Systems Discontinuity
ROADBLOCK TO STRATEGIC CHANGE

Also in this Issue:
- DB2 Users Stand Up To Be Counted
- A Head Start on MAP/TOP 3.0
- Software Chairmen Reoccupy Hot Seats
- How To Ensure Disaster Recovery
One Solution that’s Powerful.

Now there’s one software solution for all your Information Center applications. One solution for efficient data management, accurate statistics, easy report writing, and customized graphics. One solution—the SAS® System.

You can choose between the simple English-like command language or a front-end menuing system. On-line help facilities make it easy to handle every application, quickly and accurately. You can track sales leads, determine market share, present results. File employee records, analyze benefit programs, manage the payroll. Take orders, keep inventory, produce mass mailings. Schedule projects, determine product mix, make forecasts, produce spreadsheets. All this and more with the SAS System.

One Solution that’s Friendly.

It’s easy with the SAS System. You can write front-ends for all your applications. And with a few keystrokes, you can change them as your information needs change. A convenient screen manager lets you edit, display, and control your work without ever leaving your desk. And if you need to move between several operating systems, you’ll find the language, syntax, and commands the same for the mainframe, minicomputer, and PC SAS System.

Whatever your application, the SAS System is your Fourth Generation Software Solution. Call us today.

SAS Institute Inc.
SAS Circle, Box 8000
Cary, NC 27511-8000, USA
Telephone (919) 467-8000, x280
Telex 802505

SAS is the registered trademark of SAS Institute Inc., Cary, NC, USA. Copyright © 1985 by SAS Institute Inc. Printed in the USA.
The all-new Tandy 5000 MC Professional System is pure performance, from the Intel® 80386 processor operating at 20 MHz to the high-speed memory with cache controller that provides RAM-fast access to your data.

With the 5000 MC, you have the high-performance platform needed to take full advantage of industry-standard MS-DOS® applications, powerful new MS® OS/2 programs or multiuser SCO® XENIX® software.

Operating at 20 MHz, the 5000 MC cuts through the big jobs like database management, large spreadsheets and sophisticated graphics. The system architecture also provides a radical increase in data-transfer rates when the Tandy 5000 MC is configured within a 3Com® workgroup or multiuser environment.

And its IBM® Micro Channel™ compatible architecture allows multiple processors to use the same bus.

The Tandy 5000 MC is the new alternative in personal computing.
## NEWS

### Look Ahead

The 1988 *DATAMATION*/Cowen & Co. mini/micro survey forecasts a 5% drop in pc shipments.

### Management

Jeff Moad reports on the return to corporate operating control by three trailblazers of the mainframe software industry. John Imlay, John Cullinane, and Jack Berdy have all supplanted their handpicked successors in recent weeks. Do the veterans have what it takes to play the game today?

### Operating Systems

Leila Davis finds information resource managers readily embracing the newly approved Posix federal information processing standard.

### Government

Willie Schatz sheds some light on an unreleased report by the House Appropriations Committee's Survey & Investigations group that criticizes the Army for locking itself into IBM systems in the contract award for its Viable project, which comes in the wake of the GAO's recent report ripping into the Army's entire dp standardization procedure.

### Behind the News

The past six months have witnessed an alarming growth in the frequency of reports about software viruses. Not surprisingly, vendors are rushing to market with mallets in the form of vaccine programs designed to crush the bugs. Edward J. Joyce reports.

## FEATURES

### Systems Discontinuity: Roadblock to Strategic Change

BY MICHAEL GOLDSTEIN AND JOHN HAGEL

Why modifying systems portfolios incapable of supporting new business initiatives is less strategically sound than rearchitecture.

### Following Successful Project Management Steps

### British Telecom Starts from Scratch

### DB2 Users Stand Up To Be Counted

BY HOWARD FOSDICK AND LINDA GARCIA-ROSE

How is DB2 really used? Two independent surveys give some answers.

### A Head Start Down the MAP/TOP 3.0 Road

BY ROBERT S. ELLINGER

You don't have to wait for MAP/TOP 3.0 to start your network implementation.

### Pursuing One Peripheral

BY DANA BLANKENHORN

Why hasn't a printer-copier-scanner-fax yet been combined in one box?

### Innovative In-house Development

BY EDWARD J. JOYCE

How today's multitude of tools to build new systems are being used.

### How To Ensure Disaster Recovery

BY PHILIP J. ROTHSTEIN

Key elements of an effective recovery plan.

### Disaster Avoidance: Taking the Preventive Approach

### Planning for Protection: User Group Support
NEW PRODUCTS

99 Hardware
Fibronics introduces a package aimed at lowering the cost of interconnecting devices. In Trends: safer VDTs.

103 Software
DEC announces Ultrix-32, the latest release of its Unix-based OS. In Trends: a corporatewide disaster recovery system.

DEPARTMENTS

4 Letters

107 Calendar
Oh, to be in Arlington, Va., now that the Software Productivity Conference has come.

107 Career Opportunities

112 Advertisers’ Index

Cover Photograph by Walter Wick

Coming in the next issue:

Users Await Fruitful DEC/Apple Yield Chargeback Systems Come of Age The Systems Integrator Solution

CALLING ALL USER GROUPS!
Please send information about your user group to be included in DATAMATION’s User Group Directory. Please include your group’s address, phone number, number of members, names of officers, date of next meeting, statement of purpose, and a list of services provided. The address is: 249 W. 17th St. New York, NY 10011 Attn.: David R. Brousell

Editorial

Decision-Making Just Got Tougher
For many years, when it came to software products, the user community had it pretty good. A stable group of independent software companies arose, prospered, and provided users with real options.

Over the last few years, the software industry—driven as much by technological evolution as by shifts in the market—has undergone profound change. The companies that were once dominant—Cullinet, MSA, Software AG, Applied Data Research—have had their troubles as a new breed of company—capitalizing on microprocessor technology, industry standards, and new user applications requirements—emerged (note the rise of Lotus, Microsoft, and Oracle). For users, the old reliables perhaps weren’t as strong anymore.

Remember how service and support slipped after Mathematica sold Ramis (now owned by On-Line Software) to Martin Marietta, for example?

So it comes as no surprise that the founder/entrepreneurs of some of the software companies that have fallen behind have returned for an attempted rescue (see “Chairmen Reoccupy the Hot Seats at Major Software Firms,” p. 17). Whether their efforts will succeed in the long run is the crucial question both for their companies and for users. Many observers of the software industry feel that what is happening is not just surface-level market changes or temporary power shifts. Rather, many feel that there are fundamental changes occurring in product technology, the mechanisms by which these products are delivered to the market, and to whom they are delivered.

Accordingly, we feel that users would be well advised to evaluate carefully the vendors they choose. It has become imperative to purchase products that are not only technically sound, but that are well cared for over the long haul by their providers. A product owned by one company one day can change hands the next. What’s to ensure proper maintenance, enhancement, and support? Users know all too well that when they buy into a product, they usually buy into a long-term relationship with that product; it is not easy or inexpensive to change if it doesn’t perform well or is not developed properly.

Even as the earth continues to move underneath the software industry, users must have their feet planted firmly on the ground. Decision-making may have just gotten tougher, but the rewards of the right purchasing decision will make life easier in the long run.

DAVID R. BROUSSELL
MANAGING EDITOR / NEWS & FEATURES
The Game, Not the Name

"CIO: Misfit or Misnomer?" (Aug. 1, p. 50), based on the Coopers & Lybrand survey of Chief Information Officers was an accurate report of the failure of senior corporate executives to meet the challenge of the information revolution that my co-author Bill Synnot and I identify in our book Information Resource Management (John Wiley & Sons, 1981).

The CIO concept we propose in our book is based on an analysis of the chaotic state of information systems management in the 1970s. Information systems was moving from a "dp monoply" first stage in the information revolution, to a second stage of "decentralized anarchy." We were in a period in which user divisions and departments were running away from the "dp monopoly" with timesharing and minicomputers. We put forward the idea that there are very severe costs to "decentralized anarchy" and that senior corporate management needs an information technology strategy.

Synnot and I projected into a third phase of the information revolution in which we would move from "decentralized anarchy" to an era of the "electronic business," the third stage in the information era in which best information management would include information systems for competitive advantage and the chief information officer as one of the facilitating strategies.

Correction

Martin Litzyk's name was misspelled in "Can Unisys Juggle Open Systems, Too?" (Sept. 1, p. 50). Litzyk was formerly on the board of directors of the Sperry users group. Also, transposed dates and incorrect earnings per share appeared in a chart describing Unisys' financial performance on p. 54 of the Sept. 1 issue. Here is the corrected chart:

**Recent Financial Results for Unisys Corp.**

<table>
<thead>
<tr>
<th>Second Quarter</th>
<th>First Half</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenue</strong></td>
<td>$1988</td>
</tr>
<tr>
<td><strong>Net Sales</strong></td>
<td>$1,586.9</td>
</tr>
<tr>
<td><strong>Service and Rentals</strong></td>
<td>805.8</td>
</tr>
<tr>
<td><strong>Total Revenue</strong></td>
<td>$2,392.7</td>
</tr>
<tr>
<td><strong>Research and Development Spending</strong></td>
<td>175.4</td>
</tr>
<tr>
<td><strong>Net Income</strong></td>
<td>162.3</td>
</tr>
<tr>
<td><strong>Earnings per Share</strong></td>
<td>$7.85</td>
</tr>
</tbody>
</table>

Source: Unisys
Clear, well-defined vision is the mark of a leader.

The Wyse WY-60. If there's one reason why Wyse is today the world's leading independent terminal manufacturer, it's vision. From the beginning, Wyse designers have had the uncanny knack of seeing what people needed in a terminal—often before they did. That vision is most eloquently articulated in the WY-60.

It's a better ASCII terminal. A better ANSI terminal. And a better PC terminal. In fact, the WY-60 is compatible with a wide range of operating environments that includes MS-DOS, UNIX, XENIX, and PICK. It emulates 20 different personalities. With five keyboard options, so nobody has to learn a new one. It's also part of SystemWise. The WY-60 links effortlessly with Wyse PCs and multi-user platforms to create uniquely integrated and cost effective system solutions.

But what people want to see most in a terminal is clearly. So the WY-60 has sharp 10x16 characters for extraordinary resolution. A large 132 column x 44 line format that can display an entire spreadsheet. And a choice of white, amber or green screen phosphors.

Because we know what vision is most important to people who use a terminal day in and day out. Theirs.

Call 1-800-GET-WYSE.

We make it better, or we just don't make it.
"I know it pays to have power protection. But why should I pay for more protection than I need?"

You shouldn't, and you won't, with Power Protection Systems from AT&T. Unlike most other uninterruptible power systems, AT&T systems deliver all the power they're rated for, so you don't have to pay for a "cushion" you don't need.

The reason? A unique parallel processing design, developed by AT&T Bell Laboratories, that incorporates an innovative electronic by-pass feature, along with precision microprocessor controls, and battery reserves to protect against power fluctuations as well as complete blackouts.

AT&T's design offers another big advantage: it accommodates both linear and non-linear power loads, so you get an "umbrella of protection" that covers your laser printers and other peripherals as well as your computers.

To precisely meet your needs, AT&T offers a broad line of models, ranging from single-phase 1 KVA for desktop and small PBX applications, to 3, 5 or 10 KVA for floor-standing minis and larger PBXs, to three-phase 10 and 20 KVA models. Everything it takes to meet the requirements of virtually any computer environment.

On top of all that, AT&T gives you a 12-month free parts and labor warranty,* backed by prompt, expert customer service from more than 100 nationwide locations.

For more information, and the location of your nearest distributor, call AT&T at 1 800 982-0030. In Canada, call 1 800 445-5607.

*Limited warranty details on request. © 1988 AT&T

AT&T
The right choice.

Circle 6 on Reader Card
Theirs.

The second most reliable impact printer did this much before it stopped. It wound up in the repair shop after 7,000 hours or ten months of printing.
The HP RuggedWriter 480 printer did this much before we stopped counting. After the equivalent of 20,000 hours, it just kept working. And working.

Only HP could have built an impact printer as reliable. Or as fast. At 480 cps for draft and 240 cps for letter quality, you'll be able to turn out everything from letters and spreadsheets to six-part forms, at least 20% faster in letter quality mode than other 24-wire impact printers.

And with its 180 x 360 dot per inch resolution, it's certainly no slouch when it comes to graphics.

It's also compatible with the computer system you already have. IBM PCs. PC-compatibles. And of course, HP.

And compatible with your budget. At a price of just $1695.

For more information, call 1-800-752-0900, Ext. B287. And you'll see why the competition just doesn't stack up.
Exclusive!

Your Choice of V.32 Modems From The Philips Family

- Rack Mountable
- Stand-Alone
- V.32-PC Card

Rack mounted, stand-alone or PC Card, Philips V.32 modems offer the winning combination of outstanding performance, international data communications technology and cost-saving features!

