systems could appear that would provide full-blown ISDN services.

FIG. 2

CONCEPTUAL VIEW OF ISDN CONNECTION FEATURES



The subscriber loop portion of today's telephone network consists of twisted pair links between the subscriber and the central office, carrying 4KHz analog signals. Under the ISDN, one or two twisted pairs will be used to provide a basic full-duplex digital communication link. This digital pipe between the ISDN network termination on the customer's premises and the central office will be used to carry a number of communication channels. The capacity of the pipe and therefore the number of channels may vary from user to user.

Most attention has been paid by standards organizations to user access. A common physical interface will be defined. It will work with telephones, computer terminals, and videotex terminals. A new physical connector will be defined for the interface that will provide universal access to any device equipped with that connector. For pre-ISDN devices, a terminal adaptor will be required. In addition to the connector specification, protocols are needed for the exchange of control information

between user device and the network. Provision must also be made for high-speed interfaces for digital PBXs and LANs.

TWO PACKAGES PROVIDED

Two packaged services will be provided. The basic service will consist of two 64Kbps channels (B channels) and one 16Kbps channel (D channel). Each B channel can be used to carry digitized voice or digital data. The D channel is used to carry control signals (e.g., connection requests) and will also support packetized data intended for a packet switched network service. The primary service, suitable for digital PBX and LAN connections, consists of multiple 64Kbps channels; both 24-channel and 31-channel pipes will be standard. The digital central office will connect the numerous ISDN subscriber loop signals to the IDN. In addition to providing access to the circuit-switched network, the central office will provide subscriber access to dedicated lines, packet-switched networks, and time-

shared transaction-oriented computer services. These services may be offered by the ISDN provider or by non-ISDN providers on a competitive basis, or by a mixture of these two approaches.

Although a number of standards organizations are involved in various aspects of ISDN, the controlling body for ISDN standards is the International Telegraph and Telephone Consultative Committee (CCITT). The CCITT defines the ISDN by describing it in terms of six attributes.

1. The ISDN is to evolve from the existing telephone networks, which themselves are evolving into integrated digital networks.

2. New services introduced into the ISDN should be compatible with the basic 64Kbps switched digital connections.

3. The ISDN will require from 10 to 20 years (from the early 1980s) for full transition.

4. During the transition, the ISDN will rely on internetworking among the national ISDNs and other non-ISDN networks.



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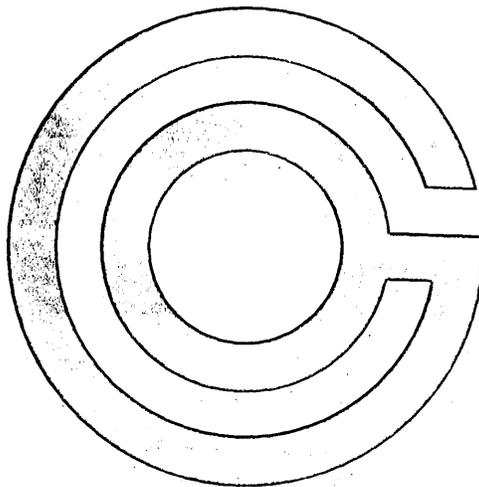
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Standards are being developed that relate to signaling, network interfaces, and protocols.

FIG. 3

BLOCK DIAGRAM OF ISDN FUNCTIONS

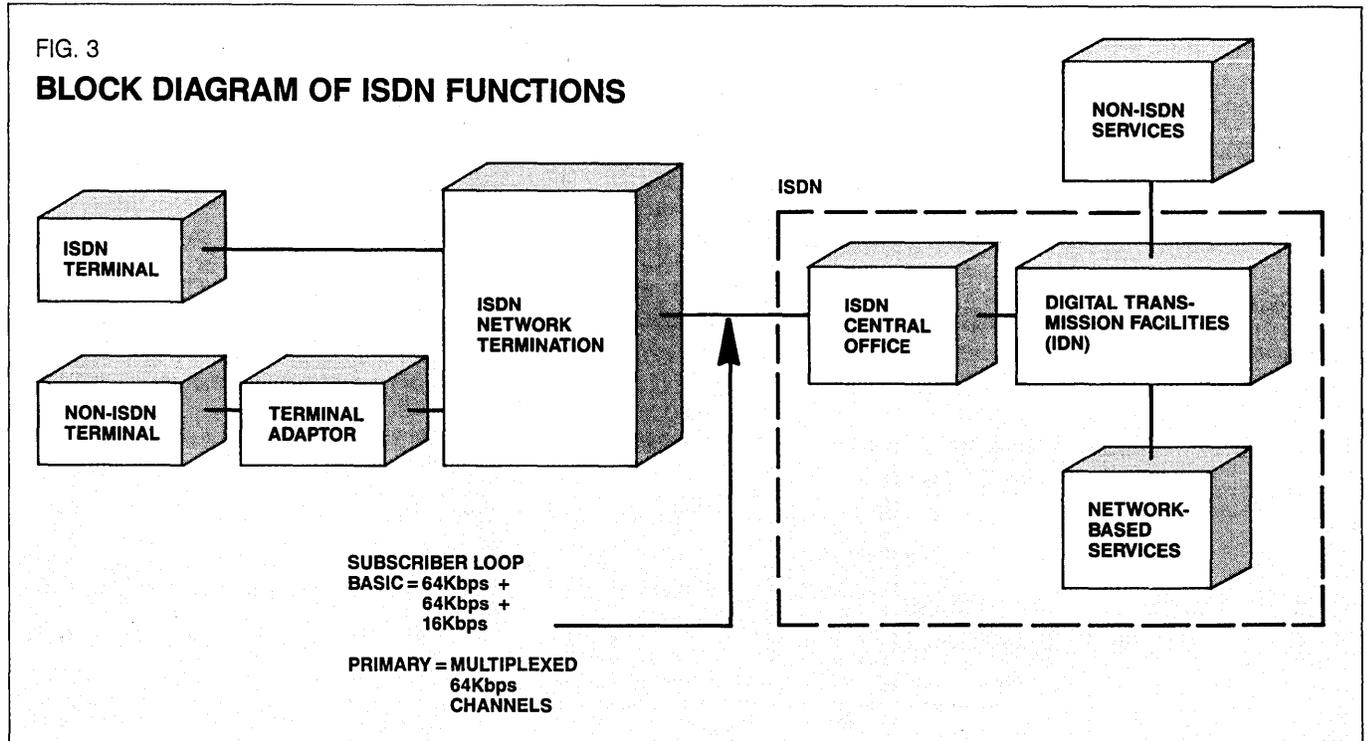


FIG. 4

CANDIDATE SERVICES FOR INTEGRATION

BANDWIDTH	SERVICE			
	TELEPHONE	DATA	TEXT	IMAGE
Digital Voice (64Kbps)	Telephone Leased circuits Information retrieval (by voice analysis and synthesis)	Packet switched data Circuit switched data Leased circuits Telemetry Funds transfer Information retrieval Mailbox Electronic mail Alarms	Telex Teletex Leased circuits Videotex Information retrieval Mailbox Electronic mail	Videotex Facsimile Information retrieval Surveillance
Wideband (> 64Kbps)	Music	High-speed computer communications	Teletex	Teletex Tv conferencing Videophone Cable tv distribution

5. The ISDN will contain intelligence for the provision of service features, maintenance and system control, and network management.

6. The ISDN will use a layered functional set of integrated protocols for the various access arrangements.

With these attributes in mind, standards are being developed that relate to signaling, network interfaces, and protocols.

This work will have a significant effect in every major area of telecommunication. The CCITT has completed work on the first family of ISDN standards. Over 30 recommendations were formally adopted in 1984, and these will form the basis for the first phase of evolution to the worldwide ISDN. The focus of the 1984 standards is the customer interface. These standards aim to establish a small set of interfaces that meet

projected needs and will have a lifetime of many years. As usual, CCITT will issue the next batch of ISDN standards in four years—1988. These new standards will provide refinements to the customer interface and more details on internal network functions.

With the planned and in-place standards, the evolution depicted in Fig. 6 is possible. In the current transition phase,

FIG. 5

BASIC AND ADDITIONAL FACILITIES FOR ISDN SERVICES

BASIC FACILITIES

Telephony	Data	Teletex	Videotex	Facsimile
National toll access	Automatic dialed call	Incoming call not disturbing local mode	Information retrieval by dialog with a database	Automatic dialed call
International toll access	Manual dialed call	Message printed on operator demand		Manual dialed call
Malicious call blocking	Automatic answer	Message presentation as in the original		Automatic answer
		Day and hour automatic indication		

ADDITIONAL FACILITIES

Transfer call	Direct call	Delayed messages	Transactions	Delayed delivery
Abbreviated dialing	Closed user group	Abbreviated address	Message box service	Multiple destination
Rerouting to verbal announcements	Closed user group with outgoing access	Multiple address	Loading of software from a database to a terminal	Code, speed, and format conversion
Intermediate call	Calling line identification	Charging indication		
Conference call	Called line identification	Telex access	Loading of special character set	
Camp on busy	Abbreviated address calling	Graphic mode		
Barring outgoing toll traffic	Barring incoming call			
Hot line	Multi-address calling			
Detailed billing	Detailed billing			
Automatic wakeup	Transfer call			
	Call charging indication			

the telecom complex is becoming increasingly digitized. There is more use of common channel signaling for digital services. Unlike in-band signaling, in which control signals to the network share the same transmission channel as the user's voice or data input, common channel signaling uses a separate, dedicated control channel for greater flexibility and efficiency.

The first-generation ISDN could begin by 1986. It will include integrated access to voice and data services, without the need for modems or other special adapters. CCITT-standard interfaces and equipment will appear. With separate-channel signaling the user will have greater control over the network, including, for example, dynamic allocation of bandwidth to match fluctuating needs. By 1990, second-generation systems could appear that would provide full-blown ISDN services.

Will it happen? The odds certainly seem to favor it. There is worldwide support and active participation from governments and industries (see box). Despite the scale of these standards, fundamental conflicts are few and far between. Perhaps the largest potential conflict is that the U.S. and its industry wish to avoid standards that constrain competitive development of services, while most other countries want detailed standards for all aspects of ISDN.

FIG. 6

THREE PHASES OF ISDN EVOLUTION

TRANSITION (1983-1986)

- Pre-ISDN services
- Separate access facilities—voice and data
- Expanded digital capability in local loops and switching exchanges
- Increased use of common channel signaling
- 1984 CCITT ISDN standards

FIRST GENERATION (1986-1990)

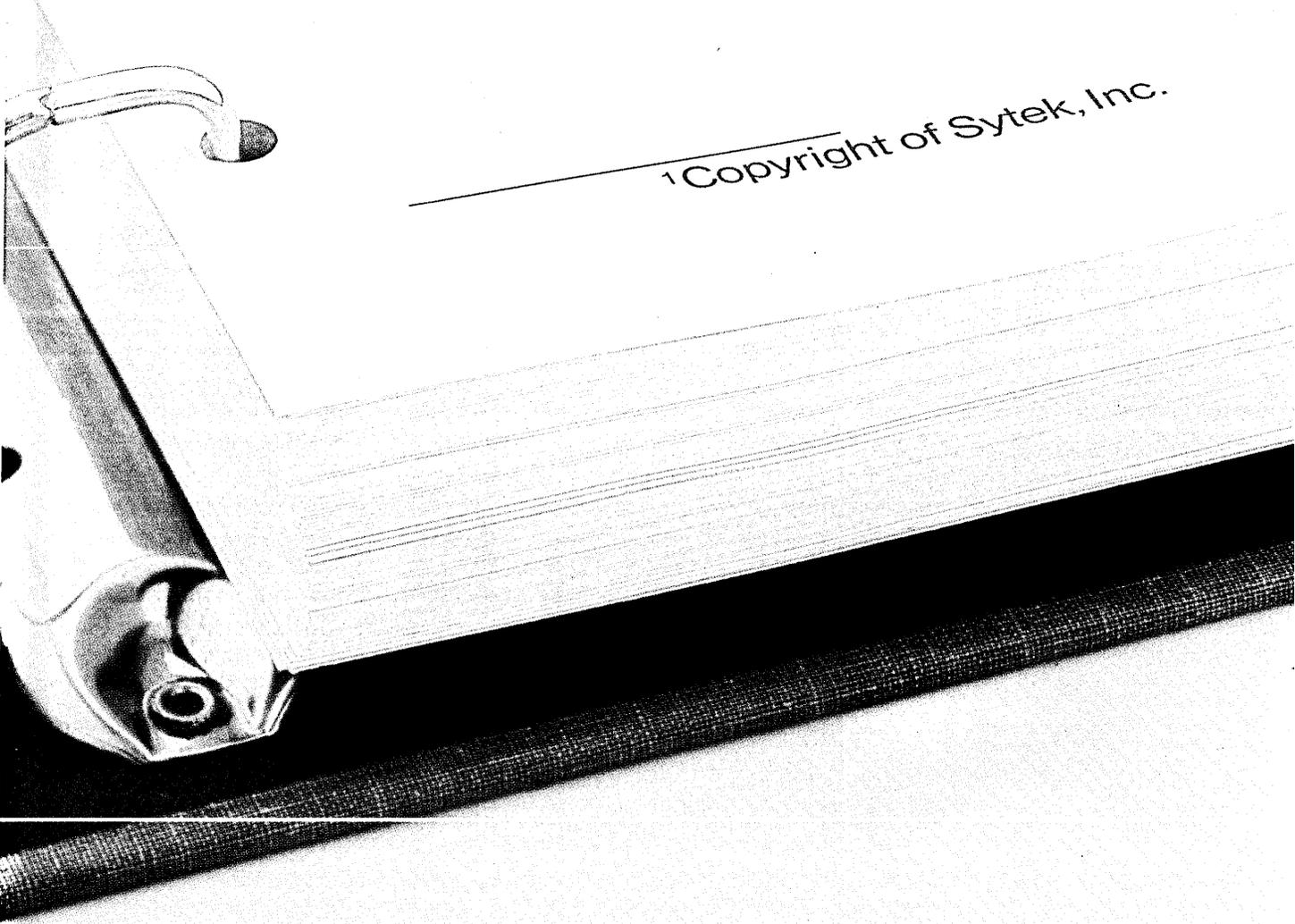
- Integrated access
- CCITT-standard equipment interfaces
- Expanded customer control
- 1988 CCITT ISDN standards

SECOND GENERATION (1990 and beyond)

- High-speed data and video capability
- Integration of circuit and packet switching
- New services

If this conflict can be resolved by a clever structuring of the family of standards, then the road is clear. Already there are LSI circuits in the prototype stage, designed to support the basic interface. If, as expected, the cost and performance of ISDN services are improvements over alternative schemes, the ISDN evolution will be rapid. ©

Dr. William Stallings is senior communication consultant with Honeywell Information Systems, McLean, Va. This article is based on material in his book, *Data and Computer Communications* (Macmillan, 1984). He is also author of *Local Networks: An Introduction* (Macmillan, 1983).



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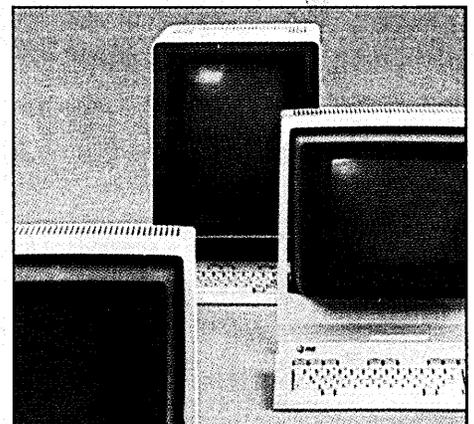
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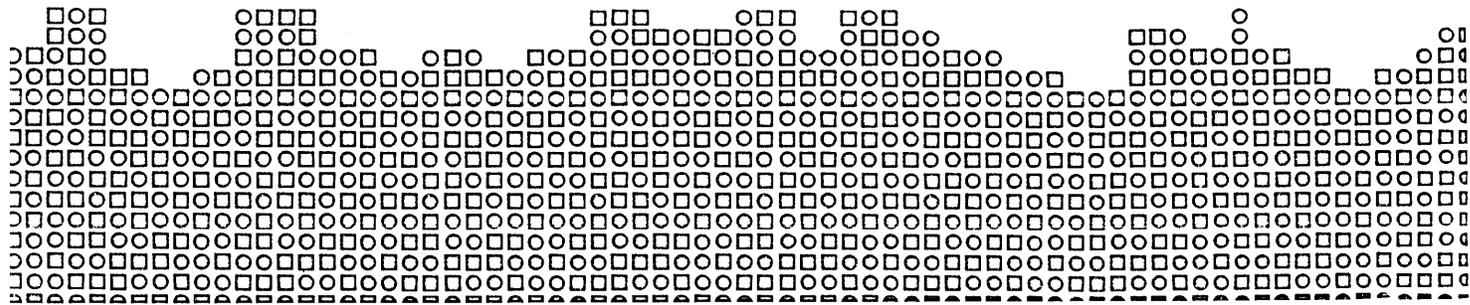
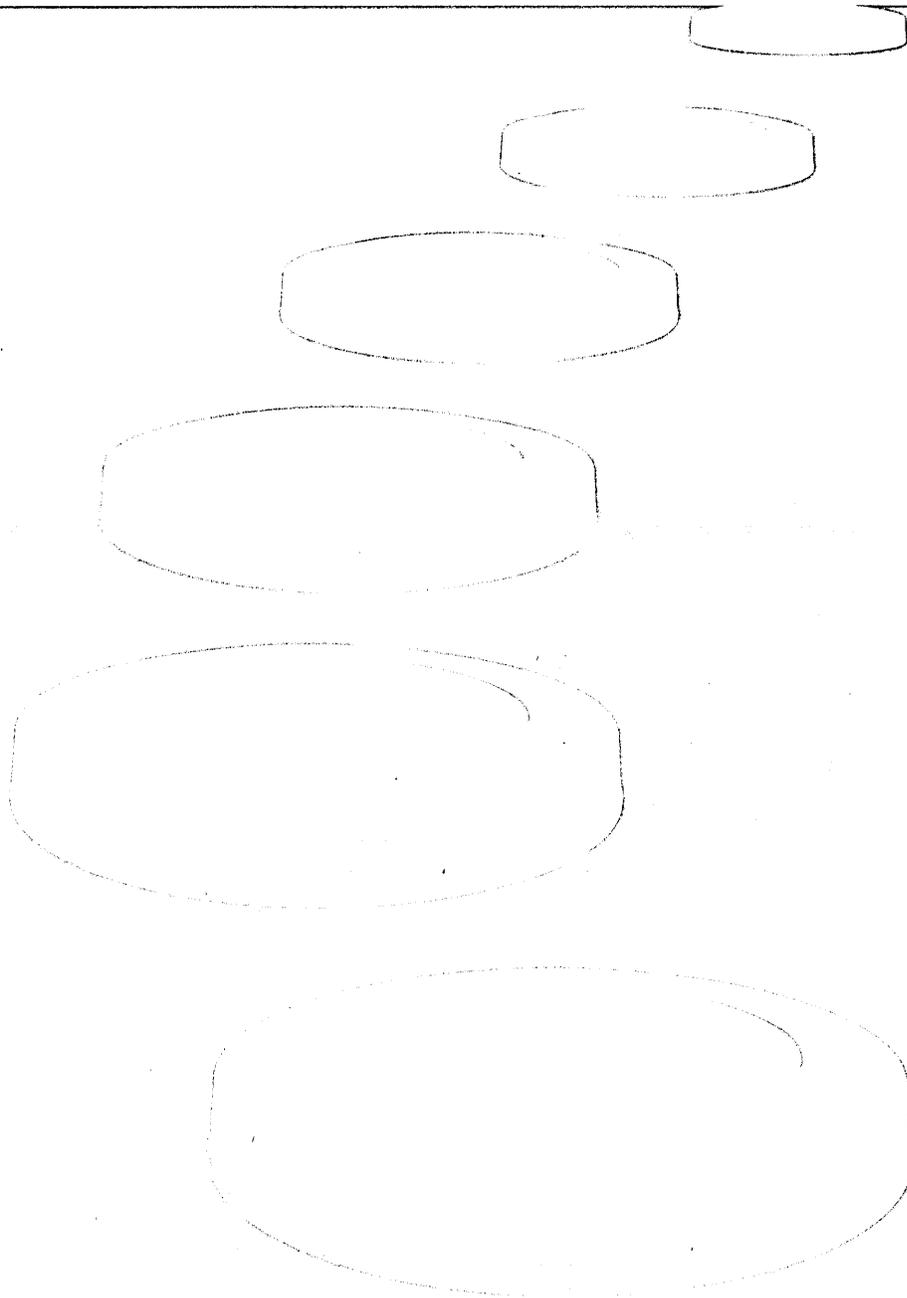
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More than 5,000 active users rate the performances of 135 packages.

SYSTEMS SOFTWARE SURVEY: USERS' FAVORITE DISKS

by Data Decisions

Ever wonder if other data processing managers have the same trials and tribulations with their systems software as you do? Glitches in communications code, program development aids that are more trouble than they're worth, or resource managers that consistently miss the estimating mark do exist, but the latest version of DATAMATION's annual systems software user survey shows that on balance, life is not getting any worse when it comes to systems software maintenance. On an ascending scale of 1 to 10, the average overall performance rating was a rather positive 7.1 for the second year in a row. No wonder the software business is growing at a 35% annual clip from a \$9 billion base this year, with DBMS and productivity aids on the shopping lists of dp managers around the world.

To find out just what kind of experiences information processing professionals were having with the most widely used systems software products over the past year, DATAMATION and Data Decisions, a Cherry Hill, N.J., computer research firm, polled thousands of users on what they think of their recently purchased systems software—how they feel about vendor support, package performance, and whether the package was going to be replaced.

This year 5,415 active users of 135 widely used systems software packages for mainframes and minis responded with ratings and comments on their recent purchases. Using their ratings, we came up with the average rating in five experience categories for each product, and comparisons by nine product groupings. While the average rating of 7.1 is the same as last year, that number masks some important changes in the individual product rankings.

The highest rated package was in the utilities/operating systems/enhance-

ments group—Flee/Xp from Goal Systems Int'l., Columbus, Ohio, took top honors with an average rating of 9.1. In addition, 89% of the respondents classified it as "an outstanding value." Call it the Mary Lou Retton of the software set. This is the first time in many years of surveying users that a package has won such acclaim. However, it's not entirely fair to call it the best software package on the market because its function is not as complex as that of a database management system or an artificial intelligence package. But it does show that a real rave review is possible in the software business.

The highest average rating received by any one category was 7.7, for utilities/operating systems/enhancements, and the lowest was 6.6, for data center management systems.

As for database management systems, System 1022 from Software House, Cambridge, Mass., led all DBMS packages with an average rating of 8.4, but Software AG's ADABAS and Cullinet's IDMS received average ratings of 8.0 and 7.9, respectively, making them the highest rated of the IBM-based systems in the survey.

In the data management and DBMS aids category, Quickjob III from System Support Software, Dayton, Ohio, came in first with a rating of 8.4. Condor from Phoenix Computer, Culver City, Calif., headed up the list of program development aids with an 8.4 average rating, but it was closely followed by Mapper from Sperry, with a rating of 8.2.

In the media control and resource management category Super MSI from CGA Products, Holmdel, N.J., was the top package, with an 8.3 rating.

There was a tie for top honors in the monitor and performance aids category between Candle Corp.'s OMEGAMON and Morino Associates' MICS, both with aver-

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tem designed to work with UCC-1. UCC-9. A unique hardware management product that helps you get the most out of each hardware dollar. UCC-10. A Data Dictionary/Manager which automates the communication and control needed to effectively manage the IMS data base operation. UCC-8. An online, integrated system designed to manage the complex support activities of today's data centers. UCC-2. (DUO). In a class by itself. UCC-2 helps you move from DOS to MVS with minimal effort. UCC-20. An OS JCL Gen-

erator which works in conjunction with UCC-2 to ease the transition to OS. UCC-4. The hottest new number in the UCCEL line, UCC-4 is a hardware accounting system so advanced... it's taking the industry by storm. So ware the hottest numbers in systems software. Ware UCCEL. Because this year, more than ever before... UCCEL's got your number.

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The highest-rated package was in the utilities/operating systems/enhancements group.

age ratings of 8.3.

A relative newcomer to the survey, Haverly System's OMNI, took top honors in the query and report writer category, with an average rating of 8.2. There was another tie in the data center management category, between UCCEL's UCC-7 and Value Computing's Data Center Management System: each had a 7.3 average rating.

A perennial winner again took top place in the communications category. WESTI from Westinghouse, with a rating of 7.9, led all other packages in that group. Altergo's SHADOW II, however, came in a close second with a rating of 7.8.

SOME CAVEATS IN ORDER

A few caveats are in order here. The classifications are not exact, and in some cases the nine categories include products that are not direct competitors. Also, newer systems, with more up-to-date technology, are typically rated significantly higher than many of the more mature offerings. One noticeable exception is WESTI, a decidedly mature product that still leads the field in the area of communications. One reason for this may be that the complexity of communications technology in general might make users overly critical of products offering new methodologies and allow a less complex terminal management product to shine.

Uniformly rave reviews are not always the case. Although the average package received an overall rating of superior (a 9 or a 10 score) from 26% of its users, a very good rating (6, 7, or 8) from the majority, an acceptable rating (3, 4, or 5) from 18%, and an inadequate (1 or 2) rating from 2%, still, 13%, or approximately 650 users, indicated that they were actively seeking replacements. About one third of this group, or 200 users, said they were shopping because their current packages lacked the features and capabilities they felt they needed. Only 2% were doing so because of general dissatisfaction, however—a remarkably low figure.

Users were also asked detailed questions about vendor support, system performance, and features. Ease of use, freedom from bugs, and installation time are included in the performance evaluations. Overall, users were slightly less pleased with vendor support than they were with the packages themselves and gave support an average rating of 6.4. The high and low scores in this area—7.0 and 5.9 respectively—were registered by the same two types of packages: utilities and data center management.

Seventy-eight percent of this year's respondents are running their products on IBM mainframes. When we add the 4%

running on Amdahl systems, the 2% on NAS, and the 1% on Magnuson, this brings the IBM-compatible base to 85%, which closely approximates the estimated IBM share of the market. As to the rest, 5% were using DEC minicomputers and mainframes, 3% were Sperry users, 2% had Hewlett-Packard systems, and 1% used Wang small systems. The remaining 5% reported using a variety of computers—among them CDC, Honeywell, Prime, and Data General systems.

We asked the users to review performance using four measurable parameters: efficiency of hardware utilization, ease of use, freedom from bugs, and the time it took to install the package. Vendor support included responsiveness to requests, training, and documentation. When rating operational characteristics, the user was asked to measure the product's ability to handle expanded processing volumes, the availability of effective security measures (when applicable), and the effectiveness of its backup and recovery procedures (again, when applicable).

A quarter of the packages in this year's survey didn't receive ratings in the areas of backup and recovery and security. Although some packages don't require these provisions, many that deal with transaction processing must contain them. Because of this, we have broken out the composites for these two functions, and have indicated how many packages were rated on these points.

SECURITY AN ISSUE FOR DBMS

Probably because DBMS and communications software are the most complex and sophisticated entities surveyed, the users were much more demanding with regard to backup and recovery, and especially with regard to security.

Notice that program development aids are consistently near the top of the ratings for backup, recovery, and security, due probably to their background. They are generally fourth generation languages and application development tools and quickly evolved as the computer industry took off on its microcomputer-based interactive personal computing binge. Although they weren't necessarily brought about by the introduction of the microcomputer, the technology was greatly influenced by it. As the trend toward higher-level languages that let the end user "program" without making demands on the always busy department continues, the popularity of these tools will continue to increase.

Monitoring and performance aids is another new area that bears watching. This

category also received relatively high performance ratings.

While program development aids are designed to ensure the best utilization of human resources, monitoring and performance aids concentrate on providing the hardware/software combinations that utilize the computer best. Developing these products calls for considerable expertise, much more than required for a utility package. The cost of this expertise is frequently reflected in the cost of the package, and this goes a long way toward discouraging smaller installations. The size of the marketplace may be part of the reason there are so few vendors of these types of packages.

How good or bad a product is in the view of users often depends on how well it is supported. When it comes to the mainframe software market, it is rare for a vendor not to supply some form of support. Four basic types of support are typical: on-site, where the representative of the vendor is either constantly on location or very close by; on-line, where there is a communication line between the customer's computer and the maintenance site so that the problem can be downloaded; mail, where the user mails a series of dumps to the vendor for analysis and resolution; and telephone hot line, which allows the customer to pick up a phone when a problem arises and discuss it immediately with a specialist at the vendor's site. Some hot lines are manned 24 hours a day, seven days a week, while others are available only at set times.

It came as no surprise that 90% of all respondents to this year's survey reported the telephone hot line as the prime form of support used within their installations. On a scale of one to 10, these respondents rated the service at 6.7—higher than any other form of service. How else can a vendor make so much expertise available to so many installations on a real-time basis? What was somewhat surprising was the fact that 51% of the respondents said they were still using the mails for vendor support. And on top of that, they rated this support at 6.1. The only possible explanation for this high percentage is that many of the computer vendors (e.g., IBM) require that problems be documented and mailed in with dumps even when a temporary fix has been worked out by phone. It is also possible that, rather than tying up the telephone lines trying to reproduce nonrecurring problems requiring low-priority attention, users are handling this type of situation by mail. In either case, we can expect mail support to continue until on-line support becomes financially feasible.

On-line support was introduced about 10 years ago but never really got off

Program development aids were consistently near the top of the ratings for backup, recovery, and security.

the ground because the associated resources and costs made it practical for only a few installations. Very few vendors are offering on-line support and only a handful of respondents reported using it. Those who do rated it a low 5.8. Despite this, there's a strong possibility that, as more sophisticated communications facilities become available, the use of on-line facilities to help correct software problems will become feasible. We estimate, however, that it will be at least 10 years before this happens.

This leaves telephone support, offering a centralized pool of expertise. In spite of everything, 39% of the users of 87 packages reported that on-site support was their prime source of support, and they rated it a healthy 6.5. Most of the products supported on-site were large and complex.

SEVEN BUYING FACTORS

Taking all the different factors into consideration, how do buyers decide what to purchase? In this year's survey seven basic factors were suggested, and respondents indicated the level of influence each had on their decisions to acquire the software being rated. Seventy-nine percent reported the major factors influencing their decisions were package features and capabilities; 62% stated compatibility with other software in use was a major consideration; and 63% said productivity and ease of use were of major concern.

Recommendations from consultants had the least influence, with 63% of all respondents reporting they had absolutely no influence on their decision to purchase. In another interesting finding, 51% reported that experience with another product from the same vendor also had no direct influence. This means that a vendor can no longer assume that a user will automatically acquire another package just because the first one worked well.

While features and capabilities were the prime factors influencing the purchase of packages in general, they were of primary concern for only 67% of the users of communications packages. Seventy percent of this group was more concerned with product compatibility. Until some truly acceptable standards are adopted, incompatibility will continue to be a major concern facing all those who implement any form of communications.

Fifty-six percent of all respondents reported they had evaluated other packages before acquiring their product; 28% of this group evaluated an average of 1.4 packages from their computer vendor, but 18% indicated that their computer vendor did not offer an equivalent. Forty-five percent indi-

cated they looked at an average of 2.4 packages from independent suppliers.

The fact that almost twice as many respondents went to independent suppliers and that almost twice as many packages from independents were reviewed is to be expected. The majority of the products in this survey are designed to operate on large IBM mainframes, and this is the market area where independents feel there is the greatest room for competition. As we have seen, the manufacturer frequently doesn't even have an equivalent product, and even Big Blue is limited in the number of alternatives it makes available for one specific configuration. On the other hand, there may be eight or 10 independents addressing that one area.

In reviewing each of the nine categories, we found that purchasers of media control and resource management packages and DBMS were most likely to look at evaluation alternatives; 792 users responded to this question, and 61% in each of the categories said they had examined other packages. Thirty-three percent of the DBMS users reported evaluating an average of 1.5 packages from computer vendors, and 54% of both groups noted looking at an average of 3.3 packages from independents. With the introduction of the new IBM DB2 product, we can expect more respondents to look at computer vendor software products in the future.

Users of monitoring and performance aids seemed to spend the least effort evaluating comparable products. Still, 49% of the 504 respondents to this question indicated that some effort was made; 23% looked at an average of 1.2 packages from the computer vendor, and 39% investigated an average of 1.8 packages from independents. One reason for this comparative lack of activity might be a lack of alternative products. In fact, in some cases products from the computer vendors are the only offerings.

FUTURE OF VENDOR PRODUCTS

What about the future of these products? Only 19% of all our respondents reported doing any postacquisition evaluation; 8% evaluated alternate packages from their computer vendor and 12% evaluated packages from independent suppliers. Surprisingly, the DBMS purchasers were the most active in this ex post facto exercise: 26% of the 792 DBMS respondents said they had evaluated another product. Of this group, 49% looked at an average of 1.7 packages from their computer vendor, and 66% indicated they had investigated an average of 2.8 packages from independents.

Considering the cost involved in purchasing and installing a DBMS, it seems unlikely that any quick changeover would be considered. Much of this postacquisition activity, however, may be related to upgrading (e.g., looking at SQL or DB2 to supplement DL/1 or IMS). In addition, large corporations might be looking to expand their database capabilities without necessarily replacing anything.

The data center management packages were subject to the least postacquisition evaluation (by only 13% of the 332 respondents). Of those, 10% reviewed on average less than one package from computer vendors, but 49% looked at an average of 1.2 packages from independents. Here is another case where the number of packages available is far fewer than in many other categories and the installation effort is great. Therefore, users probably won't start looking for a replacement soon.

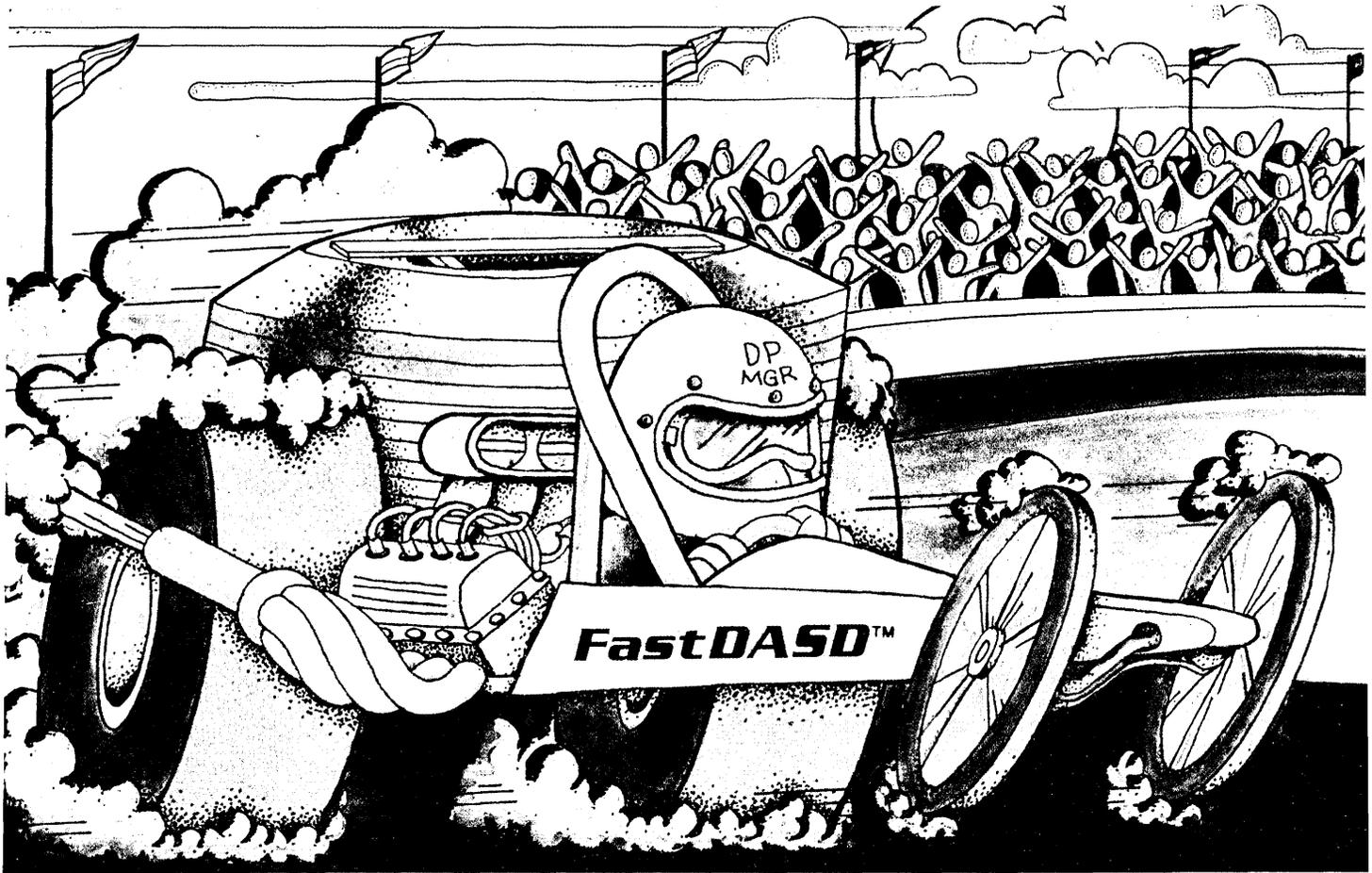
How many respondents were actively looking to replace their packages? Of the total group, 13%, or about 650 users, said they were actively evaluating alternatives. Leading the field were users of communication packages and DBMS, with 19% out of their total respondent bases of 387 and 792 respectively.

It comes as no surprise that users of communications software are now looking elsewhere, especially in the area of CICS-competitive products. Many independent suppliers of CICS-type monitors have been dropping out of the market. The latest dropout is Applied Data Research's DATA-COM/DC. This development, plus TSI International's halt in the marketing of TASK/MASTER and the dropping of MINICOMM from the SDA/Polygon line, reinforces the view that major TP monitor vendors are leaving the field to IBM and CICS.

One exception to this is Westinghouse's WESTI. This small-system, limited-facility monitor gives good value for the money, has kept in tune with the latest technology without promising the user the world, and is marketed on a very low-profile basis.

In the area of communications in general, 22% of the respondents indicated they were seeking to replace products that didn't have features and facilities they felt they needed; 25% claimed their products performed too slowly, and 15% were generally dissatisfied. Interestingly, 15% reported that they were seeking alternative products because they were upgrading from one operating system to another from the same vendor. This probably means that many IBM users are upgrading from a DOS to an OS environment.

Of the 123 respondents who were



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Package features and capabilities were the major factors that influenced 79% of buying decisions.

actively seeking a replacement for their DBMSs, 36% reported they required features and facilities that did not exist in their current system; 27% said they were generally dissatisfied with their system, and 25% cited slow performance as the major reason for seeking an alternative.

Owners of data center management packages were the least anxious to replace their systems (only 7% of the 332 respondents felt this way). Of these, 23% reported general dissatisfaction as the major reason for refraining from replacement, 21% complained of poor or discounted vendor support, 20% wanted additional features and capabilities, and 14% felt the price/performance ratio was unsatisfactory.

PRODUCT MEASURED BY VALUE

Products can be measured in many ways, but the one true measure of a good software acquisition is whether or not users feel they have gotten true value for the money invested. In order to judge this, we asked our survey respondents to characterize their acquisitions as excellent, good, or poor values.

For a product to be considered an excellent value, it must supply outstanding features and capabilities at a price comparable to or lower than competitive packages or provide good (not necessarily outstanding) features and capabilities at a price substantially below competitive packages. To be considered of good value, a product must provide outstanding features and capabilities at a higher price than competitive packages with lesser capabilities, provide good but not necessarily outstanding features and capabilities at a price comparable to competitive packages, or provide newer features and capabilities than competitive packages but at a significantly lower price.

A poor value is a package that provides good but not outstanding features and capabilities, but at a price significantly higher than competitive packages, or one that lacks many important features and capabilities but is priced comparable to or higher than competitive packages.

The results showed that 46% of the users felt they had acquired excellent value, while 44% said that they received good value. Only 4% felt they had made poor selections. Not unexpectedly, 61% of those who reported on utility-type packages considered them excellent values, while only 43% of the users of communications packages and 40% of the DBMS purchasers felt the same way—and 7% and 8% respectively felt they had received poor value. Only 31% of those judging data center management packages and 38% of those with query and report writing systems rated their

acquisitions as excellent value.

One area that is always of interest is whether the products exceeded, met, or failed to meet the vendor's promises concerning installation time, features and capabilities, and performance/speed/efficiency. The average systems software package studied did best in the area of features and capabilities, with 91% of the users saying their acquisitions met or exceeded the vendor's promises. In addition, 89% said they met or exceeded promises about installation time, and 88% reported that promises relating to performance/speed/efficiency were met or exceeded.

Eighty-one percent of the users of the average systems package said that it met or exceeded vendor promises in all three areas, and only 1% said it hadn't met any vendor promises. Of the nine package groups, utilities/operating systems/enhancement packages were rated most favorably, with 88% of the users reporting that all vendor promises had been met or exceeded. Data center management packages fared worst, with only 72% making this claim.

In order to participate in Data Decisions' survey, the user must have had the package installed for at least six months. The average package was, in fact, installed for 38 months, with communications packages installed for the longest period, 50 months, and program development aids and media control and resource management packages installed for the shortest time, 34 months.

BAR GRAPHS HEART OF REPORT

The heart of this report is a series of bar graphs that show certain ratings for each product, each individual category, and the survey as a whole. In this section, which begins with surveywide averages, the graphs are laid out by category, with each set of product graphs preceded by a graph with the averages for that category.

The graph for the whole category has one set of red bars that shows the various averages. The product graphs have two bars per rating, a red bar showing the average for the category and a black bar showing the rating for the specific product.

Other information includes the number of responses per package or category, the number of users who judged the product outstanding, the number who judged vendor support outstanding, and the number actively seeking to replace the product and the reasons for this action. We also provide the vendor's name, address, and telephone number to facilitate further contact.

Rating Summaries

COMMUNICATIONS SOFTWARE—11 packages studied.