The Philips V.32 offers:
- Full CCITT V.32 Compatibility
- Software Configuration
- Autoadaptive Digital Echo Cancellation
- Identical Cards for Both Stand-Alone and Rack Mount
- Fully Automatic Dial Back-Up
- V.25 bis, Hayes AT Async Dialer
- SDLC Sync Dialer
- Phase Roll Compensation
- Network Management

The Philips V.32 family offers outstanding performance, including both international and domestic communications versions. For central site applications, a combination of up to 12 rack mounted modems can be accommodated, including Philips V.27, V.29, V.32, V.33 and short-haul modems.

Philips Information Systems Company
A Division of North American Philips Corporation
15301 Dallas Parkway
Suite 300
Dallas, TX 75248
1-800-443-6004

Call today for complete information on the Philips family of V.32 modems and other outstanding data communications products as well as Personal Computer Workstations from Philips Information Systems.

Circle 8 on Reader Card
BOSTON -- U.S. users are putting the brakes on pc purchases. The latest DATAMATION/Cowen & Co. survey of mini and micro users forecasts a 5% drop in pc shipments and a modest 10% rise in pc revenues next year, versus 21% unit and 23% revenue growth last year. A West Coast brokerage firm also has just scaled back its pc projections for 1989 to 5% growth, from a reported double-digit growth rate. Analysts speculate that users are holding off new pc purchases until they get their existing pcs networked and until they see whether there are enough OS/2 applications to justify new hardware investments.

NEW YORK -- It looks like the rumored death of IBM's 43XX midrange system has been greatly exaggerated, or is at least premature. Observers now expect IBM to announce a 4381 upgrade in the first quarter of '89 that could give the line new life. The so-called 4391 is expected to go from a 7MIPS uniprocessor to a 22MIPS four-way air-cooled system. It's also expected to support the new MVS/ESA operating system and to include a vector processing facility--the better to challenge Digital Equipment Corp.'s VAX in technical applications. At the same time, observers say IBM's 3090 mainframe has at least one upgrade left in it. The "G series" would be announced in the fourth quarter of '89, with a 15% performance boost over the current S series. The G is expected to support larger and faster expanded and central storage and optical channels.

CANNES, FRANCE -- Expect DEC to announce its first value-added network services (VANS) partnership in Europe over the next few weeks. With its own financial services VANS already in operation in London, and network products being developed in its research center at Valbonne near Nice, the company is looking for a large slice of the European VANS market in the coming years. The new partnership deal will help expand DEC's network services offerings, perhaps in the French insurance market, but European marketing vp Bruno d'Avanzo won't say who the partner will be.

CANNES -- Also revealed at the DECworld exhibition was a DEC plan to soon announce a desktop VAX called the P-VAX, and a RISC-based workstation running a version of Unix that ultimately will be compliant with the future Open Software Foundation standard. Also under development are top-end VAX models to help large users expand their major DEC-based systems, and a vector facility.
CUT FROM THE SAME BRANCH

CULVER CITY, CALIF. -- The two executives who directed Waltham, Mass.-based Nixdorf Computer Corp.'s U.S. banking strategy are negotiating an agreement to purchase rights to the company's branch automation software. The pair, Manfred Leuthard and Richard B. Gas- tin Jr., recently formed Nevis Technologies Inc. here. They hope to complete development on the package and introduce new versions for OS/2 and the Open Software Foundation's AIX-based Unix operating system. Nixdorf reportedly is holding off on a licensing and investment agreement pending the pair's ability to raise financing from other sources.

MARIETTA TESTS OLGA AND BORIS

ORLANDO, FLA. -- Martin Marietta Data Systems' Orlando Data Center recently tested two yet-to-be-released MVS versions of Systar Inc.'s on-line performance monitoring software products, Olga and Boris, which have been used extensively by Sperry users. One deficiency discovered during the tests, says Andy Crawford, senior software systems designer, was the absence of threshold exception analysis, whereby the user sets a threshold and the software notifies the user when it is exceeded. With the products from Greenbelt, Md.-based Systar, he says, it is up to the operator to realize that a threshold has been exceeded from graphic representation of the data. But Systar plans to use its Daisy expert system to do threshold analysis, he adds. Marietta was testing the products for possible inclusion in a proposal for a multiple operating system environment. Systar says the products should be available early in 1989.

GARDEN CITY, N.J. -- Fujitsu Ltd. may have lost out in the bidding for Princeton, N.J.-based Applied Data Research, but the Japanese giant is still set on finding third-party software to run on its Facom mainframe hardware. Charles Wang, chief executive officer of Computer Associates--ADR's new owner--says he and Fujitsu have been negotiating to adapt several of CA's systems software products to the Facom hardware. One problem, according to Wang, is that Fujitsu has been very slow to hammer out an agreement.

IBM's refusal to sell its token ring local area network in Hong Kong may have been proven costly for Big Blue. Bank of America had been considering IBM as a vendor for a large office automation project at its data center there, but, according to sources, the absence of the token ring LAN pushed Bank of America into the waiting arms of Wang.
ORNACLE® sets world performance record
265 transactions per second

On July 18th, 1988, ORACLE made history by setting performance records in every major computing environment. Using industry standard benchmarks, ORACLE set speed records on IBM compatible mainframes running MVS, DEC VAX minicomputers running VMS, and minicomputers running UNIX.

ORACLE set the world record for performance by running 265 transactions per second (tps) on a 3090-600E class Amdahl* mainframe running the IBM MVS operating system. This breaks the old record of 240 tps set by a cluster of 16 Tandem computers.

ORACLE also set the record for DEC minicomputers by running 49 tps on a VAX 6240 running VMS. This breaks the previous VAX/VMS record of 29 tps set on a VAX 8700 connected to a VAX 8800. ORACLE's results were audited and verified by the Codd and Date Consulting Group. And not only is ORACLE's performance nearly twice as fast as this previous record, but ORACLE's cost per transaction is almost four times better than that of the other system.

ORACLE set a UNIX record of 124 tps on a large minicomputer from Sequent as well. Once again, the results were independently verified by the Codd and Date Consulting Group.

ORACLE has long been recognized as the technology leader in DBMS portability. (ORACLE is the only DBMS in the world that runs on MVS, VMS and UNIX.) Now ORACLE is the clear technology leader in performance as well. Your DBMS decision just got a little easier. Call us at 800-345-DBMS and sign up for the next seminar in your area.
Let's talk about relational data bases.
But first, find the clown with the red nose, top hat and no balloons.

If you picked the first clown from the right on the top row, you didn’t need the help of a relational data base system.

Of course, real-life business problems are considerably more complicated. That’s why IBM, the leader in relational data base technology, offers a wide range of products to work with a full range of hardware, from workstations to midrange and mainframe computers.

IBM’s data base products can help users in any department retrieve information about as easily as you solved the problem above. They also provide tools for programmers to do their job more efficiently. And that means improved productivity for everyone.

In fact, IBM’s DB2 and SQL/DS offer referential integrity, which allows you to maintain data relationships without complex programming. And with application enabling tools such as IBM’s Cross Systems Product, you can develop new programs with speed and simplicity. So even as your business needs change, your existing applications and data bases will remain sound investments.

Call 1-800-IBM-2468, ext. 44, for literature or to arrange for an IBM marketing representative—in the blue suit, yellow tie with a black briefcase—to contact you.

IBM. The Bigger Picture
OUR NEW PRINTERS MAKE EVEN BAD WRITING LOOK GOOD.

CHAPTER ONE
THE BLACKEST HOUR IS MIDNIGHT

It was not a night fit for man or beast what with the sky being as black as ink and it starting to rain like cats and dogs. As if things weren't bad enough, Jeffrey Whipple had to climb all the way up to the top of Bald Eagle hill in his snakeskin boots so new their smell reminded him of a car he once leased in Flagstaff, Arizona just to check things out because earlier in the day a message had gotten through that there was going to be trouble this night so he was feeling ominous as the dry wind whipped up the dust around his feet and wondering if he should go on or go back to camp when suddenly, he heard a twig crack behind him or thought he did but as he turned he didn't see anything except the black bleakness of the

We're sorry that our new 24-wire Pinwriter® P5200 and P5300 printers can't do much for the quality of your writing. But they can certainly do wonders for the way it looks. The secret is the ribbon. Other dot matrix printers only use a fabric ribbon. Our Pinwriters print with both a fabric and a letter-quality, multi-strike film ribbon—the same kind used on executive typewriters.

The NEC Pinwriters can also enhance your writing in other ways. They have seven resident type styles. Plus four more are available on plug-in font cards. Which means you can express your thoughts with just the right typeface. You can also get an inexpensive, user-installed color option. And if graphics are part of your story, these Pinwriters produce the highest resolution of any printer you can buy.

Call NEC Information Systems at 1-800-343-4418 to see how much better our new Pinwriter P5200 and the wider P5300 can make your writing look. Whether you're a budding Hemingway, or a Hemingway & Company.

NEC PRINTERS. THEY ONLY STOP WHEN YOU WANT THEM TO.

NEC Information Systems, Dept. 1610, 1414 Massachusetts Ave., Boxborough, MA 01719.
News in Perspective

MANAGEMENT

Chairmen Reoccupy the Hot Seats at Major Software Firms

Founders are ousting their own handpicked successors and resuming operating control of their struggling companies; observers wonder if that’s the answer.

BY JEFF MOAD

It is 7 p.m. and John Imlay is at his desk at Management Science America Inc., between meetings. Imlay, MSA’s long-time chairman, contemplates the half-eaten lunch that stares back at him as he tries to explain the recent organizational changes that saw MSA president and chief operating officer William M. Graves resign, and the 52-year-old Imlay reassume operating control of the industry’s largest applications software vendor. “It was something I felt I had to do,” says Imlay. “Now that I’m back, I’m pretty busy.”

Imlay is not the only software industry chairman and father figure who is back in the hot seat. In recent weeks, the chairmen and founders of at least two other major mainframe software vendors have ousted their handpicked successors and reassumed operating control of their struggling companies.

Imlay’s unexpected return to MSA’s top operating job was preceded by the celebrated reincarnation of John J. Cullinane as chairman and CEO of Cullinet Software Inc. And it was followed within days by the firing of On-Line Software Chairman Robert Berdy, “A few years ago, many of us had the idea we needed to bring in a new level of professional management. I thought it would free me up to do other things and that it would bring some magical knowledge that we didn’t have. In retrospect, I’m not so sure what it actually brought to the table.”

The return of Cullinane, Imlay, and Berdy to operating roles in their companies may be reassuring to some of their customers, investors, and board members who long for a return to prosperity and stability. Some observers, however, are wondering if, in a new era for the software industry that is characterized by new technologies, architectures, and competitive forces, it makes sense to bring back the old team.

“Many of these larger mainframe software companies are having trouble bringing their older products up to date, to exist in a world of SAA, SQL, and CASE,” says Scott Smith, a software analyst with Donaldson, Lufkin, Jenrette. “The founder’s magic alone won’t be enough to turn those products around.”

According to Stu Miller, the former president and CEO of Software AG.

These Aren’t the Good Old Days

At the time Cullinane returned to an active role at Cullinet, the company hadn’t reported a profitable quarter since fiscal 1986. MSA recently reported a second-quarter net income drop of 69% and 16.5% lower operating revenues compared with the same period last year. MSA says it expects its second-half earnings to fall short of the first half. On-Line Software expects a first-quarter loss following $4 million of red ink in the fourth quarter last year. Similar problems are rumored to have led Ameritech recently to sell mainframe software vendor ADR off to Computer Associates International Inc.

Obviously, many of the explanations for these troubles are different for each vendor. What is similar are the decisions of the companies’ founder and/or chairman to ride to the rescue. “I was getting frustrated by our earnings prospects, so I decided to act,” says Imlay. “What it came down to was that my long-term strategy was different from Bill’s. I felt we needed to move faster to take some action because things are not going well for their companies. The only thing they know is to take control. But that’s not the answer.

These companies need someone who can take a new look at how things have changed and are changing,” says Miller, the former president and CEO of Software AG.

Who Needs an MBA?

What gives here? Just a couple of years ago, successful entrepreneurs like Cullinane and Berdy were beating the bushes for professional managers who could step in and run the software companies they had started but which supposedly were growing so large they needed executives with MBAs and big business experience to manage long-term growth. Now, after watching the profit margins and stock prices of their companies come under increasing pressure, these same software industry graybeards are leaving the bench and getting back in the game.

According to Berdy, “A few years ago, many of us had the idea we needed to bring in a new level of professional management. I thought it would free me up to do other things and that it would bring some magical knowledge that we didn’t have. In retrospect, I’m not so sure what it actually brought to the table.”

The return of Cullinane, Imlay, and Berdy to operating roles in their companies may be reassuring to some of their customers, investors, and board members who long for a return to prosperity and stability. Some observers, however, are wondering if, in a new era for the software industry that is characterized by new technologies, architectures, and competitive forces, it makes sense to bring back the old team.

“Many of these larger mainframe software companies are having trouble bringing their older products up to date, to exist in a world of SAA, SQL, and CASE,” says Scott Smith, a software analyst with Donaldson, Lufkin, Jenrette. “The founder’s magic alone won’t be enough to turn those products around.”

According to Stu Miller, the former president and CEO of Software AG.

These Aren’t the Good Old Days

At the time Cullinane returned to an active role at Cullinet, the company hadn’t reported a profitable quarter since fiscal 1986. MSA recently reported a second-quarter net income drop of 69% and 16.5% lower operating revenues compared with the same period last year. MSA says it expects its second-half earnings to fall short of the first half. On-Line Software expects a first-quarter loss following $4 million of red ink in the fourth quarter last year. Similar problems are rumored to have led Ameritech recently to sell mainframe software vendor ADR off to Computer Associates International Inc.

Obviously, many of the explanations for these troubles are different for each vendor. What is similar are the decisions of the companies’ founder and/or chairman to ride to the rescue. “I was getting frustrated by our earnings prospects, so I decided to act,” says Imlay. “What it came down to was that my long-term strategy was different from Bill’s. I felt we needed to move faster to...
MSA Will Buy Technology

Imlay says he already has made two key decisions that he hopes will put MSA back on the right road. He will be more active in seeking technology partnerships, and he will embark on a plan to make MSA's products comply with IBM's Systems Application Architecture. "Where Computer Associates is buying companies, we'll just buy the technology," says Imlay.

SAA compliance means that MSA applications will use interfaces published by IBM. Imlay even has plans to license and use IBM's Cross System Product 4GL as an applications generator for MSA products.

Imlay also moved quickly to reduce expenses, cutting MSA's payroll by 9%, or 230 jobs. Berdy at On-Line and Cullinan at Cullinet took similar steps as soon as they took operating control of their companies. Berdy closed several direct sales offices, and Cullinan instituted layoffs and slashed $10.5 million from Cullinet's first quarter 1989 operating expenses.

Most observers agree, however, that cost-cutting alone won't be enough. The question is, what will they do after they've cut costs? "The problem," says Kidder Peabody analyst Bahar Gidwani, "is that the market is maturing, prices are declining, and vendors are going to have to start making things like tele-marketing part of their strategy." DB2 is putting pressure on a lot of the independents, and many of them are being forced to be more focused and to make changes in R&D that will help them get out the next release of their product.

On-Line's Berdy attributes most of On-Line's problems to high end-user sales and marketing expenses and longer sales cycles related to some of the company's newer, higher-priced software products, such as Ramis II and the Caspesc CASE product line. Berdy has acted by reducing the number of On-Line direct sales offices to four from nine, although he denies reports that he is de-emphasizing the Ramis II product line.

But, in addition to cutting sales expenses, Berdy is planning to reorganize On-Line's product development efforts and so make them more efficient. "We'll go more to a pooled development concept, rather than dividing projects up," he says.

Most users seem to approve of their vendors becoming more efficient. But some express mixed feelings about the return of chairmen and founders. Priscilla Davis, a systems analyst with wire manufacturer National-Standard Co. of Niles, Mich., is both an MSA user and president of the On-Line UFO and COBOL EXE International Users Group. She says that while she understands vendors having to cut costs to remain competitive, she doubts whether Imlay and Berdy can run their companies on a day-to-day basis and attend to long-term planning.

"One person can't do it all when it comes to running a big company," says Davis.

Users such as Davis also say the returning software entrepreneurs will be on the spot to make good on new product promises that have not been kept in the recent past. For example, users such as National-Standard and Metropolitan Life in New York bought MSA's new purchasing and payables integrated application for IBM mainframes only to find that the initial release of the product fell short of their expectations. Both are now planning to upgrade to release 2, but it's taking extra time.

Listening to Customers

"There was a time recently when some of these companies weren't listening very well to their customers," says Met Life senior vp Daniel J. Cavanagh. "But I'm hopeful that having people like Imlay and Cullinan coming back will improve things."

Users say Cullinet, too, has to improve on new product implementation. The company is counting on its new IDMS-SQL and Knowledgebuild products as key elements in improving revenues in the second half of 1989. But some Cullinet users who have tested the product say the company still has a lot of work ahead of it.

Atlanta-based utilities holding firm Southern Co. had considered using IDMS-SQL and Knowledgebuild to develop an on-line application for Alabama Power. But the company rejected the Cullinet products for that application because, among other things, they did not support a dynamic pick list or multiple scroll regions.

According to Southern Co. manager of power generation N.V. Subramanian, Cullinet has promised those features in future releases of IDMS-SQL and Knowledgebuild. "As of right now, the product is not mature," says Subramanian.

Problems Pre-date Successors

Observers note that, in many cases, software company founders were at least as responsible as their hired successors for the inflated operating costs, lack of product focus, and execution and other errors that they are now returning to correct.

"A couple of years ago," recalls Oakland, Calif., database consultant William M. Baasch, "when Cullinet was trying to decide whether to support SQL. John Cullinan said, 'Over my dead body.' Now they're doing it under his live body."

Cullinan acknowledges that many of Cullinet's problems pre-date his decision to step away from the company early in 1987.

"Two years ago," he says, "I knew we needed to do a lot of changing, but I also knew that would be difficult to do because there were a lot of people who had been with the company for a long time." Cullinan says his stepping aside—though only temporarily—opened the door for a new layer of management to infiltrate Cullinet, which now has much of the responsibility for working out Cullinet's comeback strategy, according to Cullinan.

Meanwhile, the return of Cullinan, Berdy, and Imlay to more active roles in their companies may at least hold off unhappy investors and unfriendly takeover attempts long enough to give troubled mainframe software vendors a chance to survive as independents.
Federal Info Managers Embrace Stopgap Posix Standard

The new Posix federal information processing standard will be utilized until IEEE’s draft full-use Posix is released later this year; officials see major advantages.

BY LEILA DAVIS

Federal information resource managers say they are eagerly awaiting the newly approved Posix federal information processing standard (FIPS) in the belief that it will ease public sector connectivity problems and reduce procurement challenges.

The new Posix FIPS was proposed by the National Institute of Standards and Technology (formerly the National Bureau of Standards) for use as a stopgap federal standard until the IEEE’s draft full-use Posix is released later this year. After a lengthy review process, the Posix FIPS was implemented on Sept. 12.

The full-use IEEE Posix will have to earn its own set of international approvals and is expected to be accepted by next summer (see “ANSI, ISO Back Posix, Despite AT&T,” April 1, p. 30).

Posix, which stands for portable operating system for Unix, will be a “real advantage for federal IRM,” thinks the Department of Agriculture’s associate director for IRM, John Kratzke.

“It gives us an authoritative basis to say what we want to specify on a procurement and it takes Unix out of the proprietary realm,” Kratzke feels.

According to Bob Woods, director of the office of IRM at the Department of Transportation, “Posix will have a real impact as a FIPS. A lot of government agencies are trying to move toward more open architecture without stifling competition in the procurement process."

“Philosophically, the big issues for government users are software portability and connectivity. In upcoming big buys and son of big buys, if Posix is the only game in town, they’ll latch on to it,” asserts Woods.

Connectivity Is a Major Goal

The timing of the Posix standard is especially important, say IRM officials, because many government agencies are at the level of systems sophistication and applications need that makes large-scale networking mandatory.

“Connectivity in the micro arena is a major goal, especially in those agencies with field operations that have all different types of systems in offices all over the country,” comments Howard Grandier, director of the office of software development and information technology at the General Services Administration’s Office of Technical Assistance (OTA).

OTA acts as a consultant for other government agencies in systems and software procurement and planning. One of its most frequently used services is conversion management for agencies migrating from older disparate systems to newer networking installations.

“Most agencies are in phase two, meaning they are computerized, but their systems have been bought and implemented in a haphazard manner,” says Grandier.

“Phase three lets them connect those systems with a local or wide area network. A standard operating system like Posix would help.”

Grandier sees Posix as a potential boon to further micro development “as long as the standard has teeth to it. If there aren’t too many exceptions to the rules, it could persuade a lot of smaller agencies to standardize on a Unix-type operating system.”

“Posix will be specified in RFPs more and more as vendors demonstrate their ability to provide it,” predicts Transportation’s Woods. “And my guess is that as more vendors get involved, Posix will drift away from [AT&T’s] Unix.”

Under their mandate to keep procurements as competitive as possible, many agencies have struggled to find a way to specify a Unix-type environment without weighting the requirements in favor of Unix’s developer, AT&T. Last fall, the Army had to drop a requirement for a derivative of AT&T’s Unix System V Interface Definition (SVID) on a $2 billion Army Command and Control System upgrade. Vendors complained that even requiring them to employ a derivative of AT&T’s proprietary Unix unfairly ensured that AT&T reaped licensing fees for the Army network.

As a result, the Army has firmly embraced Posix. “We are already specifying in all...
News in Perspective

GOVERNMENT

House Unit Criticizes Army VIABLE Pact

An unreleased report is said to allege an IBM systems bid by EDS locked the Army into a specific solution.

BY WILLIE SCHATZ

Something's happening here; what it is ain't exactly clear. "As far as I know, there's nothing wrong with VIABLE," says Terry Miller, president of Government Sales Consultants Inc. (GSCI), a Great Falls, Va.-based procurement analysis firm. VIABLE, aka the U.S. Army's Vertical Installation Automation Baseline, is a $656 million, 10-year deal with Electronic Data Systems (EDS), Dallas, to upgrade information processing at 47 Army installations worldwide. VIABLE has since rechristened the Army Standard Information Management System.

"The problem is the Army's dp procedure as a whole, not the VIABLE piece," Miller contends. "But the VIABLE thing is beginning to smell, and I'm not sure why." The House Appropriations Committee's Survey and Investigations (S&I) group thinks its olfactory nerve is right on, though. According to an internal Army memo, a recently completed S&I report apparently accuses the Army of a multitude of sins concerning ASIMS, foremost among them locking ASIMS into a specific technical

EDS' TARELL: We're not having any problems with the Army.

Our procurements that once there is a Posix standard, within one year of implementation, we require the offerer to migrate the operating system to the Posix standard," says Enrico Merendini, technical director for the U.S. Army's Information Systems Selection and Acquisition Activity. "We hope that Posix will clear up these procurement challenges."

Dual Posix, DOS Requirements

The Army uses a Unix-type operating system for systems design, development, and maintenance. Merendini does not expect the opportunity for interconnectivity to bring more applications into the Unix fold at the Army because he sees Unix as "too complicated for use by nontechnical specialists." Interconnectivity is not enough of an incentive to give the general office worker Unix," comments Merendini. However, he predicts that large micro buys, common in the military agencies to feed a variety of applications, will have dual requirements for Posix and DOS in the future.

Grandier at the Office of Technical Assistance sees Posix as having a broader impact. "Right now, micro technology is still new, most agencies still have their original micro hardware, and there is no need to get rid of DOS," says Grandier. "But in two to three years, when it comes time to replace those systems, agencies will think seriously about standardizing. If Posix is there and has teeth, they'll go for it."

"The portability of software that Posix could provide could make a big difference to agencies. The savings in training costs alone could be tremendous," he says.

Grandier feels that even nontechnical office users can be converted to a Unix-type operating system if it is done as part of a major conversion, when people expect and are geared up for change. Other IRM officials see a dual requirement for both Posix and DOS becoming prevalent.

The Department of Agriculture's Kratzke also expects that dual DOS and Posix requirements will be the norm for quite a while. "There is a lot of old software around, and none of us have the resources to redo completely," Kratzke observes. "This department alone has 15,000 locations in the field. We will have to manage a large base of residual software for a long time, so we will need the flexibility to go both ways."

The Department of Agriculture has been closely involved with universities and research institutions that develop useful applications packages available in the public domain, says Kratzke. These various packages, mostly DOS-based, are used heavily throughout the agency. Because many federal agencies are in a similar position, IRM officials say that Posix is just the first step in the quest for a complete set of standards that will bridge many different operating environments.

Other standards also in the works, such as GOSIP, COS, and X/Open, will round out the definitions needed to standardize applications, Kratzke points out. "In the long run, a mix of options, like X/Open's approach, might be the way to go," says Transportation's Woods. "There are a number of things that could happen—for example, if technology develops in an area that isn't Posix-compliant, or if the private sector doesn't come around to Posix, this trend could be reversed. One thing in Posix's favor is that the international market likes it."

Leila Davis is a freelance writer based in Alexandria, Va.
No matter how little you paid for that first car, it was a quantum leap in your social life. You met more people. You got more done. You made more money.