Mean Score

- 7.9—Westinghouse Electric WESTI
- 7.8—Altergo Products SHADOW II
- 7.5—Tone Corporation TONE 3/TONE 4
- 7.1—Applied Data Research ADR/ROSCOE
- 7.0—Digital Equipment DECnet
- 6.9—Group Average**, IBM Corp. CICS/VS
- 6.6—Cincom Systems ENVIRON/1
- 6.5—Software AG COM-PLETE
- 6.4—IBM TSO
- 6.2—IBM ICCF
- 6.0—IBM IMS/DC

DATA CENTER MANAGEMENT SYSTEMS—7 packages studied.

Mean Score

- 7.3—UCCEL UCC-7, Value Computing Data Center Management System
- 7.1—UCCEL UCC-11
- 6.9—Pace KOMAND
- 6.7—Johnson Systems JARS
- 6.6—Group Average**
- 5.5—Computer Associates CA-SCHEDULER
- 5.1—Value Computing COMPUT-A-CHARGE

DATA MANAGEMENT & DBMS AIDS—15 packages studied.

Mean Score

- 8.6—System Support Software QUIKJOB III
- 8.4—AS Institute SAS
- 8.0—Dylakor DYL-280
- 7.9—Battelle Labs BASIS
- 7.8—DBMS Inc. TOOL KIT
- 7.1—Dylakor DYL-260
- 7.0—Group Average**
- 6.9—Applied Data Research DATA DICTIONARY, MSP DATAMANAGER
- 6.8—Oceanic EXTRACTO, Application Software ASI-ST
- 6.5—Information Processing BLISS/COBOL
- 6.4—Henco Software INFO
- 6.3—Sperry Corp. IMS
- 5.5—UCCEL UCC-10
- 5.1—TSI Int'l. DATA CATALOGUE 2

DATABASE MANAGEMENT SYSTEMS—21 packages studied.

Mean Score

- 8.4—Software House SYSTEM 1022
- 8.0—Software AG ADABAS, Cullinet IDMS
- 7.8—Hewlett-Packard IMAGE/3000
- 7.3—Information Builders FOCUS
- 7.2—Computer Corp. of America MODEL 204, Mathematica RAMIS II
- 7.1—Infodata INQUIRE, Honeywell DM-IV
- 6.9—Cincom Systems TIS
- 6.8—Group Average**
- 6.7—Intel SYSTEM 2000, DEC DBMS, Sperry Corp. DMS-1100
- 6.5—Tominy Data Base Plus
- 6.3—National Information DPL

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ACIP2 is developed by DEC, Inc., Rosemont, MA 01936
Cambridge markets ACIP2 only in the US and Canada.

CIRCLE 40 ON READER CARD

Users of monitoring and performance aids spent the least effort evaluating comparable products.

6.2—Oracle Corp. ORACLE
6.0—IBM SQL/DS
5.8—Cincom TOTAL, IBM DL/1, IBM IMS/VS
5.6—Applied Data Research
ADR/DATACOM/DB

MONITORING/PERFORMANCE AIDS SOFTWARE—13 packages studied.

Mean Score

8.3—Candle Corp. OMEGAMON, Morino Associates MICS
7.7—Candle Corp. DEXAN
7.5—Morino Associates TSO/MON
7.4—BGS Systems CAPTURE/MVS
7.3—Boole & Babbage RESOLVE
7.2—Applied Data Research ADR/LOOK
7.0—Group Average, BGS Systems BEST/1
6.8—Boole & Babbage CMF/MONITOR
6.4—Boole & Babbage IMF
6.0—Boole & Babbage TSA
5.7—Boole & Babbage PPE
5.4—Duquesne Systems QCM

PROGRAM DEVELOPMENT AIDS—17 packages studied.

Mean Score

8.4—Phoenix CONDOR
8.2—Sperry Corp. MAPPER
8.0—Applied Data Research ADR/VOLLIE
7.8—Online Software Int'l. INTERTEST
7.7—Cincom Systems MANTIS
7.6—Software AG NATURAL, IBM ISPF
7.3—Altergo Products QUOTA II
7.2—Pansophic Systems O-W-L
7.1—Online Business Systems WYLBUR
7.0—Group Average, Altergo Products CPG
6.6—TOM Software SPEED I
6.3—Applied Data Research METACOBOL
6.0—Management & Computer Services DATAMACS
5.8—Oxford Software UFO
5.4—Informatics MARK IV
4.6—IBM DMS

MEDIA & RESOURCE MANAGEMENT SOFTWARE—16 packages studied.

Mean Score

8.4—CGA Computer SUPER MSI
8.3—Cambridge Systems Group ACF2
8.1—CGA Computer MSM

8.0—Corodale SYSTEM/MANAGER
7.9—Sterling Software DMS/OS
7.8—SDI Inc. EPAT
7.7—Cambridge Systems Group ASM2, Computer Associates CA-DYNAM/FI
7.5—UCCEL USS-1
7.3—Group Average
7.2—Computer Associates CA-DYNAM/D
7.0—Tower Systems TFAST
6.9—Tower Systems DFAST
6.6—Pansophic Systems PANAUDIT
6.5—Computer Associates CA-TLMS
6.1—UCCEL UCC-3
5.7—Pansophic Systems PANEXEC

QUERY/REPORT WRITING SYSTEMS—11 packages studied.

Mean Score

8.2—Haverly Systems OMNI
7.3—Applied Data Research ADR/DATA-QUERY, Cullinet EDP AUDITOR
7.2—Pansophic Systems EASYTRIEVE
7.1—Computer Associates CA-EARL
6.8—Group Average
6.7—TSI Int'l. AUDIT ANALYZER
6.6—H & M Systems KEYFAST

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NOMAD is a registered trademark of D&B Computing Services, Inc. DunsPlus is a trademark of DunsPlus, a company of The Dun & Bradstreet Corporation.

CIRCLE 49 ON READER CARD

A smart terminal smart on a desk.



Section 170A: Interest and Professions Data is a catch - all statute.

The elements which make up the statute are concerned with unlawful and unfair business practices. It is the major consumer law, acting as an umbrella on the protection it offers to consumers against wrongful business practices.

To save the statute from constant revisions, it is vague and broad in its wording. Deliberate to defend on anything that violates the law, regardless of what the law is. Unfair is not so clearly defined and has an open ended definition, leaving a lot of scope for interpretation by the legislature.

Whenever a business practice has violated a law, 170A has also been violated. Just offers greater protection to the consumer than any law has available under the remedies for the particular law involved.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1.1	1.3	1.5	1.7	1.7	1.8	1.9	2.0	2.2	2.2	2.1	2.4	21.9
1.0	1.0	1.1	1.1	1.1	1.3	1.1	1.3	1.3	1.3	1.3	1.4	14.0
6.2	6.3	6.7	6.2	6.3	6.4	6.7	6.0	6.3	6.4	6.2	6.1	71.1
8.3	8.6	9.2	9.0	9.1	9.3	9.9	9.9	9.9	9.9	9.6	9.0	107.0

James Anthony 402-651-3215
James Robert 402-425-2537
Loren Arthur 402-342-2945

Enter required name:

The 12.02 pc PC Connect (inc. 12.02) name.

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Like all our display products, the WY-50 combines an unusually small footprint with a very generous 14" diagonal display. The non-glare screen tilts, swivels, and displays a full 132-column format. The low-profile keyboard adjusts, too, for perfect fit and feel.

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WYSE
| | | |

Wyse Technology, 3040 N. First Street, San Jose, CA 95134.

CIRCLE 50 ON READER CARD

Owners of data center management packages were least anxious to replace their systems.

- 6.4—Cullinet CULPRIT
- 6.3—DEC DATATRIEVE
- 6.2—HP QUERY/3000
- 5.9—TSI Int'l. DATA Analyzer

UTILITIES/OPERATING SYSTEM ENHANCEMENT SOFTWARE— 24 packages Studied.

Mean Score

- 9.1—Goal Systems FLEE/XP
- 8.8—Goal Systems FAVER/XP
- 8.7—Westinghouse Electric Disk Utility System
- 8.6—Macro 4 LOGOUT/MULTILOG, Software Pursuits DOS/MVT/VSE
- 8.5—Syncsort Inc SYNCSORT/DOS

- 8.4—Computer Associates CA-SORT
- 8.3—Innovation DP FAST/DUMP/RESTORE (FDR), Syncsort Inc. SYNCSORT/OS
- 8.2—SDI Inc. INSTANT FBA
- 8.1—Computer Associates CA-RAPS, Compuware ABEND-AID, Goal Systems FAQs/XP
- 7.8—CGA Computing TOP SECRET
- 7.7—Group Average
- 7.6—Applied Data Research LIBRARIAN
- 7.5—IMSL Inc. IMSL LIBRARIES
- 7.3—Pansophic Systems PANVALET
- 7.1—Century Analysis BOSS/3
- 7.0—TSI Int'l. KEY/MASTER
- 6.8—Computer Associates CA-DRIVER

- 6.7—Nixdorf Computer Software EDOS
- 6.3—UCCEL UCC-2
- 5.8—Value Computing VALU-LIB
- 5.6—Computer Associates CA-JASPER ©

This systems software survey is based on a forthcoming report in Data Decisions' *Software*, a monthly updated information service covering systems and application software for mainframes and minicomputers. Additional information on Data Decisions' subscription services and custom consulting capabilities is available from Data Decisions, 20 Brace Road, Cherry Hill, NJ 08034, (609) 429-7100.

METHODOLOGY

The survey was designed by Data Decisions and conducted by Beta Research Corp., Syosset, N.Y., in the spring and summer of 1984. The objective was to obtain users' evaluations of their packages and data on the environment in which systems software is used.

The universe consisted of packages designated by International Computer Programs, Indianapolis, as having generated \$5 million or more in sales; 164 packages from 79 companies qualified for this year's survey. On May 18, a registered letter on DATAMATION stationery was sent to the vendor of each package listed in the ICP rankings, requesting a list of the 125 most recent customers who had the designated package installed and running for at least six months as of the date of the letter; for packages with fewer than 125 qualified customers, the vendor was asked to supply the entire user file. Vendors were also asked to certify that the lists represented their 125 most recent customers and that they would make no effort to contact these customers with regard to the survey. Users were also asked whether they had been contacted by the vendor.

A minimum of two follow-up phone calls was made to each vendor in an effort to gain maximum cooperation; 56 companies (71% of those contacted) responded, providing lists for 105 systems packages (63% of those originally identified for inclusion in the sample). Four of the package lists contained fewer than 29 names (the minimum mailing sample), and a database maintained by Computer Intelligence Corp., La Jolla, Calif., was used to supplement three of these lists. The fourth was dropped, leaving a net of 104 packages from 56 companies. Because packages from hardware vendors aren't listed by ICP, user lists were also

obtained from the CIC database for 31 additional packages marketed by 12 major hardware manufacturers. With the addition of these lists, the total survey universe grew to 135 packages from 68 vendors.

During the first week of July 1984, 12,653 questionnaires were mailed to the individual designated as the vendor's primary contact at each location. In a cover letter, recipients were asked to give the questionnaire to someone who used the package if they were not personally qualified to respond. To encourage a timely response, a \$1 in currency incentive was included in the first mailing. A second mailing, without an incentive, was made in early August to all nonrespondents.

A total of 5,971 questionnaires was returned, for a net response of 48%; 118 questionnaires were undeliverable by the postal service.

To increase the response rate, telephone interviews were conducted among nonrespondents. The sample was selected so as to provide a minimum response rate of 4% and a minimum user base of 15 for each package. The questionnaire used in the telephone interview was identical to that used in the mail survey.

The telephone interviews brought the total number of responses to 6,137, for an overall response rate of 49%; included in the responses were 722 indicating that the package was not currently in use at the installation. ©

AV. TOLERANCES FOR 68% CONFIDENCE LEVEL

SAMPLE SIZE	OVERALL SATISFACTION			SPECIFIC ATTRIBUTE RATINGS			
	6.0 or Under	7.0	8.0 or Higher	5.0 or Under	6.0	7.0	8.0 or Higher
60 or more	.20	.20	.15	.30	.30	.25	.20
50 to 59	.25	.25	.20	.30	.30	.30	.25
40 to 49	.30	.30	.25	.35	.35	.30	.25
30 to 39	.35	.30	.25	.40	.40	.35	.30
20 to 29	.40	.30	.30	.45	.45	.45	.45
15 to 19	.50	.50	.40	.55	.55	.50	.45

As in all surveys, the numbers reported are estimates within a range of what would have been obtained if all sites in the universe had been surveyed. The margin of sampling variation, or "tolerance," applicable to the ratings in this survey are given in the above table.

The chances are approximately two out of three that a reported rating differs by no more than the indicated tolerance from the rating that would have been obtained if all eligible sites had been surveyed.

For example, suppose a sample of 30 sites gives a software package an overall satisfaction rating of 7.0. The table indicates a tolerance of 0.30, so the chances are two out of three that the interval 6.70 to 7.30 includes the rating that would have been obtained if all eligible sites had been surveyed.

Rating Values

10-9: Superior
8-6: Very Good

5-3: Acceptable
2-1: Inadequate

Legend

■ Specific Product Rating
□ Group Average Rating

OVERALL SUMMARY

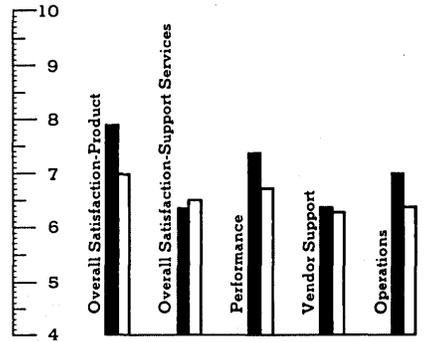
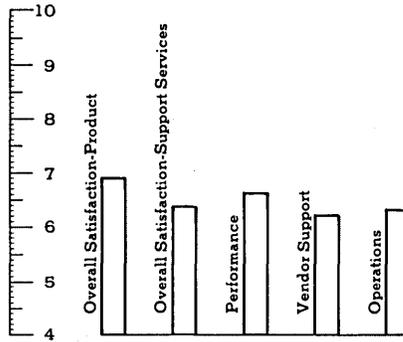
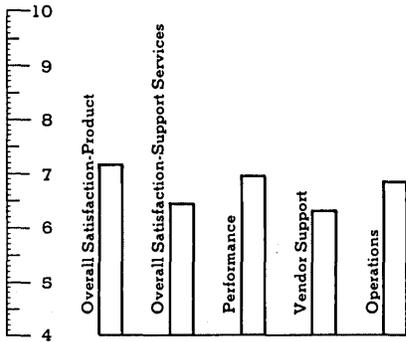
Average—All Packages • 135 packages
5415 responses • 26% judged package and 14% judged vendor outstanding • 704 actively seeking to replace package, with 108 citing unsatisfactory performance as reason.

COMMUNICATIONS

Group Average • 11 packages
387 responses • 20% judged package and 13% judged vendor outstanding • 74 actively seeking to replace package, with 12 citing unsatisfactory performance as reason.

SHADOW II • Altergo Products, 400 West Cummings Park, Suite 6900, Woburn, MA 01801 • 617-983-8811

43 responses • 40% judged package and 9% judged vendor outstanding • 17 actively seeking to replace package, with 2 citing unsatisfactory performance as reason.



ADR/ROSCOE • Applied Data Research, Inc., Route 206 & Orchard Road, CN-8, Princeton, NJ 08540 • 201-874-9100

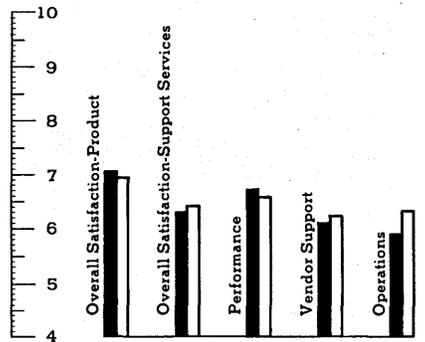
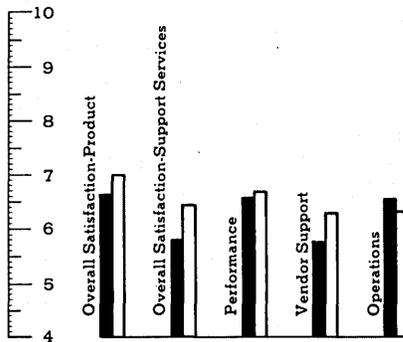
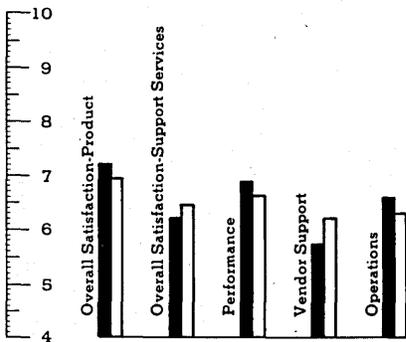
41 responses • 20% judged package and 12% judged vendor outstanding • 3 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.

ENVIRON/1 • Cincom Systems, 2300 Montana Avenue, Cincinnati, OH 45211 • 513-662-2300

48 responses • 19% judged package and 6% judged vendor outstanding • 20 actively seeking to replace package, with 5 citing unsatisfactory performance as reason.

DECNET • Digital Equipment Corporation, 146 Main Street, Maynard, MA 01754 • 617-897-5111

31 responses • 32% judged package and 10% judged vendor outstanding • 1 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



CICS • IBM Corporation, National Accounts Division, 1133 Westchester Avenue, White Plains, NY 10604 • 914-696-1900

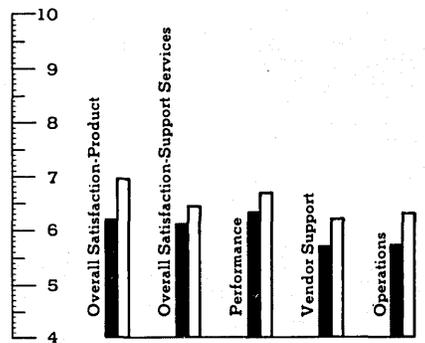
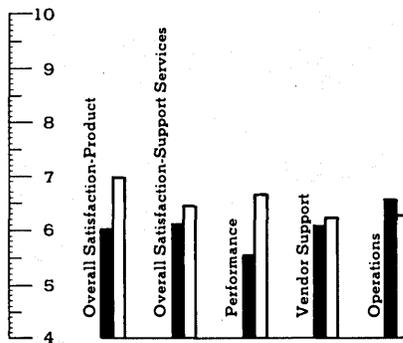
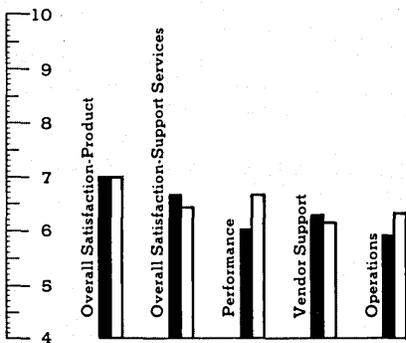
36 responses • 17% judged package and 22% judged vendor outstanding • 0 actively seeking to replace package.

IMS/DC • IBM Corporation, National Accounts Division, 1133 Westchester Avenue, White Plains, NY 10604 • 914-696-1900

16 responses • 6% judged package and 6% judged vendor outstanding • 2 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.

ICCF • IBM Corporation, National Accounts Division, 1133 Westchester Avenue, White Plains, NY 10604 • 914-696-1900

35 responses • 3% judged package and 9% judged vendor outstanding • 10 actively seeking to replace package, with 2 citing unsatisfactory performance as reason.



Rating Values

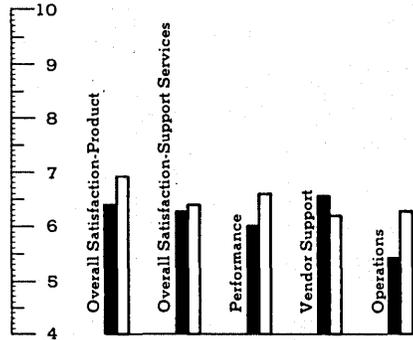
10-9: Superior
8-6: Very Good
5-3: Acceptable
2-1: Inadequate

Legend

■ Specific Product Rating
□ Group Average Rating

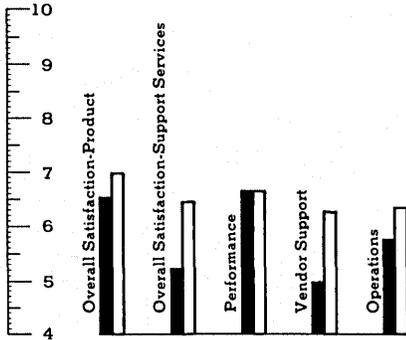
TSO • IBM Corporation, National Accounts Division, 1133 Westchester Avenue, White Plains, NY 10604 • 914-696-1900

31 responses • 7% judged package and 10% judged vendor outstanding • 1 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



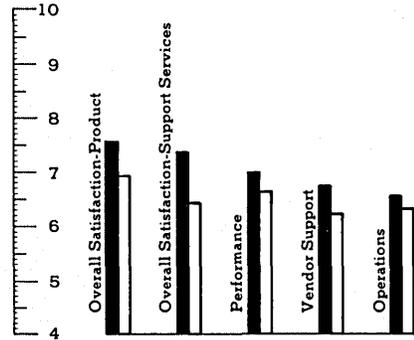
COM-LETE • Software AG of North America, 11800 Sunrise Valley Drive, Reston, VA 22091 • 703-860-5050

56 responses • 11% judged package and 2% judged vendor outstanding • 11 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



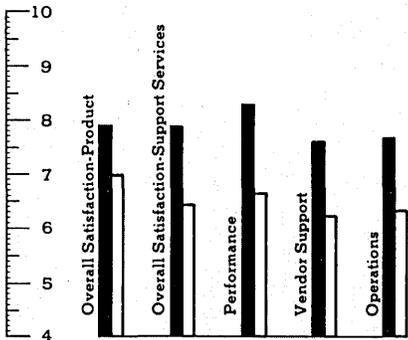
TONE 3/4 • Tone Corporation, 1735 South Brookhurst, Anaheim, CA 92804 • 714-991-9460

27 responses • 22% judged package and 26% judged vendor outstanding • 10 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



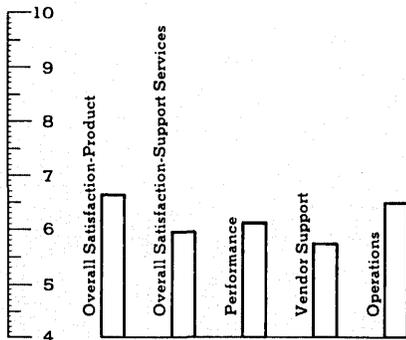
WESTI • Westinghouse Electric, 777 Penn Center, 7th Floor, Pittsburgh, PA 15235 • 412-636-3100

23 responses • 48% judged package and 35% judged vendor outstanding • 3 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



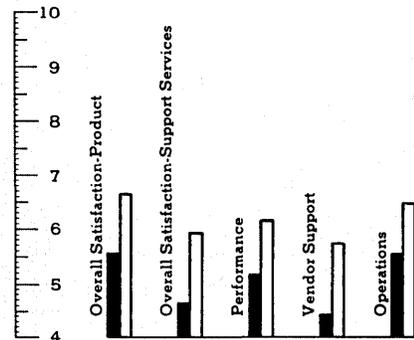
DATA CENTER MANAGEMENT

Group Average • 7 packages
332 responses • 13% judged package and 8% judged vendor outstanding • 23 actively seeking to replace package, with 7 citing unsatisfactory performance as reason.



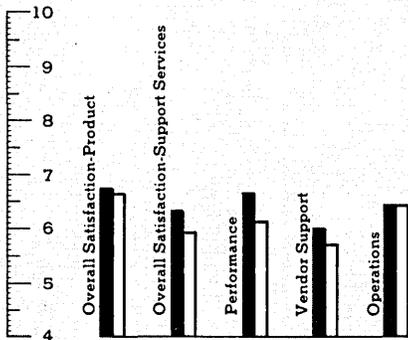
CA-SCHEDULER • Computer Associates Int'l, 70 Jericho Expressway, Jericho, NY 11753 • 516-333-6700

39 responses • 0% judged package and 5% judged vendor outstanding • 5 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



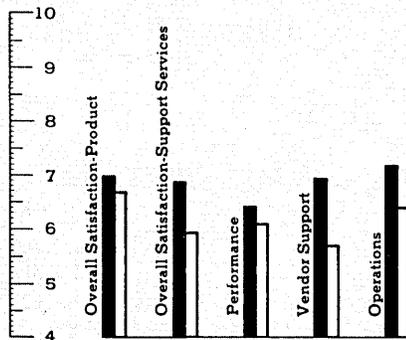
JARS • Johnson Systems (for information contact Computer Associates, Int'l) 70 Jericho Expressway, Jericho, NY 11753 • 516-333-6700

39 responses • 5% judged package and 8% judged vendor outstanding • 1 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



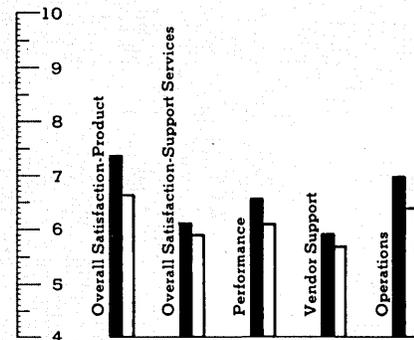
KOMAND • Pace Applied Technology, 7900 Sudley Road, Suite 602, Manassas, VA 22110 • 703-369-3200

52 responses • 19% judged package and 17% judged vendor outstanding • 5 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



UCC-7 • UCCEL Corporation, UCCEL Tower, Exchange Park, Dallas, TX 75235 • 214-353-7533

50 responses • 18% judged package and 6% judged vendor outstanding • 1 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



Rating Values

10-9: Superior
8-6: Very Good

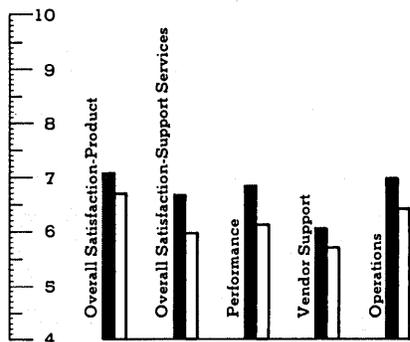
5-3: Acceptable
2-1: Inadequate

Legend

■ Specific Product Rating
□ Group Average Rating

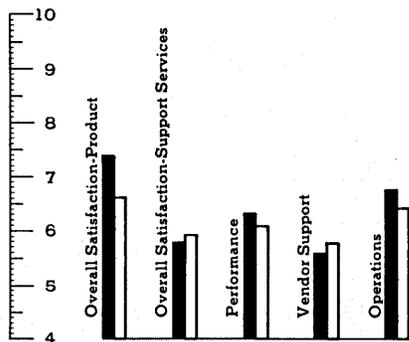
UCC-11 • UCCEL Corporation, UCCEL Tower, Exchange Park, Dallas, TX 75235 • 214-353-7533

44 responses • 21% judged package and 16% judged vendor outstanding • 2 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



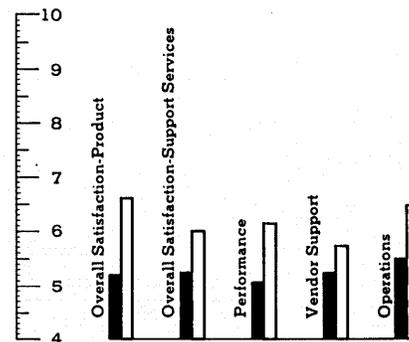
DATA CENTER MANAGER • Value Computing Inc., 498 North Kings Highway, Chery Hill, NJ 08034 • 609-482-2500

61 responses • 23% judged package and 7% judged vendor outstanding • 2 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



COMPUT-A-CHARGE • Value Computing Inc., 498 North Kings Highway, Cherry Hill, NJ 08034 • 609-482-2500

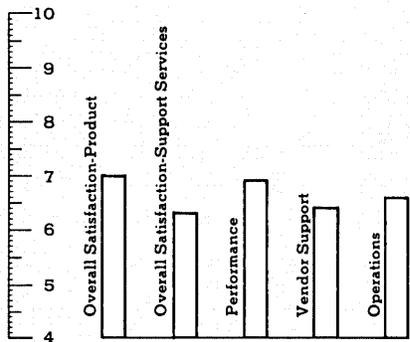
47 responses • 4% judged package and 0% judged vendor outstanding • 7 actively seeking to replace package, with 2 citing unsatisfactory performance as reason.



DATA MANAGEMENT/DBMS AIDS

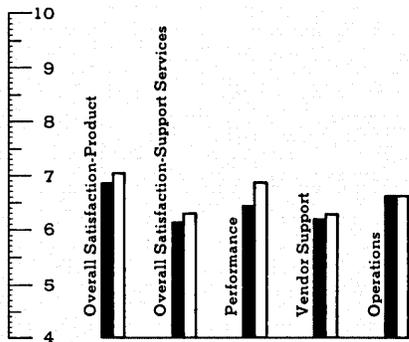
Group Average • 15 packages

554 responses • 24% judged package and 13% judged vendor outstanding • 72 actively seeking to replace package, with 11 citing unsatisfactory performance as reason.



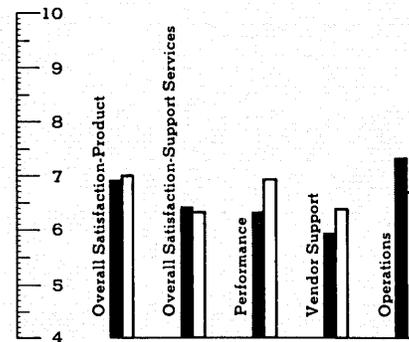
ASI-ST • Applications Software, Inc., 21515 Hawthorne Boulevard, Torrance, CA 90503 • 213-540-0111

17 responses • 12% judged package and 0% judged vendor outstanding • 5 actively seeking to replace package, with 2 citing unsatisfactory performance as reason.



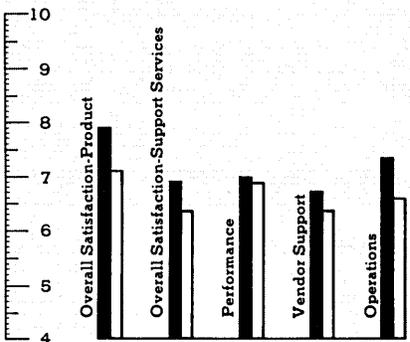
ADR/DATA DICTIONARY • Applied Data Research, Inc., Route 206 & Orchard Road, CN-8, Princeton, NJ 08540 • 201-874-9100

23 responses • 9% judged package and 13% judged vendor outstanding • 0 actively seeking to replace package.



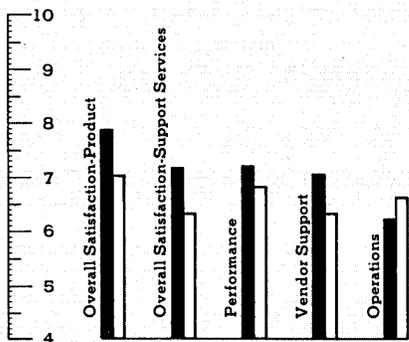
BASIS • Battelle Labs, 505 King Avenue, Columbus, OH 43201 • 614-424-5524

43 responses • 30% judged package and 19% judged vendor outstanding • 4 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



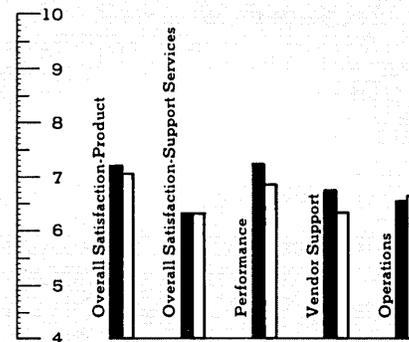
TOOL KIT • DBMS, Inc., 1801-A Mill Street, Naperville, IL 60540 • 312-961-5700

63 responses • 27% judged package and 16% judged vendor outstanding • 0 actively seeking to replace package.



DYL-260 • Dylakor, 17418 Chatsworth Street, P.O. Box 3010, Granada Hills, CA 91344 • 818-366-1781

27 responses • 30% judged package and 15% judged vendor outstanding • 6 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



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With Northern Telecom's unique multi-tasking capability, you can perform a multitude of jobs—simultaneously.

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Rating Values

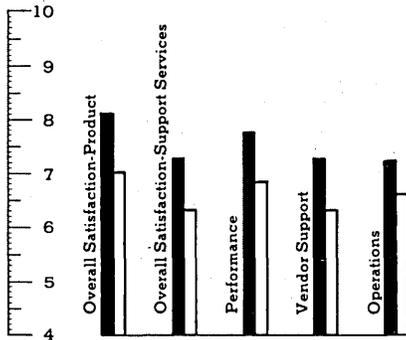
10-9: Superior
8-6: Very Good
5-3: Acceptable
2-1: Inadequate

Legend

■ Specific Product Rating
□ Group Average Rating

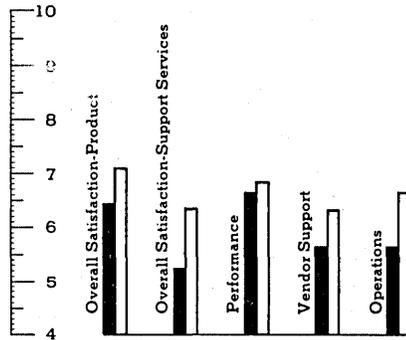
DYL-280 • Dylakor, 17418 Chatsworth Street, P.O. Box 3010, Granada Hills, CA 91344 • 818-366-1781

55 responses • 40% judged package and 15% judged vendor outstanding • 3 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



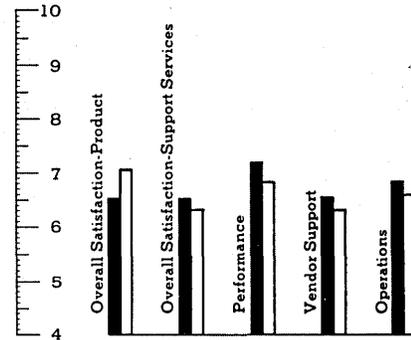
INFO • Henco Software, 100 Fifth Avenue, Waltham, MA 02154 • 617-890-8670

31 responses • 13% judged package and 0% judged vendor outstanding • 4 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



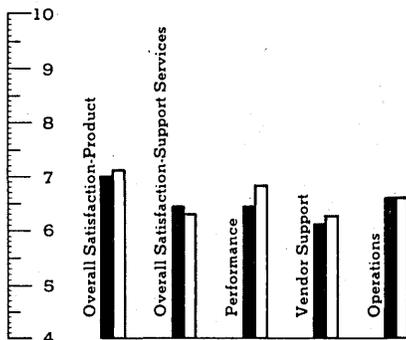
BLIS/COBOL • Information Processing Inc., 1850 Lee Road, Suite 320, Winter Park, FL 32789 • 305-647-2200

15 responses • 20% judged package and 13% judged vendor outstanding • 1 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



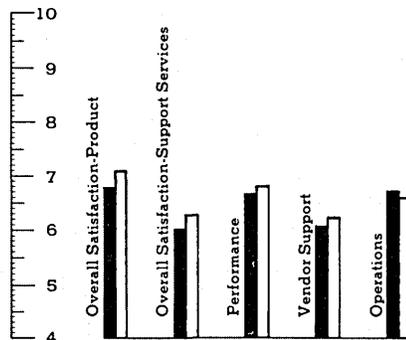
DATAMANAGER • Manager Software Products (MSP), 131 Hartwell Avenue, Lexington, MA 02173 • 617-861-6130

46 responses • 13% judged package and 11% judged vendor outstanding • 4 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



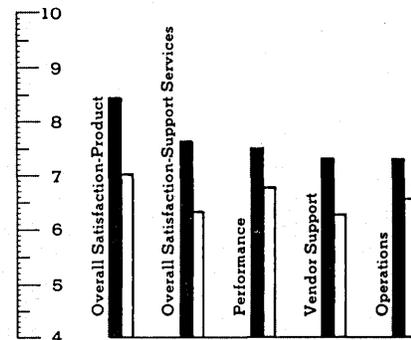
EXTRACTO • Oceanic Information Systems (Optipro), 2197 Leon-Harmel, Quebec City, POQ G1N 4N5 • 418-681-7741

32 responses • 25% judged package and 16% judged vendor outstanding • 6 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



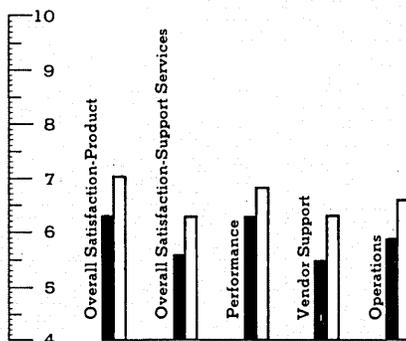
SAS • SAS Institute, SAS Circle, P.O. Box 8000, Cary, NC 27511-8000 • 919-467-8000

66 responses • 50% judged package and 26% judged vendor outstanding • 1 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



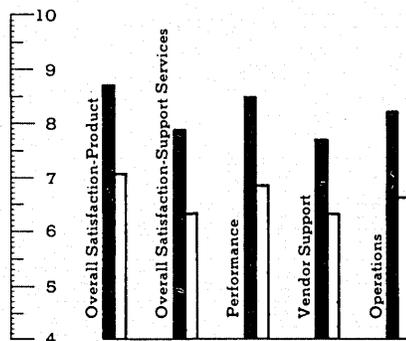
IMS • Sperry Corporation, P.O. Box 500, Blue Bell, PA 19424 • 215-542-4011

42 responses • 12% judged package and 7% judged vendor outstanding • 17 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



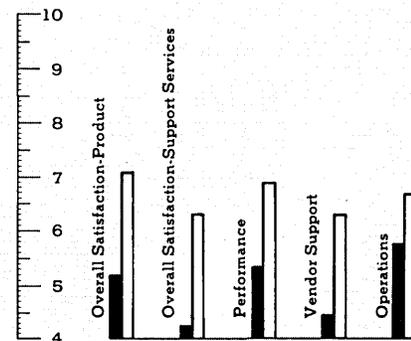
QUIKJOB III • System Support Software, 5230 Springboro Pike, Dayton, OH 45439 • 513-435-9514

19 responses • 68% judged package and 32% judged vendor outstanding • 0 actively seeking to replace package.



DATA CATALOG 2 • TSI Int'l., 187 Danbury Road, Wilton, CT 06987 • 203-853-2884

27 responses • 7% judged package and 0% judged vendor outstanding • 6 actively seeking to replace package, with 3 citing unsatisfactory performance as reason.



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With the BTI 8000, you can support up to 200 interactive terminals, simultaneously running programs in COBOL, Pascal, FORTRAN, and BASIC. Better yet, you can get all this supermini power a chunk at a time. Which means it costs far less than replacing or adding systems to increase performance.

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it, and restart the system. Our powerful operating system automatically reorganizes the remaining resource modules so you're back on-line in minutes.

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So if you've reached a dead-end with your present system, find out more about the supermini with all the power and expandability you could want. A chunk at a time.