Now you can enter the world of high-performance, multi-vendor network connectivity for less than a pair of dumb muxes. That's right. You can take a quantum leap to X.25 packet switching networks for lower costs, easy growth, and all of the versatility of open-system access. For the same money you could waste on constricting multiplexers, you can now start a network that will grow with your business.

We provide a full range of inexpensive access nodes, switching nodes, and network control and management centers that let you tailor your network to your needs. Whatever the size of your business, there's a Telematics networking solution. So, fit your networking to your budget.

Send for our Network Consultant Quarterly, or contact Telematics International in the U.S. at 1-800-NETWIDE or (305) 772-2117. In the U.K., call (0256) 467385.

TELEMATICS
COMPUTERS FOR COMMUNICATIONS
MIS manager buys M
Although we'd be quite pleased to have you replace every PC you own with Macintosh® computers, the introduction of our machines into a DOS office does not require any such drastic measures.

Because, and we'll say it flat out, Macintosh runs MS-DOS. Macintosh reads MS-DOS. And Macintosh shares data with MS-DOS computers.

How closely a Macintosh works with your PCs depends on what you actually need. Because Macintosh can be configured for almost any degree of compatibility. From easy speaking terms to an intimate working relationship.

If you need to run DOS programs such as 1-2-3 and dBase III, there are several easy ways to do that. One is the AST Mac286 card. Which you simply plug into a slot in the Macintosh II for AT-type performance. Or, if you prefer not even to lift a screwdriver, SoftPC is a software program that lets you run both DOS and Macintosh applications at the same time.

After closer analysis, however, you may find that the kind of compatibility that's really important is the ability to share information effortlessly between computers. Particularly if you have years of accumulated data stored away on PCs.

Here the Macintosh concept of workgroup computing proves itself in practice. In fact, you may find it easier to network Macintosh computers with your PCs than to network PCs by themselves.

Two examples of that are Novell Netware for Macintosh and our own AppleShare® and AppleShare PC file server software. With these systems in place, you can move data back and forth without complications.

And if you don't choose to network, there are other simple ways for Macintosh and PCs to communicate. One is DaynaFile, a Macintosh disk drive system that reads data directly off any of the several DOS disk formats. Another is MacLinkPlus, a cable and software system for sharing data between computers.

But no matter where the information originates, or how it's transferred, once on the Macintosh, this computer's unique power to analyze, enhance, and graphically communicate that information is unmatched.

Which is one reason Macintosh is moving into formerly DOS-exclusive realms in such great numbers.

For a lot more reasons simply call us toll-free at 800-446-3000, ext. 400, for the name of your nearest authorized Apple® reseller.

We'll show you how harmoniously and productively Macintosh can work with any PC work force. Without massive layoffs.

The power to be your best."
nal pressure and the Army’s belated recognition that, as the GAO says, “the Army three-tier architecture standards would have limited future procurements.”

The three-tier architecture’s demise was also hastened by input to GAO from 17 competitors who felt they were restricted from bidding on Army contracts because of the mandated use of IBM’s systems.

The June 1986 mandatory standards for the three-tier architecture had MVS as the tier one operating system; VM with CMS, MVS, VSE, or Unix 5 compatible for tier two; and Unix 5 compatible or MS/DOS for tier three. All DBMSs at tiers one or two had to include an SQL interface. General purpose pcs had to be IBM PC-compatible. Communications had to be Systems Network Architecture or an SNA gateway with a minimum of remote job entry, 327x, and Document Interchange and Delivery/Document Content Architecture.

Nevertheless, while the three-tier architecture is history, its legacy isn’t. Under the three-tier design, tier one consisted of the Army’s five regional data dp centers and specifically identified activities such as distribution systems to support the mass of Army users. Tier two was organizations, such as commands and armories, within the Army. Tier three was the individual workstation and the desktop level.

So what happens to projects such as ASIMS that were installed under the late, unlamented standards? True, ASIMS preceded the three-tier setup, which wasn’t created until March 1986 and the standards for which didn’t appear until June 1986. EDS finished ASIMS’ five regional data centers in 1985, three years after it signed the contract. And the company has completed the 47 individual base sites.

Even though ASIMS was born prior to the three-tier architecture, however, EDS has had to follow those standards. Both it and IBM bid IBM equipment. EDS won because it proposed a more creative solution to the Army’s problem. Does following these orders remove the blame for ASIMS being locked into a specific, outdated technical solution, as the S&I report charges? And if ASIMS is stuck in the wrong time zone, where does the Army go from here?

“They’ve really painted themselves into a corner,” says a government relations staffer at a major computer company. “The Army knows it’s got billions invested in IBM equipment, none of which was acquired under an acceptable federal standard. So what’s it going to do? Trash VIABLE to comply with the federal standards?

“They were very open about adopting IBM, and they were so naive, they thought it was okay. Are other companies supposed to sit still while that happens?”

The Army may be getting the message. After the fury over the three-tier architecture, the Army commissioned Planning Research Corp. (PRC), McLean, Va., to recommend standards that would meet the Army’s

---

**We wrote the book**

**Now we’ve**

---

Get a free video from the leader in CASE.

It’s called “The Excelerator® Difference.” And it’s a frank, management-to-management discussion about why Excelerator from Index Technology is so different from other CASE solutions. And why Excelerator®/RTS’ superior capabilities—with Index Technology’s implementation support—can make a difference in your organization.

In this short video, you’ll learn how Index Technology has helped the leaders in aerospace, defense and engineering. And how we can help you
needs—primarily, interoperability—while complying with federal competitive guidelines. Based on the Army baseline, the Army requirements, and "the litigious environment in the industry," PRC concluded that any standard recommended should come from voluntary standard bodies such as the International Standards Organization (ISO) or the American National Standards Institute (ANSI). It also warned the Army of legal ramifications.

"The Army's never given up on its goal," the government relations staffer contends. "They've just taken different tacks to get there. One way they might do it with VIABLE is to continue with EDS even after the contract expires in 1992. In fact, EDS's implementation of VIABLE is a further indication of ongoing bias by the Army."

That, among several other ramifications, was a major concern of the S&I report. Although the report hasn't been seen, it's obviously being heard. But some parties think the S&I group should not be seen or heard.

"I don't know where this stuff came from," says Joe Tarell, president of EDS's Army systems division, Bethesda, Md. "Everything is fine with ASIMS. We continue to be on schedule and under budget. And we're not having any problems with the Army. We've done everything they've asked us to.

"So I have no idea what precipitated this report. Whoever wrote it never bothered talking to us."

The rule for S&I reports is that they are rarely made public, and the ASIMS document will prove to be no exception.

According to Ronald Craven, acting assistant deputy director of policy and strategy in the Army's Information Systems for Command, Control, Communications and Computers (DISC4), the S&I group knows exactly what it's talking about.

"The S&I guys did a hell of a job," says Craven, who wrote the memo responding to the S&I report after the report was released to the Army. "They checked into everything. They had no hidden agenda.

"I think the issue simply is that it's a big project. I think it's going to end up being a lot of to-do about nothing."

Don't bet adult money on that one. Even if there's no successor to VIABLE, we're talking megabucks in future Army dp contracts.

"The question for those of us who want to compete for the next Army contract is whether the implementation of VIABLE has poisoned the well if they recompete," the government relations source says. "The Army's frozen in place because they don't know what to do with their massive installed base."

"They've said on paper they're going to change from the IBM standard, but they haven't proved it. If they don't change, we can't compete for any VIABLE follow-on. They've got to break up this game and take their chances.

"All we want is to keep the rules fair," claims the source. "We'll do the rest."
There's more to networking than just hooking things up.

It can be hard enough just to get all of your PC's connected. But getting them all to work together can be nearly impossible.

Banyan has a solution. Our network servers are designed to make your network run smoothly, whether it covers a cluster or a continent. Because our StreetTalk™ naming system makes world-wide resource sharing utterly transparent. And our network management software gives you control from any PC on the network.

But one of the best things about Banyan is that you can keep adding on to the network without interrupting it. That's one reason Banyan has been chosen by so many Fortune 1000 companies. And a very good reason to use Banyan for any company that hopes to become one someday.
Software Viruses: Pc-Health Enemy Number One

Covert code, designed to annoy or destroy, is emerging as the latest threat to pc security, and vendors are rushing to dispense protection.

BY EDWARD J. JOYCE

A few days before Thanksgiving last year, a student at Lehigh University checked out a software disk from the microcomputer laboratory. Within minutes, he returned what he believed to be a faulty disk and asked for another. Before the day was over, this scenario was repeated dozens of times with students checking out floppy disks at the 15 microcomputer laboratories across campus and returning them immediately as inoperable. Officials at the Bethlehem, Pa., university knew something was dreadfully wrong, but they could not explain what had caused disks to go haywire.

Unbeknownst to students and staff at the time, the university's computers were afflicted by a software virus—a small, mischievous program written by a hacker as a practical joke or as an act of vandalism. Viruses, like their biological counterparts, are programmed to reproduce rapidly, debilitate hosts, and spread like wildfire through a variety of carriers. Fortunately for Lehigh's computer users, the school's software analysts quickly identified the errant software and devised a "vaccine" program. Within days of the initial complaints, they had apparently eliminated the virus from software libraries in the microcomputer laboratories. Still, the virus had infected several hundred disks and probably disrupted the work of just as many students.

Although Lehigh University recovered relatively unscathed from its first bout with a computer virus, the well-publicized case augured the newest—and perhaps the most frustrating—problem in pc maintenance: diseased software. The pernicious attacks have affected personal computers for the most part, although mainframes can function as carriers and transfer virulent code to other pcs. In the past six months, virus reports have been growing with alarming frequency, and the virulent software shows no deference to business, government, or academic computers.

Besides Lehigh, academic sites that have been hit by viruses include the Universities of Pittsburgh, Delaware, and Wyoming, Penn State University, George Washington University, Georgetown University, Bowie State College in Maryland, the College of Alameda in California, and Hebrew University in Israel. In the federal government, virus infections have been reported at the National Aeronautics and Space Administration and the Justice department. In the corporate world, Electronic Data Systems, Apple Computer Inc., AT&T, and Arco are among those that have been infected.

Even commercially sold, shrink-wrapped software has been infected with viral contagion. Seattle-based Aldus Corp. discovered a virus last March in copies of its FreeHand product, a Macintosh design program. The virus, which displayed a harmless "message of peace," was inadvertently passed to Aldus by another company that prepares training disks for Aldus. Contaminated copies of the software were distributed to retail outlets for a few days before the
Behind the News

problem was discovered.

While users are puzzling over the anatomy and biology of viruses, software vendors are rushing to the market with vaccine programs designed to detect or quash virulent code. John McAfee, president of Interpath Corp., Santa Clara, a firm that sells several antiviral products, knows of more than 25 different virus programs and he says the list is growing. Working closely with the National Bulletin Board Society, a Santa Clara-based, nonprofit organization dedicated to certifying communications experts, McAfee's firm routinely analyzes viruses and catalogs their behavior patterns.

Most viruses known today, McAfee explains, were originally implanted by the hacker-author in existing systems software or applications software on a pc disk. These viral hosts include systems boot blocks and operating system utilities. The virus may be appended to an existing program or cleverly embedded in the program's code.

When the program is executed, the virus seizes control of the computer and tries to replicate itself by copying the viral code to a noninfected program on the same or another disk. After reproduction or attempted reproduction, which is carried out relatively quickly so as not to draw the attention of the user, the virus transfers control to the host program.

Following a period of reproduction, which varies from virus to virus, the disease usually will surface by making some powerful and deliberate demonstration of its presence. This demonstration ranges from a benign—if annoying—display of a screen message, to the erasing of a hard disk without warning. While inflicting damage, viruses have been known to taunt users with messages like "We hope you've enjoyed our program," "That's life Dr. Death," and "F— you."

Newer, better-designed viruses, however, tend to mimic their organic-life counterparts, making self-preservation and global infection top priorities. They discreetly clone themselves and place copies on all available disk media, especially floppy disks—the conventional path for transferring programs and data between pcs. Their destructive behavior is tied to an incubation period, so the virus will have ample opportunity to reproduce and the user will be less likely to associate subsequent problems with the acquisition of the infected software.

Some viruses are programmed to do no harmful actions for a set period. Depending on how they were designed, they could be programmed to reproduce or lie dormant. Others are triggered by a specific date like Jan. 1, 1989. Still others link activation to random intervals or a predefined cycle. For example, a spreadsheet virus may slightly alter the results of a recalculate operation every hundredth time it is executed.

Once a virus is identified and removed from a system, one of the major challenges is to prevent reinfection. Peter Scheidler, systems engineer at the Providence Journal Co. of Rhode Island, went through several reinfection cycles last May while combating a virus that had infected about 10% of the company's 1,500 floppy disks. The Providence Journal case stands out as one in which the author of the virus was actually identified and confronted.