BTI8000

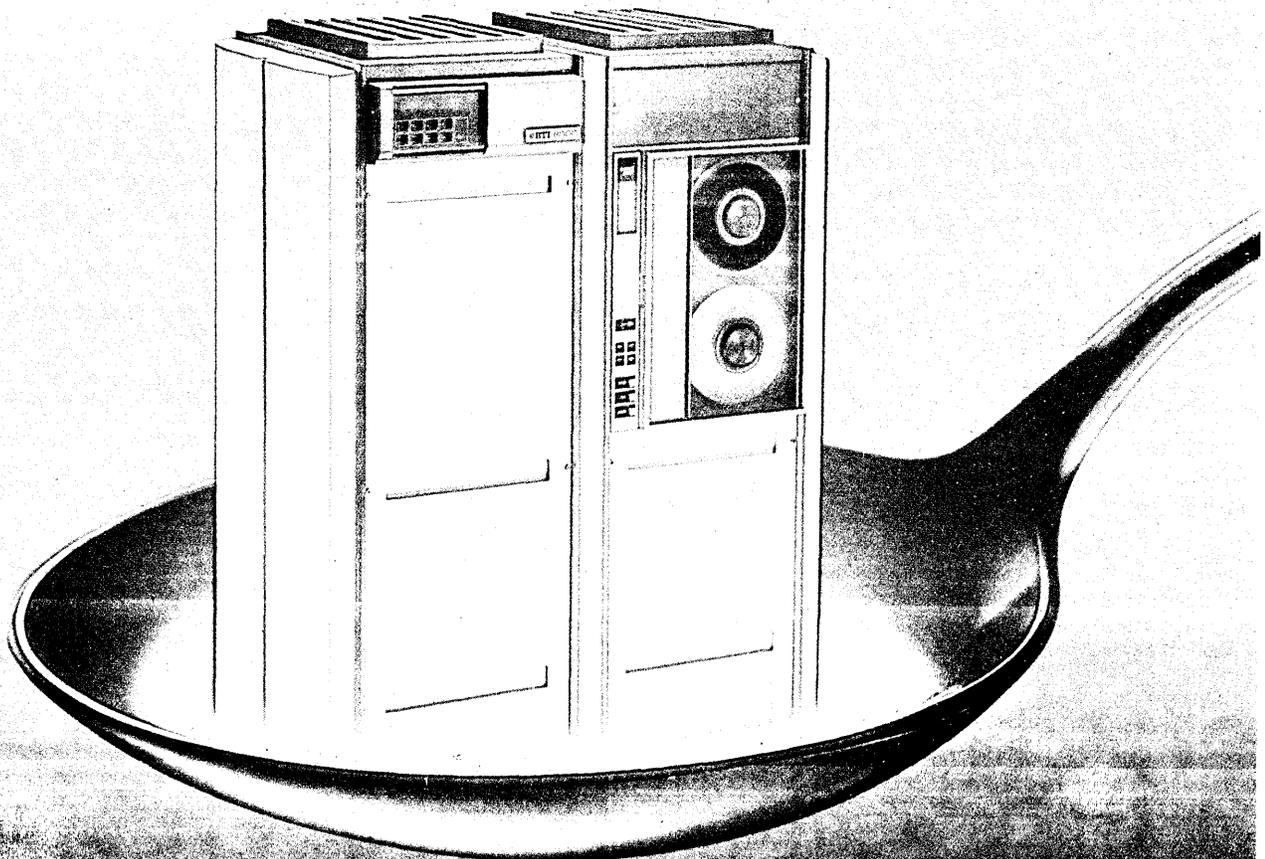
32-bit Multiprocessor System

BTI COMPUTER SYSTEMS

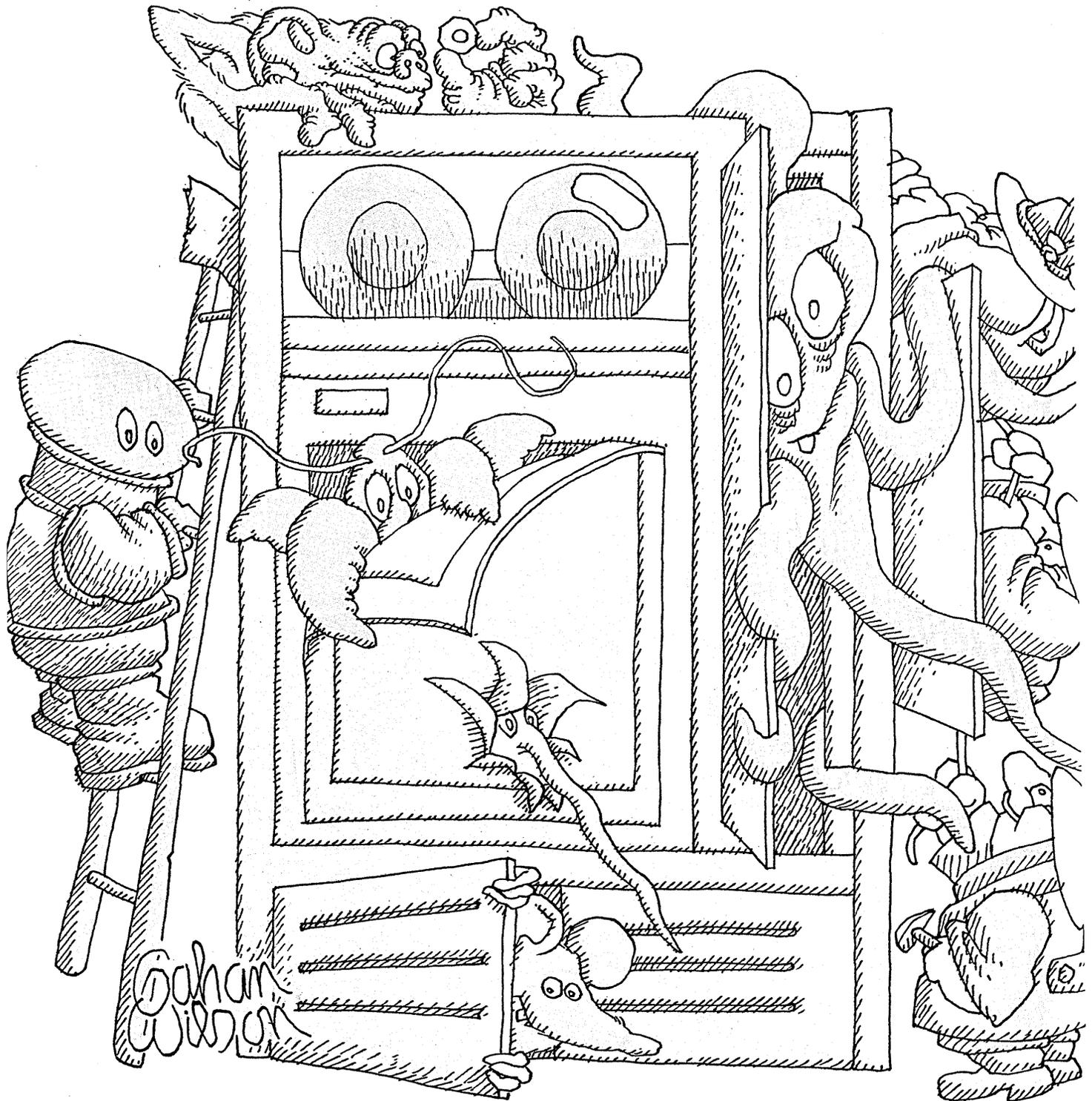
870 West Maude Ave., Sunnyvale,
California 94086 (408) 733-1122

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CIRCLE 52 ON READER CARD



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PROTOCOL. THE END OF THE

YOU KNOW WHO'S MAINFRAME?

This real life nightmare can make any DP manager lose sleep.

You want to give more people access to your corporate mainframe, so they can get the information they need.

Which is nice.

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PCI can show you how to connect virtually any ASCII device to an IBM mainframe. And control mainframe access with positive security.

For example, our PCI protocol converter boxes and PCI-Link add-on communications board both require users to identify themselves with a special password before they can access your host.

That gives you an extra measure of protection.

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FOR MICRO TO MAINFRAME COMMUNICATIONS, NO ONE TALKS TO IBM LIKE PROTOCOL.

There's another reason you know you're secure



Only Protocol Computers offers both protocol converter boxes and add-on communications boards with positive security features to help you control who gets access to your mainframe. And who doesn't.

with PCI. We're the leader in protocol conversion technology.

In 1980, we introduced the first successful protocol converter. And today, more than 9000 PCI boxes are installed worldwide, handling data communications for leading companies in diverse industries. Including aerospace. Oil. Packaged goods. Manufacturing. Banking. And retail.

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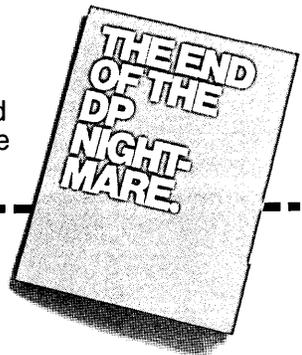
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DP NIGHTMARE.

CIRCLE 53 ON READER CARD

DAT 12/1/84

Rating Values

10-9: Superior
8-6: Very Good

5-3: Acceptable
2-1: Inadequate

Legend

■ Specific Product Rating
□ Group Average Rating

UCC-10 • UCCEL Corporation, UCCEL Tower, Exchange Park, Dallas, TX • 75235 214-353-7533

48 responses • 6% judged package and 6% judged vendor outstanding • 15 actively seeking to replace package, with 3 citing unsatisfactory performance as reason.

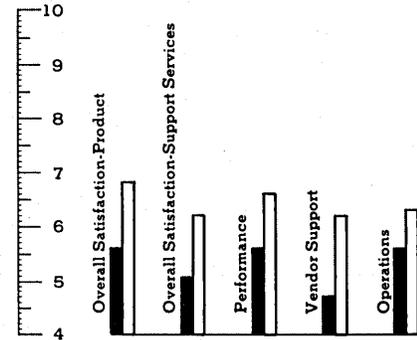
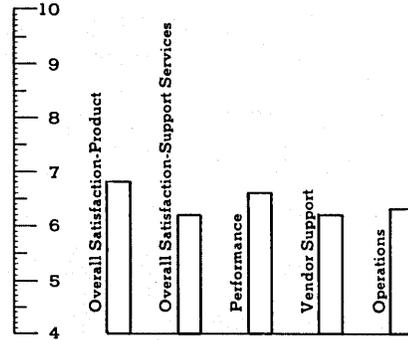
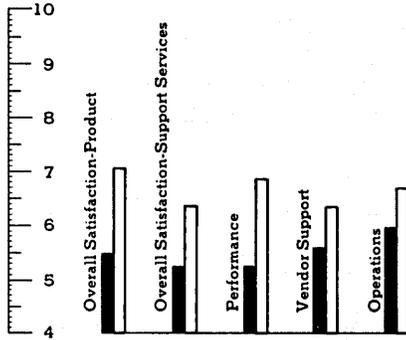
DATABASE MANAGEMENT SYSTEMS

Group Average • 21 packages

792 responses • 19% judged package and 11% judged vendor outstanding • 150 actively seeking to replace package, with 32 citing unsatisfactory performance as reason.

ADR/DATACOM/DB • Applied Data Research, Inc., Route 206 & Orchard Road, CN-8, Princeton, NJ 08540 • 201-874-9100

15 responses • 0% judged package and 0% judged vendor outstanding • 9 actively seeking to replace package, with 2 citing unsatisfactory performance as reason.



TIS • Cincom Systems, 2300 Montana Avenue, Cincinnati, OH 45211 • 513-662-2300

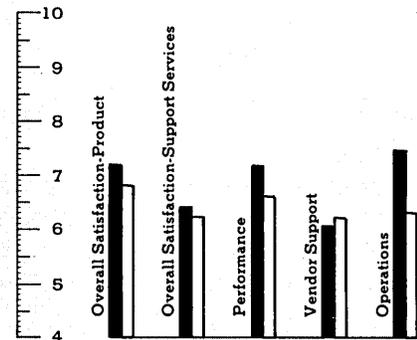
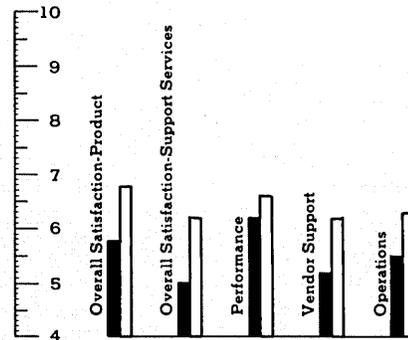
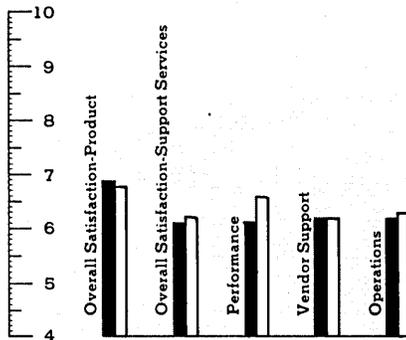
15 responses • 27% judged package and 13% judged vendor outstanding • 1 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.

TOTAL • Cincom Systems, 2300 Montana Avenue, Cincinnati, OH 45211 • 513-662-2300

25 responses • 8% judged package and 8% judged vendor outstanding • 12 actively seeking to replace package, with 2 citing unsatisfactory performance as reason.

MODEL 204 • Computer Corporation of America, 4 Cambridge Center, Cambridge, MA 02142 • 617-492-8860

50 responses • 28% judged package and 12% judged vendor outstanding • 2 actively seeking to replace package, with 2 citing unsatisfactory performance as reason.



IDMS • Cullinet Software, 400 Blue Hill Drive, Westwood, MA 02090 • 617-329-7700

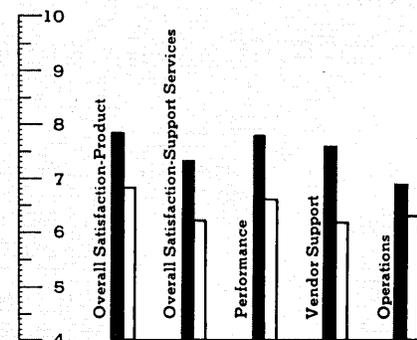
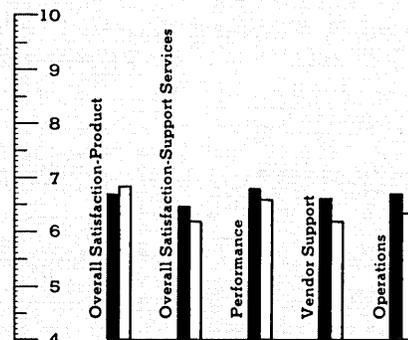
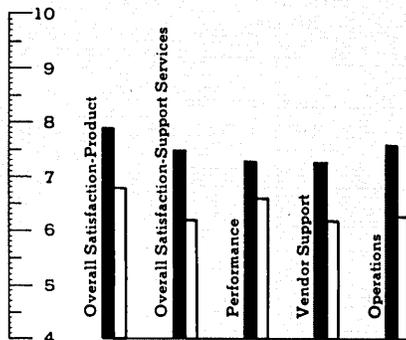
47 responses • 43% judged package and 26% judged vendor outstanding • 1 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.

DEC DBMS • Digital Equipment Corporation, 146 Main Street, Maynard, MA 01754 • 617-897-5111

21 responses • 24% judged package and 5% judged vendor outstanding • 4 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.

IMAGE/3000 • Hewlett-Packard, 3000 Hanover Street, Palo Alto, CA 94304 • 415-857-1501

46 responses • 24% judged package and 26% judged vendor outstanding • 2 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.

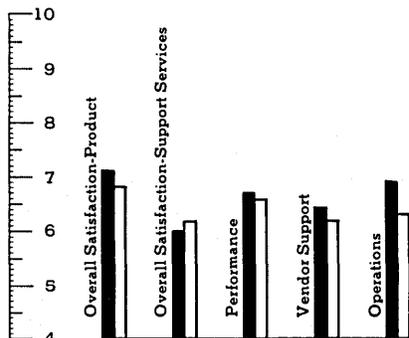


Rating Values
10-9: Superior
8-6: Very Good
5-3: Acceptable
2-1: Inadequate

Legend
 ■ Specific Product Rating
 □ Group Average Rating

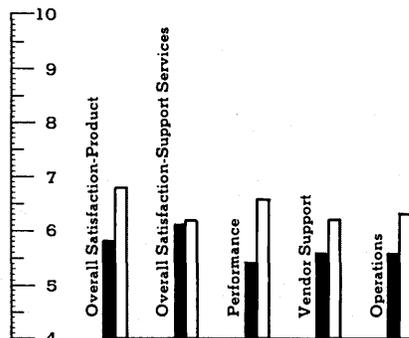
DM-IV • Honeywell Information Systems, 200 Smith Street, Waltham, MA 02154 • 617-870-5200

20 responses • 25% judged package and 5% judged vendor outstanding • 1 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



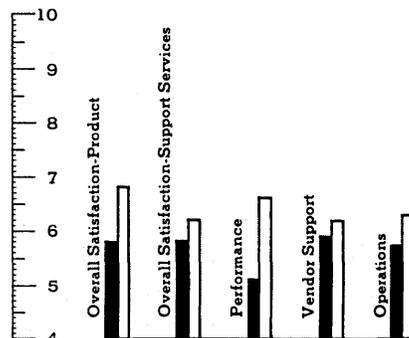
DL/1 • IBM Corporation, National Accounts Division, 1133 Westchester Avenue, White Plains, NY 10604 • 914-696-1900

35 responses • 0% judged package and 9% judged vendor outstanding • 8 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



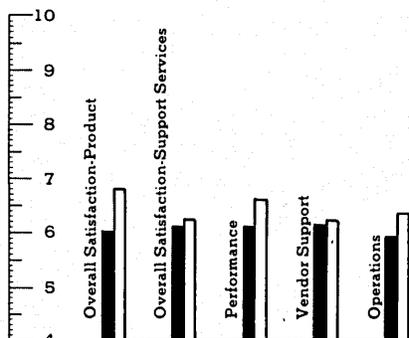
IMS/DB • IBM Corporation, National Accounts Division, 1133 Westchester Avenue, White Plains, NY 10604 • 914-696-1900

25 responses • 0% judged package and 4% judged vendor outstanding • 2 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



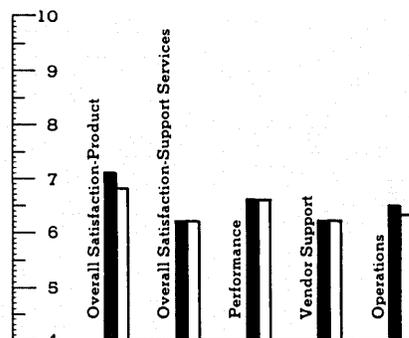
SQL/DS • IBM Corporation, National Accounts Division, 1133 Westchester Avenue, White Plains, NY 10604 • 914-696-1900

36 responses • 11% judged package and 14% judged vendor outstanding • 9 actively seeking to replace package, with 3 citing unsatisfactory performance as reason.



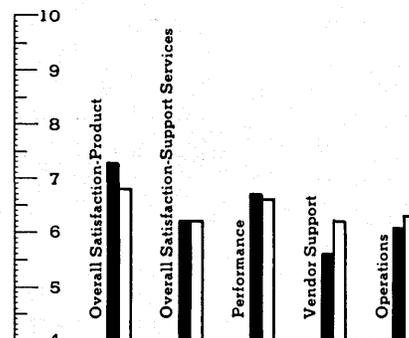
INQUIRE • Infodata Systems, 5205 Leesburg Pike, Falls Church, VA 22041 • 703-578-3430

47 responses • 23% judged package and 6% judged vendor outstanding • 6 actively seeking to replace package, with 2 citing unsatisfactory performance as reason.



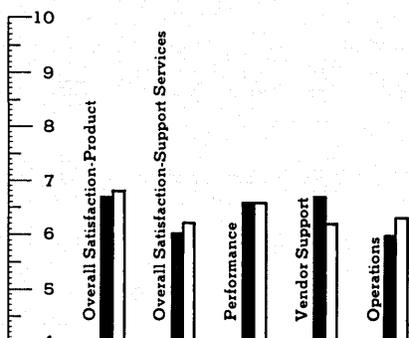
FOCUS • Information Builders, Inc., 1250 Broadway, New York, NY 10001 • 212-736-4433

50 responses • 20% judged package and 4% judged vendor outstanding • 6 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



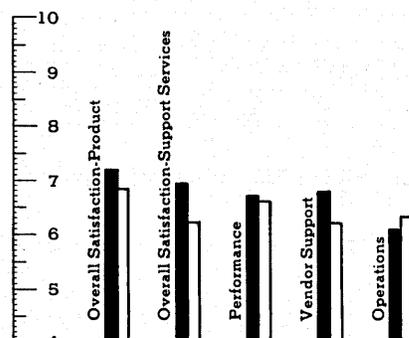
SYSTEM 2000 • Intel Systems Corporation, 12675 Research Boulevard, P.O. Box 9968, Austin, TX 78766 • 512-258-5171

35 responses • 0% judged package and 9% judged vendor outstanding • 6 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



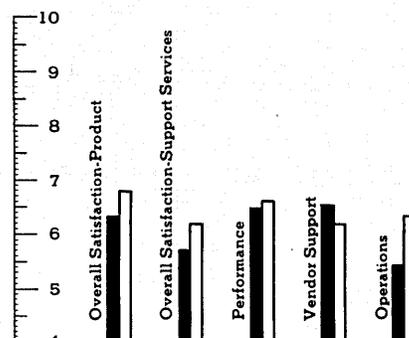
RAMIS II • Mathematica Products Group, P.O. Box 2392, Princeton, NJ 08540 • 609-799-2600

58 responses • 19% judged package and 19% judged vendor outstanding • 3 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



DPL • National Information Systems, 20370 Town Center Lane, Suite 130, Cupertino, CA 95014 • 408-257-7700

29 responses • 7% judged package and 3% judged vendor outstanding • 19 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



Rating Values

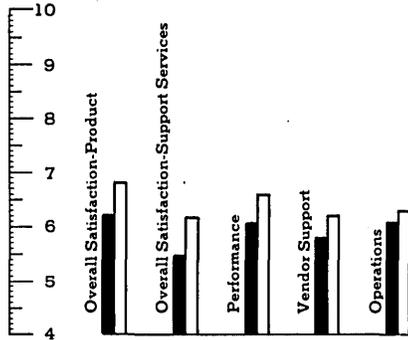
10-9: Superior
8-6: Very Good
5-3: Acceptable
2-1: Inadequate

Legend

■ Specific Product Rating
□ Group Average Rating

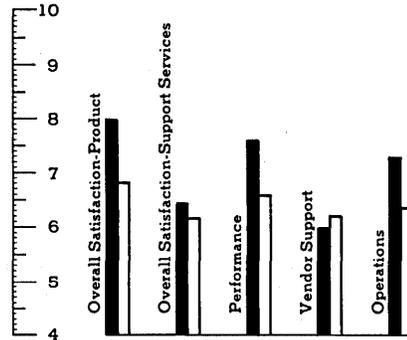
ORACLE • Oracle Corporation, 2710 Sand Hill Road, Menlo Park, CA 94025 • 415-854-7350

50 responses • 12% judged package and 8% judged vendor outstanding • 8 actively seeking to replace package, with 4 citing unsatisfactory performance as reason.



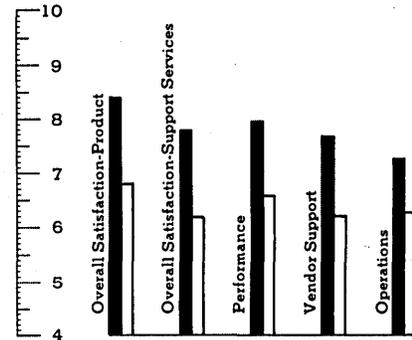
ADABAS • Software AG of North America, 11800 Sunrise Valley Drive, Reston, VA 22091 • 703-860-5050

65 responses • 40% judged package and 8% judged vendor outstanding • 3 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



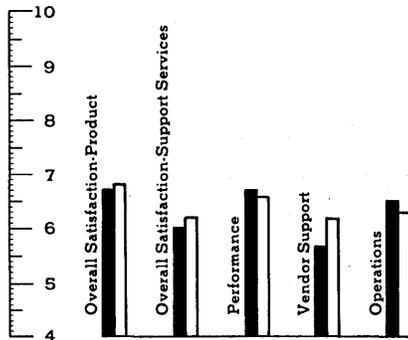
SYSTEM 1022 • Software House, 1105 Massachusetts Avenue, Cambridge, MA 02138 • 617-661-9440

53 responses • 55% judged package and 30% judged vendor outstanding • 12 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



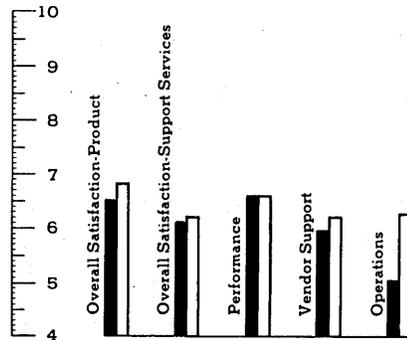
DMS - 1100 • Sperry Corporation, P.O. Box 500, Blue Bell, PA 19424 • 215-542-4011

38 responses • 13% judged package and 8% judged vendor outstanding • 3 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



DATA BASE-PLUS • Tominy, Inc., 4221 Malsbary Road, Building One, Cincinnati, OH 45439 • 513-984-6605

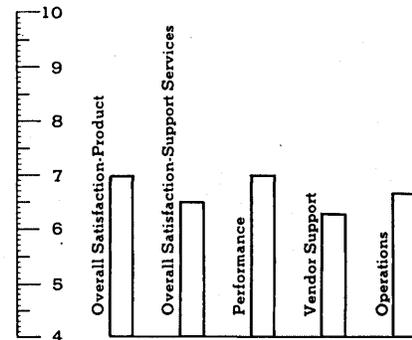
32 responses • 13% judged package and 13% judged vendor outstanding • 6 actively seeking to replace package, with 2 citing unsatisfactory performance as reason.



MONITORING/PERFORMANCE AIDS

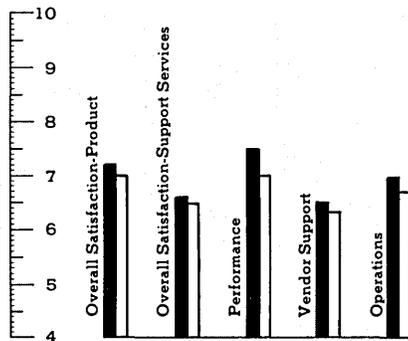
Group Average • 13 packages

504 responses • 24% judged package and 17% judged vendor outstanding • 55 actively seeking to replace package, with 10 citing unsatisfactory performance as reason.



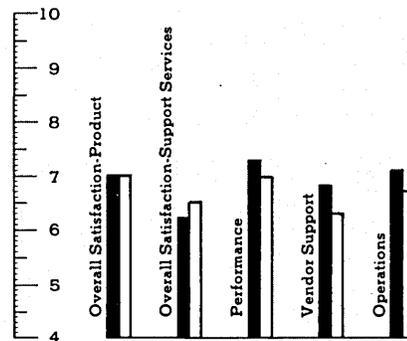
ADR/LOOK • Applied Data Research, Inc., Route 206 & Orchard Road, CN-8, Princeton, NJ 08540 • 201-874-9100

33 responses • 18% judged package and 6% judged vendor outstanding • 4 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



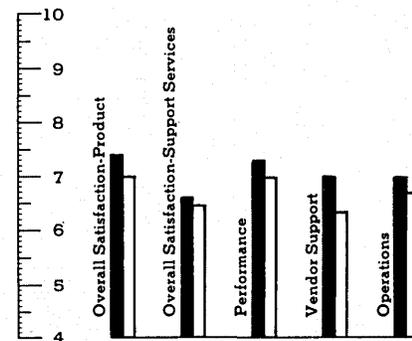
BEST/1 • BGS Systems, Inc., One University Office Park, 29 Sawyer Road, Waltham, MA 02254 • 617-890-0000

47 responses • 23% judged package and 13% judged vendor outstanding • 3 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.

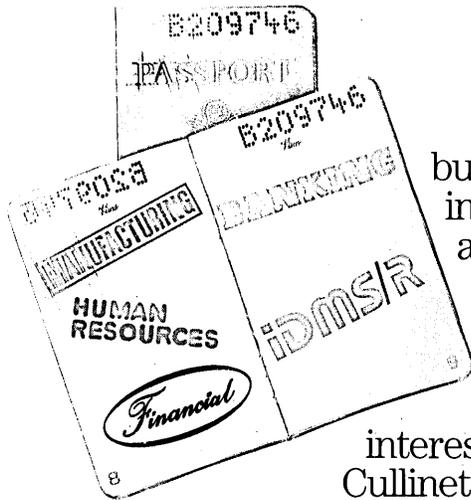


CAPTURE/MVS • BGS Systems, Inc., One University Office Park, 29 Sawyer Road, Waltham, MA 02254 • 617-890-0000

46 responses • 26% judged package and 15% judged vendor outstanding • 5 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



With Cullinet applications, there are no boundaries to what your company can accomplish.



It's an all too common problem. Manufacturing buys an application, and data processing is expected to integrate it with the corporate database. Finance buys an application, and data processing is expected to integrate it, too. And so it goes. Three years later, the job still isn't finished. And the ideal of a *true* data-base management system is still just that—an ideal.

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Cullinet has systems in four application areas—financial, manufacturing, human resources management and banking. Each is a functionally superior product in its own right—which, of course, is a primary concern to the people who use them.

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Cullinet

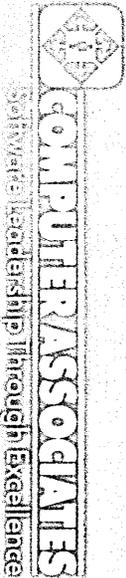
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DMO

Rating Values

10-9: Superior
8-6: Very Good

5-3: Acceptable
2-1: Inadequate

Legend

■ Specific Product Rating
□ Group Average Rating

CMF/MONITOR • Boole & Babbage, Inc., 510 Oakmead Parkway, Sunnyvale, CA 94086 • 408-735-9550

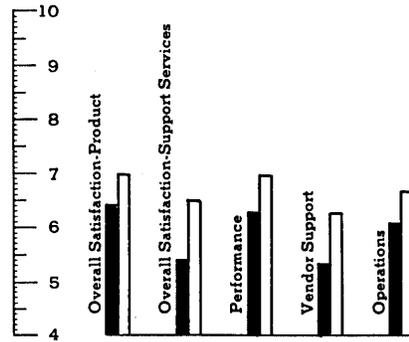
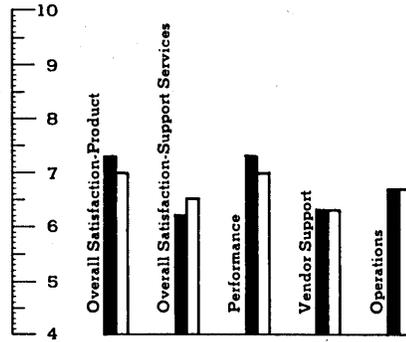
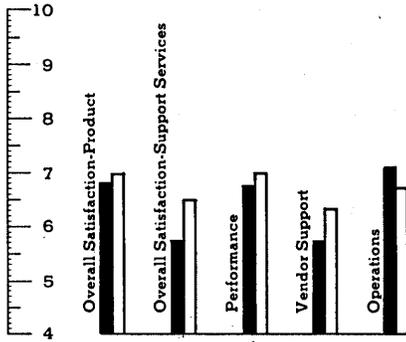
57 responses • 12% judged package and 5% judged vendor outstanding • 8 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.

RESOLVE • Boole & Babbage, Inc., 510 Oakmead Parkway, Sunnyvale, CA 94086 • 408-735-9550

54 responses • 28% judged package and 6% judged vendor outstanding • 9 actively seeking to replace package, with 2 citing unsatisfactory performance as reason.

IMF • Boole & Babbage, Inc., 510 Oakmead Parkway, Sunnyvale, CA 94086 • 408-735-9550

40 responses • 10% judged package and 8% judged vendor outstanding • 7 actively seeking to replace package, with 2 citing unsatisfactory performance as reason.



TSA • Boole & Babbage, Inc., 510 Oakmead Parkway, Sunnyvale, CA 94086 • 408-735-9550

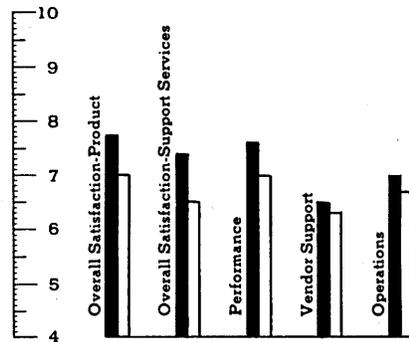
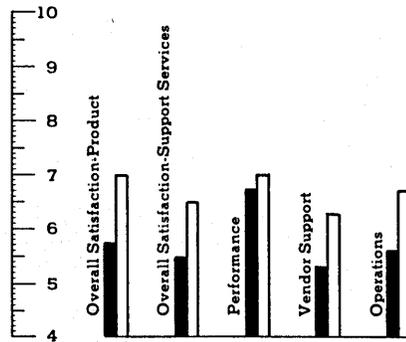
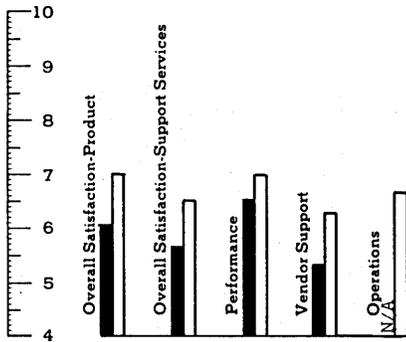
31 responses • 10% judged package and 0% judged vendor outstanding • 4 actively seeking to replace package, with 3 citing unsatisfactory performance as reason.

PPE • Boole & Babbage, Inc., 510 Oakmead Parkway, Sunnyvale, CA 94086 • 408-735-9550

15 responses • 7% judged package and 7% judged vendor outstanding • 2 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.

DEXAN • Candle Corporation, 10880 Wilshire Boulevard, Los Angeles, CA 90024 • 213-207-1400

15 responses • 47% judged package and 33% judged vendor outstanding • 0 actively seeking to replace package.



OMEGAMON • Candle Corporation, 10880 Wilshire Boulevard, Los Angeles, CA 90024 • 213-207-1400

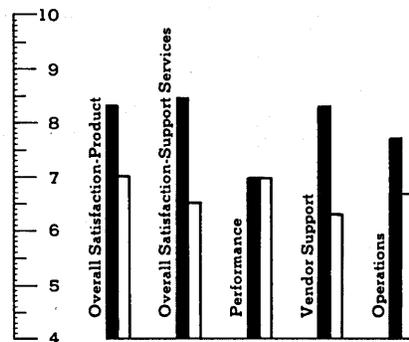
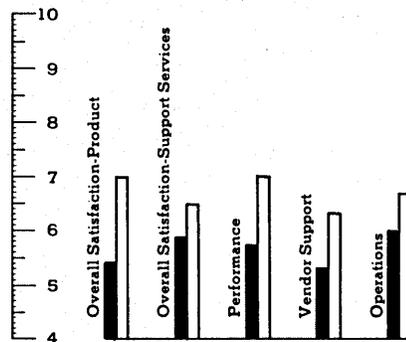
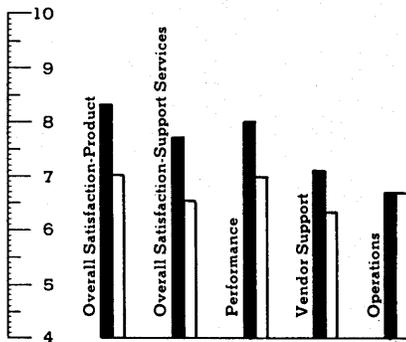
33 responses • 55% judged package and 36% judged vendor outstanding • 2 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.

OCM • Duquesne Systems, Inc., Two Allegheny Center, Pittsburgh, PA 15212 • 412-323-2600

17 responses • 6% judged package and 0% judged vendor outstanding • 8 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.

MICS • Morino Associates, 8615 Westwood Center Drive, Vienna, VA 22180 • 703-734-9494

61 responses • 44% judged package and 51% judged vendor outstanding • 0 actively seeking to replace package.





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In the 1970's we developed a system to provide data independence—before there was such a thing as a relational data base.

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Rating Values

10-9: Superior
8-6: Very Good
5-3: Acceptable
2-1: Inadequate

Legend

■ Specific Product Rating
□ Group Average Rating

TSO/MON • Morino Associates, 8615 Westwood Center Drive, Vienna, VA 22180 • 703-734-9494

55 responses • 29% judged package and 36% judged vendor outstanding • 1 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.

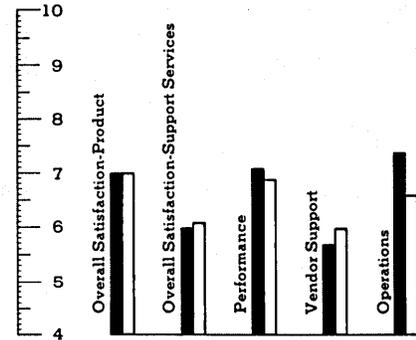
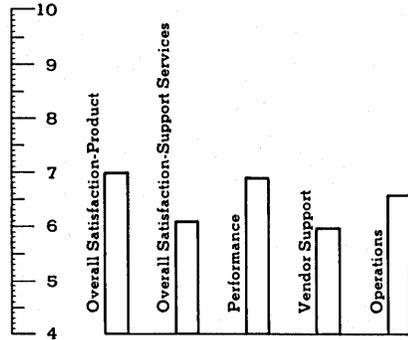
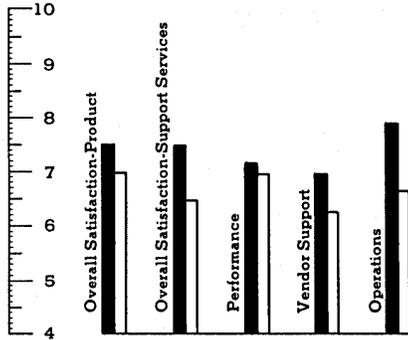
PROGRAM DEVELOPMENT AIDS

Group Average • 17 packages

628 responses • 23% judged package and 12% judged vendor outstanding • 100 actively seeking to replace package, with 19 citing unsatisfactory performance as reason.

CPG • Altergo Products, 400 West Cummings Park, Suite 6900, Woburn, MA 01801 • 617-983-8811

33 responses • 24% judged package and 3% judged vendor outstanding • 8 actively seeking to replace package, with 2 citing unsatisfactory performance as reason.



QUOTA II • Altergo Products, 400 West Cummings Park, Suite 6900, Woburn, MA 01801 • 617-983-8811

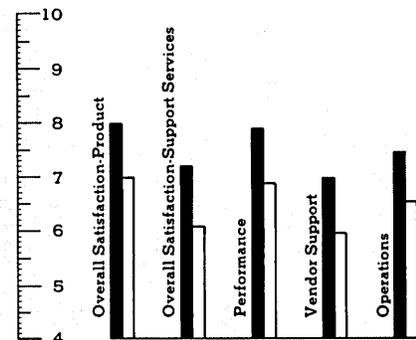
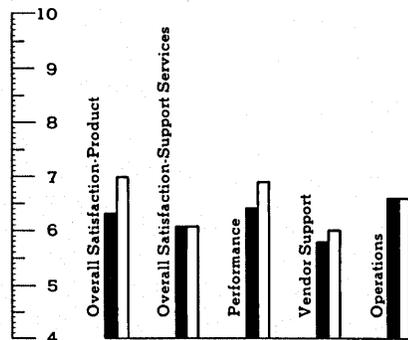
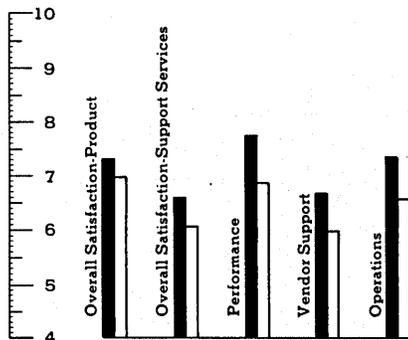
22 responses • 23% judged package and 14% judged vendor outstanding • 8 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.

METACOBOL • Applied Data Research, Inc., Route 206 & Orchard Road, CN-8, Princeton, NJ 08540 • 201-874-9100

33 responses • 15% judged package and 9% judged vendor outstanding • 2 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.

ADR/VOLLIE • Applied Data Research, Inc., Route 206 & Orchard Road, CN-8, Princeton, NJ 08540 • 201-874-9100

57 responses • 30% judged package and 19% judged vendor outstanding • 2 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



MANTIS • Cincom Systems, 2300 Montana Avenue, Cincinnati, OH 45211 • 513-662-2300

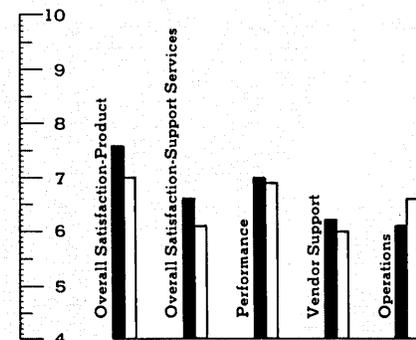
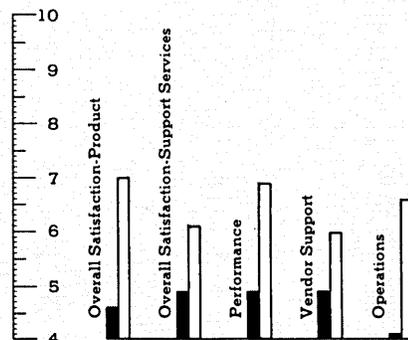
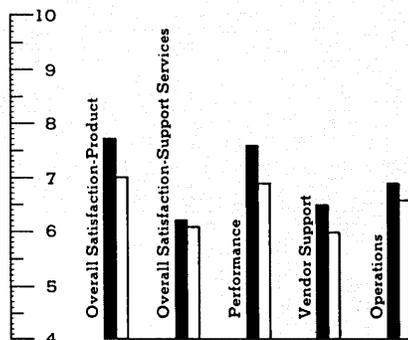
30 responses • 30% judged package and 7% judged vendor outstanding • 4 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.

DMS • IBM Corporation, National Accounts Division, 1133 Westchester Avenue, White Plains, NY 10604 • 914-696-1900

24 responses • 0% judged package and 4% judged vendor outstanding • 11 actively seeking to replace package, with 7 citing unsatisfactory performance as reason.

ISPF • IBM Corporation, National Accounts Division, 1133 Westchester Avenue, White Plains, NY 10604 • 914-696-1900

29 responses • 21% judged package and 17% judged vendor outstanding • 2 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



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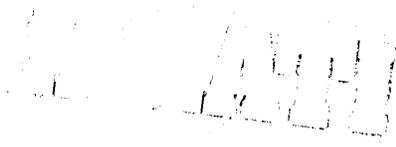
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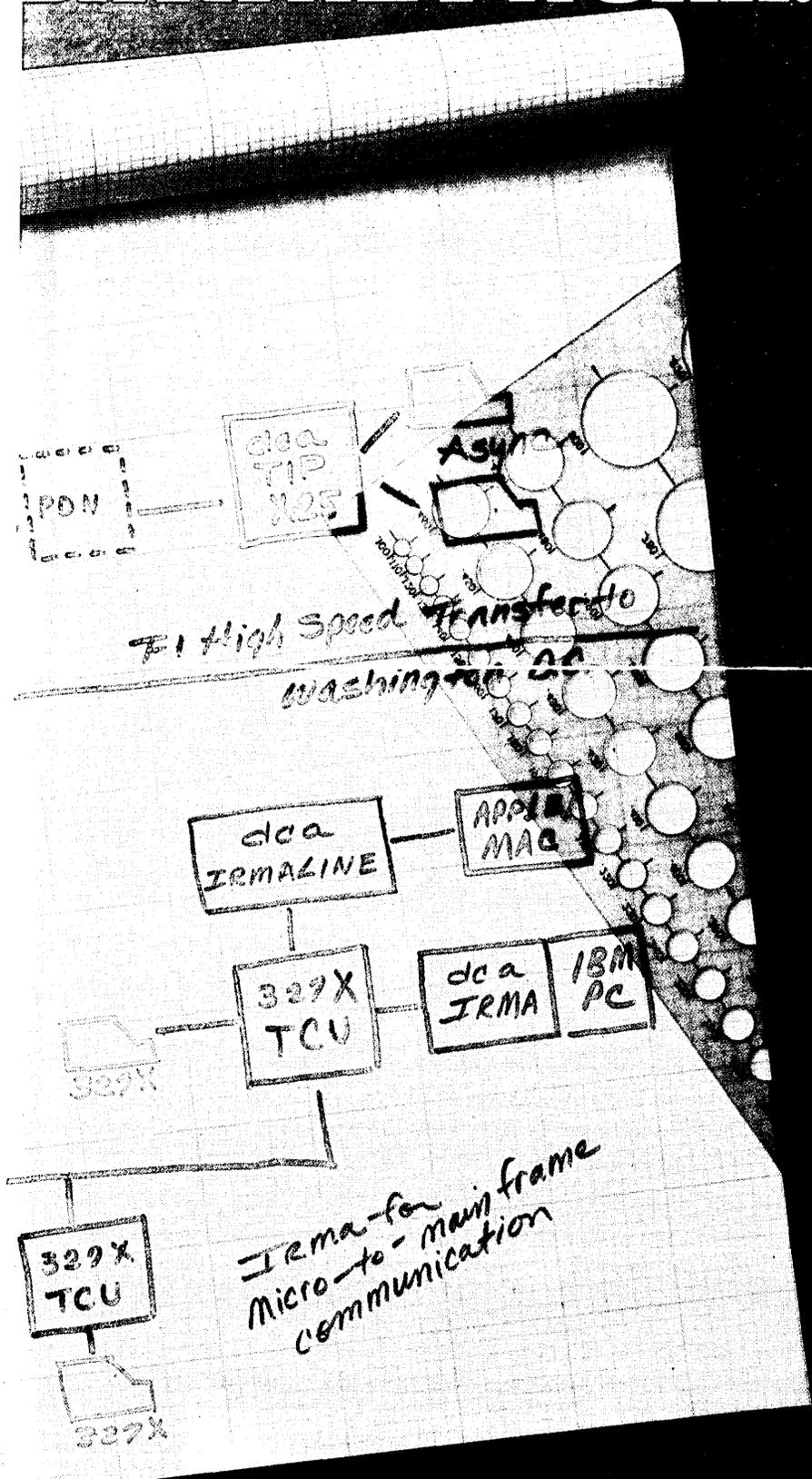
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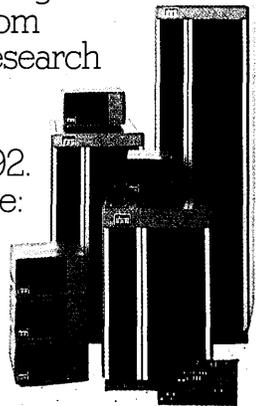
Host selection: With INA, any async terminal in the network can access any host in the network. Including IBM hosts, packet mode hosts and public data networks. And any 327X terminal can access any host running 3270 BSC.

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Rating Values

10-9: Superior
8-6: Very Good

5-3: Acceptable
2-1: Inadequate

Legend

■ Specific Product Rating
□ Group Average Rating

MARK IV • Informatics General Corporation, 21031 Ventura Boulevard, Woodland Hills, CA 91364 • 213-887-9040

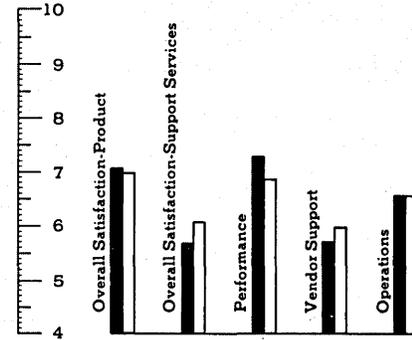
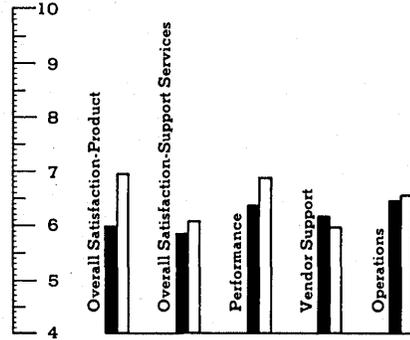
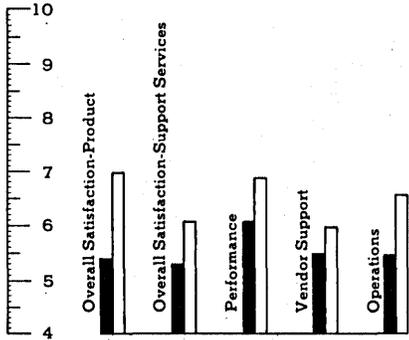
27 responses • 7% judged package and 7% judged vendor outstanding • 11 actively seeking to replace package, with 4 citing unsatisfactory performance as reason.

DATAMACS • Management & Computer Services, Great Valley Corporate Center, Valley Forge, PA 19482 • 215-648-0730

21 responses • 5% judged package and 5% judged vendor outstanding • 1 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.

WYLBUR • On-Line Business Systems, 115 Sansome Street, San Francisco, CA 94104 • 415-391-9555

34 responses • 21% judged package and 9% judged vendor outstanding • 9 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



INTEREST • On-Line Software Int'l., Fort Lee Executive Park, Two Executive Drive, Fort Lee, NJ 07024 • 201-592-0009

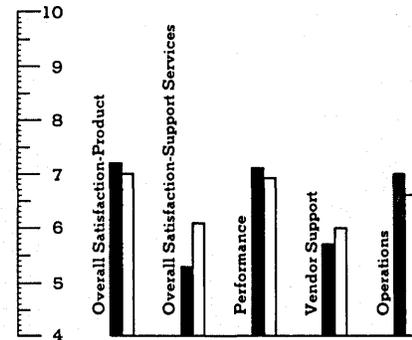
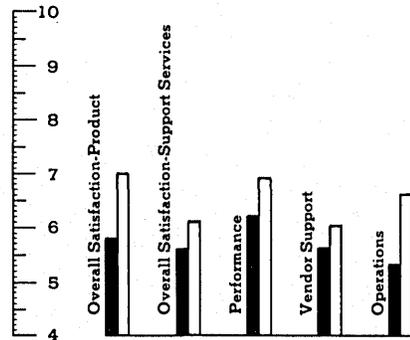
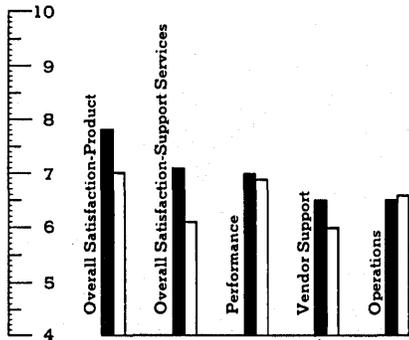
41 responses • 39% judged package and 29% judged vendor outstanding • 1 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.

UFO • Oxford Software, 174 Boulevard, Hasbrouck Heights, NJ 07604 • 201-288-1515

35 responses • 6% judged package and 3% judged vendor outstanding • 8 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.

O-W-L • Pansophic Systems, 709 Enterprise Drive, Oakbrook, IL 60521 • 312-986-2263

49 responses • 29% judged package and 12% judged vendor outstanding • 8 actively seeking to replace package, with 4 citing unsatisfactory performance as reason.



CONDOR • Phoenix Computer Corporation, 11944 Jefferson Boulevard, Culver City, CA 90230 • 213-827-4500

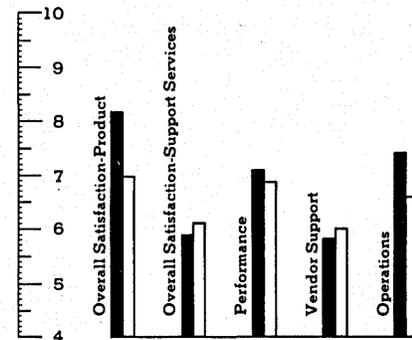
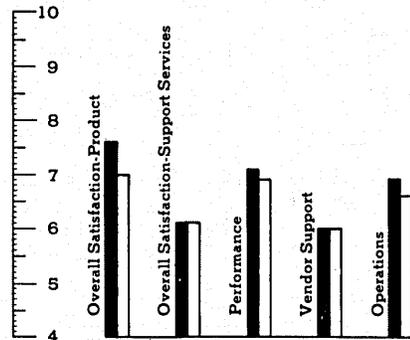
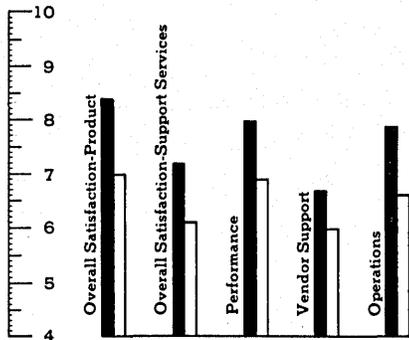
63 responses • 60% judged package and 32% judged vendor outstanding • 4 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.

NATURAL • Software AG of North America, 11800 Sunrise Valley Drive, Reston, VA 22091 • 703-860-5050

68 responses • 25% judged package and 9% judged vendor outstanding • 1 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.

MAPPER • Sperry Corporation, P.O. Box 500, Blue Bell, PA 19424 • 215-542-4011

28 responses • 43% judged package and 11% judged vendor outstanding • 2 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.

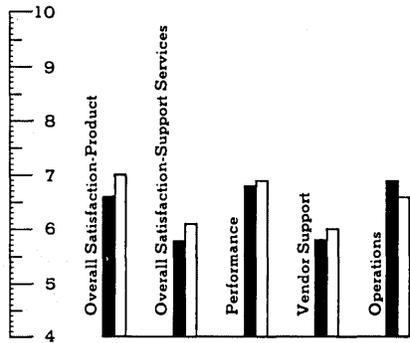


Rating Values
 10-9: Superior
 8-6: Very Good
 5-3: Acceptable
 2-1: Inadequate

Legend
 ■ Specific Product Rating
 □ Group Average Rating

SPEED I • TOM Software, P.O. Box 66596, Seattle, WA 98166 • 206-246-7022

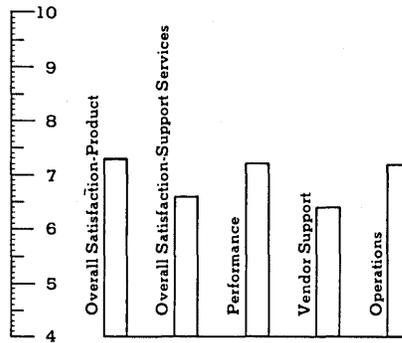
37 responses • 19% judged package and 14% judged vendor outstanding • 3 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



MEDIA CONTROL/RESOURCE MANAGEMENT

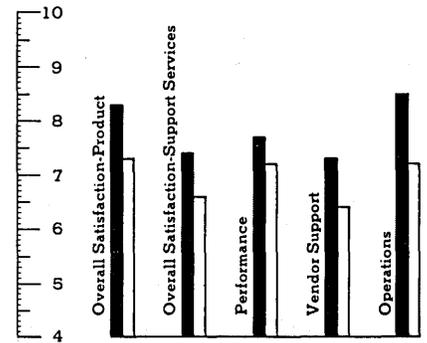
Group Average • 16 packages

738 responses • 26% judged package and 14% judged vendor outstanding • 74 actively seeking to replace package, with 7 citing unsatisfactory performance as reason.



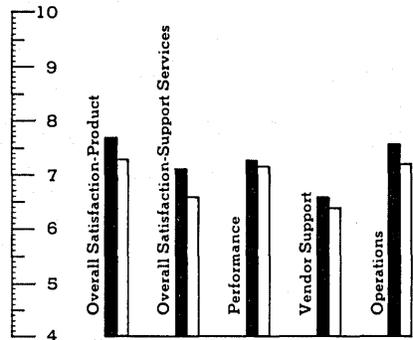
ACF 2 • Cambridge Systems Group, 1333 Lawrence Expressway, Suite 440, Santa Clara, CA 95051 • 415-941-4558

62 responses • 47% judged package and 31% judged vendor outstanding • 2 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



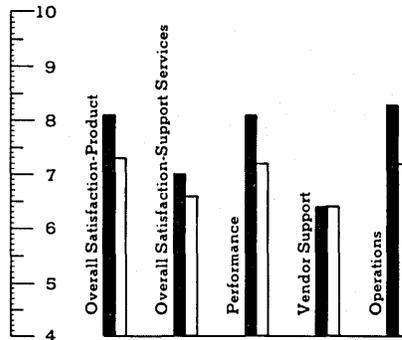
ASM 2 • Cambridge Systems Group, 1333 Lawrence Expressway, Suite 440, Santa Clara, CA 95051 • 415-941-4558

70 responses • 26% judged package and 10% judged vendor outstanding • 9 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



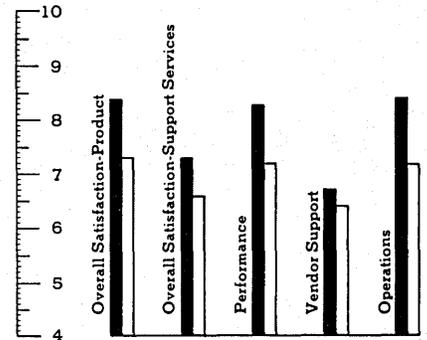
MSM • CGA Computer Inc., 960 Holmdel Road, Holmdel, NJ 07733 • 201-946-8900

46 responses • 39% judged package and 15% judged vendor outstanding • 1 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



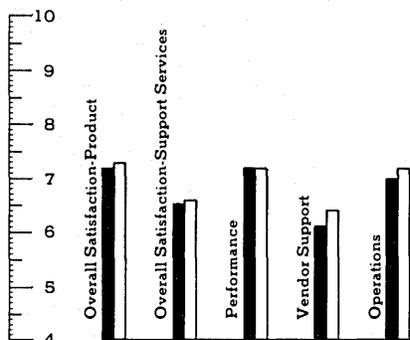
SUPER MSI • CGA Computer Inc., 960 Holmdel Road, Holmdel, NJ 07733 • 201-946-8900

50 responses • 52% judged package and 22% judged vendor outstanding • 4 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



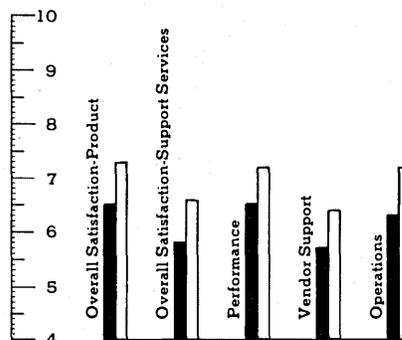
CA-DYNAM/D • Computer Associates Int'l., 70 Jericho Expressway, Jericho, NY 11753 • 516-333-6700

52 responses • 15% judged package and 6% judged vendor outstanding • 6 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



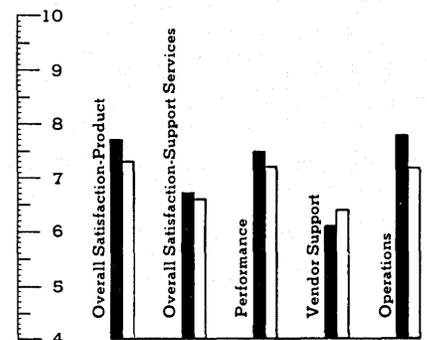
CA-TLMS • Computer Associates Int'l., 70 Jericho Expressway, Jericho, NY 11753 • 516-333-6700

35 responses • 14% judged package and 6% judged vendor outstanding • 4 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



CA-DYNAM/FI • Computer Associates Int'l., 70 Jericho Expressway, Jericho, NY 11753 • 516-333-6700

30 responses • 33% judged package and 20% judged vendor outstanding • 4 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



Oddly enough, most offices
are better equipped for the future than
the people who will create it.



The MIT Museum

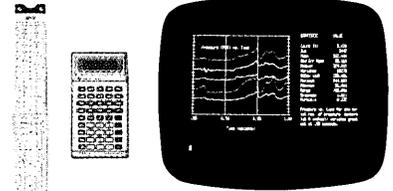
According to recent reports, this last year, businesses spent over \$10.5 billion successfully automating America's offices.

Meanwhile, do you realize what many of the scientists and engineers are using to design and develop America's new products?

Hand calculators.

Which is just preposterous.

Especially now that there's computer-aided analysis software designed specifically to do what all technical professionals spend most of their time doing: analyzing data.



The evolution of scientific tools.

It's called RS/1™. And it's from BBN Software Products Corporation.

RS/1 is fully capable of making technical professionals 4-5 times more productive. Which in turn, will allow them to create considerably better, considerably more reliable new products. In a fraction of the time it now takes.

And it will do so without turning them into hackers. RS/1 works like a research assistant. Not a computer.

Lest you doubt the significance of RS/1, we would hasten to point out that a single copy of RS/1 running on a single computer has already saved one company over \$7 million. In one plant. In one year. Without any additional investment in new equipment. They did it simply by allowing their technical professionals to explore alternatives they never had the time to before.

And if you think RS/1 may be something you should look into in the future, you should know that many leaders in American industry are already using it to get their new products out into the marketplace faster.

Don't expect them to tell you about it, though. They'd just as soon you continue spending your money only on getting your letters out faster.

For information on RS/1, call toll-free 1-800-251-1717.



This one's for the VAX and PDP-11.



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CIRCLE 59 ON READER CARD

Rating Values

10-9: Superior
8-6: Very Good

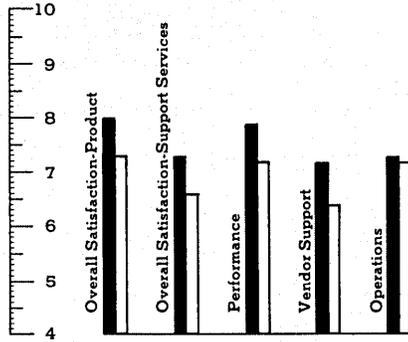
5-3: Acceptable
2-1: Inadequate

Legend

■ Specific Product Rating
□ Group Average Rating

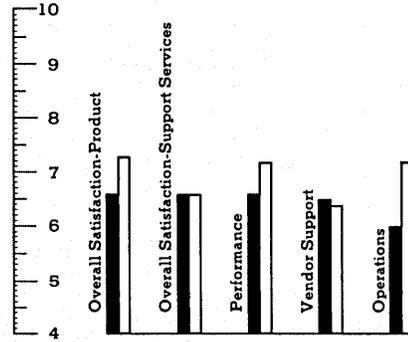
SYSTEM/MANAGER • Corodale Systems, 211 Congress Street, Boston, MA 02110 • 617-426-8780

64 responses • 44% judged package and 27% judged vendor outstanding • 5 actively seeking to replace package, with 2 citing unsatisfactory performance as reason.



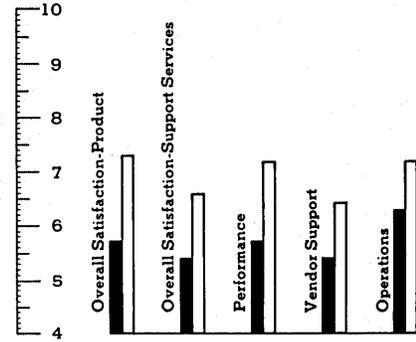
PANAUDIT • Pansophic Systems, 709 Enterprise Drive, Oakbrook, IL 60521 • 312-986-2263

30 responses • 13% judged package and 13% judged vendor outstanding • 1 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



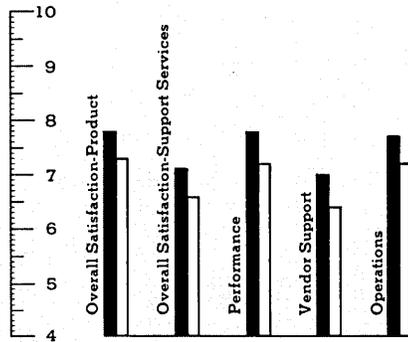
PANEXEC • Pansophic Systems, 709 Enterprise Drive, Oakbrook, IL 60521 • 312-986-2263

32 responses • 3% judged package and 6% judged vendor outstanding • 5 actively seeking to replace package, with 2 citing unsatisfactory performance as reason.



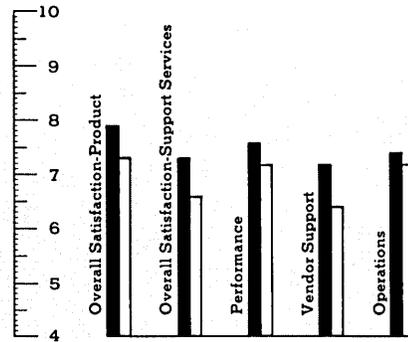
EPAT • SDI, Inc., 1700 South El Camino Real, P.O. Box 5801, San Mateo, CA 94402 • 405-572-1200

60 responses • 42% judged package and 22% judged vendor outstanding • 12 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



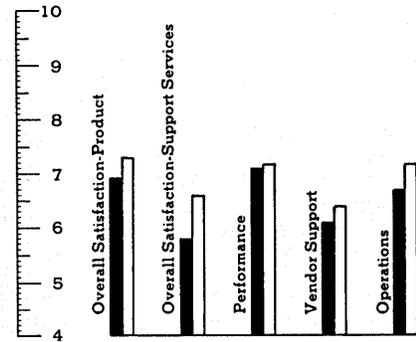
DMS/OS • Sterling Software Marketing, Crocker Bank Building, Suite 500, 1007 Seventh Street, Sacramento, CA 95814 • 916-441-7234

63 responses • 32% judged package and 18% judged vendor outstanding • 2 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



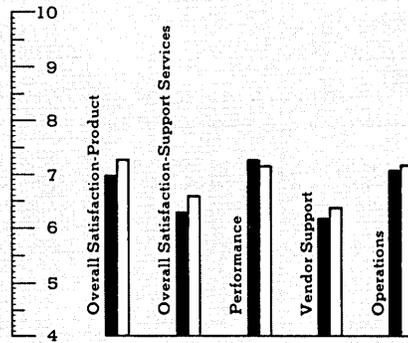
DFAST • Tower Systems Int'l., 19782 MacArthur Boulevard, Suite 365, Irvine, CA 92715 • 714-752-8263

35 responses • 20% judged package and 17% judged vendor outstanding • 7 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



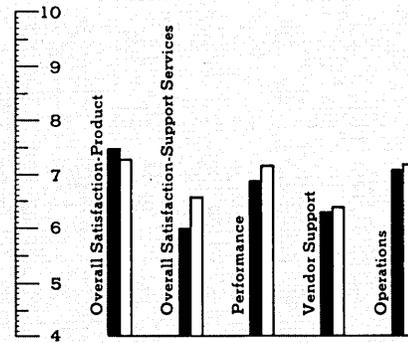
TFAST • Tower Systems Int'l., 19782 MacArthur Boulevard, Suite 365, Irvine, CA 92715 • 714-752-8263

33 responses • 9% judged package and 6% judged vendor outstanding • 4 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



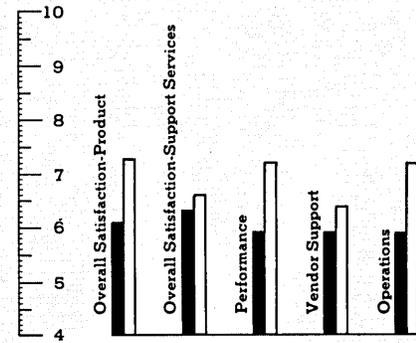
UCC-1 • UCCEL Corporation, UCCEL Tower, Exchange Park, Dallas, TX 75235 • 214-353-7533

38 responses • 21% judged package and 0% judged vendor outstanding • 1 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



UCC-3 • UCCEL Corporation, UCCEL Tower, Exchange Park, Dallas, TX 75235 • 214-353-7533

38 responses • 5% judged package and 5% judged vendor outstanding • 5 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



SURELY IT WILL
COME TO PASS...

THOU SHALT HAVE
NO OTHER O.S.
BEFORE S1

THOU SHALT NOT
TAKE THE NAME S1
IN VAIN

THOU SHALT NOT
grep

THOU SHALT NOT
sag

NEITHER SHALT
THOU ratfor

THOU SHALT NOT
MAKE THEE
ANY uux

NEITHER SHALT
THOU scd

THOU SHALT NOT
DESIRE xargs

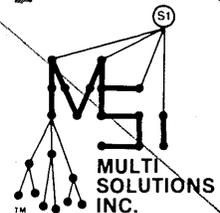
THOU SHALT NOT
BEAR FALSE yacc

THOU SHALT NOT
COMMIT shmop

TM
S1 THE NEXT
WORLD STANDARD
OPERATING SYSTEM

- MULTIUSER, MULTITASKING PER USER
- TASKING, EVENTS, GATES
- NETWORKING: Remote Logon, Distributed File System, Intermachine Communications
- FULL SCREEN MANAGEMENT: Windowing, Bit-Mapped Displays
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- SUPPORTS ALL FORMS OF MEMORY MANAGEMENT, Including Virtual Memory - But Not Required
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- COMPLETELY UNIFORM AND COMPATIBLE ACROSS ALL VERSIONS OF ALL HARDWARE FOR ALL USERS, ALL PROGRAMMERS AND ALL APPLICATIONS

ONLY S1 VENDORS & USERS
WILL SURVIVE THE NEXT REVELATION

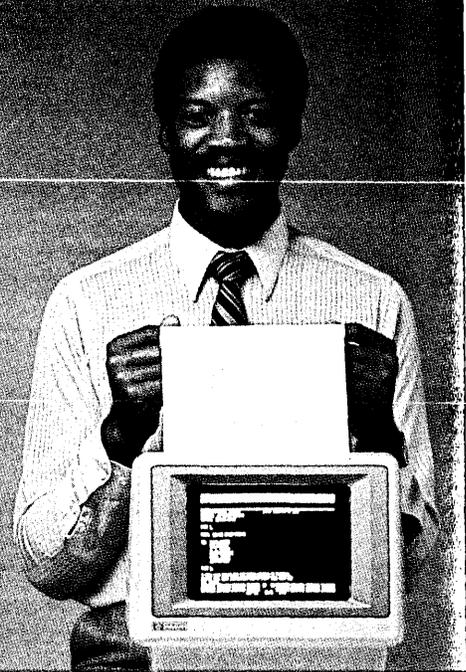
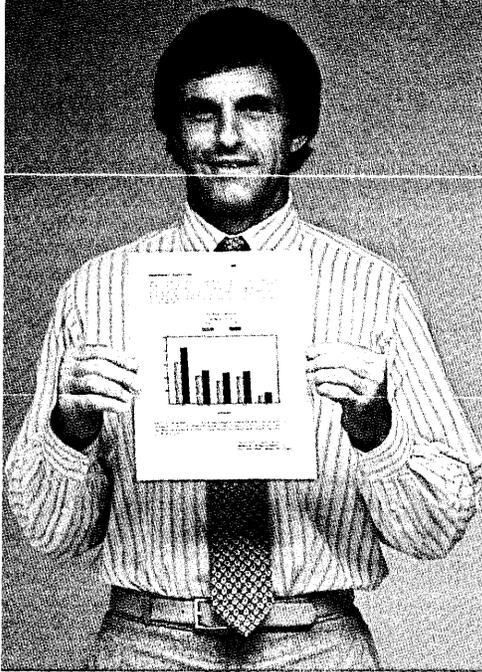


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Our Personal Productivity Center is the single solution for both the office automation and data processing sides of your company. Built around the powerful HP 3000 computer family, it integrates the information your people need to work more productively.

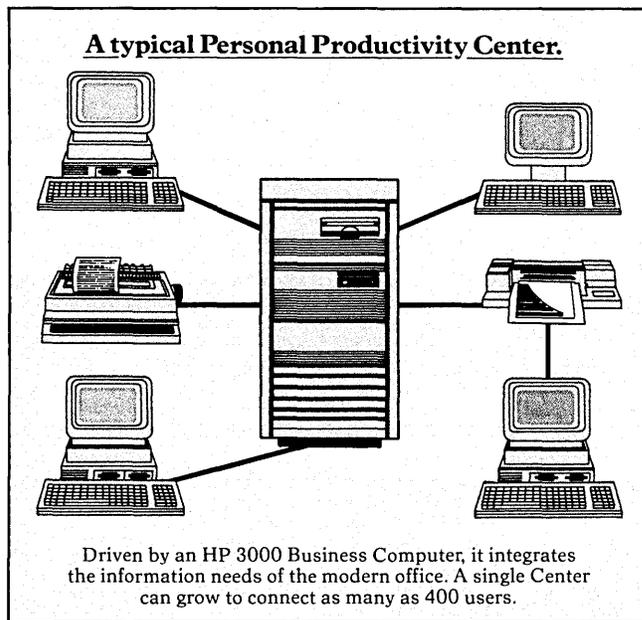
The HP 3000 provides an interface

for a wide variety of workstations, peripherals and personal computers, including our Touchscreen Personal Computer and

and The Portable, as well as IBM PCs. That way, you can use the built-in capabilities of the personal computer and also interact with the powerful HP 3000, without having to learn DP commands.

You can do word processing, report writing, business graphics, spread sheet analysis, and

all the other functions of office automation. You can send electronic mail and integrate text with graphics. Then,



Driven by an HP 3000 Business Computer, it integrates the information needs of the modern office. A single Center can grow to connect as many as 400 users.

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PACKARD**

BD02431

Rating Values

10-9: Superior
8-6: Very Good

5-3: Acceptable
2-1: Inadequate

Legend

■ Specific Product Rating
□ Group Average Rating

QUERY/REPORT WRITERS

Group Average • 11 packages

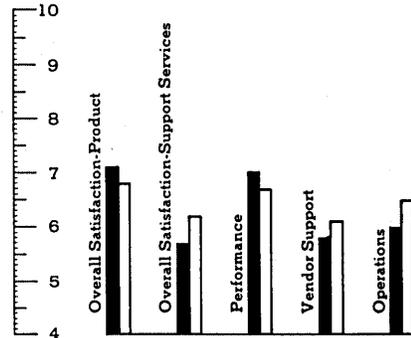
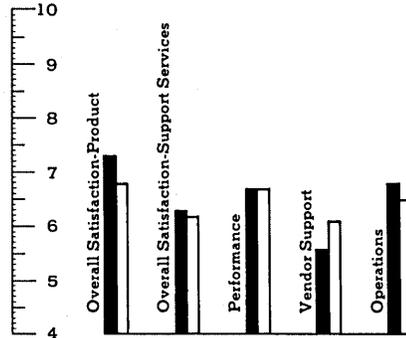
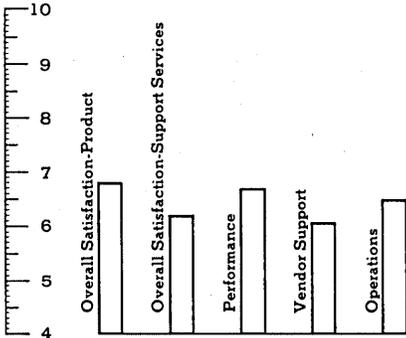
369 responses • 21% judged package and 9% judged vendor outstanding • 41 actively seeking to replace package, with 7 citing unsatisfactory performance as reason.

ADR/DATAQUERY • Applied Data Research, Inc., Route 206 & Orchard Road, CN-8, Princeton, NJ 08540 • 201-874-9100

17 responses • 35% judged package and 12% judged vendor outstanding • 1 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.

CA-EARL • Computer Associates Int'l, 70 Jericho Expressway, Jericho, NY 11753 • 516-333-6700

17 responses • 12% judged package and 6% judged vendor outstanding • 2 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



EDP-AUDITOR • Cullinet Software, 400 Blue Hill Drive, Westwood, MA 02090 • 617-329-7700

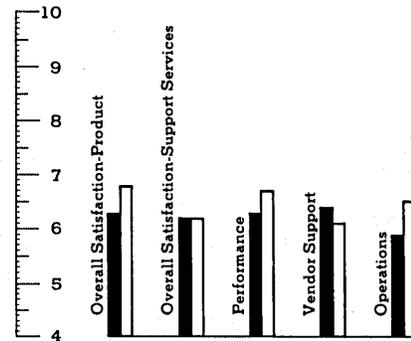
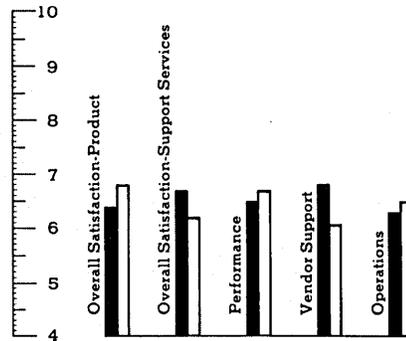
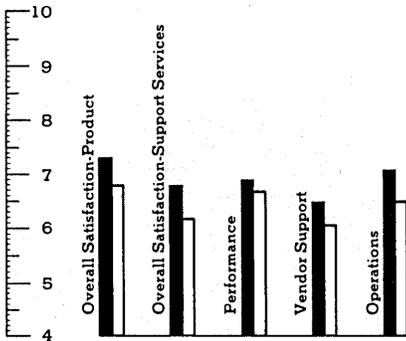
16 responses • 25% judged package and 6% judged vendor outstanding • 1 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.

CULPRIT • Cullinet Software, 400 Blue Hill Drive, Westwood, MA 02090 • 617-329-7700

47 responses • 9% judged package and 15% judged vendor outstanding • 3 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.

DATATRIEVE • Digital Equipment Corporation, 146 Main Street, Maynard, MA 01754 • 617-897-5111

40 responses • 10% judged package and 5% judged vendor outstanding • 2 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



KEYFAST • H&M Systems Software, 351 Evelyn Street, Paramus, NJ 07652 • 201-599-9111

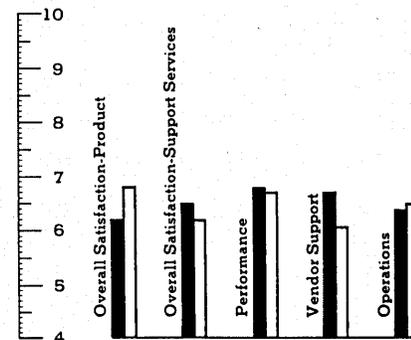
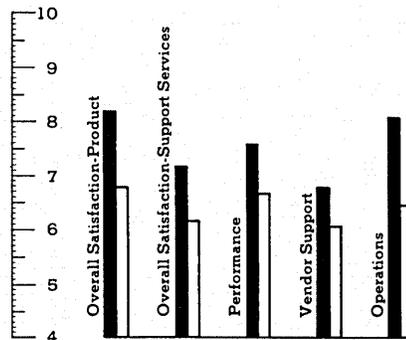
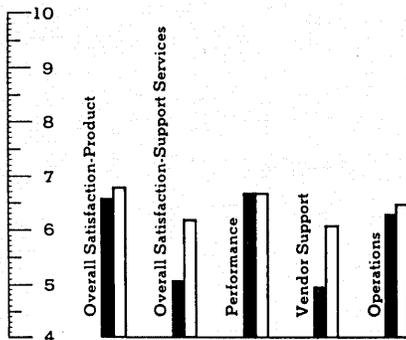
45 responses • 20% judged package and 9% judged vendor outstanding • 4 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.

OMNI • Haverly Systems, 78 Broadway, P.O. Box 919, Denville, NJ 07834 • 201-627-1424

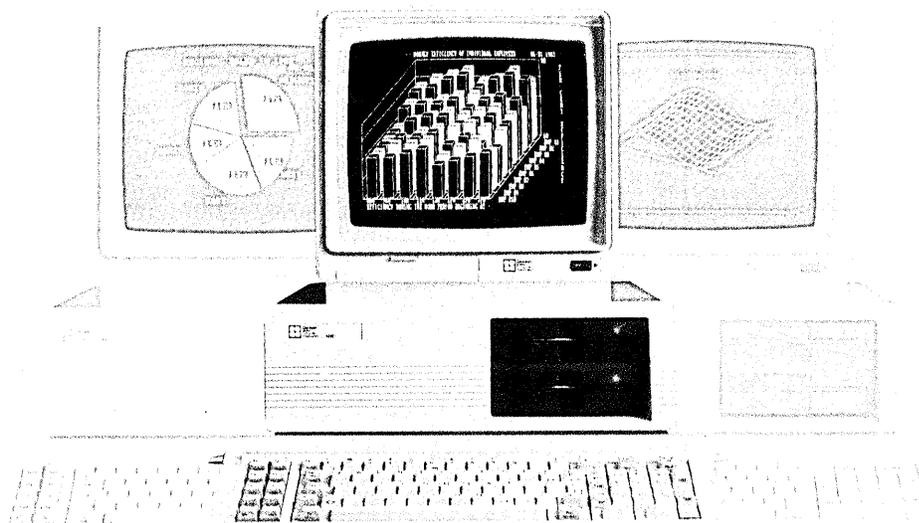
33 responses • 52% judged package and 15% judged vendor outstanding • 2 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.

QUERY/3000 • Hewlett-Packard, 3000 Hanover Street, Palo Alto, CA 94304 • 415-857-1501

43 responses • 9% judged package and 9% judged vendor outstanding • 11 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



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THE NEWEST CRT TERMINAL FOR THE IBM/34/36/38 IS A PERSONAL COMPUTER, TOO.

One machine. Two separate functions. A multi-feature work station for easy access to your System/34/36 or /38. And your own personal computer which runs programs from the IBM Personal Computer software library.

The Decision Data Computing Work Station combines the power of on-line computing with the freedom of independent processing. For less cost. And in less space.

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let you enter or retrieve up to 78 characters each —with a single key stroke, cutting down on repetitive typing.

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- I want to know more now. I'll phone **(800) 523-6529**. In PA call (215) 757-3322.

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Telephone _____

Address _____

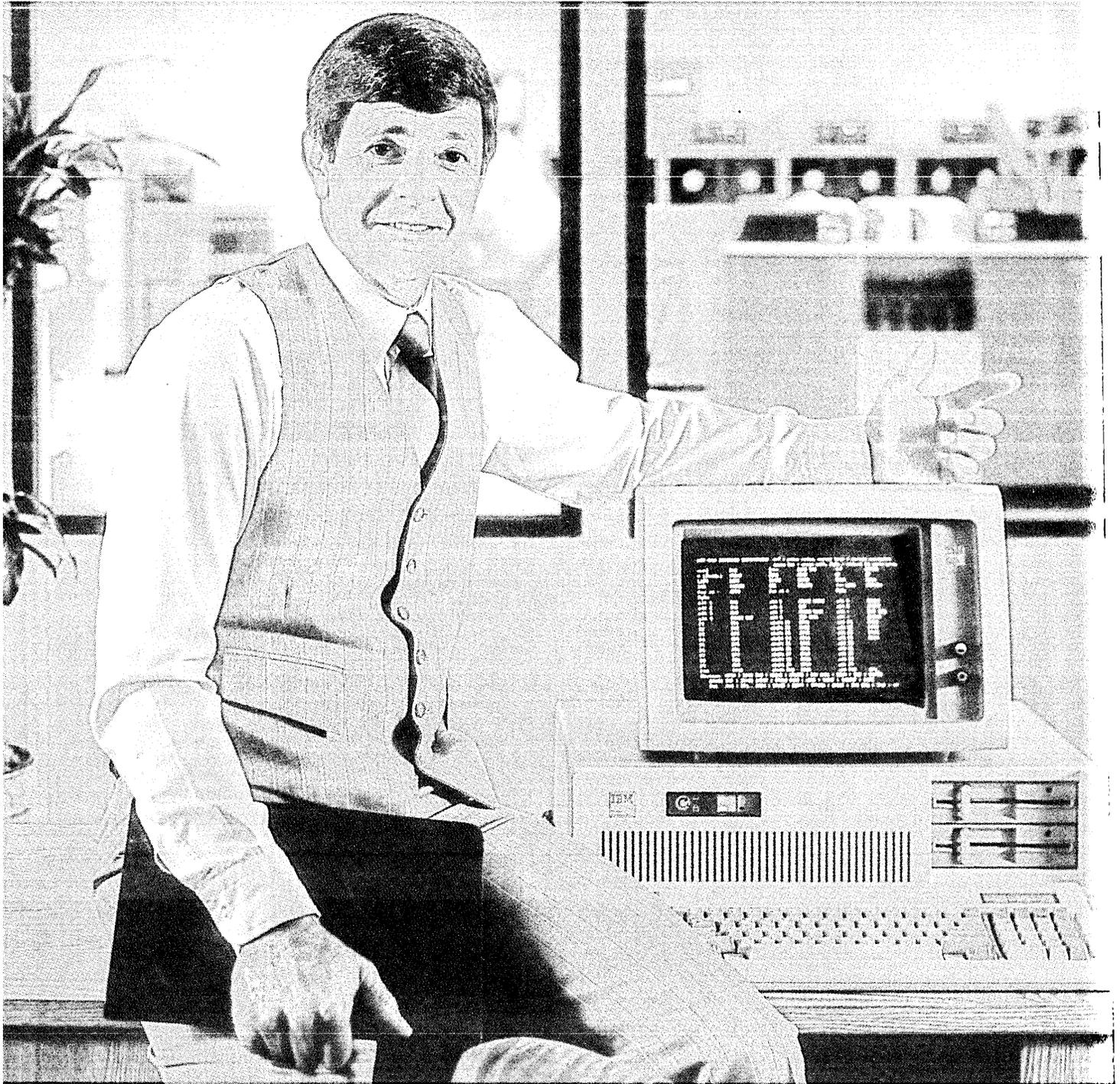
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State _____

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DECIDEDLY BETTER

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Today, I'm solving a complex problem for our Director of Marketing. He's opening up seventeen new field sales offices and wants to link them to our host at headquarters. Now, at the same time, we're looking to convert our communication network from BSC to SNA. Here, AST really protects my hardware investment.

You see, they have SNA and BSC products with the same hardware. I can go with AST-BSC™ today, then just load another disk to upgrade to AST-SNA™. And with AST's plug-in cards, PCs can emulate 3274/6 controllers, 3278-2 or 3279-2A terminals, even 3287 printers.

Using PCs in the field sales offices gives us the flexibility of local PC processing power, and the benefit of concurrent processing, since we can use DOS functions while continuing to maintain the mainframe link. It's certainly a major money-saver—a really smart alternative to dumb terminals.

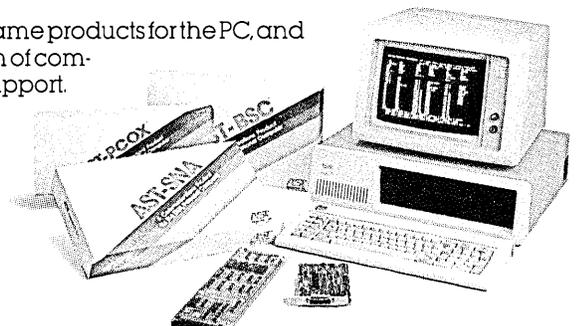
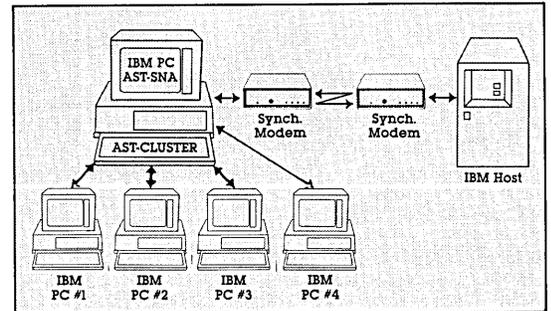
We expect those new sales offices to grow rapidly. When they do, I'll be adding AST cluster functions so we can use PCs, and VT-100™ or compatible terminals in our configuration. All of them can communicate to headquarters over a shared phone line to reduce our telecommunications costs.