The trouble began in the early part of May when a reporter brought a damaged disk to the firm's systems department to see if a file could be recovered. An analyst determined that the disk's boot block contained a virus program, which the reporter was not aware of. Embedded within the program code were an address and telephone number from Pakistan. This virus, dubbed the Pakistani brain virus, has been determined to be relatively benign because its primary goal is self-replication on floppy disks. It can, however, destroy small amounts of data, particularly on disks that are full or nearly full. Further, mutant strains that have been modified by hackers have surfaced and exhibit much more sinister behavior.

Scheidler found the virus on disks in the Providence Journal Bulletin newsroom, in state bureau offices, and in employees' home computers. Personnel in

How To Maximize the Safety of Your Disks

Computer viruses range from crude, simplistic software to extremely sophisticated, programmed instructions that may well be the work of several people. While it is impossible to eliminate totally the possibility of infection from these viruses, there are practical, commonsense ways to minimize the risks. The following material summarizes recommendations from virus victims and the vendors of antiviral products.

• If you're booting a pc from a floppy disk, always use a single write-protected copy of the original system disk. Booting from borrowed, unknown, or multiple disks greatly increases the chances of infection.

• If your pc has a hard disk, use it for booting, if possible.

• Treat all public domain software and shareware as if it were infected. There's at least one virus that masquerades as software that gives instructions for a popular shareware vaccine program; while displaying instructions on how to combat viruses, the virulent software erases the hard disk. If you must use software obtained from a public source, execute it on a standalone pc without a hard disk, so that it has no chance of infecting other disks. In the case of shareware, obtain a copy from a secure source, such as the original author, rather than from a bulletin board or a friend.

• If you must work with high-risk software, namely, public domain software or shareware or in an environment known to have viral infections, consider the use of antiviral agents.
Systems software for MVS data centers:

**Enter the world of total security, total support.**

Computer Associates announces the industry's only complete security software solution:

CA-UNIPACK™/SCA
SECURITY, CONTROL AND AUDITING
Consisting of CA-ACF2™ or CATOP SECRET®,
CA-VMAN™ and CA-EXAMINE™.

Utilizing advanced security techniques and integrated, industry-leading software, CA-UNIPACK/SCA provides total access control, enhanced network security and complete MVS operating system auditing capabilities—including virus detection.

With the industry's largest and most knowledgeable security staff, Computer Associates alone has the resources and expertise to provide this cost-effective solution. And no one else can match CA's commitment to the present and future of the security industry.

And only Computer Associates offers CA-UNISERVICE™, a secure link between your mainframe and CA's Customer Service System 24 hours a day. You get online access to software fixes, interactive problem resolution, plus product tutorials and more!

Call Dana Williams today:
800-645-3003 (Ext. 1742).

711 Stewart Ave., Garden City, NY 11530-4757

**COMPUTER ASSOCIATES**
Software superior by design.

- World's leading independent software company.
- Broad range of integrated business and data processing software for mainframe, mid-range and micro computers.
- Worldwide service and support network of more than 100 offices.

Resource & Operations Management • Financial • Banking • Graphics • Spreadsheets • Project Management

Circle 15 on Reader Card
Behind the News

his department spent two weeks testing and disinfecting disks at a cost of "about $10,000" before they declared the problem "licked for now." During the course of his investigation, Scheidler dialed the Pakistani phone number "not knowing what to expect." The man who answered claimed he was the author of the virus, says Scheidler. "He said the virus was originally written to help him trace pirated copies of software that he had copyrighted in 1986. He had no idea how the virus ended up in the United States, but he apologized for the problems it had caused us."

Scheidler and others who have been smitten by viral bugs freely offer advice on prevention measures (see "Safe Disks"), but they admit that there is no foolproof method. Moreover, they predict that viruses probably will be a chronic problem with no easy solution.

The medicine a user can buy off the shelf for fighting viruses falls into two general categories: programs that help prevent viruses and programs that help determine whether a system has been infected.

Stopping Viruses Before They Spread

Programs that prevent viruses are typically terminate-and-stay resident programs that monitor systems activity and watch for characteristic viral replication activities. They check all disk reads and writes and generate a warning message when potential viral activities are attempted. Such activities include writes to executable programs, systems device drivers, and boot blocks. This type of protection has the advantage of stopping viruses before they enter a system; however, viruses can be written to circumvent it.

The second category of viral protection software, programs that help identify an infected system, must first be installed on a known clean system. These programs work by periodically checking key information on the system disks (such as file date stamps, sizes, and checksums, among other items), looking for changes that would indicate a virus has infected the system.

Vendors of vaccine software admit that their products are effective only against known contagion and will likely lag one step behind the latest mutant strains. Not only will new generations of mutants be more resistant, they probably will be much more difficult to detect because of increased complexity.

Some new viruses operate subtly with random and intermittent behavior to ensure survival. For example, a recent virus reported to the National Bulletin Board Society purportedly searches disks only for data files and then occasionally increments or decrements only numeric fields in those files. In a business application such as a billing system, the user may learn of this type of problem only after customers report occasional underbilling or overbilling. And then the user would probably choose to replace various hardware and software components of the system before discovering the actual cause of the problem, if indeed it is ever discovered.

The potential for virus-spawned disaster may spell the demise of public domain software, shareware, and the routine exchange of user-written programs. Some companies are already taking the initiative to restrict the flow of this type of software into the corporate computing environment. The Providence Journal Co. now requires users to boot their pacs only from company-supplied disks, and strictly prohibits the use of public domain software. Employees at Hewlett-Packard have been forbidden to bring to work uncopyrighted, public domain software.

One computer analyst views virulent software in light of a human virus of epidemic proportions. "The current free flow of information will stop. Everyone will be very careful about who they come into contact with and with whom they share their information. It might do to computers what AIDS has done to sex."

Edward J. Joyce is a consultant based in Lexington, Ky.
Systems software for MVS data centers:

Enter the world of total production control, total support.

Computer Associates introduces CA-UNIPACK™/APC, the only production control software system to offer real solutions that meet the growing demand for unattended operations.

CA-UNIPACK/APC—AUTOMATED PRODUCTION CONTROL

Consisting of: CA-SCHEDULER™ or CA-7™, CA-41™, CA-OPERA™, CA-PRODICT™, CA-JCLCHECK™, CA-DISPATCH™, and CA-RAPS™.

Unattended operations is now a reality because CA-UNIPACK/APC provides automation for the entire production operation. Automating: workload planning and scheduling, production JCL set up and validation, realtime monitoring and problem identification, restart and recovery, console activity management and report distribution.

As an advanced, integrated production control system, CA-UNIPACK/APC creates a synergy that results in startling productivity gains including improved workload throughput, system availability and end-user service levels.

Only Computer Associates has the products and expertise to provide MVS data centers with such a cost-effective, total solution.

And only Computer Associates offers CA-UNISERVICE™/III, a secure link between your mainframe and CA's Customer Service System, 24 hours a day. You get online access to software fixes, interactive problem resolution, plus product tutorials and more!

Call Dana Williams today: 800-645-3003 (Ext. 1742).

711 Stewart Ave, Garden City, NY 11530-4787

COMPUTER ASSOCIATES
Software superior by design.

- World's leading independent software company.
- Broad range of integrated business and data processing software for mainframe, mid-range and micro computers.
- Worldwide service and support network of more than 100 offices.

Resource & Operations Management • Financial • Banking • Graphics • Spreadsheets • Project Management

Circle 17 on Reader Card
To develop your application faster, you need the only 4GL that doesn't rely on COBOL or C to fill in the missing pieces.

INFORMIX-4GL.

A complete COBOL replacement.

Unlike other DBMS products, INFORMIX-4GL is a complete application development language for SQL databases. It's the only 4GL with full screen-building, report-writing and SQL database I/O capabilities designed into a single programming language. Which means it's a real COBOL-replacement-caliber tool. So you'll rarely have to revert to COBOL or C to customize an application.

10 times faster than COBOL.
3 times faster than any other 4GL.

When you leave COBOL and C behind, high productivity kicks in. In fact, with INFORMIX-4GL, you'll be able to deliver even the most complex custom applications at least 10 times faster than you can with COBOL or C. And 3 times faster than with any other 4GL.

Moreover, application debugging and maintenance are a breeze with our INFORMIX-4GL Interactive Debugger. You can view and debug your 4GL source code while the program runs. Even maintenance time will be reduced drastically.

Here's what it takes to make a complete 4GL. And only Informix has it all.

- Complete report-writing screen-building and database I/O language in a single product.
- Language comprised of non-procedural statements.
- Language flexibility equal to COBOL or C.
- Full SQL implementation.
- Application portability without recompiling.
- Complete source code debugger capability.
- A 10 to 1 increase in developer productivity.

After all, with the non-procedural syntax there's less code to maintain. And the debugger makes it easy for others to understand and maintain your code.

What's more, our INFORMIX-4GL Rapid Development
Database in UNIX. Complete 4GL.

System lets you compile your code in a fraction of the time you'd normally take. And you can port your applications to other operating systems without rewriting or recompiling a single line of 4GL code.*

Informix 4GL is as flexible as conventional languages, but provides all the power of a 4GL with its non-procedural syntax for handling menus, forms, reports and SQL.

Plus it's more portable.

You can take INFORMIX-4GL just about anywhere—MS-DOS, OS/2, VMS, and, of course, most every known version of UNIX. Better yet, it runs on more machines (over 200) from more manufacturers (85) than any other DBMS.

All that and a best-seller, too.

Informix DBMS products for UNIX, including INFORMIX-4GL, outsell their closest competitors by a substantial margin. So if you subscribe to the theory that there is safety in numbers, rest assured. With INFORMIX-4GL, the numbers are on your side.

Free booklet, "How To Choose A 4GL".


INFORMIX

#1 for good reason.

*Obviously mixed 4GL-C programs or code written to take advantage of specific operating system features may need to be rewritten or recompiled.

Informix is a registered trademark of Informix Software, Inc. UNIX, MS-DOS, OS/2 and VMS are registered trademarks of their respective manufacturers. © 1989, Informix Software, Inc.
As firms strive to sharpen their strategies, they are running into systems discontinuity: systems portfolios incapable of supporting new initiatives. Often, management clings to kludges rather than risk rearchitecture. But in the long run, modification may not be the safest or least costly course.

The core of Binary's systems portfolio, 40 major systems in all, is over 10 years old, including the key order entry, customer service, and financial reporting systems. These systems have been constantly enhanced over the years, and have survived major strategic and structural alterations in Binary's business.

Binary's sales have shifted from exclusively leased sales, with bundled hardware, software, and maintenance, to primarily unbundled outright sales. The average price of systems has dropped as the typical order changed from a single system to multiple, microprocessor-based systems. Furthermore, Binary's manufacturing strategy shifted from manufacture-to-order for all products, to manufacture-to-inventory for many products. It changed from a pure functional organization to a product-focused development organization, with shared manufacturing and logistics and industry-focused marketing and sales. Binary also entered the realm of systems integration, where its maintenance force has to support hardware offerings from other vendors.

Binary had made successive modifications to its systems portfolio, but the efforts never had been totally successful. At each stage, management had been willing to accept compromises to get the systems up quickly and save money. Yet, the cost to the business in terms of excessive personnel costs, uncompetitive service levels, and the inability of Binary's management to make decisions was staggering. Over time, these problems had become part of the accepted method of doing business at Binary, and top management, all of whom had come up through the ranks, were only dimly aware that they had problems.

For example, Binary's order entry system originally had been designed to handle single-cpu orders, and this was deeply embedded in the logic of the system. Today, if a customer orders 10 microprocessor-based systems, the salesman must enter 10 separate orders. A recent sales efficiency study found...
The Challenges of Information Technology
Second in a Series

that account executives spent 40% of their time on order entry. Moreover, the system had become so complicated, with cryptic codes and procedures for special cases, that each sales office employed a person to support the sales force in order entry.

At the corporate level, the finance department employed dozens of analysts to take reports that were designed for a functional organization and rework them into a form usable by product management. Maintenance technicians working on integrated systems ended up maintaining competitors' equipment for free, because Binary's equipment logs couldn't handle the different lengths and patterns of competitors' serial numbers. As a result, there were no reliable records of what equipment was under warranty as part of a turnkey installation.

Binary's order entry system required a minimum three-day shipping cycle. This had been acceptable when every order essentially had to be custom manufactured, but it placed Binary at an extreme disadvantage in some businesses, such as computer supplies, where next-day delivery was the norm. Almost as bad, the software ordering system had been developed separately when the shift was made to unbundled software. Unfortunately, as a separate system, it was impossible to coordinate delivery of hardware and software at the same time. Sometimes, software would be delivered weeks ahead of a special order cpu, then would be lost by the time the installers showed up.

The maintenance systems had been designed as a time-accounting system only, in the days when every Binary customer was on a maintenance contract. Today, when Binary management wants to provide preferential service to contract customers, all maintenance calls are handled identically because the system can't identify who is on contract and who isn't. Even worse, bills must be prepared manually—errors are common and adjustments difficult.

By far the most costly problem plaguing Binary is management's deeply impaired ability to make decisions. Product management was supposed to manage the overall profitability of their product lines, but most of the numbers on the income statements received were allocated on a revenue basis, rather than on actual expenditures. Because of the time needed to massage the reported numbers, monthly results came out 60 days after the close. Binary had gained the reputation of being slow to respond and competitors had stolen market share by judicious pricing actions.

When there were disagreements among Binary's management team, the two sides often couldn't agree on what the problems were, much less how to resolve them. Top management meetings to address key issues turned into debates on the validity of the numbers needed to make the decisions. Pre-tax earnings had fallen from 15% of sales in the late 1970s to barely break-even. Binary had been the dominant supplier in its key market segments, but it now finds itself in danger of slipping to number two in several of them.

Why Companies Don't See Discontinuity

How does a company get itself into a position like Binary's, and why doesn't management do something about it?

Part of the problem is that top management's recognition of the problem may be low. Organizations simply adapt to their systems limitations and may fail to recognize the hidden costs they create. When it comes time to make another change to the systems portfolio, the marginal cost of doing one more modification will always be lower than a major rearchitecture.

Even when management recognizes the problem—and Binary's eventually did—the cost and risk of doing something...
about it can be daunting. In a company of Binary’s size, a major rearchitecture can cost tens, even hundreds, of millions of dollars. In very large companies, the cost can be measured in billions. What’s worse, the outcome is far from certain. In Binary’s case, several development projects aimed at fixing the worst systems problems had been attempted, and failed. Few CIOs—much less ceos—want to take on a major project, with all of the risk it entails, given a history of development failures.

Finally, few ceos realize that they have to be intimately and actively involved if their organizations are really going to fix these problems. A systems discontinuity requires changes not only to the systems themselves, but to the organization and management environment into which they are installed. Yet, because most ceos don’t understand this, they delegate the solution to the IS chief, who simply isn’t empowered to solve the total problem. Sensibly, few CIOs take on high-visibility, expensive efforts that are bound to fail. Instead, they try to do the best they can with the resources they are given.

**Managing Discontinuity Successfully**

AmCom is one of the 50 largest and most profitable commercial organizations in the world. Its traditional business is insurance marketed directly to consumers, but it has achieved dramatic growth of both revenues and earnings by improved quality of its customer base, improved risk management, and selective diversification into related financial services, such as consumer credit. Despite its success, AmCom faced serious problems in the mid-1980s.

AmCom’s systems development budget had tripled between 1982 and 1985. Maintenance, which had been 45% of the systems development budget, reached 70%. Installed MIPS grew at a rate of 40% a year, even though the real growth of financial transactions had been only about 5% (AmCom’s revenue growth of 25% a year had been achieved by increasing the value of each transaction.) Even more important, however, the systems development function could no longer keep up with the rate of business changes demanded.

### Following Successful Project Management Steps

Before insurance marketer AmCom undertook its major rearchitecture, it studied how other firms had negotiated systems transformations and emulated the practices that were instrumental in their successes. This is what AmCom found.

**Keep the ceo and top management involved.** Top management involvement is essential for success. But beyond the personal commitment of the chairman, the formation of a steering committee (made up of the chairman, the CIO, the project manager, and the head of each major business unit) makes clear to the whole organization top management’s commitment and involvement throughout the project and forces organizational politics into the open.

So, AmCom’s top management also ensures broad support. Problems become the responsibility of the whole business to solve, not just the MIS manager operating without support or authority. And, after working together for months with a common purpose, users and systems developers have been known to actually trust each other.

**Empower the project team to make decisions.** A rearchitecture entails literally thousands of decisions about a huge range of issues: from fundamental issues of business strategy to simple issues of placing data on a screen. These have to be made quickly because time is the enemy of success. Conventional decision mechanisms are usually too slow, and more than one project has entered a death spiral, whereby requirements become obsolete before implementation, staff turns over, and management commitment weakens. One source of delay triggers additional delays, so that the project never finishes. The project team must have the authority to proceed without requiring sign-offs from line organizations. The steering committee should have the final authority in handling disagreements.
Every two years or so, the board had approved a major new strategic initiative. For such crash projects, systems development was able to get the necessary systems enhancements running and integrated with AmCom's core systems. But nothing else could get done, and enhancement requests from the established businesses backlogged. High-priority requests took over a year, medium priority requests didn't get done at all. Users began to demand enhancements that were harder and harder to do — systems that required integration across multiple databases and changes to more and more programs. Systems development was growing as fast as it could and had adopted code generators and other advanced tools. State-of-the-art software rejuvenation techniques were implemented. But each time systems development thought it was about to get on top of the problem, another board-level initiative came along.

AmCom's CIO had been appointed in 1982. He had spent the first two years of his tenure trying to accomplish two things: earn a reputation among top management as someone who was responsive and could deliver and educate the CEO about systems technology and the impact it was having on the business. By 1984, the CIO worried that the underlying systems problems would begin to damage his hard-earned reputation for getting things done. However, that same year the education effort bore fruit.

The chairman agreed to sponsor a comprehensive technology strategy review. With the chairman's support, top management of each of the business areas committed real time and energy to thinking through the kind of systems and technology support they would require in the future. After six months, the combined efforts of management, users, and IS staff produced the most comprehensive view of the future of the business that AmCom had ever attempted.

The study found that the individual changes of the past few years were really aspects of a larger and much more fundamental strategic change. AmCom faced new, low-cost competitors who were cherry picking some large, price-sensitive segments. They had developed a highly efficient delivery system from scratch that took advantage of the latest technology. To maintain market share and position, AmCom had to match these low-cost competitors in the basic product offerings, and then tailor more specialized and higher-margin products to higher-value segments. This would result in higher profitability with AmCom's best customers, and still permit low-priced, profitability offerings to other more competitive segments.

**Design Incapable of Supporting Strategy**

A detailed technical assessment of the existing systems found that their design did not support many requirements of the new strategies. The whole system had been designed around the now obsolete model of a homogeneous customer base and a single, high-cost/high-margin service standard. The data required to segment the customer base resided in seven separate systems, and additional data entities would be required that didn't exist anywhere. All of the main processes would have to be fundamentally modified to deliver differentiated services to different customer and risk classes.

Altogether, implementing the new strategies would require modifications to over 1,000 programs. Some of these programs were 20 years old, were written in assembly language, and had been untouched in at least 15 years. In a few cases, source code listings and external documentation were lost, possibly permanently. The study team concluded that if it were necessary to fully implement the new strategies, it would be cheaper to start from scratch.

Moreover, even if the changes could be made, adequate performance was unlikely. Part of the new strategy was to give customers instant access to Datamation OCTOBER 15, 1988 37
their own policy and account histories. How could AmCom provide one-second response rates if data had to be pulled from seven separate systems, or how could data integrity be guaranteed if extracts were used?

At the same time as the study recommended starting from scratch, it also questioned AmCom's ability to successfully build the new systems following its traditional methods. The last major systems development project, a two-year attempt that began in 1980, had been only a fraction of the size required for this one and had run into serious problems. Despite meeting the written spec, users found the delivered systems didn't meet their needs. Systems development insisted this was not a technical failure, but a failure of management will, but to no avail. The systems had to be redeveloped, causing an 18-month delay and cancellation of three follow-on phases. Two earlier, smaller projects had gone only slightly better.

The cost, if ultimate success could be assured, was not the issue. Even though the effort would cost hundreds of millions of dollars, the risk to AmCom's core business of not doing the project far outweighed this cost.

It took AmCom three months to decide. As part of the decision, the original study team was asked to investigate other organizations that had attempted major rearchitectures, and extract the practices that contributed to their success (see "Following Successful Project Management Steps"). The findings they presented to the board included a set of organizational, timing, and resource recommendations based on this work. These were implemented when the project started up, and were continually refined as AmCom went along.

The initial charter for the project was to develop a detailed vision for the new systems, and to report this vision back to the board within nine months, along with a specific timetable and cost estimate for completion. This was accomplished, and a 24-month development schedule and 24-month rollout schedule was approved. The effort was not without problems, but systems were rolled out within nine months of the original schedule and satisfied all of the essential requirements of the original specification.

Major Discontinuity, Midsize Solution

Regional Life is a well regarded, U.S.-based life insurance company with a policy count of 600,000. The company's systems were developed over a 20-year period, the core of which had been written in unstructured COBOL, and documentation had been lost. Among many problems with the systems, key business variables such as prices had to be hardcoded into these unstructured and undocumented programs, so that responses to changing market and competitive conditions were glacially slow, and new product introductions were essentially impossible.

Regional Life's initial response was to try to build the new systems on its own, from scratch. A specification project was initiated—totally staffed by IS personnel. After 18 months and six man-years of effort, however, general management realized the effort was nowhere near completion and that optimistic estimates (which were no longer believed) for the project's implementation were pegged at seven years. A new team consisting of general management and outside consultants was brought in to evaluate the project's progress to date, and to make recommendations on how to proceed.

The new approach was radically different from the original. Short-term requirements for specialized products would be met by developing some stand-alone minicomputer systems, supplemented by quick fixes to the requirements. Over the long term, instead of developing a complete system from scratch, the core of the new systems would be a vendor-supplied software package. Regional's development effort would be spent in developing real competitive differentiators, not in reinventing basic processing systems. Specific plans were established for developing specialized analysis and marketing capabilities on top of the vendor-supplied solution, and for migrating the newly developed, stand-alone specialty systems.

Regional is now in the midst of implementation. Migration to the new environment is expected to take three years, at a cost estimated to be one third of the best estimates for the internally developed systems. A major rearchitecture was not a viable option for a company of Regional's size, but by using a vendor-
LINK'S NEW GENERATION OF MULTIPLE CONCEPT TERMINALS HAS MORE FEATURES, BETTER ERGONOMICS, AND COSTS LESS.

James P. Everyother III
CEO, Everyother Terminal Company

THAT'S JUST PLAIN UNFAIR.
LINK CALLS THIS THE NEXT GENERATION OF MULTIPLE CONCEPT TERMINALS.

WE CALL IT RESTRAINT OF TRADE.

UNFAIR

James P. Everyother III
CEO, Everyother Terminal Company

Link's new MCs. Features we can't match at prices we won't match.

Full-screen image without dark borders. Well, I like dark borders.

Choice of screen colors and keyboards. Unfair.

Flat Screens. I just hope their sales go flat.

No screen flicker. Personally, I find screen flicker very soothing.

19 emulations. Arrrgh!
“Everyother Terminal Company used to be at the top of the heap. Then Link came along. In just four years they’ve shot from last place to second place in the terminal market.

By working faster and smarter than a big, bureaucratic company like ETC can.

“Now they’ve come out with the MC5. The first of a whole new generation of their famous Multiple Concept terminals. With better price/performance than our overhead will permit us to match. And ergonomics that exceed even the toughest requirements.

Ridiculous! I mean, who ever heard of building terminals better than you have to?

“It’s not just that Link’s products are ahead of ours that makes me so mad, after all, we’re used to that. It’s that they’ve beaten us on features and quality and price. There ought to be a law. Or at least a law suit.

“Well, we’re not going to take this lying down. As soon as we finish this quarter’s financial posturing, we’re going to form a task group to study the situation, maybe make a few recommendations. But these things take time. While Link is totally dedicated to building terminals, we have more important, and frankly, more profitable, product lines to worry about.

“I wish I’d never heard the name Link.”

---

**MC5 Enhancements**
- Flat Screen for decreased glare and increased viewing area
- Overscan for full-screen image without distracting block borders
- 78Hz refresh rate to eliminate screen flicker
- High-resolution characters
- Separate contrast and brightness controls on front panel
- Advanced surface-mount technology for improved reliability
- Low-power operation

**MC5 Features**
- Flat screen
- 78Hz refresh
- Full overscan
- Brightness and contrast knobs
- 80/132 columns
- 24/25/50 data lines
- 7 pages memory
- 512 displayable characters
- 3 keyboards
- 2 serial ports
- 1 parallel port
- 19 emulations
- Virtual terminals

Every other Terminal Company’s FastWare: A line of terminals so unremarkable it’s almost as if they didn’t exist.

---

Link Technologies, Inc.
47339 Warm Springs Blvd., Fremont, CA 94539, 800-448-LINK (In CA 415-651-8000), FAX 415-651-8808.

This space donated in the interest of fairness by Link Technologies, Inc.
Sophisticated electronics is everywhere today. The fabulous Showboat Hotel & Casino is no exception. Slot machines, poker, keno games, and of course data processing for the facilities employ solid state electronics. When any of these fail, it can cost plenty.

In a business that runs 24-hours a day, the power must be reliable. The engineers at the Showboat decided to run their systems on electrical power that has been filtered by the POWER SIFTOR™ from Current Technology.