Meeting the challenge of change is a key part of my job. AST always has the products to help me. Like LANs to tie all PCs—including ATs and PCjr's together. There's also an AST-5251™ to connect PCs to System/34, System/36 and System/38 for powerful interactive communications from remote sites.

AST was the first company to offer micro-to-mainframe products for the PC, and they continue to lead the pack with a full spectrum of communications products, including AST-3780™ RJE support. Customer support and product reliability. That's why AST is my single source.

Frankly, you should find out more about them. Give their Customer Information Center a call at (714) 863-1333 Ext. 5249 and get acquainted. Just tell them you were referred by another satisfied MIS director.

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AST

RESEARCH INC.

2121 Alton Avenue, Irvine, CA 92714
(714) 863-1333 TWX: 753699ASTR UR

CIRCLE 63 ON READER CARD

Rating Values

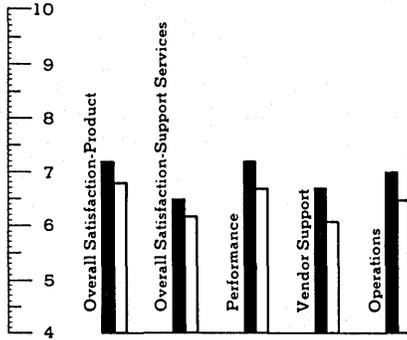
10-9: Superior
8-6: Very Good
5-3: Acceptable
2-1: Inadequate

Legend

■ Specific Product Rating
□ Group Average Rating

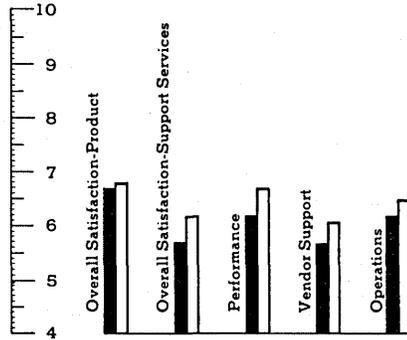
EASYTRIEVE • Pansophic Systems, 709 Enterprise Drive, Oakbrook, IL 60521 • 312-986-2263

40 responses • 25% judged package and 18% judged vendor outstanding • 3 actively seeking to replace package, with 2 citing unsatisfactory performance as reason.



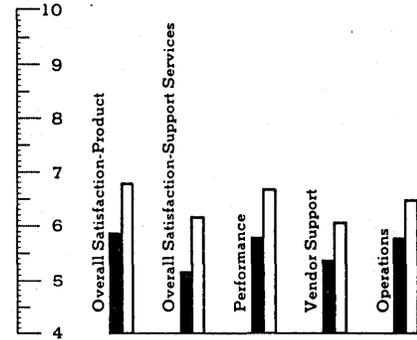
AUDIT ANALYZER • TSI Int'l., 187 Danbury Road, Wilton, CT 06987 • 203-853-2884

23 responses • 26% judged package and 4% judged vendor outstanding • 3 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



DATA ANALYZER • TSI Int'l., 187 Danbury Road, Wilton, CT 06987 • 203-853-2884

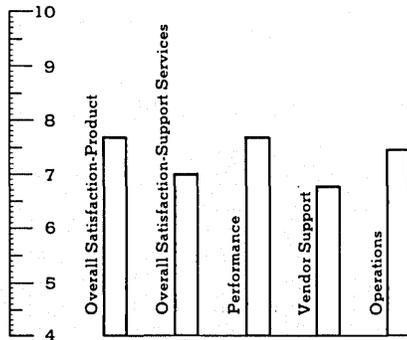
48 responses • 6% judged package and 2% judged vendor outstanding • 13 actively seeking to replace package, with 3 citing unsatisfactory performance as reason.



UTILITIES/OPERATING SYSTEMS/ENHANCEMENTS

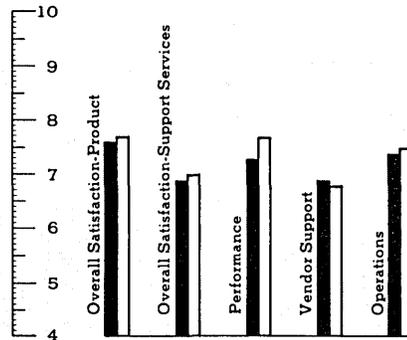
Group Average • 24 packages

1111 responses • 38% judged package and 22% judged vendor outstanding • 122 actively seeking to replace package, with 22 citing unsatisfactory performance as reason.



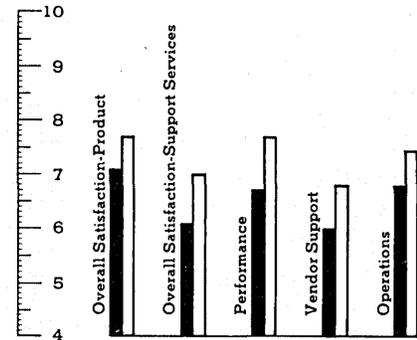
ADR/LIBRARIAN • Applied Data Research, Inc., Route 206 & Orchard Road, CN-8, Princeton, NJ 08540 • 201-874-9100

45 responses • 40% judged package and 20% judged vendor outstanding • 2 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



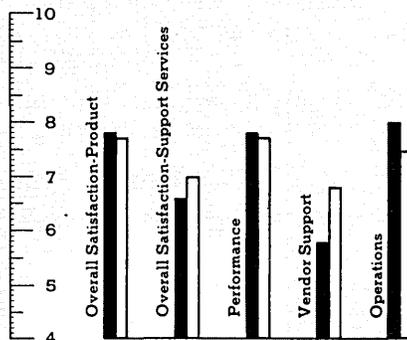
BOSS/3 • Century Analysis Inc., 80 Berry Drive, Pacheco, CA 94553 • 415-680-7800

54 responses • 15% judged package and 9% judged vendor outstanding • 10 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



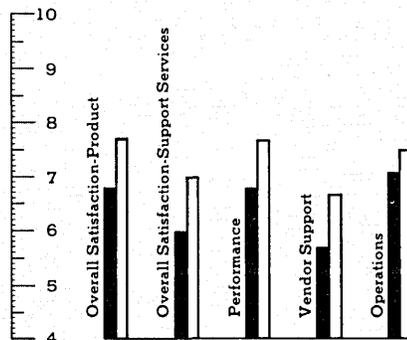
TOP SECRET • CGA Computer Inc., 960 Holmdel Road, Holmdel, NJ 07733 • 201-946-8900

58 responses • 41% judged package and 14% judged vendor outstanding • 1 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



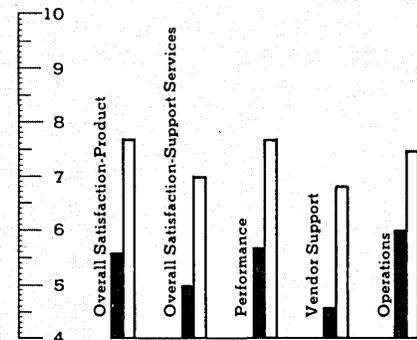
CA-DRIVER • Computer Associates Int'l., 70 Jericho Expressway, Jericho, NY 11753 • 516-333-6700

30 responses • 30% judged package and 13% judged vendor outstanding • 3 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.

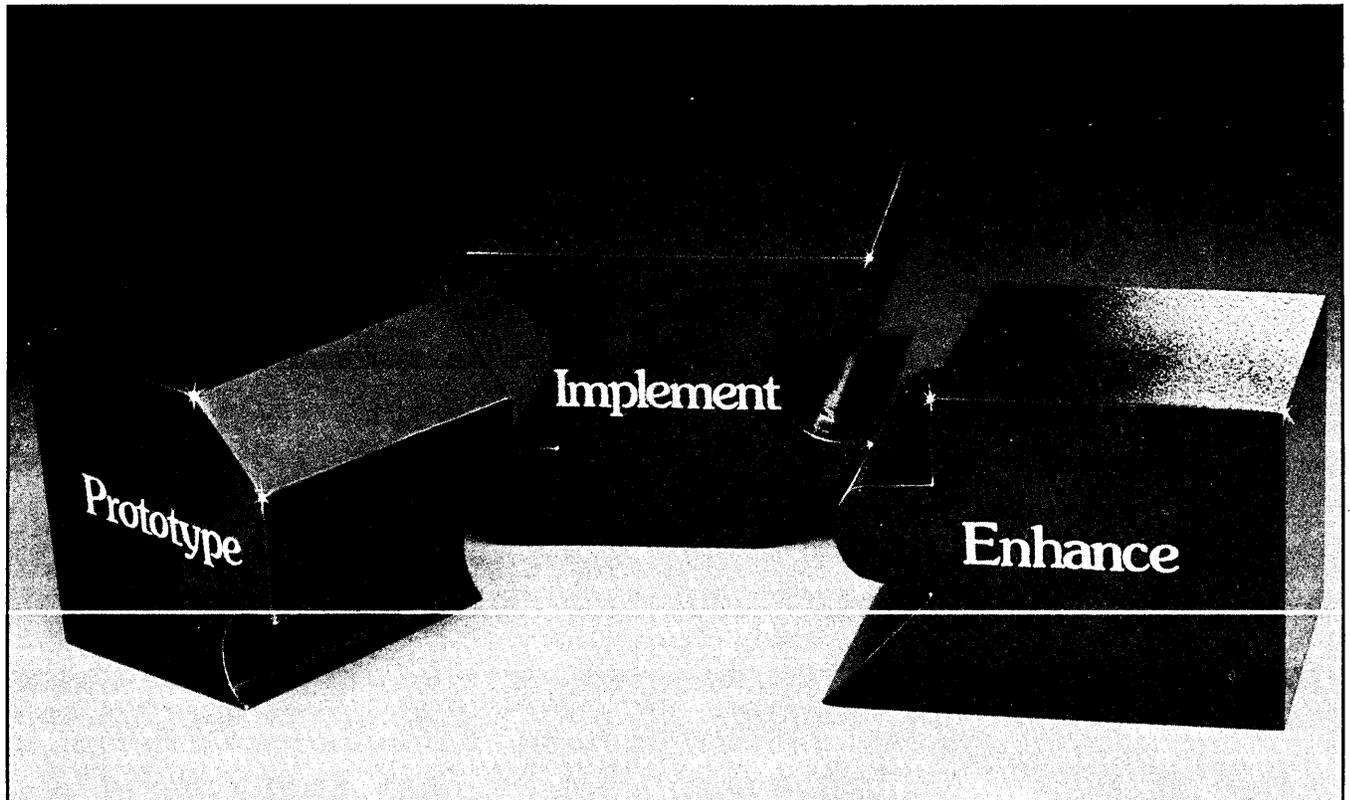


CA-JASPER • Computer Associates Int'l., 70 Jericho Expressway, Jericho, NY 11753 • 516-333-6700

37 responses • 3% judged package and 5% judged vendor outstanding • 10 actively seeking to replace package, with 3 citing unsatisfactory performance as reason.



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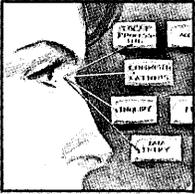
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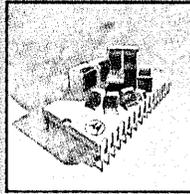
CIRCLE 64 ON READER CARD

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1982 Four-Phase Systems joins Motorola, Inc. Now, we are one of the few companies in the world to provide vertical integration of electronic technology. Together, we offer the most advanced family of microprocessors powering a range of complete office systems.

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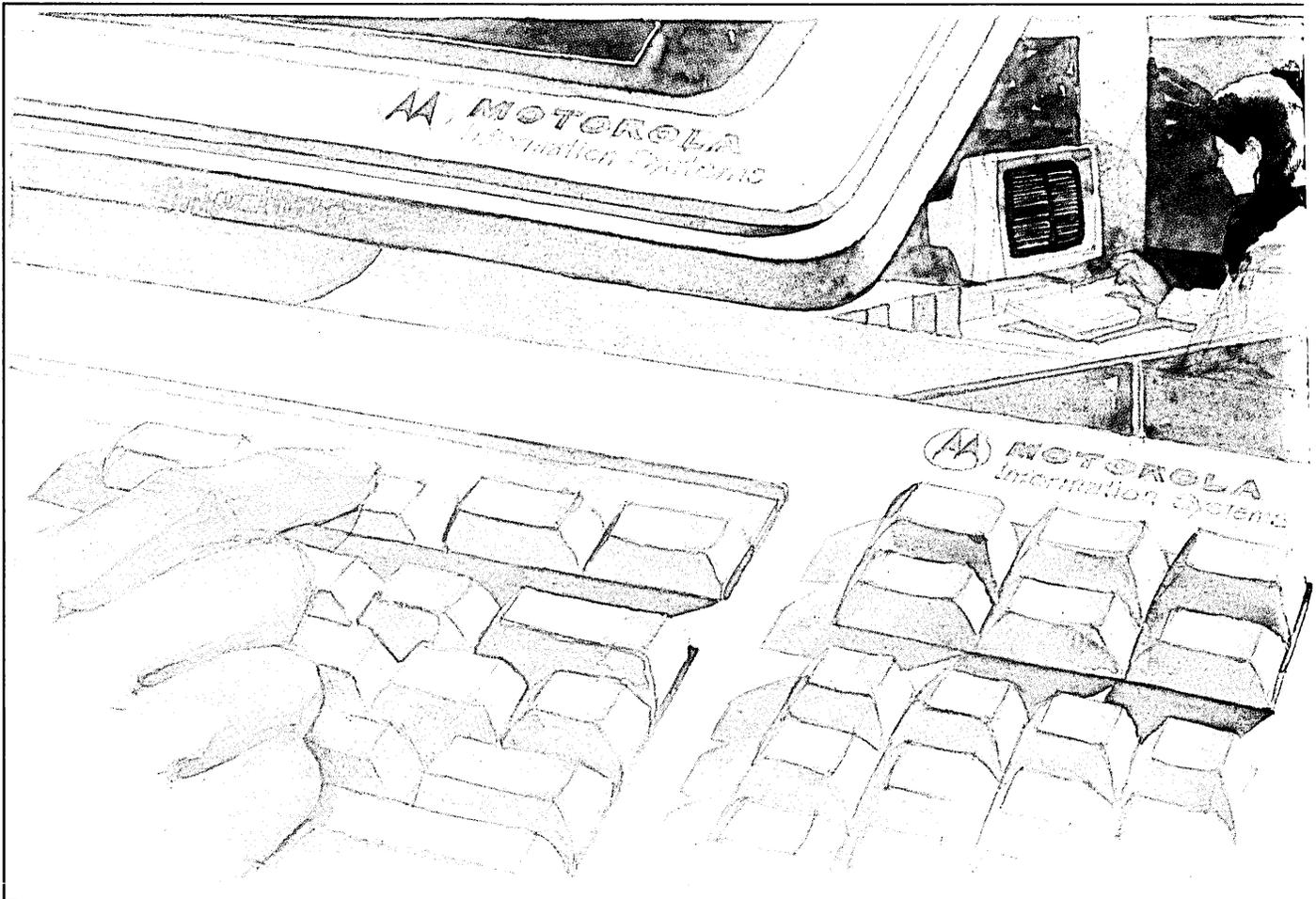
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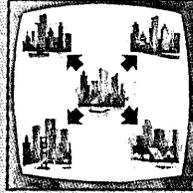
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provided by our UNIX*-based UNIVIEW™. We've designed our software to help you make maximum use of our systems.

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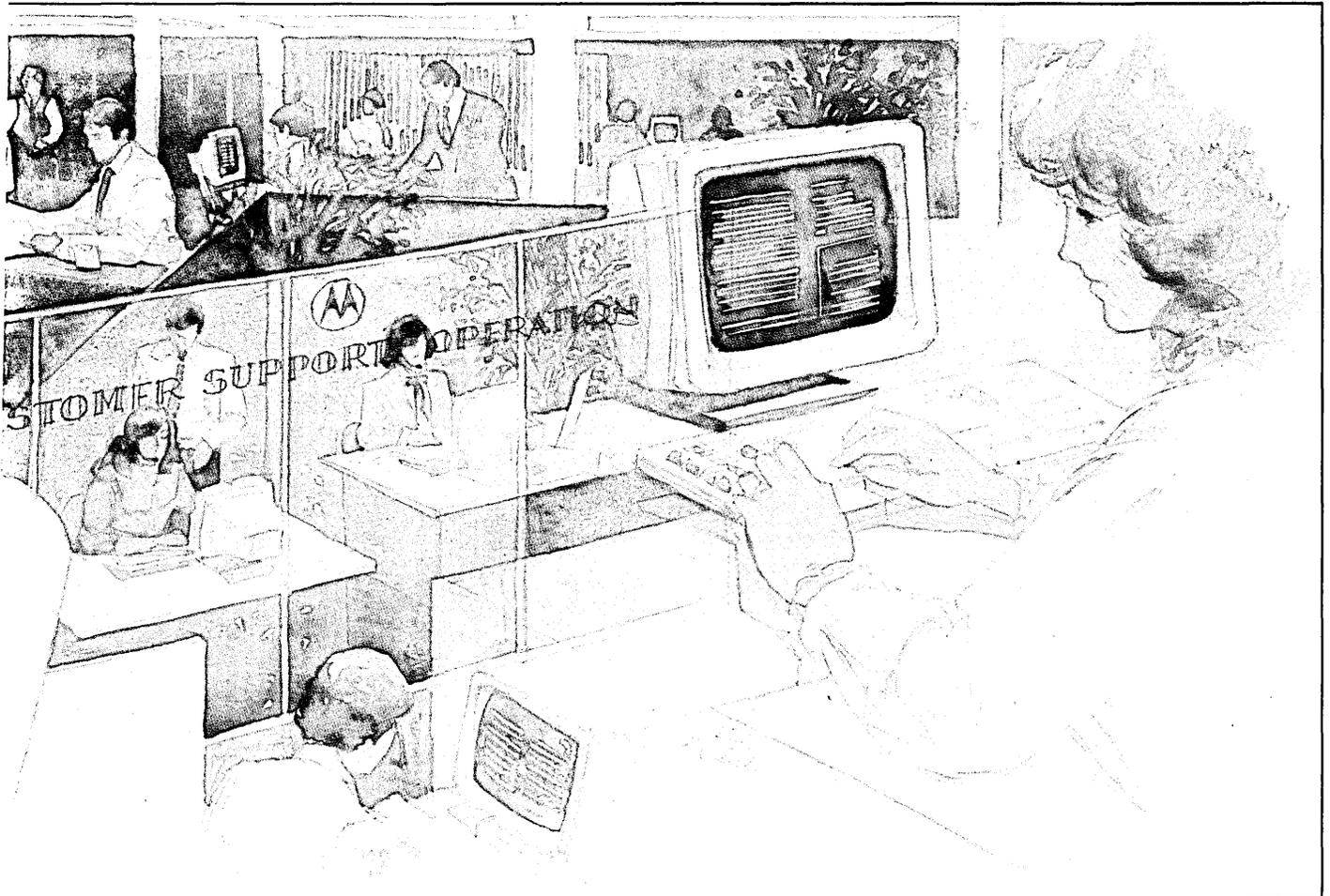
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Rating Values

10-9: Superior
8-6: Very Good

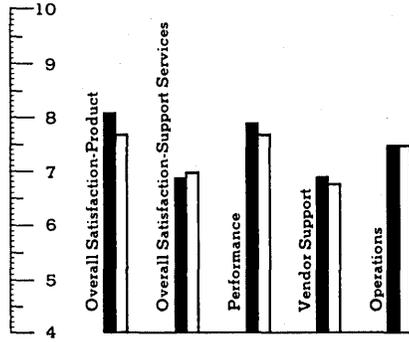
5-3: Acceptable
2-1: Inadequate

Legend

■ Specific Product Rating
□ Group Average Rating

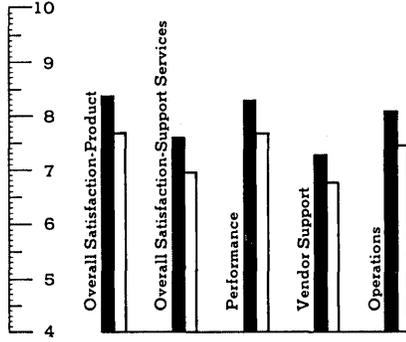
CA-RAPS • Computer Associates Int'l, 70 Jericho Expressway, Jericho, NY 11753 • 516-333-6700

44 responses • 34% judged package and 16% judged vendor outstanding • 3 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



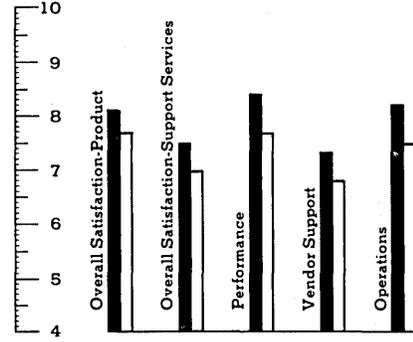
CA-SORT • Computer Associates Int'l, 70 Jericho Expressway, Jericho, NY 11753 • 516-333-6700

48 responses • 54% judged package and 27% judged vendor outstanding • 2 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



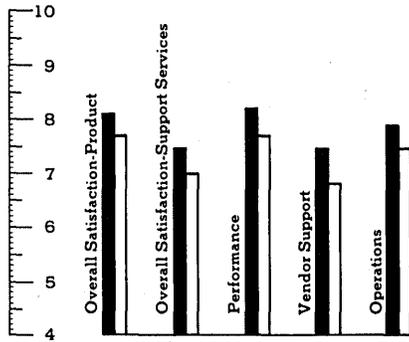
ABEND-AID • Compuware Corporation, 32100 Telegraph Road, Birmingham, MI 48010 • 313-540-0900

51 responses • 39% judged package and 26% judged vendor outstanding • 0 actively seeking to replace package.



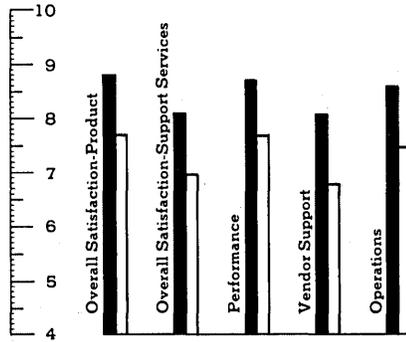
FAQS/XP • Goal Systems Int'l., 5455 North High Street, Columbus, OH 43214 • 614-888-1775

20 responses • 40% judged package and 30% judged vendor outstanding • 1 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



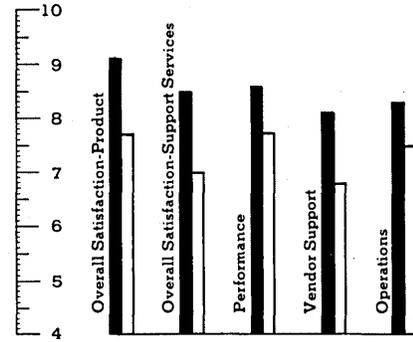
FAVER/XP • Goal Systems Int'l., 5455 North High Street, Columbus, OH 43214 • 614-888-1775

44 responses • 59% judged package and 39% judged vendor outstanding • 0 actively seeking to replace package.



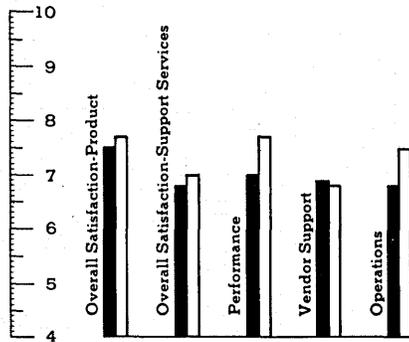
FLEE/XP • Goal Systems Int'l., 5455 North High Street, Columbus, OH 43214 • 614-888-1775

44 responses • 75% judged package and 52% judged vendor outstanding • 1 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



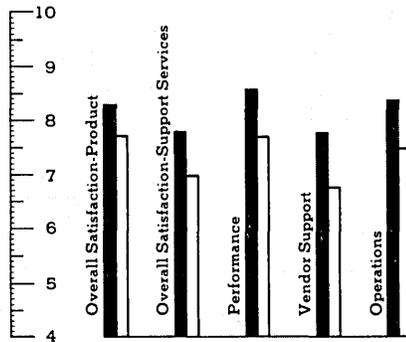
IMSL LIBRARY • IMSL, Inc., NBC Building, 6th Floor, 7500 Bellaire Boulevard, Houston, TX 77036 • 713-772-1927

39 responses • 13% judged package and 8% judged vendor outstanding • 1 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



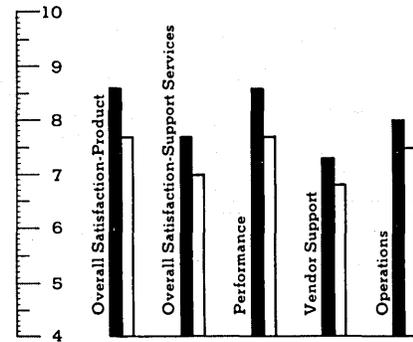
FDR • Innovation Data Processing, 970 Clifton Avenue, Clifton, NJ 07013 • 201-777-1940

57 responses • 53% judged package and 30% judged vendor outstanding • 2 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



LOGOUT/MULTILOG • Macro 4, Inc., One West Hanover Avenue, Mount Freedom, NJ 07970 • 201-895-4800

66 responses • 56% judged package and 30% judged vendor outstanding • 5 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



Rating Values

10-9: Superior
8-6: Very Good

5-3: Acceptable
2-1: Inadequate

Legend

■ Specific Product Rating
□ Group Average Rating

EDOS • Nixdorf Computer Software Co., 300 Third Avenue, Waltham, MA 02154 • 617-890-3600

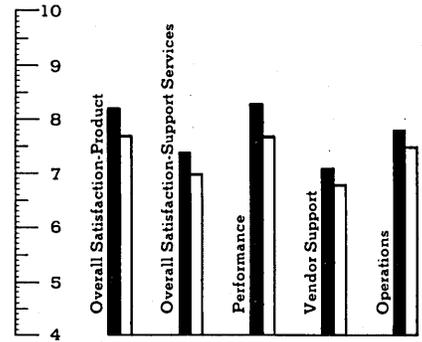
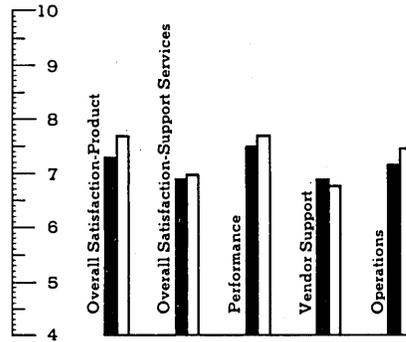
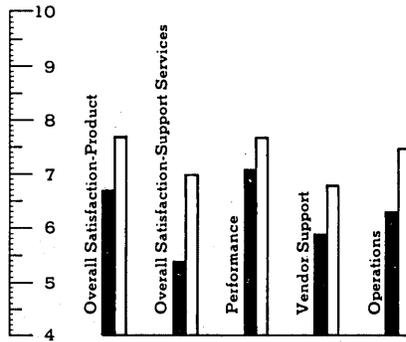
36 responses • 14% judged package and 8% judged vendor outstanding • 23 actively seeking to replace package, with 3 citing unsatisfactory performance as reason.

PANVALET • Pansophic Systems, 709 Enterprise Drive, Oakbrook, IL 60521 • 312-986-2263

37 responses • 16% judged package and 14% judged vendor outstanding • 4 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.

INSTANT FBA • SDI, Inc., 1700 South El Camino Real, P.O. Box 5801, San Mateo, CA 94402 • 405-572-1200

59 responses • 54% judged package and 25% judged vendor outstanding • 11 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



KEY/MASTER • TSI Int'l., 187 Danbury Road, Wilton, CT 06987 • 203-853-2884

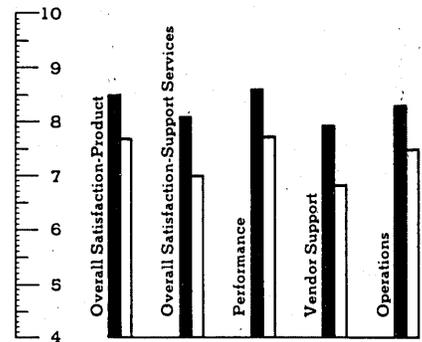
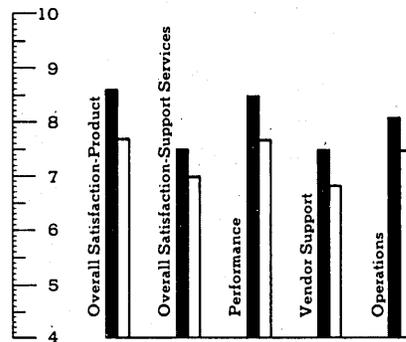
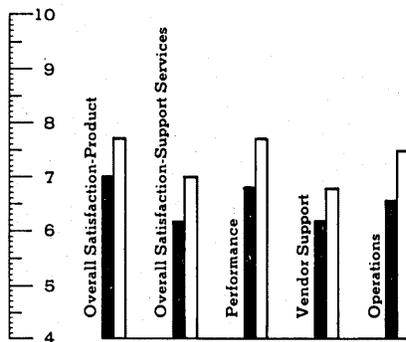
60 responses • 18% judged package and 7% judged vendor outstanding • 2 actively seeking to replace package, with 2 citing unsatisfactory performance as reason.

DOS/MVT/VSE • Software Pursuits, Inc., 444 Market Street, Suite 800, San Francisco, CA 94111 • 415-392-7171

60 responses • 65% judged package and 23% judged vendor outstanding • 9 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.

SYNCSORT-DOS • Syncsort, Inc., 560 Sylvan Avenue, Englewood Cliffs, NJ 07632 • 201-568-9700

51 responses • 57% judged package and 37% judged vendor outstanding • 3 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



SYNCSORT-OS • Syncsort, Inc., 560 Sylvan Avenue, Englewood Cliffs, NJ 07632 • 201-568-9700

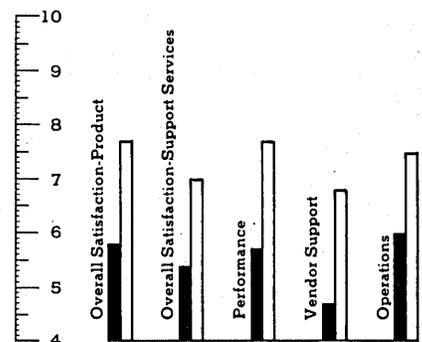
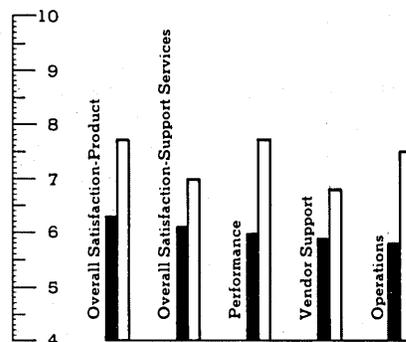
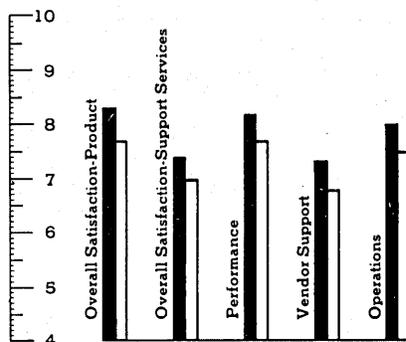
54 responses • 59% judged package and 26% judged vendor outstanding • 2 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.

UCC-2 • UCCEL Corporation, UCCEL Tower, Exchange Park, Dallas, TX 75235 • 214-353-7533

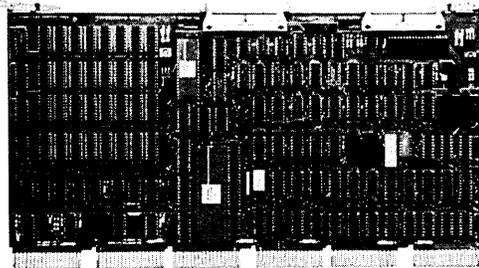
30 responses • 10% judged package and 7% judged vendor outstanding • 8 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.

VALU-LIB • Value Computing Inc., 498 North Kings Highway, Cherry Hill, NJ 08034 • 609-482-2500

46 responses • 7% judged package and 4% judged vendor outstanding • 4 actively seeking to replace package, with 3 citing unsatisfactory performance as reason.



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UNIFORUM™, Dallas Infomart, Jan. 22-25, 1985, Booth #1285.

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CIRCLE 66 ON READER CARD

Rating Values

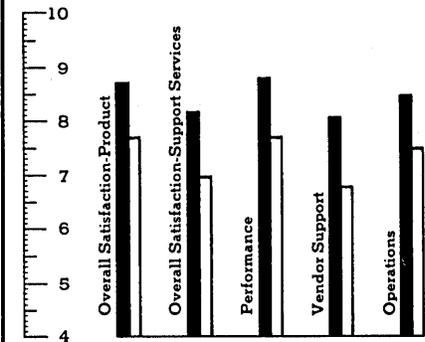
10-9: Superior 5-3: Acceptable
8-6: Very Good 2-1: Inadequate

Legend

■ Specific Product Rating
□ Group Average Rating

DISK UTILITIES • Westinghouse Electric, 777 Penn Center, 7th Floor, Pittsburgh, PA 15235 • 412-636-3100

41 responses • 61% judged package and 46% judged vendor outstanding • 1 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



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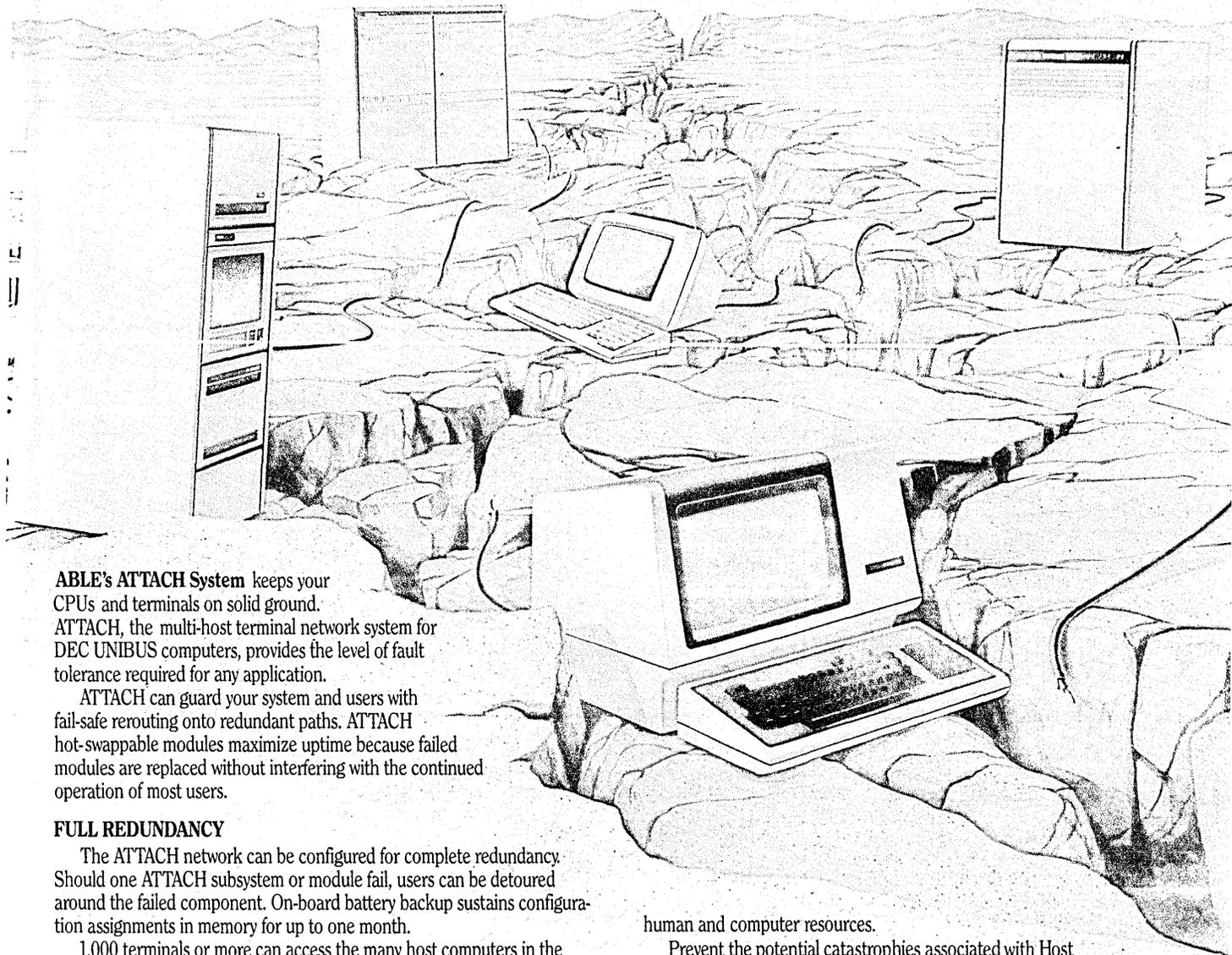
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1,000 terminals or more can access the many host computers in the ATTACH network, with each computer requiring only a single host interface and single cable to support 128 terminal users in remote or local sites.

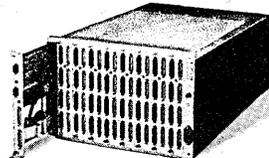
ATTACH HELPS MAXIMIZE RESOURCES

In an ordinary multi-host environment, if one host computer goes down, lots of users could be left sitting idle. The ATTACH network system eliminates user down time, by allowing users to switch to a working CPU, maximizing

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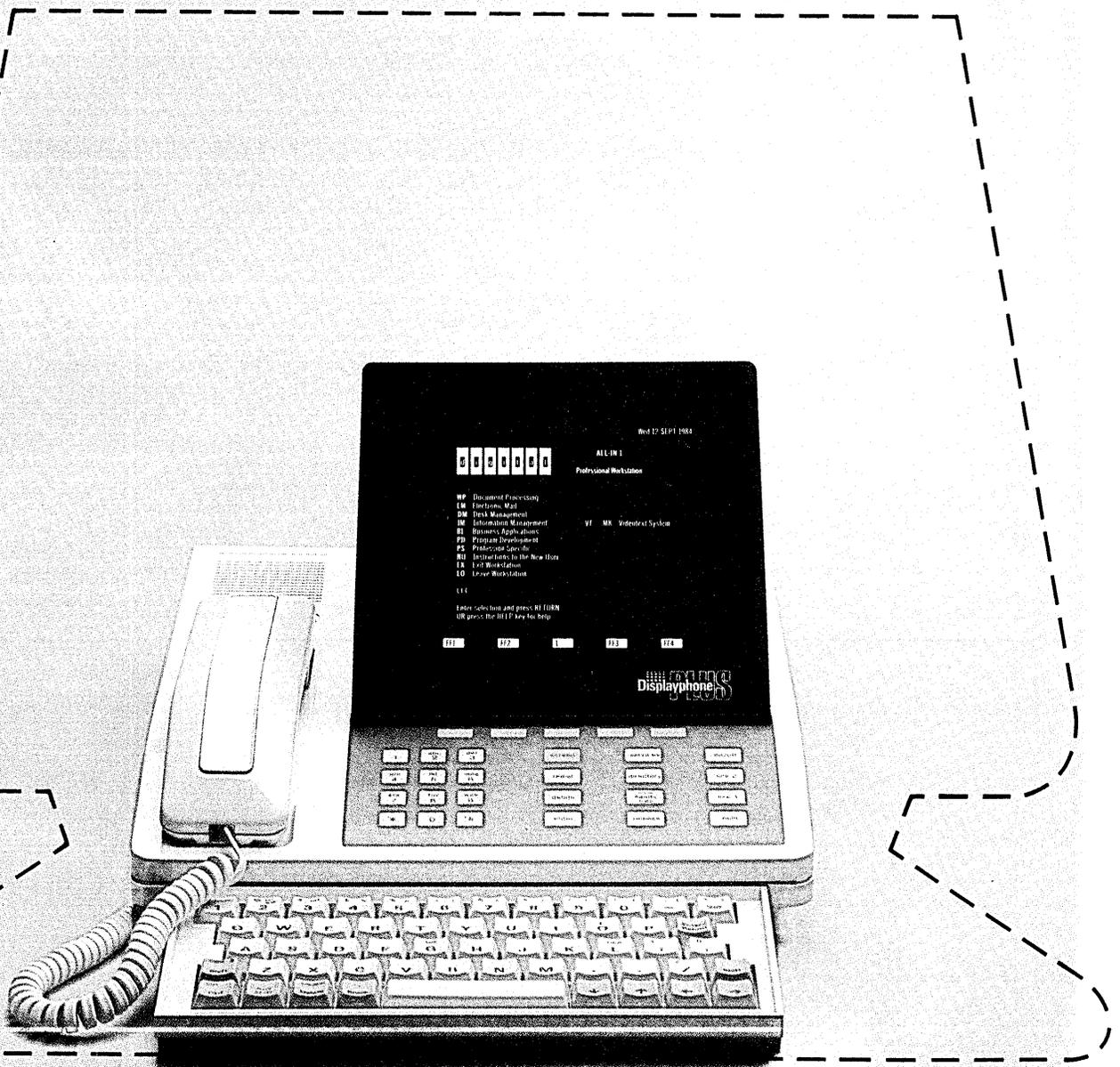
The Communications Specialists

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CIRCLE 67 ON READER CARD

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The Displayphone-Plus Terminal

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It's important that the Displayphone-Plus* terminal can fit with an existing information management system, offering download emulation of virtually any cursor addressing conversational CRT and plug-and-play compatibility with the VT-100.

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VT-100™ and VT-52™, ADDS Viewpoint®, Regent 25®, and many more.

On the outside is a full-stroke keyboard and easy-to-read amber screen which allows the Displayphone-Plus terminal to match the performance of large, conventional terminals. Its sophisticated telephone capabilities allow it to surpass them with a 90-number directory, automatic dialing, and handsfree speaking. And it's as easy as a telephone to use.