The paying customers at Joe Kelley's Showboat have very little patience with a machine that is down and malfunctioning. That's why Kelley leaves nothing to chance. You shouldn't either.

Unfiltered power can destroy your computer, communications equipment, processing equipment, or other solid state equipment. It can wreak havoc by causing lost files and directories, software bugs, master checks, and system retries. The Power Sifitor can typically eliminate these effects of "dirty power" and further increase hardware reliability.

Now, the odds of you making the right choice have been further improved by Underwriters Laboratories. The Current Technology products have received outstanding marks in Underwriters new category 1449 testing program.

Joe Kelley is right. There is too much money on the line to gamble with erratic power. Protect your systems today. Call or write Current Technology for more information.

The Power Sifitor works, you can bet on it.

"I have too much money on the line to gamble on dirty power."

Systems Discontinuity

supplied package as a base for its future systems, Regional has achieved what is, in effect, a major rearchitecture, while assuming only a fraction of the risk and expense of internal development.

Change Management Necessary

At all the firms represented by these case studies, change management was necessary. This is because all organizations tend to resist change, and a systems rearchitecture is fundamentally an exercise in change: changes in corporate strategy, changes in people's jobs, changes in required skills, as well as changes in technical knowledge and practice.

A SYSTEMS REARCHITECTURE IS FUNDAMENTALLY AN EXERCISE IN CHANGE.

Binary has not been successful, because management doesn't understand, and therefore can't face, the magnitude of the changes required. AmCom and Regional Life have been successful because they recognized the stakes and took appropriate action.

Systems discontinuity represents one of the most critical strategic issues facing businesses today. Companies that are successful are likely to be able to leverage their existing strengths more effectively than their competitors, and possibly change the basis of competition. Companies that avoid making changes to their systems portfolio risk being left in an increasingly uncomfortable position. They may be forced into the stark choice of either making major, risky systems investments in a catch-up program or accepting continued deterioration of competitive and financial performance.

SUPRA™ Opens Doors For Best Western.

PROBLEM: How to easily access and update large volumes of corporate information vital for strengthening image and facilitating expansion

CINCOM SOLVED IT: With SUPRA Advanced Relational DBMS and MANTIS, a powerful application development tool

Tracking and managing information for 3,300 hotels in more than 50 countries around the world is enough to give any MIS manager some sleepless nights. But, thanks to the SUPRA™ Advanced Relational DBMS from Cincom®, Best Western's Robert Seate (along with member hoteliers and guests) can rest assured things are running smoothly.

"With SUPRA, we really have the best of both worlds," explains Seate. "We get the advantages of a relational environment and, at the same time, get a system that performs very well in a large volume production environment."

SUPRA's superior performance lets the world's largest hotel chain access and update the marketing data as well as the property and travel publications essential to support and promote each hotel. SUPRA also works in concert with MANTIS®, a flexible application development tool in the CASE ENVIRONMENT™, to drive multiple programs designed to monitor and upgrade quality standards throughout the Best Western organization. "When you increase the value of the chain, people want to become a part of it," Seate explained.

"SUPRA and all the Cincom products work together to help us meet our corporate expansion and quality goals," Seate points out. "It's a set of tools that is very flexible, very easy to use and learn, and very capable of developing and supporting a wide variety of applications."

As for SUPRA's reliability, Seate has no reservations. "Let's put it this way," he says, "we're running our payroll on it. We'd be crazy to do that if we didn't have a high degree of confidence in the system."

If you're looking for a relational database with IBM and VAX compatibility, high performance and reliability, plus the option of a flexible application development tool, it's time you checked into SUPRA and MANTIS.

Call us today for more product and customer success information, or write our Marketing Service Department, Cincom World Headquarters, 2300 Montana Avenue, Cincinnati, OH 45211.

1-800-543-3010
In Ohio, 513-661-6000
In Canada, 1-800-387-5914

Mr. Robert C. Seate
Manager, Management Information Systems
Best Western International, Inc.

© 1988 Cincom Systems, Inc. IBM is a registered trademark of International Business Machines Corporation. MVS is a trademark of Digital Equipment Corporation.

Circle 22 on Reader Card
Introducing FMS 1000™—Fujitsu's answer to costly, complicated network management systems.

Like other systems, FMS 1000 lets you manage your communications network pro-actively instead of reactively. To reduce downtime. Increase productivity. And keep users happy.

But unlike other systems, FMS 1000 is simple to use and a snap to install. It's built on industry-standard hardware and Microsoft's® popular, powerful Windows software. And best of all it sets a new standard in price-performance, making it the only truly affordable network management system of its kind for growing companies.

There's a reason we can offer so much for so little: Fujitsu's single-board modem technology. Proprietary LSI technology that makes our LN line the world's smallest, most integrated networked modems. Modems so reliable, they come with an outrageous guarantee: should one fail during the first year, we'll give you another modem free. And fix the first one, also for free.

That's Fujitsu Modem Insurance*—backed by one of the best nationwide service networks in the business.

Now that you know a thing or three about this new system, there's just one thing more to do: pick up the phone and call 800-422-4878, in California, 408-434-0460, and in Canada, 416-673-8666, for more information on how simple and affordable a network management system can be.

*The limited offer for Fujitsu Modem Insurance is only open to new purchases of LN, L and EZ modems from an authorized Fujitsu America distributor and is subject to the terms of our Modem Insurance Policy.

FMS 1000™ is a trademark of Fujitsu America, Inc.

Microsoft® is a registered trademark of Microsoft Corporation.

FUJITSU AMERICA
DATA COMMUNICATIONS
Circle 23 on Reader Card
Two independent surveys of DB2 users provide some insight into the use of DB2 at customer sites. Almost all installations use components of DB2, such as DB2 Interactive (DB2I) and Query Management Facility (QMF), but no vendor of DB2 support tools has yet managed to rise to the status of recognized standard. Most DB2 purchasers are irrevocably committed to DB2 as their primary database management system, and they are heavily involved in the development of DB2 applications.

In the three years that DB2 has been available to customers, IBM has established its dominance in the database management system market in a way it was never able to do with its earlier database product, IMS. Even well-established DBMS competitors such as Cullinet, ADR, and Information Builders have found it necessary to coexist with DB2.

And yet, little has been done to assess the ways companies really use DB2. Horror stories about DB2 exist, as do tributes to it. An accurate picture of the environments that companies establish to build DB2 applications, and the ways in which those systems are being built, has been lacking.

Two independent surveys of DB2 users now provide a picture of DB2 in the real world. One survey, conducted in April 1988 among members of the Midwest DB2 Users Group, received nearly 300 replies, representing over 150 different users of DB2. Two thirds of the replies were from DB2 user installations, the other third represented software vendors. The second survey, performed in January 1988 among members of the New York-based Knauer DB2 users group, drew replies from 350 people representing 113 companies. All were users of DB2. Although these surveys were undertaken independently of one another, we have combined the results into what we believe is an accurate, composite picture of how companies are using DB2.

Profiles of DB2 Sites

A major task of the surveys was to profile the typical DB2 installation. What software do DB2 users install to develop DB2 applications and improve management of the DB2 environment?

Starting with DB2 support tools, we found that almost all installations use components of DB2 such as DB2 Interactive (DB2I) and Query Management Facility (QMF). Approximately one third of the DB2 sites use the separately licensed IBM products DBEDIT, the Data Extract Facility (DXT), and the DB2 Performance Monitor (DB2PM). IBM’s migration aid, DBMAUI, was employed by 23% of the New York users, and by about 15% of users in the Midwest.

Several DB2-related IBM support tools were shown to have minimal market presence: the Data Base Relational Application Directory (DBRAD), the Data Extract Assistant Tool (DXTA), and Host Data Base View (HDBV). Each of these IBM program products were used by 10% or less of the DB2 sites. Two IBM products we would characterize as currently unsuccessful in the DB2 marketplace (on the basis that they were employed by just a handful of the hundreds of survey respondents) are the IMS Data Dictionary-DB2 Interface and DB2/VSAM Transparency.

DB2 systems support tools from independent software vendors present an interesting situation. Survey respondents mentioned dozens of different products, but the only product used by more than 10% of the respondents was DB/ProEdit (from On-Line Software, Fort Lee, N.J.). The many other support tools each rated only a few mentions.

This confirmed our suspicion that no vendor of DB2 support tools has managed to gain status as a supplier of a recognized standard. Moreover, the Midwest group survey, which included responses from 50 software vendors, in-
Digital has it now.
To maintain its #1 position in the synthetic fibers industry, DuPont Fibers, the largest department in DuPont, undertook the most sweeping integration of manufacturing facilities in the company's history. According to Andrew Harriss, Manager, Information Systems, "Our goal was to improve manufacturing efficiency and customer satisfaction. We selected Digital's VAX architecture and Ethernet communications to help us automate our manufacturing processes and make the leap from centralized computers to distributed systems. Digital's architecture - in computer systems, software, and networking - was key to our choice. It's easy to use, highly flexible, distributed and expandable. And it delivers the goods...far better than what we'd been used to."

Harriss further states, "The VAX and Ethernet solution has been a godsend. Teamwork and information sharing are vastly improved. We're able to respond much more quickly to our customers' needs. We can now change the way we do things, not just do the same things better. Competitively speaking, we're very well positioned for the future."

To get your competitive advantage now, write to: Digital Equipment Corporation, 200 Baker Avenue, West Concord, MA 01742. Or call your local Digital sales office.
DB2 User Survey

Indicates that suppliers of DB2 support software will continue to flood the market with new products. It seems that DB2 users can look forward to a wide variety of software support tools, and the vendors developing these tools may face either very stiff competition or an unpleasant shakeout.

We also sought to discover which fourth generation languages, or applications generators, were used to develop DB2 applications. We found that almost all sites employ IBM’s QMF, widely considered to be an essential part of the DB2 environment. Information Builders’ Focus, Pansophic’s Telon, and IBM’s Cross Systems Product (CSP) were the next most popular applications development tools. These products were used by between 10% and 25% of the survey respondents. At 10% market share or below, we again encountered dozens of products, including IBM’s Application Development Facility (ADF), Sage Software’s Application Productivity System (APS), On-Line Software’s DB/CLIST, IBM’s Application System (AS), SAS Institute’s SAS, and Nomad, Mark IV, Intellect, Ramis, Pachbase, and many others.

The 4GL picture is similar to that for DB2 systems support tools. Each of the three clear market leaders—Focus, Telon, and CSP—has 25% or less of the market. Dozens of other tools rate at 10% or less, with many being mentioned by only one or two respondents. So, beyond QMF, DB2 users do not yet recognize any particular applications development tool as a “standard.”

Software vendors are enticed by a market that lacks resident market leaders, yet many find themselves unable to build market share once they enter the fray. That there are many products available benefits DB2 users when they seek tools, but it hurts them when they look for skilled personnel.

Among traditional programming languages, COBOL was the leading language employed in DB2 applications. The Midwest group’s survey distinguished between VS COBOL and COBOL II, and found that the impact of the “new COBOL” has yet to be fully felt: more sites still use VS COBOL. Among DB2 users, PL/I was the second most-used programming language, while many software vendors picked Assembler. Languages such as FORTRAN and APL2 are used by relatively few DB2 sites.

DB2 distinguishes itself from IMS in many ways. IBM’s IMS/DC, TSO with ISPF, and IMS/DC. This new phenomenon was not possible before the advent of DB2, in the days of CICS/VSAM, CICS-DC/1, and IMS/DC. The Midwest group survey also found significant use of the Call Attach Facility. However, such usage was largely confined to software vendors and was found in only a handful of end-user sites.

Another major area of interest in the surveys concerns the level of sophistication of DB2 users. Is DB2 used for online and transactional systems, or just for downloading data for querying? How many sites use DB2 as the primary production DBMS?

The Knauer survey judged the overall sophistication of DB2 usage from its finding that 10% of all DB2 sites are in a pilot project phase, while 50% are active in development projects. Only 40% actually have production applications, much fewer than one might expect.

The Midwest survey provides another perspective, asking for the numbers of applications in development and in production status at each site.

As expected, the responses vary widely, ranging from no applications in either status to installations having several dozen applications in both. The average site had 3.25 applications in development and 4.0 in production.

The number of applications developers at these sites also varies widely, but most staffs of DB2 programmers ranged from two or three up to about a dozen. Statistics from the Midwest survey shed further light on the nature of those applications in production. Fully 65% of DB2 installations had query applications in production, while about half of all sites had applications involving on-line....
Just a few months ago, computers this powerful were tracking planetary movements, pondering quantum physics and building rockets.
Now they're taking
Introducing the COMPAQ DESKPRO 386/20e. 20-MHz 386 performance designed to fit the increasingly sophisticated needs of 286 users.

People who work with 386 personal computers used to be called rocket scientists. Now they’re also called accountants, engineers, managers and CEO’s. Thanks to the new COMPAQ DESKPRO 386/20e.