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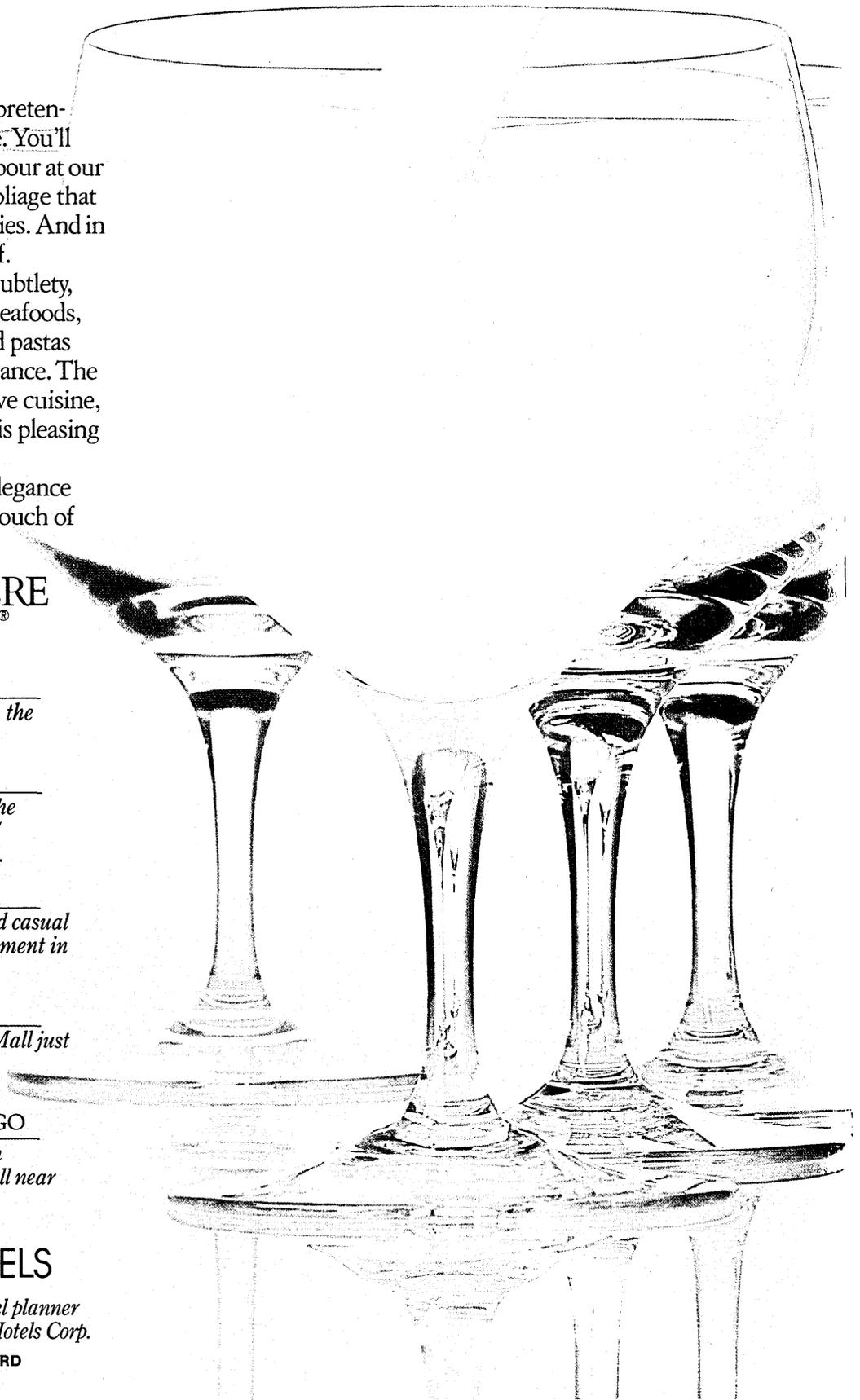
NORTHWEST CHICAGO

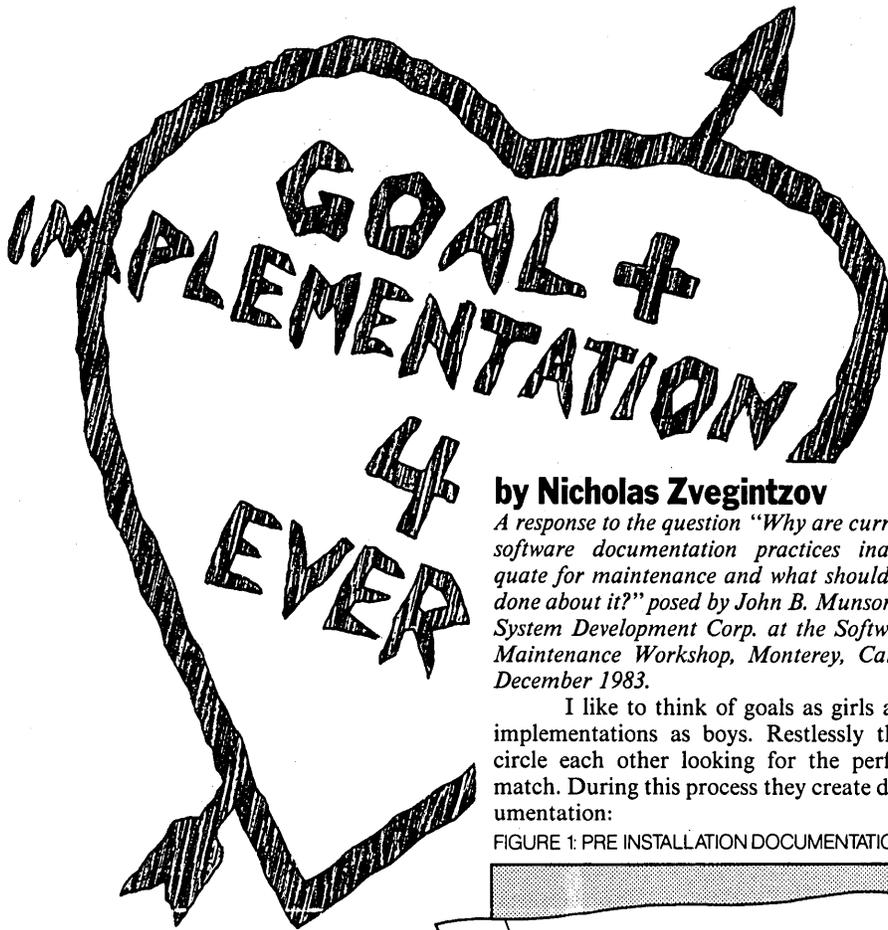
The Hyatt in Chicago's suburban Schaumburg is at Woodfield Mall near O'Hare.

HYATT  HOTELS

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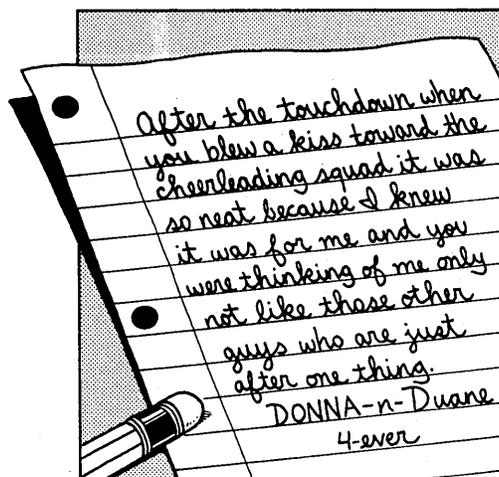


by Nicholas Zvegintzov

A response to the question "Why are current software documentation practices inadequate for maintenance and what should be done about it?" posed by John B. Munson of System Development Corp. at the Software Maintenance Workshop, Monterey, Calif., December 1983.

I like to think of goals as girls and implementations as boys. Restlessly they circle each other looking for the perfect match. During this process they create documentation:

FIGURE 1: PRE INSTALLATION DOCUMENTATION

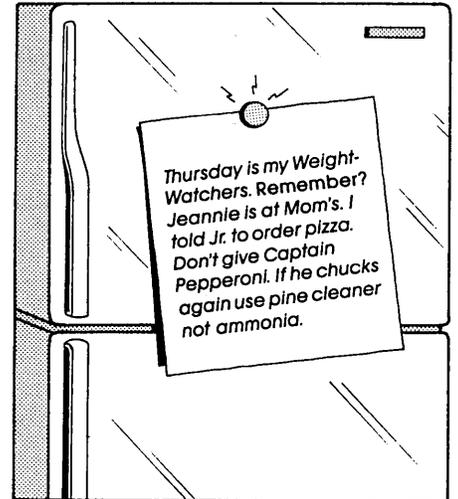


There is a certain period of development in which we have an infinite capacity for generating such messages and an infinite appetite for consuming them.

Eventually, all this restless activity reaches fulfillment and the great day arrives: installation. Final vows are exchanged—to be the new system, goal and implementation, together forever.

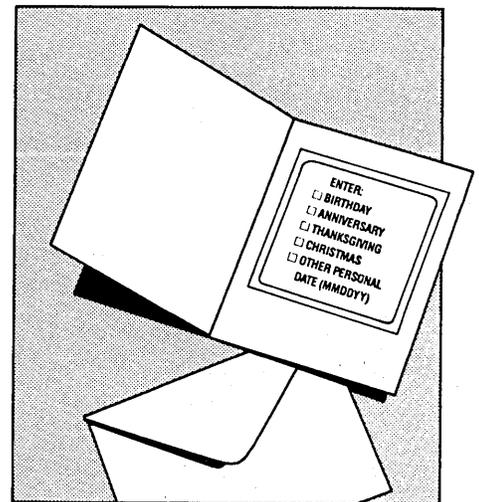
Pretty soon, the way these things go, little change requests appear. These, we know, are made of sugar and spice and all things nice. There are also little patches. They are made of string and snails and puppydog tails. Although these little creatures are recognizably related to the parent system, and are indeed the result of a pleasant cooperative activity, they nevertheless have a will and a life of their own, and require an entirely different style of communication:

FIGURE 2: POST INSTALLATION DOCUMENTATION



The preinstallation documentation is tied up with a ribbon in the back of the cabinet, and all you get, if you're lucky, is a screen from the Thoughtfulness Menu:

FIGURE 3: THE THOUGHTFULNESS MENU



Sooner than you imagine, the offspring have grown larger than the parents and that old restless activity starts up again.

Therefore, in answer to Munson's question, "Why are current software documentation practices inadequate for maintenance and what should be done about it?" I would say:

1. Computing is a field in which actions speak louder than words.
2. The important relationship is not between people and documentation nor between systems and documentation, but between people and systems.
3. What passes between a goal and an implementation is hardly ever great documentation any more than what passes between a man and a maid is great literature, but it makes the world go around. ©

Nicholas Zvegintzov is a New York City consultant who performs family counseling with existing software systems.

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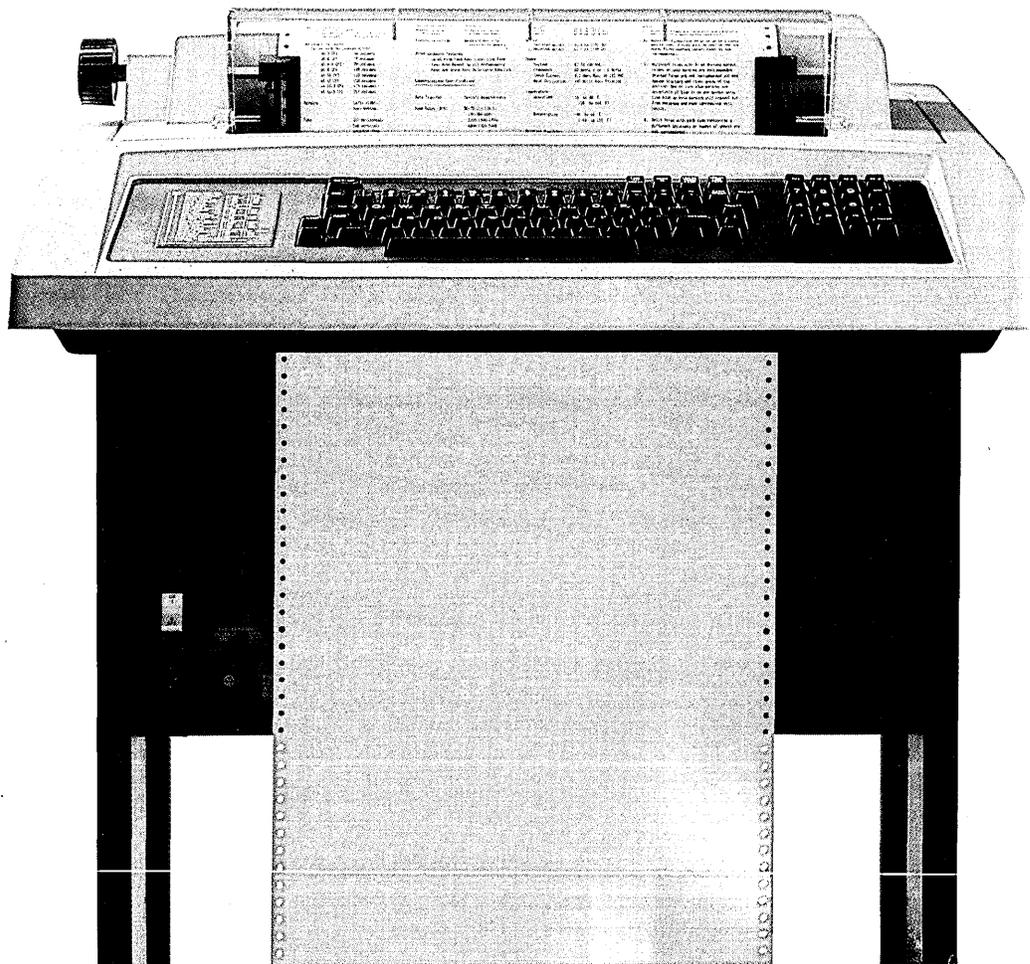
you want. Fast draft speed printing at 180 characters per second. Fanfold paper capabilities in widths up to 15". A choice of 8 character widths. And extensive communications support, including auto answerback and auto disconnect.

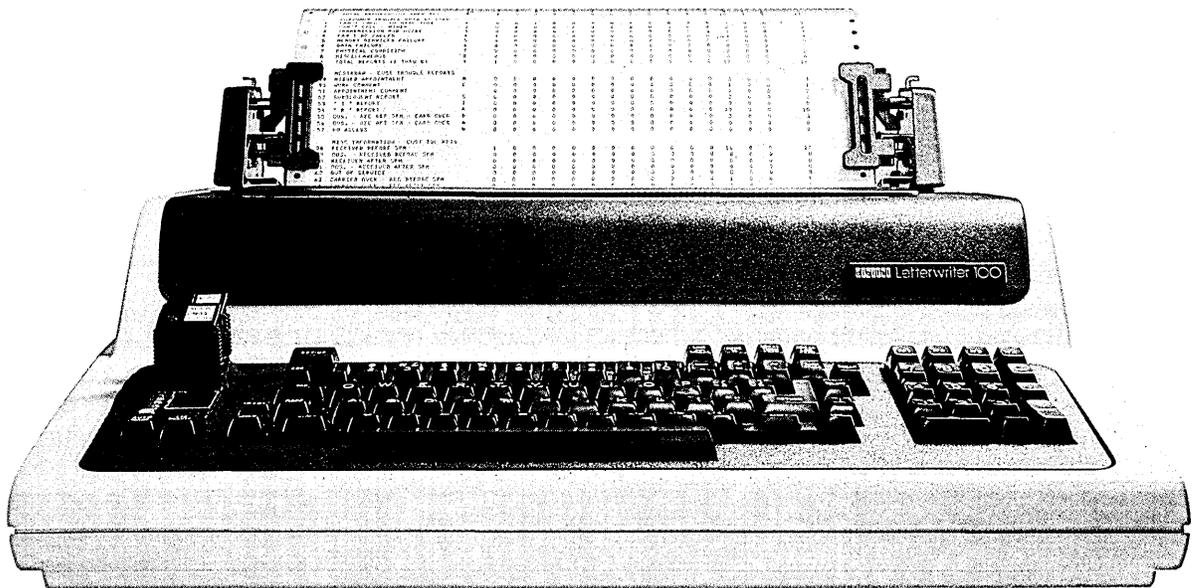
Most importantly, the DECwriter III teleprinter is a true master of forms. Some 45 features, like horizontal pitch, left/right and top/bottom margins, as well as horizontal and vertical tabs, are all summarized right on the keyboard, allowing you to set up formats in an unusually quick and sim-

ple manner. Then, once set, all can be stored in non-volatile memory. And the DECwriter III teleprinter can provide crisp, legible forms up to an impressive 6 parts.

DIGITAL'S LETTERWRITER 100. THE BEST ENGINEERED TELEPRINTER FOR THE OFFICE.

Flexibility is the word that best describes the Letterwriter 100™ teleprinter. For starters, you have a choice of multiple print speeds. You can print a draft copy of a one page proposal in just 10 seconds. Then,





by simply pressing a single button, you can shift from a high speed 240 characters per second to a high quality 30 characters per second, with printing that's difficult to distinguish from true letter quality. There's even an optional 80 character per second memo mode that's ideal for interoffice correspondence.

For further versatility, the Letterwriter 100 teleprinter lets you select from 8 different character widths, multiple character sets and a wide variety of typefaces. In fact, you can store 5 different typefaces resident within the teleprinter, and the selection can include Courier 10, 12, and Italics, Gothic 10 and 12, Orator 10, and APL, so you can select the style that suits the job as easily as pressing a key. And, in the event you'd like to illustrate a particular point, bit map graphics help you do just that.

The Letterwriter 100 can handle the paper that best suits your needs. Sheet, fanfold or roll, in any width up to 15"

Finally, the Letterwriter 100 product tackles all your forms. Setup is simple, and the high quality dot matrix printhead provides crisp, legible copies through 4 part forms.

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can function as a console or as a transportable terminal that can move from desk to desk or office to office, ready to communicate in whatever mode is available.

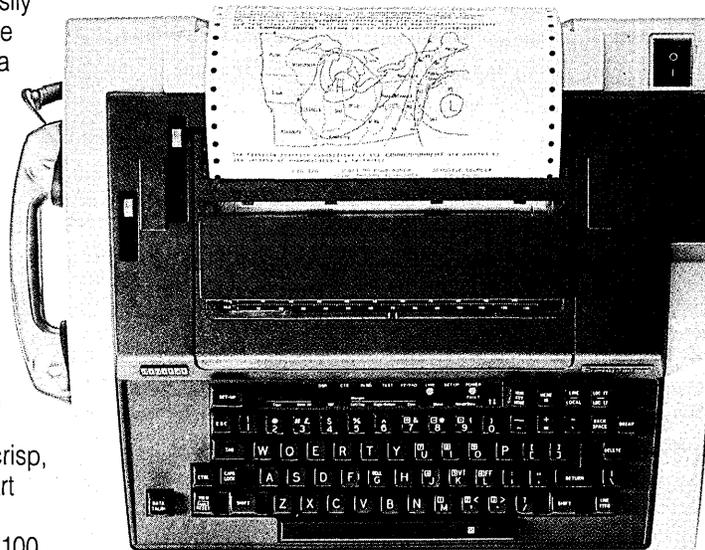
No matter how you look at it, the Correspondent teleprinter gives you a lot of capability in a small package.

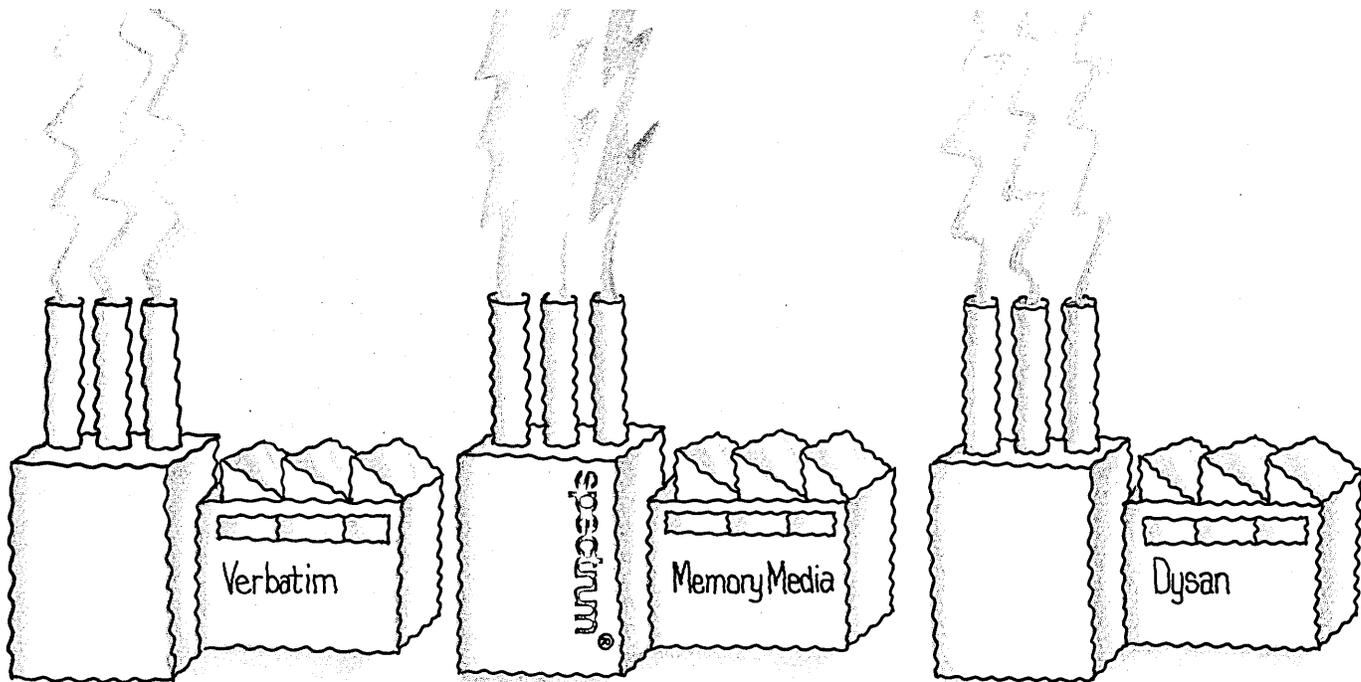
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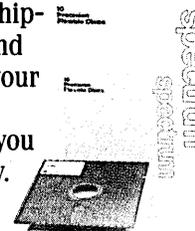
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Lots of deputies are sometimes preferable to a single sheriff.

DECENTRALIZING DATA SECURITY

by **Gordon L. Reid**

Some people argue that data security is a management issue, not a technological one. Others claim it's a technical problem that calls for a management solution. Such encapsulations fail to acknowledge the essential issue of obtaining support for data security at the grass-roots level.

Consultant and author Peter Drucker recognized this when he said, "Effective security cannot be bought; it must be a state of mind that is adopted and accepted at all levels of the corporation in order to be successful."

This implies a mission for the data security professional that is more easily stated than accomplished—especially in large organizations with thousands of computer users at many remote locations. For environments such as this, the advantages of decentralizing the administration of data security are too often overlooked. Companies that have adopted the decentralized approach have found that it not only is highly cost-effective, but also creates an environment that is conducive to user support.

A security policy, security software, and the support of management and users are all equally important to the effectiveness of a security program. Of these, positive user attitudes are undoubtedly the most difficult to achieve. This is due partly to the logistics of creating security awareness among large numbers of users, and partly to the inclination of people to adopt convenient data access practices rather than those intended to safeguard data security. Since people are more easily influenced by individuals they know well, local administrators are obviously in a better position to promote security than is an unknown central administrator whose office may be three time zones away.

The importance of positive thinking and the use of local data security administrators to accomplish it cannot be overstated. Since data security imposes restrictions on computer users and computer processes, there will always be kinks that must be

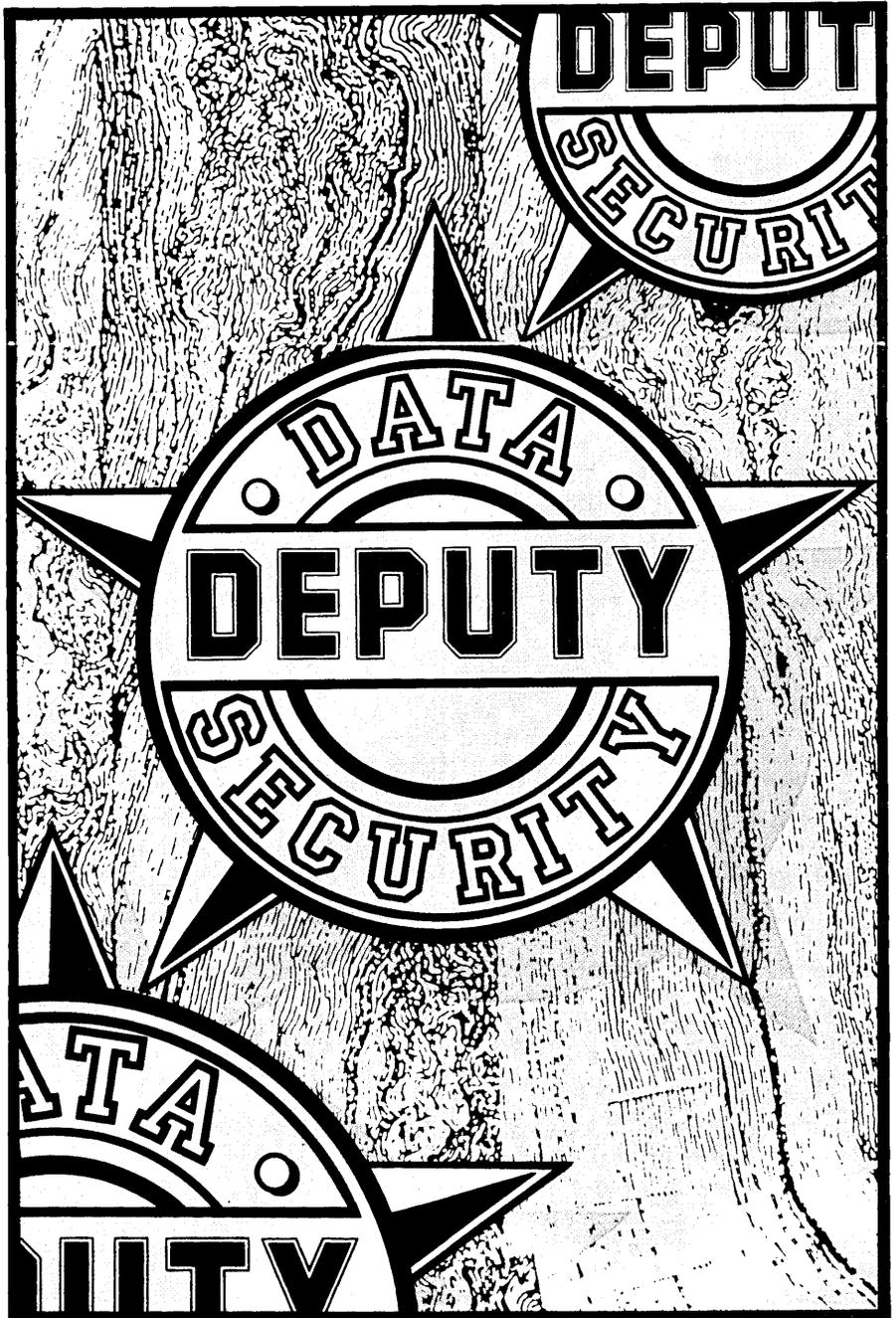


ILLUSTRATION BY CHRIS SPOLLEN

Potential violators are less likely to perpetrate a computer crime if they know their local data security administrator.

ironed out and problems to be resolved. When responsibility for data security is decentralized, local administrators resolve most of their own problems instead of referring them to central administrators. This prevents problems from developing into unproductive, finger-pointing issues that can dilute security effectiveness.

The fact that most computer crimes and abuses are perpetrated by individuals inside the organization also gives local security administrators an edge. While it's reasonable to assume that central security administrators are vigilant and resourceful—that's what they are paid for—they are neither omnipotent nor omniscient. They neither know, nor are they known by, more than a few of the individuals who interface to the computer.

Local administrators, on the other hand, are likely to have primary job responsibilities that keep them in relatively close contact with groups of computer users, either functionally or geographically (preferably the latter). Because of those other job responsibilities, local administrators may not display the same degree of vigilance or resourcefulness as their central counterparts. But they are more likely to know which users are having problems with drugs or money, which ones are being transferred or terminated, which ones are likely to be disgruntled, and so forth.

Local administrators can respond quickly in such situations by making direct, on-line adjustments via the security software. They aren't deterred by the notion that security is someone else's problem, and they're less impeded by the phone calls and paperwork that are the bane of central administration.

It is also reasonable to assume that potential violators are less likely to misuse the computer or perpetrate a computer crime if they know and respect their local data security administrator. This deterrent is forfeited when the responsibility is vested in one or more faceless individuals "back at the home office."

SECURITY INCREASES WORK DONE

It is generally believed that security is achieved only at the expense of productivity. The reasoning is that a newly organized staff of data security administrators will apply new forms, procedures, and restrictions to established computer functions. Although this may occur when security is centralized, it is just as likely that productivity will *increase* if the decentralized approach is taken. Decentralization eliminates the need for the central support personnel who initially process user requests, as well as the

need for a central data security administration staff. The formerly manual task of processing user requests for changes can be automated via a combination of purchased security software and user-written software. The result is increased security and productivity with an attendant decrease in cost.

Decentralized administration of data security also increases user productivity by reducing the amount of time users must wait for computer change requests to be processed. Centralized companies usually employ numerous specialized forms for requesting and authorizing changes. Each form requires an authorizing signature, which in turn requires the maintenance of signature verification cards. The time required to prepare, mail, confirm, process, and return these forms not only decreases the user's productivity but also adds unnecessary cost.

For example, a user at a remote location who needs a new on-line procedure may have to wait for more than a week from the time the request is initiated. The delay may be as much as two weeks if there is some irregularity or problem with the request. These delays are eliminated with the decentralized method. Here, the user's manager or designated coordinator serves as the local security administrator, and as such has the authority to make the change on-line with immediate confirmation of correctness.

How many companies have decentralized data security? It's hard to say, but conversations with representatives of several security software firms indicate that only about a fifth of their customers use a decentralized approach. Here are some likely reasons for this low total:

- Many companies have relatively few users (less than 1,000), in limited geographic locations. Local administrators may not be appropriate for them.
- Senior management often decides to install a central organization for data security without considering the decentralized approach. Once the choice is made, it may not be politically feasible to decentralize the function.
- Data security software packages are not user friendly and are not particularly adaptable for use in a decentralized environment. Moreover, these packages are usually designed to address only the security issues, which account for less than half of the requirements for establishing a new user or deleting an old one. Considerable in-house programming is required to fill these voids. Many companies elect to handle this problem manually through central administration, rather than spending the

money it would take to automate it.

There are several key requirements for implementing a decentralized data security program. Good naming conventions, for example, are necessary to all data security programs, and vital to decentralized efforts. It is important not only to control who owns what, but also who controls whom.

A decentralized program also needs a central individual to give direction to the overall program and ensure that all local administrators are observing certain standard rules. This person is usually responsible for checking compliance with the naming conventions.

Locally written programs are needed to augment the purchased security software. These programs may perform a variety of functions, including:

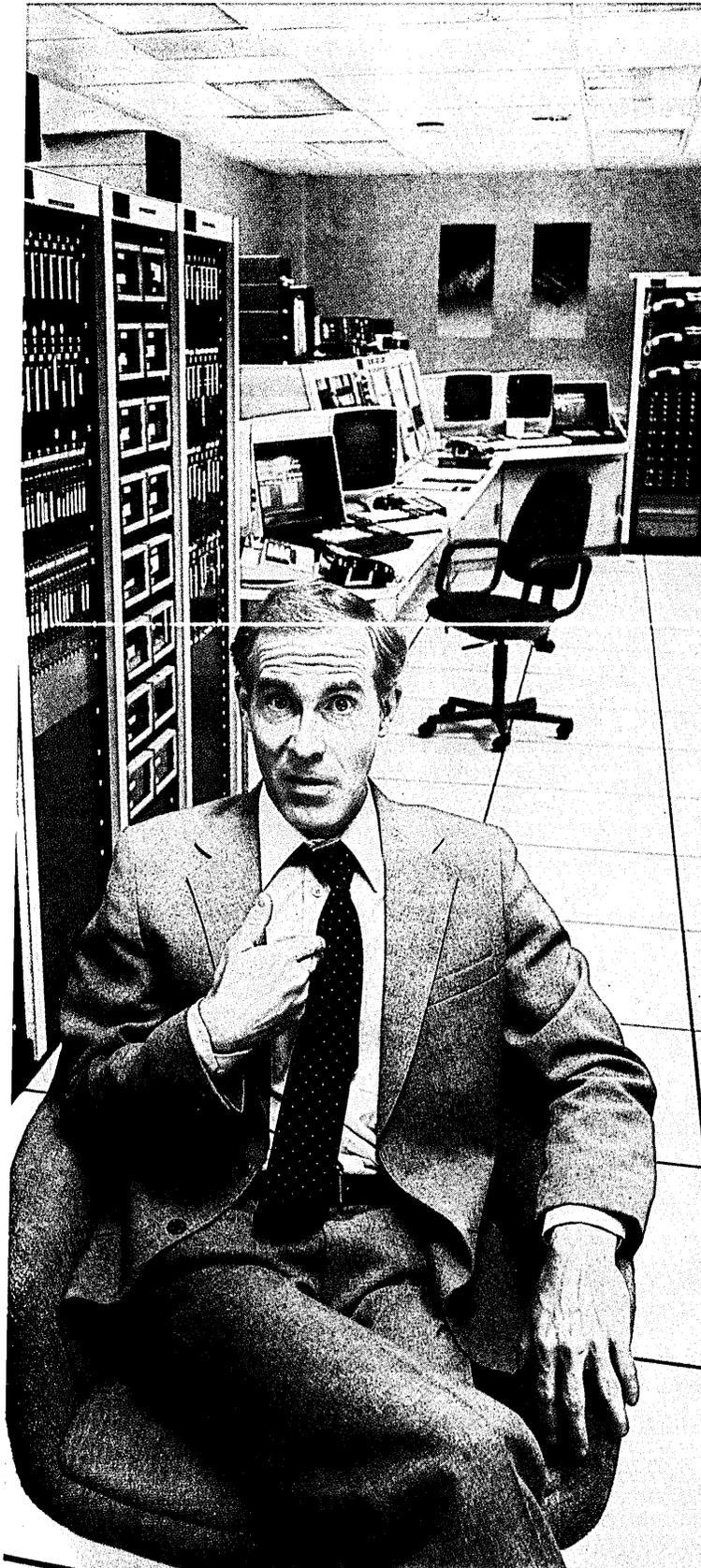
- Reporting unauthorized access attempts to the administrator responsible for the user who attempted the access as well as to the administrator who controls the data. Off-the-shelf security packages have no provision for segregating or journaling these or any other security events to individual local administrators. Obviously, each local administrator must have this information in order to function effectively.
- Coordinating accounting data, procedures, catalog pointers, and datasets when users are added or deleted. Security software packages are not well suited to this task.
- Providing a user-friendly interface that addresses and translates only those questions that require answers. Security packages are designed to operate in many environments; an appropriately tailored interface program will spare local administrators from having to master a great deal of technical jargon.

Even with the simplification and automation of the above processes, the local administrator will need a manual that lays out the rules and explains the various processes and reports. He or she will also need to keep in touch with other local administrators.

Good communication will help to perpetuate security awareness among the administrators, who in turn will influence the attitudes at the grass-roots level of the organization. ©

Gordon L. Reid is data security administrator at the Aluminum Company of America in Pittsburgh, and chairman of the data security section of the Pittsburgh Large Users Group. He has been in the data security field since 1979, and presided over the decentralization of Alcoa's data security function.

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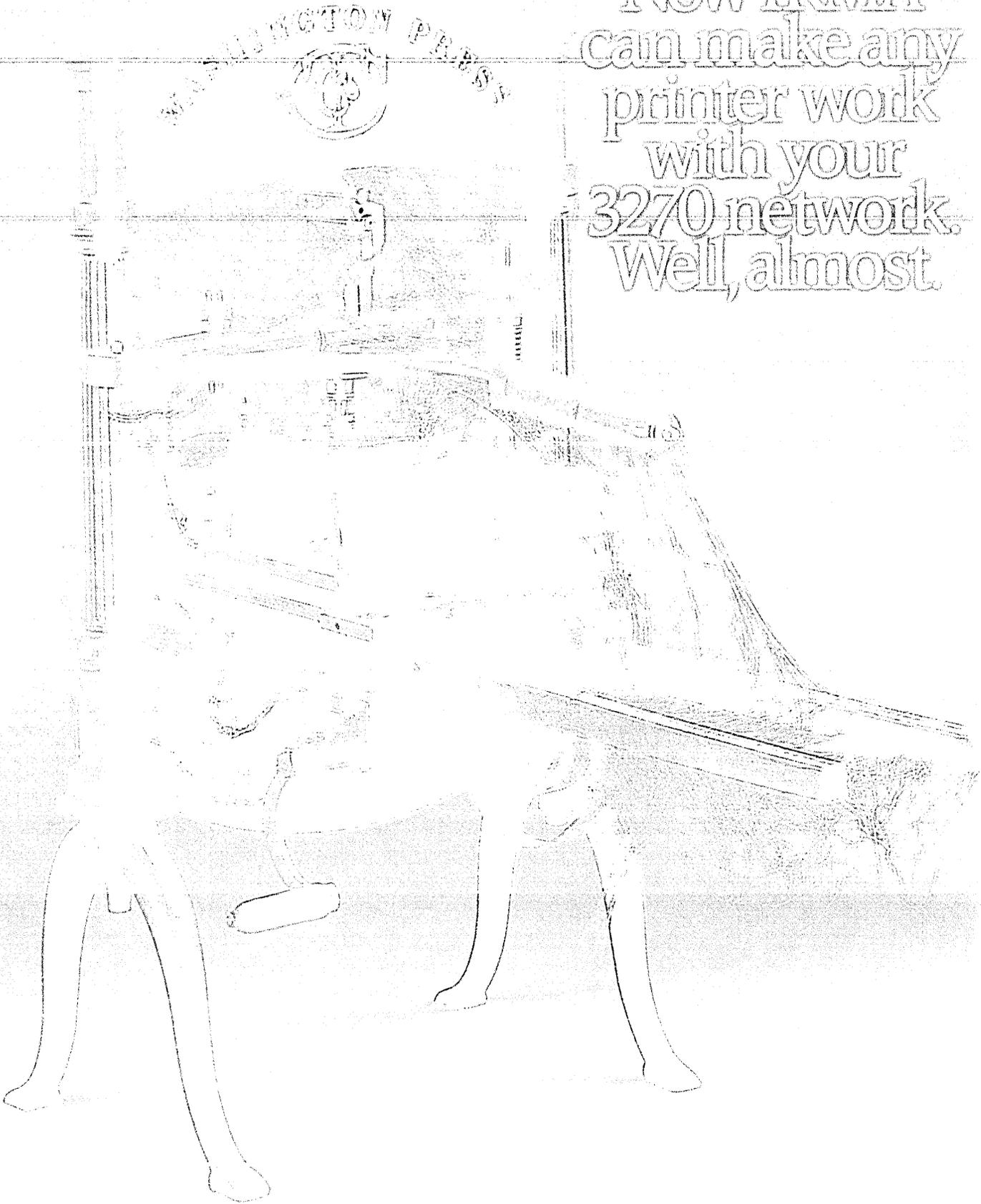
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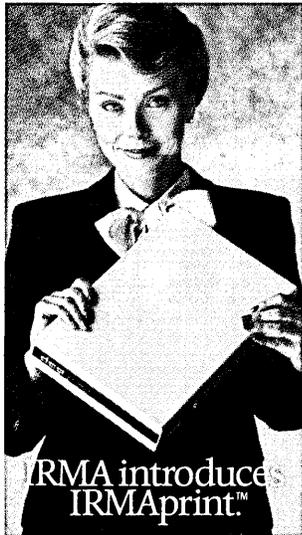
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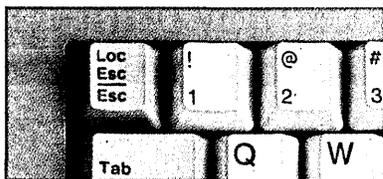
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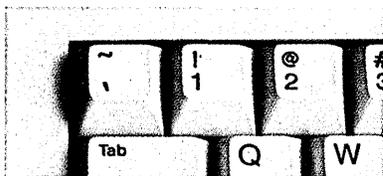
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1 Take our keyboard, for example. The RETURN key is within direct, easy reach. But VT220 users must stretch over an additional key to hit RETURN. Or have the hands of a concert pianist.



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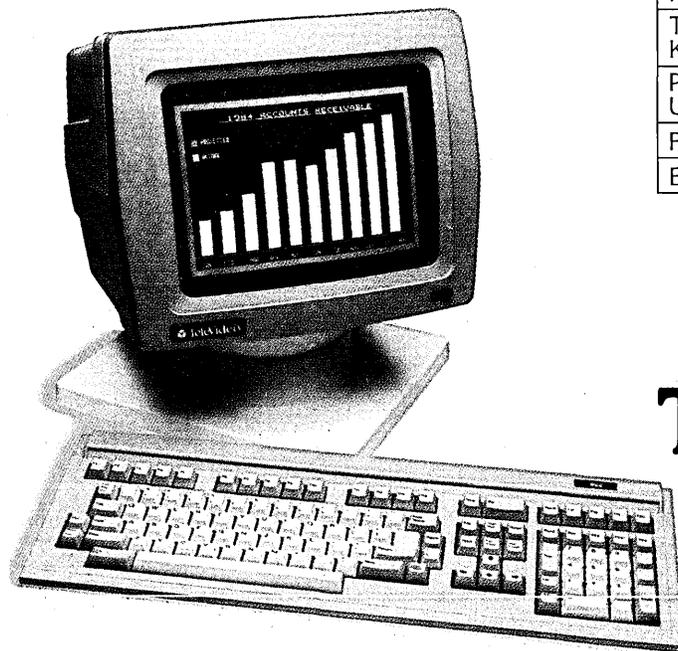
TeleVideo 922

DEC VT220

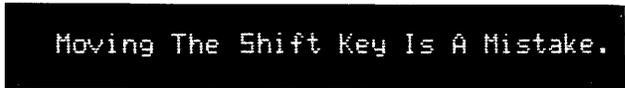
2 Our ESCAPE key is located above the TAB key, right where you'd expect to find it.

Theirs isn't. In fact, you have to go hunt for the VT220 ESCAPE key halfway across the row of function keys.

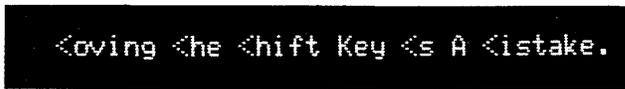
3 Take a look below at the 922 keyboard.



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CIRCLE 74 ON READER CARD

PEOPLE

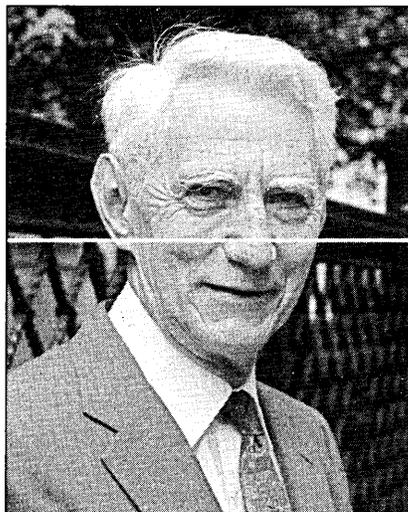
WHERE IT ALL BEGAN

"You may not recognize me, but I'm internationally famous and unbelievably rich."

That's what it says on the T-shirt Claude E. Shannon received from his wife not long ago. She bought it to cheer him up one day when he was feeling blue. He showed it off in New York City later during his acceptance speech for a \$10,000 Life Achievement prize from Marquis Who's Who Inc., which publishes that noted directory of the notable. That check may not make him unbelievably rich, but he is, without a doubt, internationally famous.

Shannon, of course, is the man who 36 years ago formulated the seminal information theory upon which much of today's computer and communications technology is based. Developed largely during World War II, when electronic communications, cryptography, and computers became crucial to the war effort, the theory defines precisely the relationships between informational bandwidths and noise levels in communications channels. The theory provided the mathematical basis for much computer work that followed and has been central to all subsequent research in telecommunications. Shannon published his historic paper while working at Bell Laboratories in Murray Hill, N.J., the leading center of communications research in the world.

Shannon is now retired from the



CLAUDE E. SHANNON: The father of information theory is building himself a juggling machine that will be dressed like W.C. Fields.

Massachusetts Institute of Technology, where he taught for about 30 years, and is living in Winchester, Mass., but he's still thinking about computers, cybernetics, information, and, of all things, juggling.

"I'm working on a juggling machine," he said proudly, sitting for a brief interview in a hallway of Manhattan's imposing Morgan Library on East 36th St. just before accepting his Life Achievement award. "It works with gears and will juggle three steel balls in the air."

He notes that the machine uses gears instead of electronics to perform its legerdemain. He hopes one day to have it bounce the balls alternately on a drumhead during the juggling cycle and also to be able to incorporate into its routine balls thrown to it by spectators.

"I'm dressing it up in a W.C. Fields costume," he said with a chuckle.

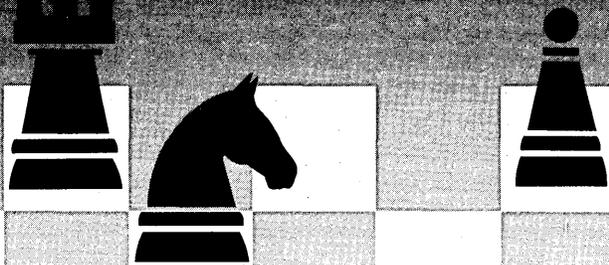
The juggling machine isn't so far removed from Shannon's previous work, however, for in the early 1950s he and others at MIT experimented with mechanical turtles designed to navigate their way through mazes and around obstacles. The mice and other semiautonomous machines were part of wide-ranging efforts at MIT to exploit the then exciting field of cybernetics. It is there that much current research in artificial intelligence, robotics, and computer science finds its roots.

Shannon published his famous theory in 1948, but he had been working with some of the same ideas for eight years prior to that. He had written his thesis at the University of Michigan on Boolean algebra and then went to MIT for graduate work. There he worked with Vannevar Bush, whose differential analyzer, a mechanical analog computer, contained a number of switching relays. Shannon's job was to keep the relays working, and in doing so he got to thinking about information in digital terms.

The war years saw Shannon working on communications at Bell Labs. "It seemed like the best place to go," he recalled, noting the labs' reputation for mathematical and scientific research. During that time, he recalls, he met with John von Neumann and Alan Turing, who visited the labs, as well as other computing pioneers.

The information theory he is so well known for has been applied far and wide, although not always with the meaning Shannon originally had in mind. Just as they have misappropriated Einstein's theory of relativity and Heisenberg's Uncertainty Principle, social scientists have occasionally misapplied Shannon's theory to such diverse areas as psychology, sociology, and even art, according to John R. Pierce, a professor at the California Institute of Technology and author of *Signals*,

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PEOPLE

the Telephone and Beyond (1981, W.H. Freeman).

"But make no mistake," Pierce writes. "Information theory is not nonsense just because so much nonsense has been written about it. Information theory has real content and value in the field of communication. It does not tell us everything about communication, but it does tell us ultimate things that are true, useful, and surprising."

Among the surprises is that communication is essentially a statistical phenomenon. The measure of information in a one-way communication channel, Shannon saw, is the unpredictability at the receiving end of the messages produced by the transmitter. Shannon's theory deals not with the content of messages but with the informational capacity of signals propagated through a noisy channel.

When social scientists are accused of misapplying the theory, it is often when they confuse signals with "information." The two are not equivalent except in rare, contrived circumstances, a fact often forgotten by psychologists studying group behavior, for instance. Information is an act, not a static fact.

Shannon's theory was developed during a war where it was necessary to deliver, with as few errors as possible, crucial orders to obedient field officers. It was assumed that the receiving officer would obey the orders implicitly. There, the signal is the message, and there was no chance of confirmation that the message had arrived safely.

In normal interpersonal communications, however, conversing persons share a wealth of "information" that surely is not located in the signals—whether verbal or otherwise—they pass back and forth. For example, a person hearing the sentence "It is raining" immediately knows that it is wet outside, that the sky is probably gray, and that the sun isn't shining. Yet none of these facts is mentioned in the sentence.

It has been suggested by Heinz von Foerster, a noted cybernetician, that the Western mind made a turn toward the schizophrenic sometime recently when it began confusing signals with the messages they carry. Perhaps the so-called information age would more properly be known as the signal age, say some critics steeped in such cybernetic theory.

About the future of computing, Shannon is optimistic. "The best is yet to come. We've only scratched the surface. Computers can only do what we tell them now, but it will be different in the future."

He said he thinks of the brain as merely another computer, one that is "orders of magnitude beyond the computers of today."

—John W. Verity

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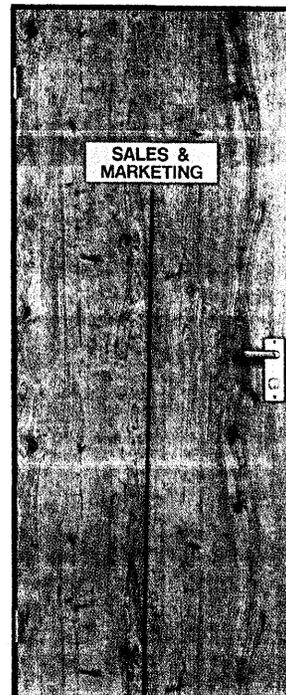
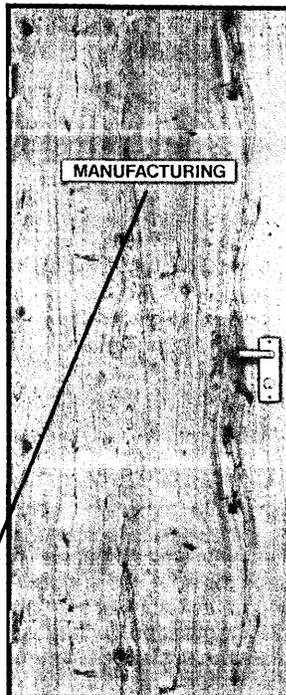
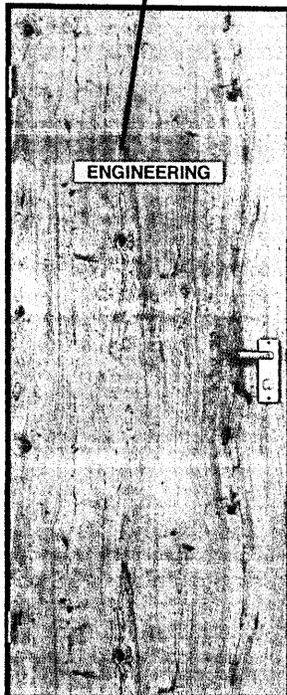
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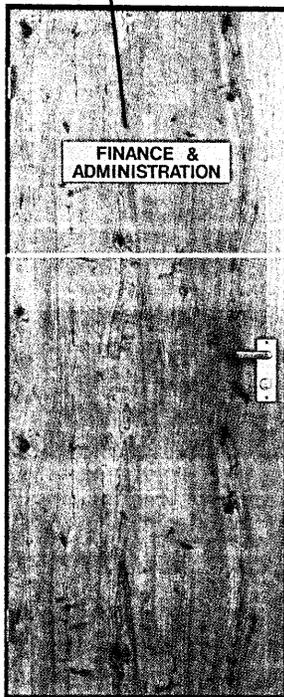
"Instead of one computer for design, one for database management, and one for text processing, why can't we get all our engineers to use a single system?"



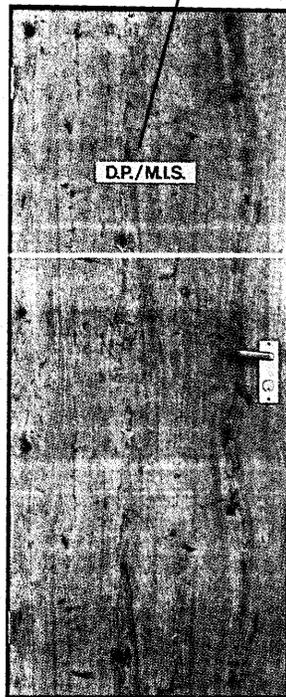
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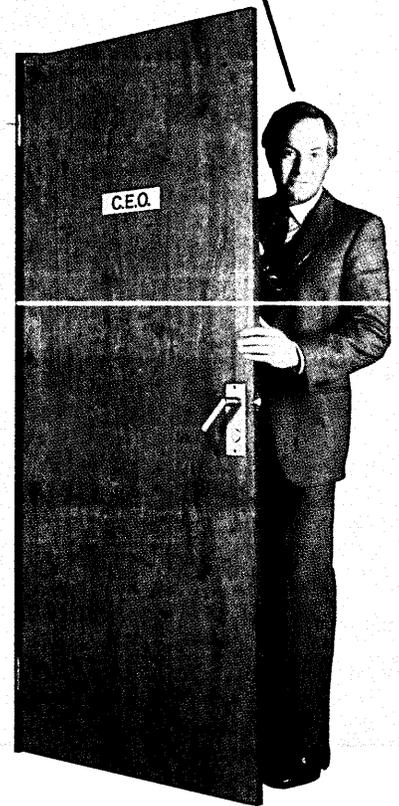
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HARDWARE

OFF-LINE

The War Games Syndrome gets thrown around computer security circles in much the same way productivity is used to strike a nerve in the lap-size computer world. After the movie was released, there were very few people who didn't know what a hacker was. The movie glorified a teenager who used a modem to break into an Air Force computer from his home outside Seattle. Through some Hollywood legerdemain he nearly started World War III by selecting "Global Thermal Nuclear War" on one of those user-friendly menus that popped up after he accessed a mainframe located in Colorado. As in most movies where Hollywood depicts a couple of crazy but good-natured kids just having a little fun, War Games ended on an upbeat note with just a small but palatable dose of morality.

Yet hacking -- the act of illegally accessing information from computers -- is stealing, and hackers are thieves. For the company or individual whose data have been tampered with, however, it really could seem like World War III. Unfortunately, the laws lag behind the technology. The federal government has prosecuted some hackers using outdated laws that were written in the 1920s for telegraph and wire fraud. The most publicized hackers caught are the teenagers, not unlike the young man in War Games. Rather than being treated as juvenile delinquents, they are treated as misguided computer geniuses and receive attention instead of criticism. Have you ever seen a teenager who shoplifted something or robbed a store treated with that kind of respect? After all, both types of acts are crimes. And since the legal system has been slow to pass laws dealing with this type of computer crime, many vendors have introduced products to thwart hackers.

But with such a serious problem as hacking, why do these vendors present their solutions in a carnival-like atmosphere? Often, these vendors have contests and offer large cash prizes to anyone who can break into their system. One vendor offered a \$100,000 reward to anyone who could bypass its security system. Why encourage behavior that the product tries to prevent? Certainly there are better ways of proving how secure a product is, be it a modem, a computer system, or a special kind of software. The most recent report of the American Bar Association's Task Force on Computer Crime counted 3,500 cases of hacking currently in litigation in the nation's courts. And a hacker has less than a 1 in 3,000 chance of going to jail. The extent of the crime committed is unknown, so it is difficult to undertake specific initiatives. Still, society's attitude about hacking has to change, as does the way antihacking products are marketed. It's time for all sides to get serious.

Data General is known for its grandiose product debuts. To introduce its smallest product, DG held its biggest event, a bash in the splendor of Lincoln Center's Avery Fisher Hall in New York. The DG/One lap computer was rolled out with the help of comic Rich Little and a symphony orchestra. The show was even more exotic than it smoke and sorcery intro of the Desktop Generation a year ago. What will DG do now for an encore? Perhaps its next major product intro will be aboard the space shuttle. The shows are fun, of course, but expensive and unlikely by themselves to lead to more press or sales. In fact, many in the industry consider them a waste of resources in a vain attempt at press. After all, how much have you heard lately about Desktop Generations?

PROCESSING SYSTEM

The S 4000 is a line of document processing systems that includes four models and four application software packages. The line has the capability to aid in the correction of unreadable characters by using image-lift technology and a newly designed, large character display screen. This technology also offers improvements in processing performance.

The system includes an operator adjustable keyboard, 400 documents-per-minute track speed, an 800-character system display, inbuilt 10MB fixed disk, 512KB memory, 1MB removable disk, four to 36 sort pockets, data communication capabilities, and a programmable dual-line matrix endorser that offers 40 characters per line. Advanced magnetic ink character recognition single-station dual readers are standard in two of the models.

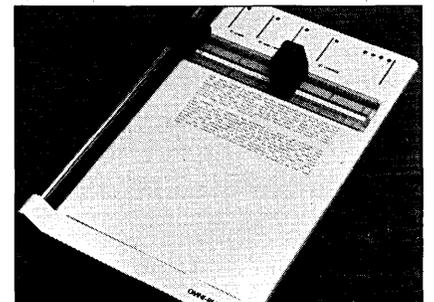
The series may be ordered with optional single or dual optical character readers (OCRs). The dual-station multi-font OCR can scan lines on two different levels, on the same document or on two different documents.

The application software for the system are: fine sort/bulk filing, proof of deposit, remittance processing, and data send and receive. Prices for the S 4000 models start at \$45,000. BURROUGHS CORP., Detroit.

FOR DATA CIRCLE 301 ON READER CARD

MICRO OCR

The Omni-Reader is an OCR compatible with most micros, including IBM's and Apple's. It is suited to small business and



HARDWARE

personal computer users in text-intensive applications.

This OCR is linked to a micro or word processor like a telephone modem, using the system's communication software. Operated manually, the device scans a line of type at a rate of two to three seconds per line. It consists of two moving parts, a read head and the tracking guide or ruler.

To operate the unit, a user passes a light-sensitive linear array (read head) across a line of text, using a ruler to guide its path. A special grating on the ruler is sensed to determine how fast and in what direction the line is being scanned. A series of vertical slices across the line of characters makes it possible to retain and store the scanned information.

Input is analyzed by a dedicated microprocessor using algorithms to process a line of recognized text ready for transmission to the host computer. Any characters not recognized because of poor print copy may be edited using the computer's keyboard and text editing software from the vendor.

The unit reads Courier 10, Courier 12, Letter Gothic, and Prestige Elite. An upgrade will soon be available to allow the device to learn new typefaces. The product will then be able to analyze and read typefaces other than those built into the machine. Also as upgrades, additional type font selections will be provided on disks to be downloaded to the OCR. Omni-Reader costs \$500. The software package costs \$50. OBERON INTERNATIONAL, Dallas.

FOR DATA CIRCLE 302 ON READER CARD

WORD PROCESSOR

The DECmate III is a word processor designed for clerical workers, managers, and other professionals who handle large amounts of text, but who also need full communications and other office applications.

The product comes with monitor, keyboard, system unit, and the vendor's WPS word processing software, including communications, list, sort, and math. It is currently available in an English language version. The product will soon support

French, Spanish, Italian, and German. Software adaptations will also be available for Scandinavian countries. Each foreign language system includes a complete Country Kit with specially tailored keyboards rather than foreign language overlays for English-style keyboards.

The product can work as a full-function word processor and as an integrated office terminal. Options for the system include an integral modem and such applications as DECspell spelling corrector, spreadsheets, and database managers. A letter-quality daisywheel printer will also be sold with the word processor.

Prices for the DECmate III start at \$2,100. The LQP03 letter-quality printer costs \$1,100. Purchased together, they sell for \$3,200, in quantities of 100. DIGITAL EQUIPMENT CORP., Maynard, Mass.

FOR DATA CIRCLE 303 ON READER CARD

FAULT TOLERANT

The Areté 1124 is a fault tolerant 32-bit minicomputer for on-line information processing. It features a dual 68000-based engine running under Unix, and a proprietary multithread architecture that tightly couples the dual 32-bit processors. According to the vendor, this architecture provides a series of data paths that optimize memory access, interprocessor communications, and data transfer. I/O data flow is also increased, as well as the system's performance at the cpu level.

The vendor says numerous reliability features have been designed into the hardware. Included are mirrored disk drives, power margining, EDAC memory protection, and redundant cooling. An optional uninterruptible power supply is also available.

The system supports two operating systems: Unix System V and RM/COS (COBOL compatible). RM/COS supports high-speed file access methods at the operating system level. Identical COBOL compilers, moreover, exist under both RM/COS and Unix so that the software developed under Unix can also run under RM/COS.

Within the product are 10 card slots to accommodate various configurations. Three slots are for cpu memory cards, while six are for I/O expansion. The remaining position is reserved for a memory controller that manages the data flow among system cards. Memory is presently available in 2MB increments, with an 8MB card planned.

The unit measures 14 inches wide, 28 inches deep, and 54 inches high. It weighs 250 pounds. Prices for the 1124 start at \$60,000. ARETÉ SYSTEMS CORP., San Jose, Calif.

FOR DATA CIRCLE 304 ON READER CARD
—Robert J. Crutchfield

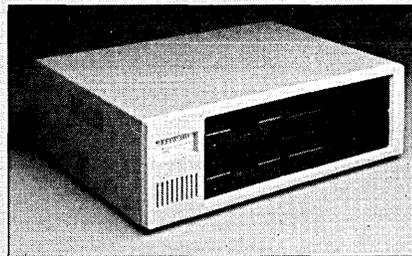
HARDWARE SPOTLIGHT

DOCUMENT CONVERTER

The Keyword 7000 is a hardware and software system that can interchange diskettes between incompatible word processors from almost any manufacturer, according to the vendor. For example, a user can create a document on a diskette on one word processor, use the product to generate a diskette compatible with another word processor, and then edit or manipulate the document on the second word processor as if it had been keyed into that machine originally. Offices can use this product to convert diskettes between incompatible word processor systems within the office, between personal computers used by employees either at work or home, or between a new word processing system and the installed system it replaces.

To accomplish the disk-to-disk conversion, users need the vendor's software pairing diskettes used in conjunction with the hardware. These are tailored to a specific combination of word processors. Currently, the unit translates pairings among the following: IBM Displaywriter, Xerox 820, Lanier's No problem and Super No Problem, Philips' Micom 2000 and 3000 Series, DECmate II, Multimate (PC/DOS), WordStar (PC/DOS and CP/M), and Wang (WPS/OIS/VS).

The converter works as a peripheral to an IBM PC or PC-compatible product. The unit consists of a controller board, which is inserted into an expansion slot inside the personal computer, and a disk drive box that sits on top of, beneath,



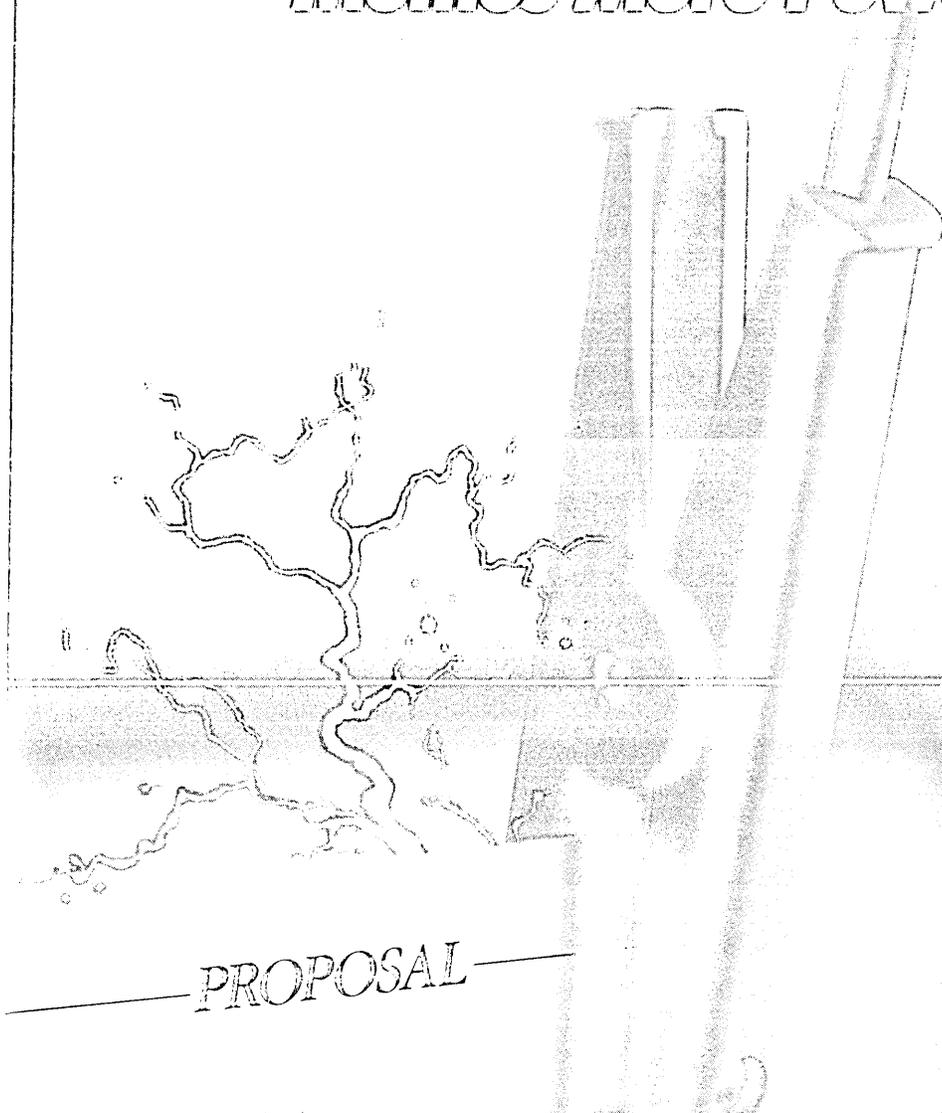
or beside the micro. The board contains the proprietary CMOS chip, which is a universal floppy disk controller that can run any kind of disk, the vendor says. The disk drive box houses two 5¼-inch drives and two 8-inch drives. The system can also support 3½-inch drives.

The menu-driven device uses a proprietary windowing package. Users can translate information from the source disk to the target disk with a minimum of keystrokes. The vendor says it takes approximately 13 seconds to convert one page of text from one disk to the other.

The system is designed for use by untrained operators. Illustrated printed documentation consists of a nontechnical user's manual with appendices for more detailed information. In addition, it has context-sensitive, on-line help screens that give information depending on the point in the operation at which the user hits the help key. The Keyword 7000 costs \$10,000 and includes one software pairing. Additional software pairings are available for \$500 each. KEYWORD OFFICE TECHNOLOGIES INC., San Jose, Calif.

FOR DATA CIRCLE 300 ON READER CARD

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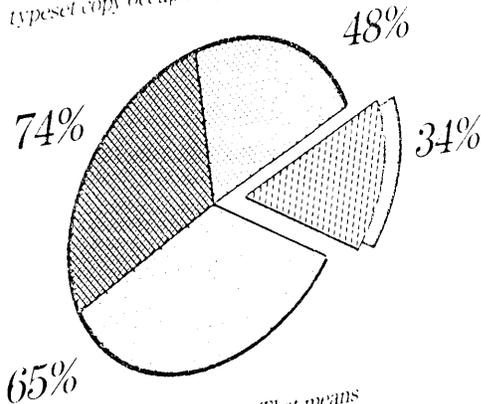
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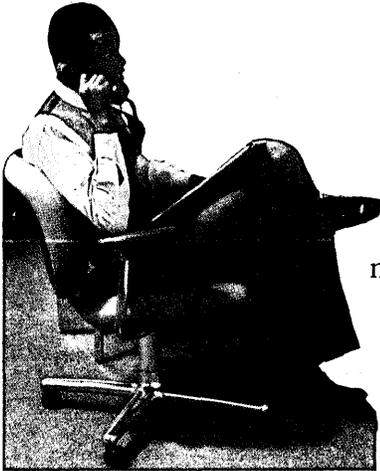
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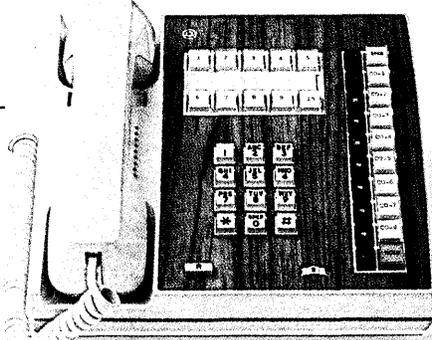


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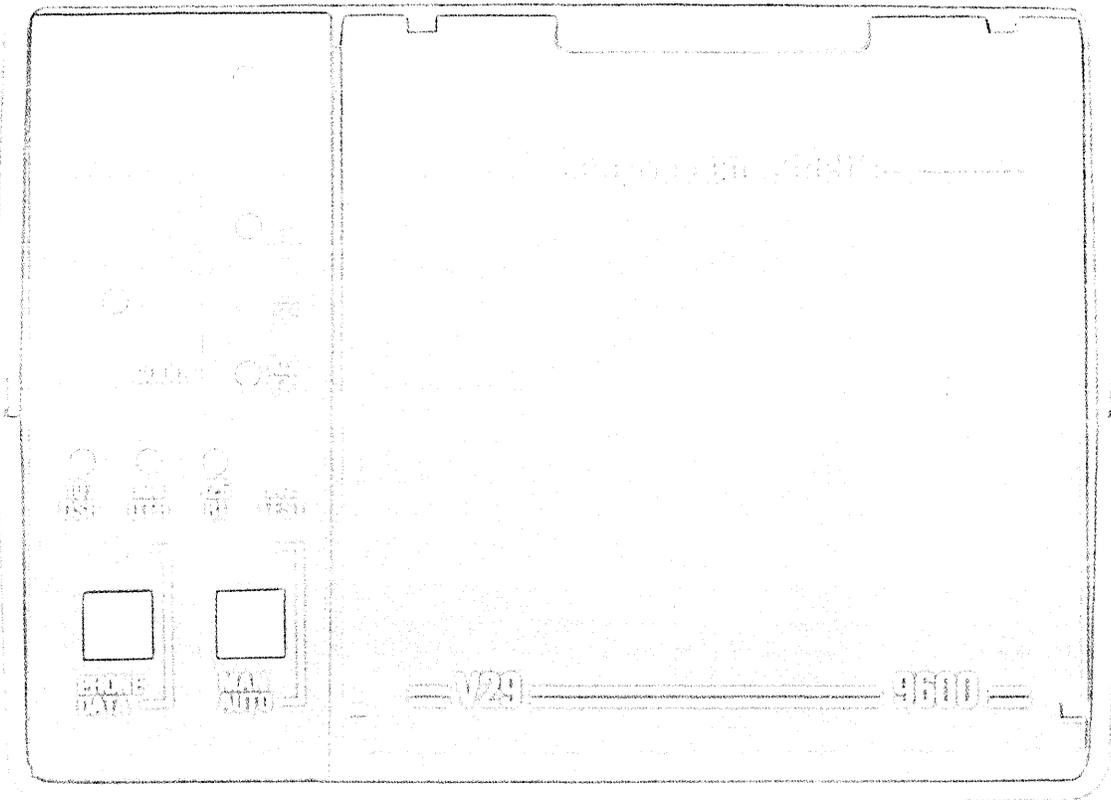
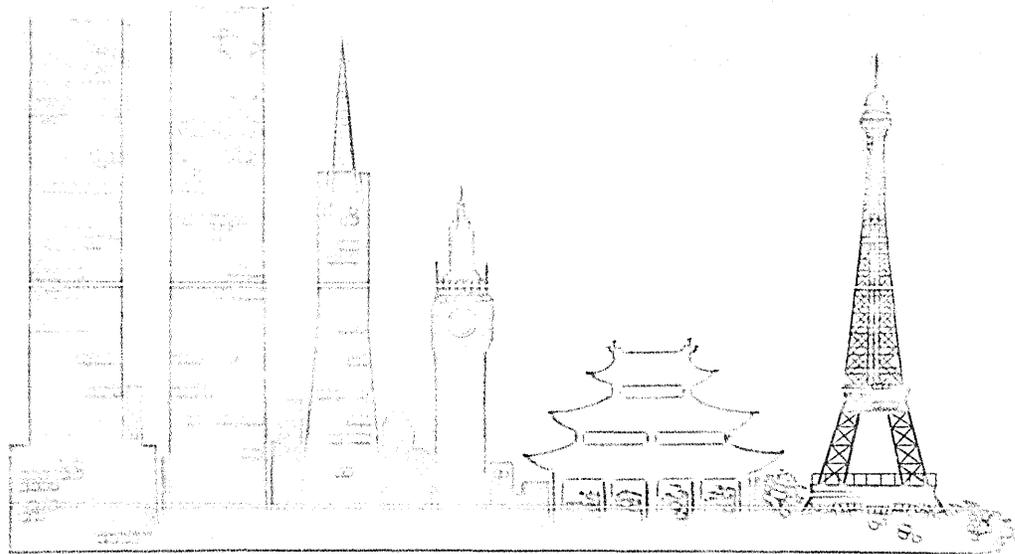
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CIRCLE 79 ON READER CARD



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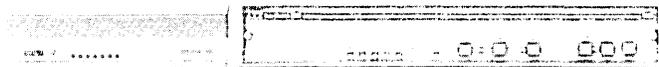
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SOFTWARE AND SERVICES

UPDATES

For months rumors persisted that IBM would take a more aggressive posture in developing and selling microcomputer software. Almost like a self-fulfilling prophecy, it has come to pass, with implications that have shaken the foundation of the micro software industry. On the heels of its PC AT cpu announcement, Big Blue quietly introduced 31 software packages that integrate accounting programs with programs for building spreadsheets, preparing graphs, and creating reports. All of the software was developed at IBM's Boca Raton Entry Systems Division. There was nothing earth-shattering in the technology announced: for every package introduced, there are at least five competitors now on the market. In terms of sheer numbers, rolling out 31 products at once would seem like a lot, but the mass debut was diluted by Peachtree Software's introduction of 24 similar products in a single day last spring. IBM also didn't have the benefit of John Imlay, the flamboyant chairman of Peachtree's parent company, Management Science America, hosting the proceedings.

Before IBM's announcement, the software community felt that whatever IBM did could only help their sales. Some of these vendors were trying to make private label deals with IBM, while others banked that IBM wouldn't get involved in whatever products they were selling, or that its size would prevent it from offering direct and convenient customer service. On the whole, these third parties have been underestimating IBM's commitment and the effect of its entry, if Wall Street's reaction to the IBM announcement is any guide. Stock prices of the major independent software companies tumbled, and MSA's Imlay put Peachtree, one of the biggest and heretofore most successful micro software vendors, on the

selling block almost instantly. (It is also selling DesignWare of San Francisco, an educational software supplier it had bought just months earlier for \$2 million.)

The reason for the sudden pessimism regarding micro software companies is simple: software was the one product area where IBM's national sales force competed unfavorably with local retailers because the IBM-endorsed product line was slim and support via traditional channels would have been too convoluted for such low-ticket items. IBM seems to have heard all the vendor and user concerns about service and done something about them. The computer giant has greatly increased its staff in its customer service center in Atlanta and plans to provide a service called Response that will offer telephone support for users who purchase the software. An initial period of such support is included in the price of the products; longer periods are available as options. The software itself includes order entry, general ledger, accounts payable, and other programs, all priced from \$100 to \$700.

Even as it is dumping Peachtree and DesignWare, Atlanta-based MSA is expanding its mainframe software offerings. Its Information Expert reporting and retrieval system is its first attempt at a natural language product. It charts a middle road between the highly advanced nature of Artificial Intelligence's Intellect and the more mundane query systems offered by most vendors. The product is free to all MSA applications software users with maintenance contracts. The vendor also introduced a new purchasing system and is building a health care cost accounting system. MSA has tapped several leading medical centers to codevelop the system, and feels their input will enhance the design of the software.

APPLICATION GENERATOR

The Factory (version 2.5) is an application generator. This version adds a CAD/CAM-like visual programming aid in the form of an action diagrammer and an advanced report generator to the automated application development tool.

The product includes an application generator and integrated fourth generation language (Builder). It is used to develop complex business applications for the Digital Equipment Corp. VAX/VMS environment.

The computer assisted action diagrammer is a graphical language editor that provides a visual representation of Builder program code, which facilitates the addition of custom program logic to Factory-generated code. The editor also checks the syntax and consistency of code while it is being entered on-line. The diagrams produced by the product's graphical language editor graphically depict the structure and flow of program logic, which makes program code easier to understand, the vendor says.

The action diagrams consist of brackets used to show the control structure of the program. The advanced report generator is fully integrated with the software's data dictionary and enables users to produce complex reports. Reports are formatted interactively on-line with a crt screen using a screen painter.

The product includes an RMS interface that supports sequential and indexed file access to other VAX applications and products and a menu-driven guidance system, which helps inexperienced users through the application development process. Additional modules are also available including an accelerator for faster run time and greater machine efficiency; a targetor that allows applications to run on PDP-11 or Professional 350 computers; a run-time system that enables the user to run applications on VAXs not used for application development; and an end-user facility that has English commands for ad hoc queries, reports, and statistical analyses. Prices

SOFTWARE AND SERVICES

range from \$10,000 to \$25,000. CORTEX CORP., Wellesley, Mass.

FOR DATA CIRCLE 326 ON READER CARD

LETTER WRITER

EZ-Letter is a letter writer software package for IBM and compatible mainframe computers, which generates customized high-speed computer letters. It is suited to mailers who need to generate personalized letters by computer.

The software handles all printing jobs, from labels to complex computer output forms. It will handle personal, data variable letters; direct mail packages; coupons; business reply mail; enrollment forms; and membership forms. The system merges variable data from files, then formats and prints without the need for special programming expertise.

The parameter-driven design of the product enables clerical staff to be trained to operate the system. Simple letters can be prepared, proofed, and ready for production in less than an hour, the vendor says, adding that complex, multi-page, double-sided letters with rotated copy windows can be done in an hour.

Features include restarting capabilities, font translation, multiline selection, name formatting, gender analysis, table handling, multiple side-by-side printing, user exits, copy window rotation, upper- and lowercase control, variable and fixed text insertion, and word wrapping. It may be used with impact or laser printers. EZ-Letter costs \$23,000. COM-MAIL, Washington, D.C.

FOR DATA CIRCLE 327 ON READER CARD

DATA LINK

Merlin is an intelligent software data link in both mainframe and microcomputer versions. It supports and facilitates distributed applications, data capture, and queries through executive workstations, office automation and operator functions, hybrid applications combining mainframe and micro processing, corporate data storage, and local microprocessing.

From the Mainframe, the product allows dp management to control data distribution to a pc network. It includes a distributed data dictionary, protocols, and standards that ensure all data entering or leaving the mainframe is consistent and security controlled.

A set of utilities provides interfaces to a variety of DBMS, word processing, and graphics packages.

A built-in link command language allows applications to be built and run simultaneously with the communications link. It also has the ability to maintain synchronized distributed databases. According to the vendor, this product gives users in the micro and mainframe environment maximum use of stored information, while at the same time, providing dp management with tools to control the network. The product runs on IBM PCs including the PC XT and PC AT. The product also supports a variety of emulator boards. The mainframe system runs in all IBM and compatible mainframe environments under OS or DOS, and directly interfaces to IMS, IDMS, and ADABAS. The mainframe version of Merlin, including a distributed data dictionary, sells for

\$20,000. The PC version costs \$1,900. TES-SERACT CORP., San Francisco.

FOR DATA CIRCLE 328 ON READER CARD

VM PERFORMANCE MONITOR

Explore/VM is an interactive VM performance monitor. Its real-time facilities are used for monitoring VM's performance on a short-term basis. A series of plotting options is available for comparing data and generating reports immediately. The batch facilities are used for identifying long-term trends.

Performance data gathered by the system is formatted by a special program into historical records. These records can be written to tape and/or disk for processing by the reporting facility.

Other facilities include user-definable exception reporting used to notify the performance analyst of potential performance problems on-line; degradation analysis, which constantly monitors a fixed set of critical resources to identify performance problems over the short term and to identify problem patterns over the long term; a long-term archiving facility to archive performance data for long-term trend analysis; and a flashback facility that allows previously collected performance data to be redisplayed in a real-time mode. Explore/VM has an introductory price of \$5,600 for a permanent license or \$140 per month for a three-year renewable license. GOAL SYSTEMS INTERNATIONAL INC., Columbus, Ohio.

FOR DATA CIRCLE 330 ON READER CARD

APPLICATIONS PROTOTYPING

ACT/1 is a prototyping tool for on-line application development. It provides the developer and user with a living mock-up, or scenario, of an on-line system. The user then evaluates the system before a large investment is made in coding, the vendor says.

It provides users with feedback on possible improvements to a system. It allows full participation of the user in system design at the human-computer interface. Also, the software presents a means for programmers to approve or sign off on a proposed application before coding has begun, yet with a good understanding of what they will get. In addition, the software provides a tool for new system development and old system enhancement and offers working models for development of on-line menu-driven systems.

The product is compatible with IBM or IBM-compatible systems under the DOS/VS(E)/CICS(VS), O/VSI, MVS, MVS/XA/CICS(VS), TSO, and VM operating systems. ACT/1 costs \$23,000. SYNERLOGIC INC., North Andover, Mass.

FOR DATA CIRCLE 331 ON READER CARD

—Robert J. Crutchfield

SOFTWARE SPOTLIGHT

DBMS FOR VAX

ADABAS (VMS) and Natural (VMS) are database management and information processing software tools for users of Digital Equipment Corp.'s VAX-11 superminicomputers.

ADABAS (VMS) can process a high volume of transactions against very large databases in a multi-user production environment. It has all the features required for production usage, such as automatic restart and recovery after hardware or operating system failure, the ability to restore data after a failure like a disk head crash, transaction processing (where changes or additions to a database are grouped as one logical transaction that must be applied together or else backed out), and a mechanism that prevents deadlocks that could arise when more than one user attempts to update the same record. ADABAS (VMS) allows databases to be stored across separate disk volumes, and can handle databases that are many gigabytes in size. It also has a direct call interface that allows it to be

called from any standard VAX programming language.

Natural (VMS) allows users to create applications for information entry, retrieval, updating, and reporting without having to code in traditional programming languages. Users with no programming background can use Natural (VMS) to work with data stored in ADABAS (VMS) databases. This product uses characteristics of VT100/200 type terminals for forms generation, and for the interactive editing and correction of Natural programs. This editor is a superset of EDT, the standard DEC full-screen editor.

ADABAS (VMS) and NATURAL (VMS) both have an on-line help facility. The vendor is offering both products together as a package for \$50,000. The price includes installation, documentation, an on-site training package, and the first year of product support including a telephone hot line, and maintenance. SOFTWARE AG OF NORTH AMERICA INC., Reston, Va.

FOR DATA CIRCLE 325 ON READER CARD

The IBM Instructional Systems

Now you can have a comprehensive training system with IBM host and PC compatibility.

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*Developed for IBM by Computer Systems Research, Inc.

The New Cincom: 10 the only software we

Finally, there's one software vendor offering a sophisticated software information network capable of meeting all of your corporate, departmental and personal information software needs—The New Cincom Systems. Organizations around the world are discovering that working with Cincom's integrated family of products enables them to greatly improve both performance and productivity. Here are just 10 of the many reasons why you should be considering the New Cincom software information network for your company:

#1 Relational Data Management Technology

Powerful relational data management technology forms the "nucleus" of our software information network. Using a unique "Logical View" concept, all applications operate directly with "derived relational tables." As a result, we can provide complete data structure independence, as well as the high performance needed for today's production environments. This relational technology is the nucleus of both our TIS™ family of information products for IBM users and our ULTRA INTERACTIVE DATA BASE SYSTEM™ for DEC™ VAX™ users.

#2 Fourth Generation Application Development

The perfect complement to our relational data management technology is our industry acclaimed 4th Generation application development system, MANTIS™. In more than 1,500 complex production environments, MANTIS is dramatically reducing the application backlog through its powerful ability to "prototype," refine and commit the application to production in one interactive sitting.

#3 Manufacturing Control Software

CONTROL: MRPS is our sophisticated manufacturing control system that is fully integrated with our relational data base

You should know how our integrated family of software technologies meets all your information processing needs.

The New Cincom is an integrated family of information management software solutions serving more than 2,500 users. From this experience, we've gained a keen understanding of the kinds of information handling problems facing the business world today.

Our approach to information processing identifies three different business levels in today's typical organizations: corporate, departmental, and personal. And we've developed a comprehensive network of software technologies that satisfies these needs through three levels of implementation: Strategic, Tactical, and Local.

The New Cincom's family of software technologies provides the optimal, integrated solution for all three levels of your company. And when used individually, they completely satisfy your specific requirements and provide a flexible foundation that will adapt to your future information processing needs.

The New Cincom's Family of Software Technologies

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- Application Data Management
- Decision Control Applications Management
- Business Support • Network Management
- Relational Data Management

ments. Nucleus provides both true data structure independence and the high performance needed for today's production environments. The power of Nucleus is incorporated within TIS™, our family of integrated information management products for the IBM environment, and the ULTRA INTERACTIVE DATA BASE SYSTEM™, our product family for the DEC™ VAX™ environment. The common NUCLEUS architecture of TIS™ and the ULTRA INTERACTIVE DATA BASE SYSTEM™ assures compatibility and eliminates conversion across the IBM and DEC environments.

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The perfect complement to our relational data management technology for your industry application development system, MANTIS™. A major breakthrough in software technology, MANTIS is the only system available that provides complete, beginning-to-end, on-line application development—all in one sitting. By using highly effective methodologies such as prototyping, MANTIS helps you dramatically reduce development time and even eliminate your application backlog.

CHICKET™ is our MANTIS 4th Generation technology applied to provides the same powerful

development tools as MANTIS for your personal environment. And when combined with PC CONTACT™, our interactive terminal, you can use CHICKET to interact directly with the mainframe.

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Also integrated with our data base technology and designed for use in VAX environments, CONTROL: MRPS™ and CONTROL: FACCS™. MRPS is our industry-proven manufacturing inventory control system that's guaranteed to dramatically improve your company's production and profitability. CONTROL: FACCS is our outstanding new financial applications package, written in MANTIS and completely integrated with MRPS.

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A high priority in our needs management solutions for the business community, is the personal, local level of needs of end users in both the mainframe and micro environments. To meet the needs of organizations in which end users interact in a terminal environment, we offer the MANAGE USER SERIES™. Using the power and the accessibility of the mainframe, the graphics, spreadsheet, text processing, and 4th Generation application development capabilities to provide PC-like capability while ensuring DP control.

Network Management
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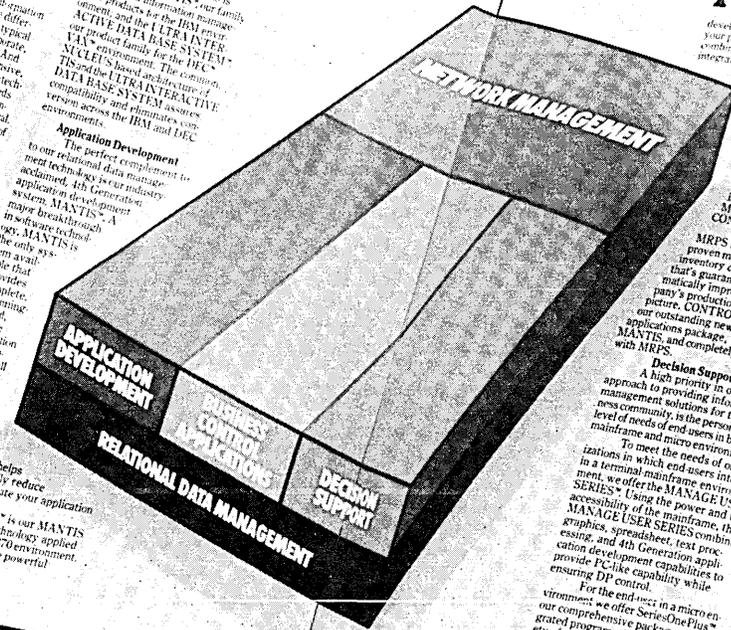
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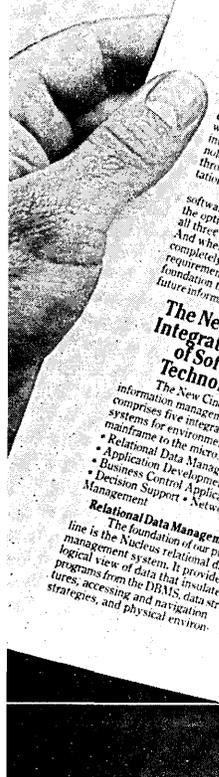
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technology. A complete closed-loop system, MRPS is improving the productivity and profitability of over 125 IBM and DEC VAX manufacturing environments around the world.

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#6 The Interactive Mainframe—Micro Link

Further expanding the capabilities of our software information network is **PC CONTACT**, our mainframe-micro link which enables users to interactively upload/download data between the mainframe and IBM PC's. **PC CONTACT** gives the PC user the ability to access multiple file types stored in the corporate data base for Decision Support manipulation.

#7 Micro Decision Support Software

For comprehensive micro-level Decision Support we offer **SeriesOnePlus™***. **SeriesOnePlus** includes file management, spreadsheet, graphics, reporting and word processing components that are all integrated through a unique "BUS" architecture. Because the system is designed exclusively for business situations, **SeriesOnePlus** complements any mainframe-micro network strategy.

#8 Mainframe Decision Support Software

The recently introduced **MANAGE USER SERIES™** provides powerful Decision Support capabilities for the mainframe user. The **MANAGE USER SERIES** combines graphics, spreadsheet, text processing and application development tools to enhance the use and display of corporate data.

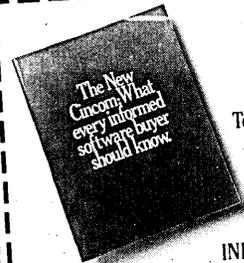
#9 Client Support

The one thing that isn't new about Cincom is our unrivaled commitment to service, support and user education. When you choose Cincom you can be assured of the highest caliber of support.

#10 Software Excellence

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believe our new products provide the highest degree of reliability, integration, performance and value in the industry. As proof, just look at our sales. From 1982 to 1983, **TIS** sales rose 136%, **MANTIS** sales rose 50%, and **MRPS** sales rose by 45%. For even more proof we invite you to personally compare our products with what our competitors are offering. Then you'll understand why the words "Excellence In Software Technology" fit so well under our name.

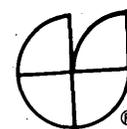


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CIRCLE 82 ON READER CARD

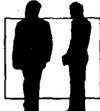
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CIRCLE 83 ON READER CARD

SOURCE DATA

BOOKS

LOOKING AT EIES

Computer-mediated communications systems, especially those loaded with conferencing facilities, seem to be tailored to the needs of scientific research communities. The obvious genius of such networks is the efficiency they add to the creation and exchange of knowledge. However, to equate efficiency with time economies alone (i.e., more messages per hour) is to settle for small change. Computer conferences are the stuff of new forms of scientific production.

Online Communities: A Case Study of the Office of the Future, by Starr Roxanne Hiltz, evaluates the Electronic Information Exchanges System (EIES), a computer conferencing system based at the New Jersey Institute of Technology, Newark. EIES is comprised of academic researchers engaged in multidisciplinary areas such as futures research, social network analysis, general systems theory, and human factors in person-machine systems. EIES provides the means for ongoing conferences on any subject users decide to discuss. The network has been in place since the late 1970s, but much writing about it so far has been anecdotal. A formal evaluation capable of yielding useful and generalizable data is welcome.

Online Communities attacks two problems: identifying likely users of the network and examining the impact of participation on user groups. It's clear that the effort produced a welter of data, which may have led to difficulties in organizing the presentation. More significantly, Hiltz and her team floundered at defining the research problem itself.

The analytical framework employed here, a standard input/output model, was first developed by the Institute for the Future, Menlo Park, Calif., for its evaluation of PLANET, a proprietary computer conferencing system. Both studies examine characteristics of

individual users and scientific user groups, the tasks they perform on their systems, and the systems themselves. These variables were treated as inputs, quantified according to the following logic: "Characteristics of individuals which were measured include skills (such as typing and previous computer experience), initial attitudes toward the system they were invited to use, pre-existing patterns of communication and exchange with other scientists in the speciality, and access to computer terminals. Among the important characteristics of the group are its size, cohesiveness, leadership, and the task it is trying to accomplish through the computer system. Important system characteristics include ease of learning, quality of documentation, friendliness of its interface, and the capabilities it offers."

Two vexing sets of difficulties emerge in the approach, although neither is in any way particular to Hiltz's work. First, input/output modeling nearly always creates more difficulty than it resolves. In a simple sense, all actors (whether they are corporations or, as in this case, persons) described by the same inputs ought to yield the same outputs. Quite obviously, they do not. In Hiltz's analysis, the output is a decision to accept EIES, and Hiltz must resort to vague residual concepts like "an interplay of attributes" to explain what her model cannot.

The other difficulty involves a confounding of findings and explanations, a more subtle point that's best illustrated by the relatively trivial quality of much of Hiltz's data. For example, she writes, "The strongest predictor of level of EIES use is the participant's own estimate of the time that will be spent online, before ever using the system." Rather than take preknowledge as a problem to be explained using methods of, say, social network analysis, Hiltz leaves her insight at an altogether inappropriate level, supposing that "there may be some important underlying psychological or

motivational traits that may predict acceptance of systems such as EIES." She goes on to muddle the matter by asserting "An *indirect indicator* [of these traits] is the finding that scientists at the middle levels of productivity and connectivity within the specialty tend to use the system more" [emphasis added].

The psychological assumptions are retained even where they are inappropriate on the surface of the matter. Put simply, computer conferencing as it's depicted here is about nothing more than the reorganization of work. "Enthusiasm" and "emotional commitment" are problems in that context, not explanations. Hiltz does approach interesting territory when she describes EIES members as midcareer characters working in search of a disciplinary base. But she misses the boat by not recognizing and glossing over these variables as the powerful explanatory vehicles of system acceptance that they surely are.

A more useful set of research instruments would have produced a more interesting collection of insights. For example, begin with the assumption that work is the principle economic activity, in itself and as a role linking individuals to the economy in its largest sense. Then build the research instruments around the insight that EIES in particular, and office automation in general, reorganizes many conditions of professional work. People work to maximize their benefits, but OA researchers often fail to recognize the many ways workers define benefits. As a result, social and even marketing issues rest on an uneasy foundation.

The payoff from the research begins precisely where individual users are effectively linked to the social organization of their professions. Consistent with other evaluations of teleconferencing systems, Hiltz found an evolution, "a pattern of change toward greater complexity, specialization, and diversity of user behavior." After passing through a threshold

SOURCE DATA

(about 50 hours of experience), EIES members "come to feel that a wide variety of communication spaces and capabilities is necessary, and the less likely they are to be satisfied with a simple message system. The group-oriented and conferencing features become much more important, as do the features that are necessary for storage, retrieval, and manipulation of text for documents" (pp. 100-101).

Systems designers and OA planners ought to be quite interested in what follows. The increasing demands placed by experienced users on the system call for what Hiltz describes as "evolutionary design." Specifically, "experiences with EIES suggest that system functions should be modifiable and extensible for specific groups and applications." That is, Hiltz suggests the incorporation of system features that enable users to customize software in order to meet immediate problems and to transform the entire system over the long run; she grotesquely designates this process "participatory evolutionary customization."

At its best, this research suggests broad and generalizable lessons. For example, EIES members spend more time communicating with their colleagues than they might otherwise, and they broaden their score to include increased contacts with others outside their discipline. Increased use of EIES also leads to increased communication with off-line colleagues. Indeed, particularly high levels of EIES participation appear to promote high levels of use of all media, including mail and telephone. Also, EIES users perceive little if any effect on their travel habits, but those who do perceive an impact are about as likely to report an increase as a decrease. So much for media substitution effects and the telecommunication/transportation trade-off.

The most important finding in the entire project is the indication that participation in the EIES network clarifies the users' sense of an "intellectual mainstream" in their specialties. Turned on its side, the point suggests that participation produces an understanding of the bases of their communities. Never mind that the same participants eventually perceived themselves as farther out of the mainstream than before. They broadened their perspectives, increased their sense of commitment to others on-line, and many reported an increase in productivity.

While Hiltz goes to some pains to avoid generalizing her results, it would be a mistake to accept her reticence. The situation of the research scientist is not so different from the one confronting R&D teams in a geographically dispersed corporation. We can look to Xerox, IBM, or any other information-intensive corporation for an example, and hypothesize a

similar experience to the one reported for EIES. Furthermore, it would be useful to inaugurate similar research on computer-mediated communication systems, accepting an interest in participatory design, but aimed at a lower corporate level. Indeed, EIES may well contain interesting lessons for management in an age and in an industry so preoccupied with matters of corporate cohesion and morale. Ablex Publishing Corp., Norwood, N.J. (1984, 256 pp., \$32.50).

Computer-Mediated Communication Systems: Status and Evaluation, by Elaine H. Kerr and Ms. Hiltz, is part of the same effort described in *Online Communities*, but is an academic exercise in the very worst sense of the term. It pretends to be a literature review (a very underrated research format in the computing and telecommunications industries) and a synthesis of knowledge gathered from evaluations of EIES and other computer conferencing systems. A disorganized project is made nearly incomprehensible by the authors' efforts to graft onto their review the results of a Delphi conference populated by the designers of the competing systems. The resulting document is a desperate effort to convince someone (funding authorities? academic colleagues?) that there is authoritative social science going on here rather than good old-fashioned evaluation research. In the process, neither goal is achieved. Academic Press, New York (1982, 212 pp., \$27.50).

—Kenneth R. Donow

BOOK BRIEF

COMPUTER SCIENCE AND DESIGN

The Handbook of Computers and Computing, by Arthur H. Seidman and Ivan Flores, is a hefty reference volume that gathers 50 original articles on many aspects of computer science and computer design. It's aimed at electrical engineers and programmers who need a quick introduction to areas outside their specialties, and at students and anyone else wishing to learn quickly about various areas of the field. The authors of the papers range from college professors to people working at computer and user companies. Their contributions have been organized under six major headings: components, devices, hardware systems, languages, software systems, and procedures. Obviously no book can cover a fast-moving field like computing, but this one brings much useful information together under one cover, and, with judicious use of diagrams, charts, and graphs, is aesthetically pleasing as well as informative. Van Nostrand Reinhold, New York (1984, 874 pp., \$77.50)

REPORTS & REFERENCES

EXPERT SYSTEMS

Few aspects of computing have received as much attention lately as so-called artificial intelligence, particularly the area of knowledge-based expert systems. These complex programs are designed to capture the rare, hard-earned expertise of certain human specialists and make it available in interactive, automatic form. This 375-page report surveys the burgeoning commercial expert systems field, including detailed descriptions of the numerous companies that sell finished expert systems and tools for building them; a rundown of the many such systems that have already been built; discussions of the programming techniques used in expert systems; and forecasts of various market sectors. "The Commercial Application of Expert Systems Technology" costs \$395, airmail included. Order from Ovum Ltd., 14 Penn Rd., London N7 9RD, England.

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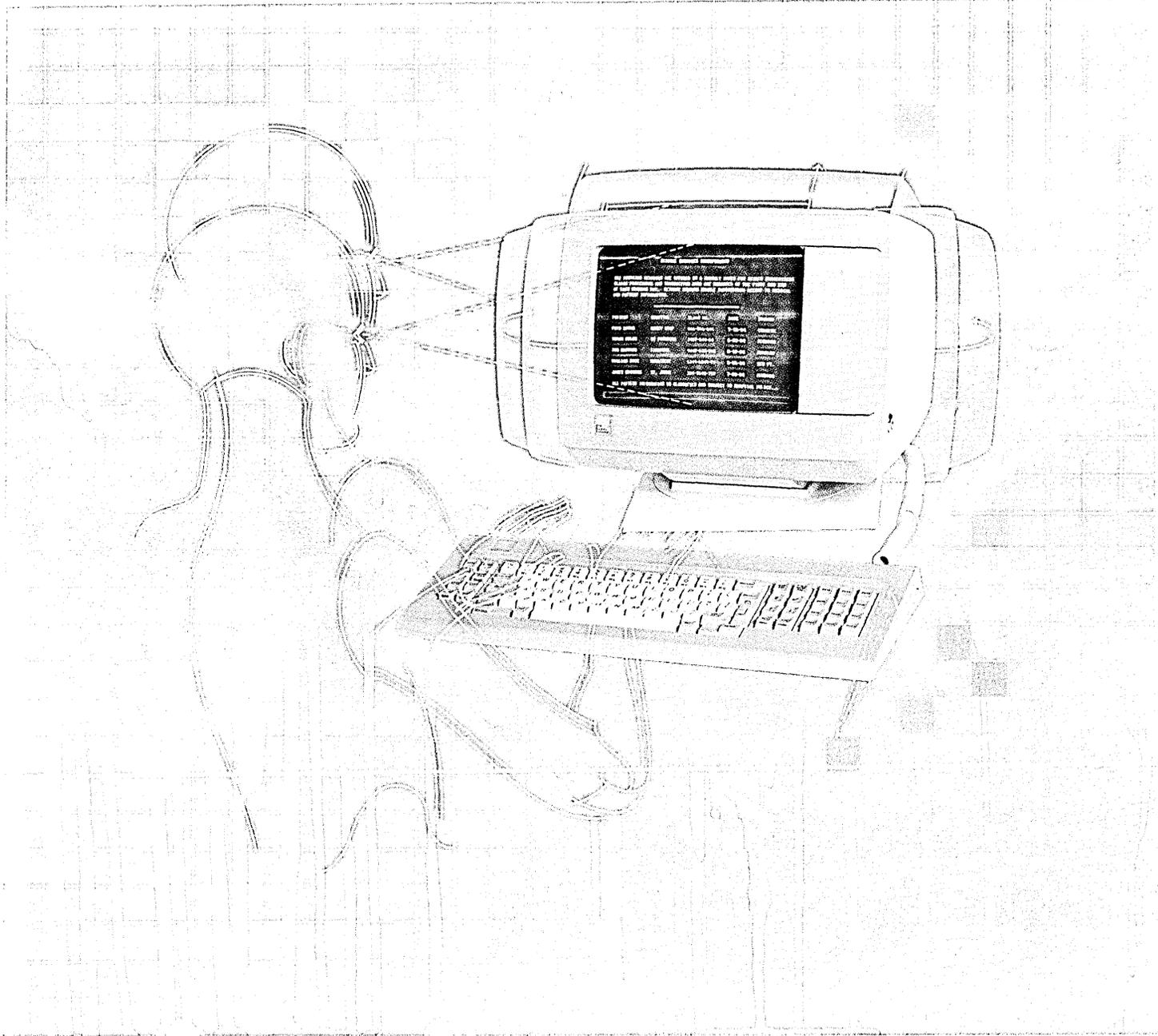
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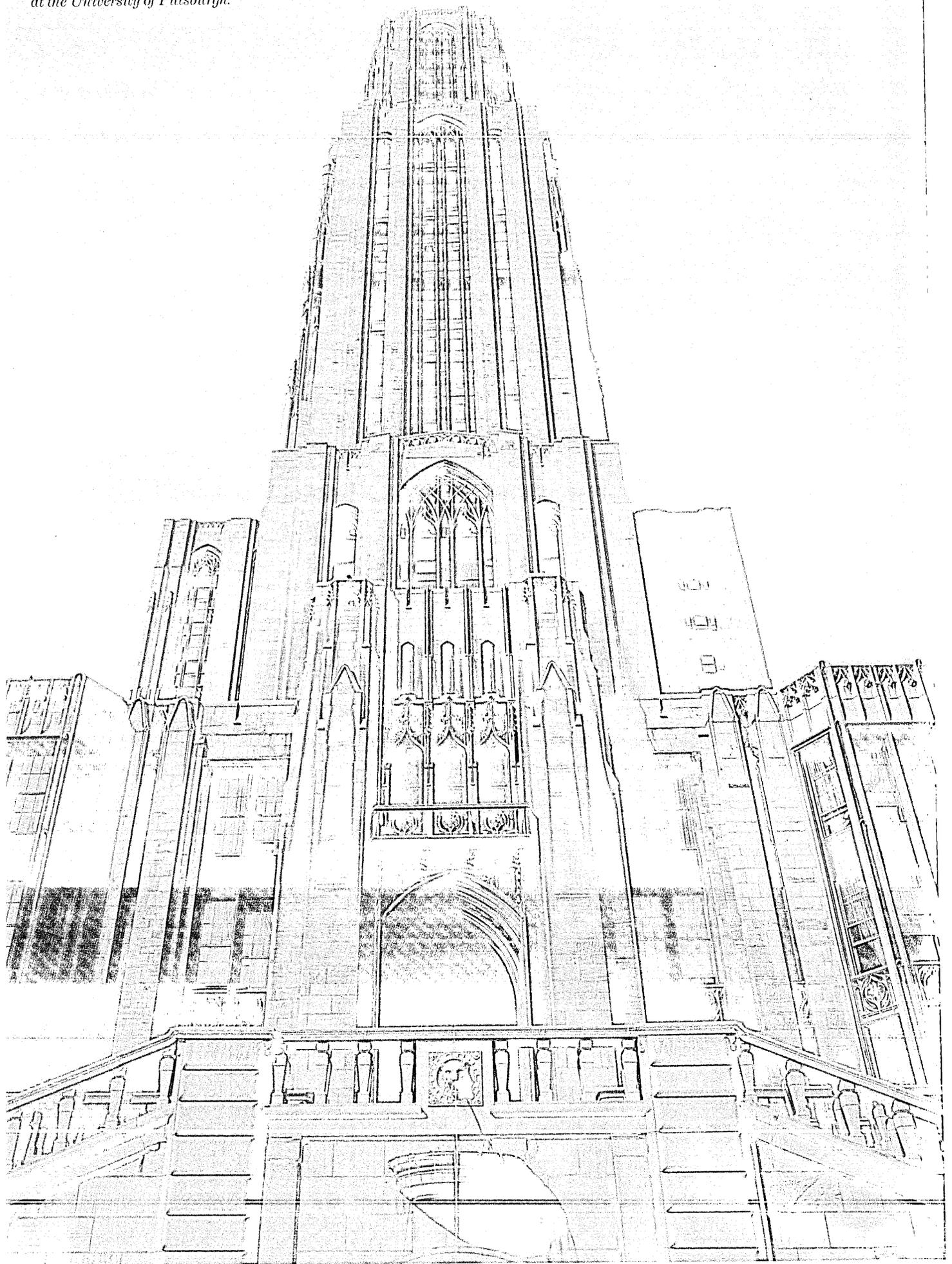
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ON THE JOB

HIGH-TECH MANAGEMENT

As businesses become more dependent on technology, they naturally begin to employ more high-tech professionals. For many companies, this influx can necessitate some changes in traditional personnel policies. Dixie Lea and Richard Brostrom, both of Lea Associates, Resources for Human Development, Pacific Beach, Calif., claim that today's high-tech professionals need a different kind of management because their motivations,

attitudes, and capabilities are different from those of other workers.

In a paper they've prepared, they claim high-tech professionals are very self-directed. Within a specialized area, moreover, they are likely to be more competent than their superiors.

Classic management techniques assume that the manager is a controller of work, as opposed to being a coordinator of people. They stress planning, organization, control, implementation, monitor-

ing, presentation, and decision-making. For technical pros, Lea and Brostrom argue in favor of something they call nondirective management. Nondirective management activities include listening, facilitating, following, coordinating, asking, responding, providing administrative support, synthesizing, integrating, and creating individual incentives.

In other words, managers of high-tech pros "need to make creative exceptions to some rules, rather than simply

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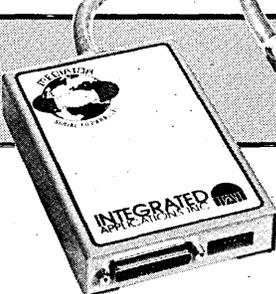
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ON THE JOB

reinforce them." They need to help subordinates solve problems and find answers to their questions rather than do it for them. This, say the consultants, is the path to growth, development, and satisfaction of the staff.

In production work, people are pretty much interchangeable; the technical environment, however, requires highly specialized talent, so the technical manager has to put more emphasis on the selection of people. Along with this increased selectivity, Lea and Brostrom say, the technical manager should be more demanding and refuse to accept work that is not up to high standards.

Lea and Brostrom also believe that high-tech professionals need to be given more freedom, like being permitted to select their own working hours, dress as they wish, write their own job descriptions, and choose from among fringe benefits. Again, the consultants stress the importance to the professionals of having more demanded of them. "Traditional management practices give less freedom and also demand less of people. Effective management for them [the techies] needs to be paradoxically more permissive and more demanding."

Another valuable management tool to use with the high-tech professionals is feedback, although it differs from the kind other employees might expect or prefer. Lea and Brostrom say the professionals are not as concerned with the frequency of feedback as they are with getting it when they want it. "Technical people want to hear the results of an experiment in objective rather than subjective terms. An occasional 'Thank you, I appreciate the help' won't hurt, but it also won't suffice." While most people prefer to hear only positive feedback, the consultants say the high-tech professional seems to value honesty.

Many high-tech environments have a tendency to develop isolated, fragmented groups of specialists who pursue their own special projects without looking at the big picture. Managers have to serve as "effective generalists, tying together

the threads of individual effort. They need to encourage sharing of experience and expertise by emphasizing efficiencies that result from user groups and other departments interacting knowledgeably with technical groups."

If you're interested in hearing more about how to manage high-tech professionals, you may want to contact either Dixie Lea or Richard Brostrom at Lea Associates, Resources for Human Development, P.O. Box 9675, Pacific Beach, CA 92109.

DO IT YOURSELF!

Back in February, we did a piece on the Joyce Institute, a professional training corporation based in Seattle, whose main focus is ergonomic skills and related office automation concerns. The Joyce Institute's Dataspan ergonomic skills course teaches employees how to use vdots in a way that increases productivity, while improving personal health and comfort.

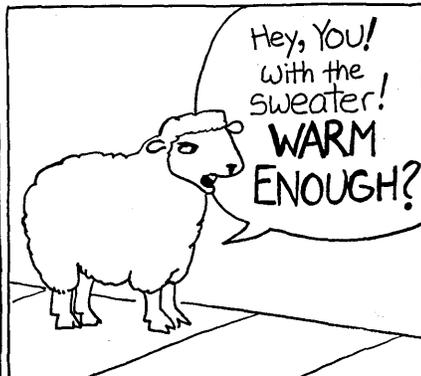
The company has now introduced its "Do It Yourself Ergonomics" approach to accompany the Dataspan training. This course is designed to give managers, supervisors, and trainers an awareness of ergonomic principles.

Here's what happens: the person taking the course works with the Dataspan consultants to select the training modules most relevant to his or her people, since word processors, customer service reps, data entry operators, and others all require different visual and auditory skills. They then attend a short seminar to learn basic ergonomic principles.

The managers and supervisors can then go to their worksites (where the workers themselves are taking the 10-hour Dataspan course) to participate in the course and learn actual application techniques. The Joyce Institute claims it has documented a 68% increase in keyboarding speed and a 42% reduction in errors. And people who have completed the course report an 85% increase in health and comfort levels.

—Lauren D'Attilo

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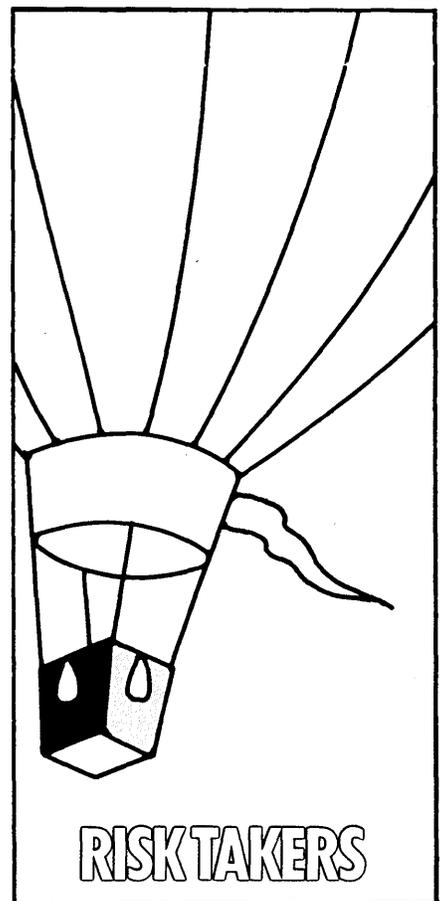
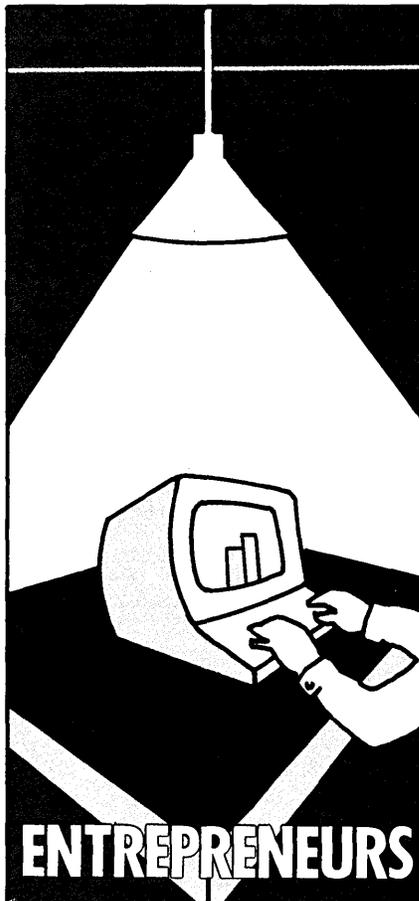
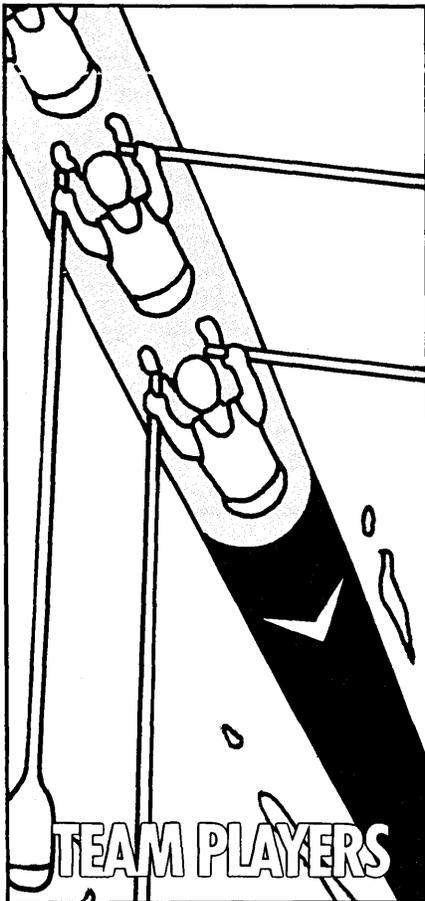
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READERS' FORUM

DECLARATION OF INTER- DEPENDENCE

One fact about modern business is inescapable: the information revolution is here to stay and it's bound to keep expanding. But our history with this phenomenon has been far from happy. True, there are some outstanding project successes, and today's corporations could not function without computer support. Yet there is a strong undercurrent of frustration and unfulfilled expectations. As business becomes increasingly dynamic, the lack of adequate responsiveness from application developers has escalated into the number one information technology issue. It is stated as the issue of application development productivity.

So far, MIS (or data processing, information technology, or whatever) has been responsible for implementing this information revolution. Most executives avoid the MIS function or become involved with it indirectly. Users seldom feel truly served. The MIS profession itself is one fraught with pressure and frustration.

Is there a pattern to the successes and failures? Can we learn to revise our perceptions so that we may extend the successes and avoid the failures? Because of my own experiences and in view of strong industry trends, I am convinced there is.

The heart of the matter is this: there is not now nor has there ever been such a thing as an information system. There is only a business system. The information system is merely a component of the entire business system. It can never be properly defined or developed except as an integral, interdependent part of that business system. For example, there is no such thing as an inventory control information system—only an inventory control system!

The concept may seem simple and even obvious. Yet in practice, we have largely operated as though this most basic fact were not true. The practical effects of this assumption have been extensive. We can observe that the unsuccessful projects have always been MIS projects, with little or no executive understanding and sporadic, inadequate user involvement. On the other side, the successful projects have always been joint, combined efforts by users and MIS, driven by a clear definition of the overall business purpose. The patterns of project success and failure

point out the mistaken belief that information systems are an independent entity. This misconception is, unfortunately, now firmly lodged within the MIS organizational function.

Even the name MIS reflects this. The MIS function, which has responsibility only for the information system aspect of business systems, is organizationally permanent and dedicated. The involvement of the business functions with respect to business systems development is usually ad hoc and nondedicated, that is, the business representatives have other responsibilities.

This brings us to the essence of the historic and prevalent difficulties with MIS. This organizational misconception has placed MIS—and the corporation—into an unmanageable dilemma: MIS is inevitably measured by the results of the total business system, for which it has only partial responsibility and control. To make matters worse, no one else has responsibility for the entire business system.

The historic and chronic problems with MIS, then, have not been failures on the part of MIS, the users, or the executives. The difficulties have been simply and fundamentally an institutionalized misconception that has made it impossible for any participant to do an optimum job.

If this is true, how do we explain project successes? Obviously, successful projects have operated from the proper concept of a business system—but on a somewhat limited scope and an ad hoc basis. In fact, the individual business systems are parts of the coherent business structure. While the successful projects are most certainly valuable, they do not realize the full potential inherent in the business systems approach.

To date, the main burden for sustaining the overall business systems has fallen on the chief executive officer, the chief financial officer, and some form of management committee. This responsibility will continue.

In the modern corporation, however, the business systems structure has become so complex, dynamic, and interconnected that it must be defined, controlled, and changed on an explicit basis. An organizational redefinition is needed: the promised computerized corporation will happen only when there is a formal, comprehensive business systems function that views information technology as an opportunity and a tool.

Can we support this assertion? The best evidence arises if we review our own direct experience. Management has always worked with business systems, and business systems have always had an information system component. When computers came along to do the information processing, we collectively fell into the misconception of thinking that something unique and separate had occurred. Nothing of the sort. The biggest single mistake made by industry was to entrust the computerization of the

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READERS' FORUM

business to computer people.

It is no use blaming the computer people, however. To be sure, they often reinforced this false uniqueness with data processing mumbo jumbo, but in the final analysis, they were doing what they were asked or allowed to do.

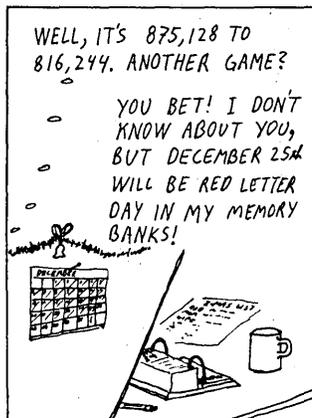
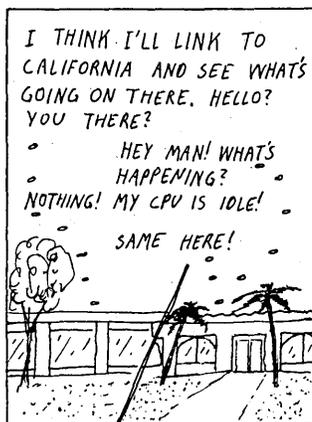
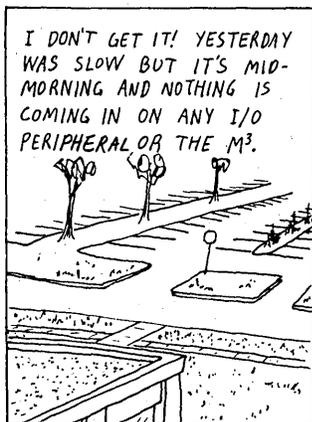
We also have some powerful industry evidence of the confusion between business and information systems. The most potent is the IBM Business Systems Planning approach (BSP). It has been extensively used, and every other method is heavily indebted to this public domain offering. BSP purports to produce an information systems network, but instead produces a business system network. IBM promotes BSP as a tool for MIS, even though it involves users and executives. The creation of BSP was never an MIS project; it was a business systems project designed to help manage the post-360 era (which required strong MIS support). But it was directed by business people for business purposes.

Every other project or method that attempts to define a coherent information system structure inevitably ends up first describing the business system structure. Why? Because the information system structure (and there is one) has absolutely no meaning independent of the business system structure. It is a real disservice for these marketed methods to develop a business system model—which they all do—without also addressing the underlying organizational issue.

Does this do away with the MIS function? Yes and no. Yes, in the sense that the function must be redefined and repositioned. No, in the sense that the MIS skills will continue to be needed. I personally see such a clarification as an opportunity and enhancement of the MIS profession.

—Donald D. Prentice
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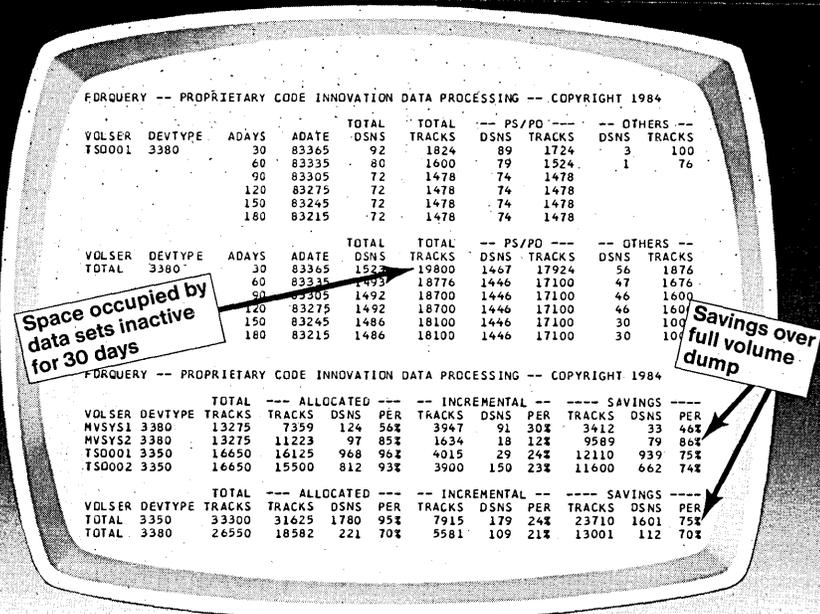
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437 Corporate Blvd.
Building Number 11, Boston

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If you requested, I spoke with you regarding the construction of the Clark and the fact that the construction funds can be found in the market. I would be able to make your selection and complete all the details in one trip before you leave for your conference in Monte Carlo.

I have also attached photographs of the five

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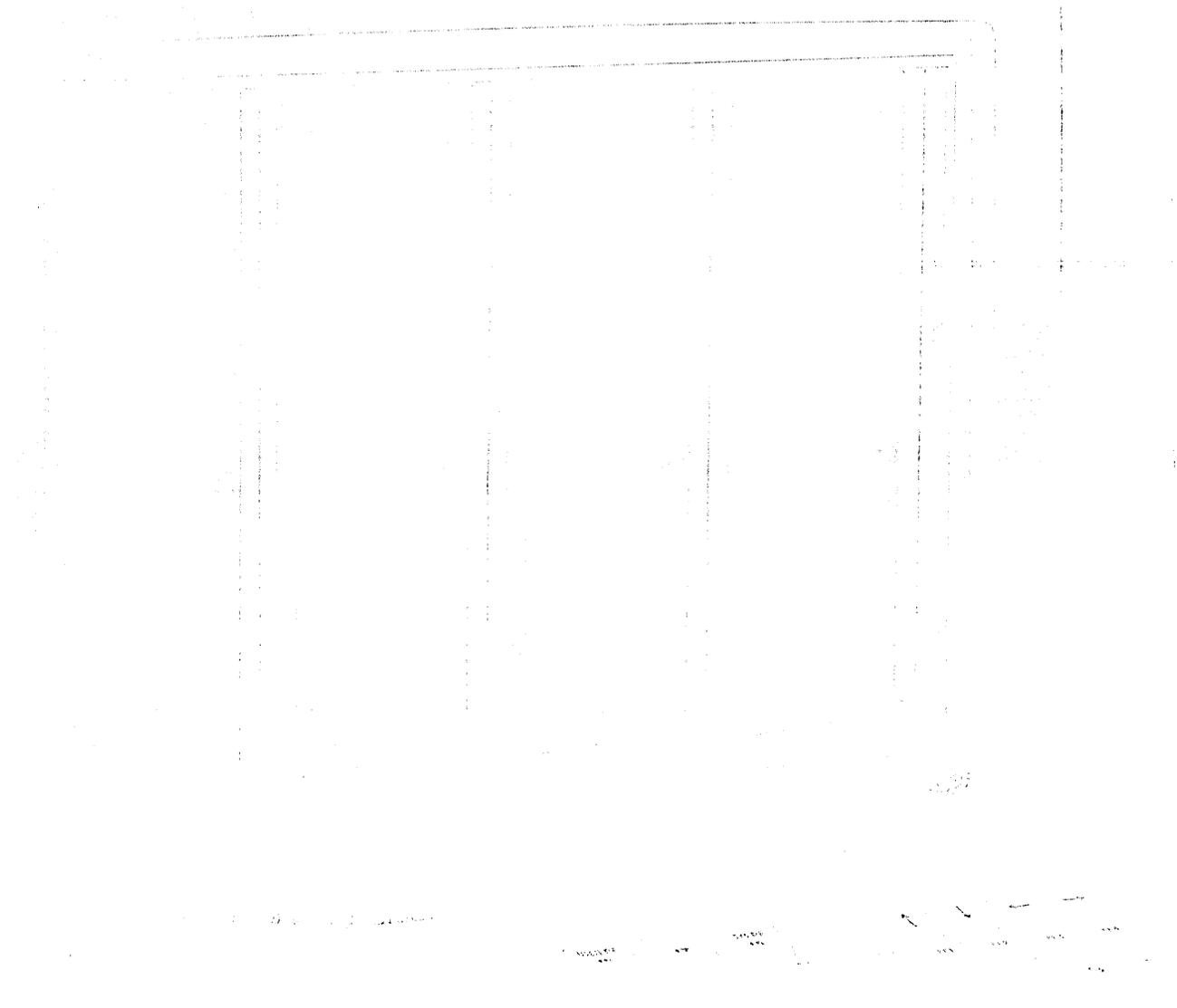
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