It delivers 386 power to people whose demanding needs have outgrown the capabilities of their 286 PC’s. Better yet, it packs all this power into a design that fits neatly on your credenza.

Start with speed. Everything in the new COMPAQ DESKPRO 386/20e is optimized to go faster.

Its 20-MHz Intel 386™ microprocessor with cache memory is surrounded by the exclusive COMPAQ Flexible Advanced Systems (Flex) Architecture. This high-speed combination runs the world’s largest library of software 25% faster than non-cache 20-MHz 386-based PC’s. And 50% faster than non-cache 16-MHz 386-based PC’s.

Its optimized 32-bit design also enables you to take full advantage of powerful 386 software and multitasking operating systems such as Microsoft® Windows/386, MS® OS/2, XENIX® and UNIX.

You’ll find that a long list of high-performance features is built in. One megabyte of memory. Sharp, high-speed VGA graphics. Support for 5¼" and 3½" diskette drives. And standard interfaces to connect a printer, mouse and communications devices.

Of course you have growth potential. Five expansion slots are available: four for a network card, mainframe communications board, modem or other devices, and one high-speed 32-bit slot that allows you to expand memory up to 16 megabytes.

You have options, too. There’s room to add two high-speed fixed disk drives, with 110 or 40 megabytes of storage. You can choose a 135- or 40-megabyte tape backup. Or match the number-crunching power of a dedicated engineering workstation by adding a powerful Intel 387™ or Weitek 3167 coprocessor.

With its integrated design and performance, the COMPAQ DESKPRO 386/20e represents the ultimate space vehicle.
Whether you use a personal computer for launching rockets or corporate acquisitions, Compaq delivers the highest-performing solution.

For those who want everything, now, the COMPAQ DESKPRO 386/25 is the most powerful PC available. For growing performance requirements, the new COMPAQ DESKPRO 386/20e is a move into the power structure. And for users considering 286 PC’s, the COMPAQ DESKPRO 386s is an affordable route to the fast track.

These PC’s are simply the highest-performing in the world. That’s one reason PC experts rate COMPAQ highest overall. And why for the past four years COMPAQ has been added by more FORTUNE 1000 corporations than any other brand.

To make this performance part of your business, call 1-800-231-0900, Operator 70. In Canada, 1-800-263-5868, Operator 70. We’ll give you the location of your nearest Authorized COMPAQ Computer Dealer and a free brochure.
BUSINESS BOOSTING BOOKS FROM AMACOM

Examine any book Free for 15 days!

HOW TO PREPARE AN EFFECTIVE BUSINESS PLAN: A Step-by-Step Approach
Robert Delaney, Jr. and Robert Howell
Here's everything you need to create a detailed business plan from scratch. This learn-by-doing manual leads you through the planning process from start to finish and includes all the charts, forms, and graphs you'll need to produce a winning plan for your organization.

#7633 $55.00/AMA members $49.50
Circle 25 to order.
Members circle 37 to order.

HOW TO MAKE IT BIG AS A CONSULTANT
William A. Cohen
This nuts-and-bolts guide gives you everything you need to know about starting and running a lucrative consulting operation, whether full- or part-time. Comprehensive and completely practical.

#5821 $17.95/AMA members $16.15
Circle 26 to order.
Members circle 38 to order.

AMA MANAGEMENT HANDBOOK Revised and Expanded Second Edition
Here's the most useful source of management knowledge in one easy-to-use volume, with proven, profit-making information on every business topic.

#000 $79.95/AMA members $71.95
Circle 27 to order.
Members circle 39 to order.

FINANCE WITHOUT FEAR
James E. Kristy and Susan Z. Diamond
This confidence-boosting book covers the financial tools every manager must know: accounting, the double-entry system, financial reports, ROI and cash flow, risk management, corporate planning and budgeting, and more.

#5776 $16.95/AMA members $15.25
Circle 28 to order.
Members circle 40 to order.

MANAGE YOUR TIME, MANAGE YOUR WORK, MANAGE YOURSELF Merrill E. Douglass & Donna N. Douglass
Develop the time management techniques that suit your own management style, goals, and priorities. Learn how to clarify objectives, plan for results, eliminate busywork, handle stress, and prevent others from abusing your time!

#5997 $18.95/AMA Members $17.05
Circle 29 to order.
Members circle 41 to order.

HOW TO PLAN AND CONDUCT PRODUCTIVE BUSINESS MEETINGS
Revised Edition by Donald L. Kirkpatrick
A must for anyone responsible for running any type of meeting! This practical manual presents proven guidelines and principles to help you make meetings more productive, from deciding when to call a meeting down to the follow-up evaluation.

#7664 $75.00/AMA members $67.50
Circle 30 to order.
Members circle 42 to order.

HOW TO PREPARE, STAGE AND DELIVER WINNING PRESENTATIONS
Thomas F. Leech
Expert instruction on how to organize your material... get your points across with confidence... win over any audience... prepare for last-minute surprises... keep your audiences involved... put punch in everything you say... and more!

#5613 $99.95/AMA members $85.95
Circle 31 to order.
Members circle 43 to order.

PERUVIOUS BUSINESS WRITING: Creating Better Letters, Memos, Reports, and More
Mary Cross
Put more punch into everything you write! Now you can apply the persuasion secrets of advertising copywriters to improve whatever you write! The result: letters, memos and reports that never fail to generate action.

#5888 $8.95/AMA members $8.05
Circle 32 to order.
Members circle 44 to order.

PETER DRUCKER ON ENTREPRENEURSHIP AND INNOVATION
(8-Cassette Tape Program)
Learn the Secrets of Successful Innovation! Discover why systematic innovation is critical to every company's success, and how entrepreneurial skills can—and must—be learned.

#9248 $185.00/AMA members $166.50
Circle 33 to order.
Members circle 45 to order.

AMACOM BOOKS
A Division of American Management Association.
### DB2 User Survey

#### Some Vendors of DB2 Products

<table>
<thead>
<tr>
<th>Artificial Intelligence Corp.</th>
<th>Pansophic Inc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 Fifth Ave. Waltham, MA 02254</td>
<td>709 Enterprise Dr. Oak Brook, IL 60521</td>
</tr>
<tr>
<td>(617) 890-8400</td>
<td>(312) 572-6000</td>
</tr>
<tr>
<td><a href="#">Circle 253</a></td>
<td><a href="#">Circle 257</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IBM Corp.</th>
<th>Sage Software Inc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old Orchard Rd. Armonk, NY 10504</td>
<td>3200 Monroe St. Rockville, MD 20852</td>
</tr>
<tr>
<td>(914) 765-1900</td>
<td>(301) 230-3200</td>
</tr>
<tr>
<td><a href="#">Circle 254</a></td>
<td><a href="#">Circle 258</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Information Builders Inc.</th>
<th>SAS Institute Inc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1250 Broadway New York, NY 10001</td>
<td>P.O. Box 8000 Cary, NC 27512</td>
</tr>
<tr>
<td>(212) 736-4433</td>
<td>(919) 467-8000</td>
</tr>
<tr>
<td><a href="#">Circle 255</a></td>
<td><a href="#">Circle 259</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>On-line Software International Inc.</th>
<th>Software Services GmbH</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Executive Dr. Fort Lee, NJ 07024</td>
<td>Karlsruhe Strasse 38 7530 Pforzheim</td>
</tr>
<tr>
<td>(800) 526-0272; or (201) 592-0009</td>
<td>West Germany (49-7231) 378866</td>
</tr>
<tr>
<td><a href="#">Circle 256</a></td>
<td><a href="#">Circle 260</a></td>
</tr>
</tbody>
</table>

---

**Discover Strategic Micro Management!**

Get the information you need to analyze and plan for the future implementation of end user computing: Buying trends by department, manufacturer, and vendor, statistics on installed base of hardware and software, or annual service and repair costs.

Monitor the costs and performance of your end user support staff: Support staff’s average response time, the number of support calls taken, or the annual cost of training and support by product or department.

Show upper management that you are in control of their growing investment in end user computing.

**Discover The Micro Resource Manager (MRM)** and you’ll discover why over 500 corporations and government agencies have implemented MRM as their solution to managing end user computing.

MRM is an advanced fourth generation application that has earned the universal praise of micro managers, MIS directors, and software experts worldwide. Over 220 reports and queries allow you to:
- Track hardware, software, or services.
- Analyze budgets, costs, and trends.
- Determine use and distribution patterns.
- Control service and maintenance costs.
- Manage support staff workload.
- Log equipment maintenance in production. The same percentage had applications they characterized as transactional in production.

Only one third of the users download data from IMS or other production DBMSs into DB2 tables for querying. About the same number of sites declare DB2 their primary DBMS for the development of new applications. In the Knauer survey, 75% of respondents indicated that their companies were committed to DB2 as their DBMS of the future.

**DB2 Purchasers Are Committed to It**

We interpret these results to show that most DB2 purchasers are irrevocably committed to DB2 as their primary DBMS, and that they are heavily involved in the development of DB2-based applications. However, given the relatively brief life span of DB2, and considering the lengthy development time for major new projects, many of the most ambitious DB2 development efforts are not yet complete. We expect many larger, more ambitious applications in the DB2 community to go on-line shortly. Meanwhile, the surveys’ statistics confirm the sweeping extent of IBM’s victory in selling DB2 to its mainframe accounts.

One of the most controversial topics related to DB2 is its performance. With directly contradictory claims reported by the trade press, vendors, and DB2 users, we hoped that our surveys would clarify the nature of these competing performance claims. Some of the confusion stems from the ill-defined nature of performance.

We found that DB2 reads large tables and databases. Users in New York reported having a 144 million row table; 105 3380s holding DB2 data; three tables with 15 million rows; several applications with 1-million- and 2-million-row tables; and new applications with 12 3380s of DB2 data.

Another way to consider performance is from the standpoint of on-line response time. In this approach, it is important to distinguish between response time for transactions versus ad hoc queries. For example, one New York DB2 user has a 2.3-million-row table with seven indexes and about 350 bytes per row. CICS on-line response time is 3 seconds for trivial transactions, and 5.9 seconds for high-function transactions. In contrast, ad hoc queries average 34 seconds.

Another New York user provides a comparison of CICS usage versus IMS/DC versus TSO/ISPF as the DB2 teleprocessing monitor. For a 2.6-million-row table
If printing multipart forms gives you multipart hassles, don't lose your cool. Lose the printer. And pick up a Datasouth DS 400 printer instead.

Datasouth specializes in building printers that put in long hours on the toughest jobs, without breaking down. And the DS 400 includes all the details essential to smooth multipart forms operations.

Details such as a straight paper path and a high torque stepper motor. So really fat forms feed straight through without creeping and bunching.

And a high power 18-wire ballistic printhead, backed up by a flat aluminum platen, to print clearly and legibly through six copies.

The DS 400 prints fast, too. Draft text at 400 cps, memo quality at 180 cps, and near letter quality at 120 cps.

So stop dealing with your printer's bad form, and start dealing with a Datasouth distributor. For more information, call 800-222-4528 or fill out the coupon below.

Datasouth has, for over ten years, built printers known for their reliability and industrial strength. That means you can count on the DS 400 to crank out those endless batches. Without a wrinkle.

Datasouth Computer Corporation
PO Box 240947 Charlotte, NC 28224
Tel: (704) 523-8500, Fax: 6843018 DASO UW
Sales: 1-800-222-4528 Service: 1-800-438-5050
West Coast Office: (415) 940-9828
Circle 50 on Reader Card
SQL Performance for OLTP.

Tandem challenges anyone.
PRODUCTIVITY PLUS PERFORMANCE.
NonStop SQL™ — the only SQL system that delivers OLTP performance. It’s embedded right into the operating system. This is where the work is done, allowing the application to run at OLTP speed. You get a distributed RDBMS with the productivity, performance and data integrity that OLTP demands.

DATA INTEGRITY. DISTRIBUTED PROCESSING. MODULAR GROWTH. Users can read, write and update data anywhere in the Tandem network with full data protection. The database will always reflect the current state of business. You can grow the system to any size, in any increment. Yet to the user, the entire database will look like a local database.

OLTP fundamentals.
If you don’t have them all, you don’t have OLTP.

NO ONE KNOWS OLTP LIKE US. Whenever there’s a need for constantly current information, linear expandability and excellent price/performance, Tandem technology proves consistently superior. Compare us to any other OLTP system. You’ll see why companies in every major industry choose Tandem. For more information, call 800-482-6336. Or in Canada, call 800-535-4335.

TANDEM COMPUTERS
OLTP is On-Line Tandem Processing.

THE BENCHMARK.
Call for this free, 20-page report: "NonStop SQL Performance." Four 8-processor NonStop VLX™ systems process over 200 transactions per second with a response time of two seconds or less. The report sets a new standard for full benchmark disclosure.
with four indexes, on-line response time for either trivial CICS or IMS/DC transactions is 1.2 seconds. This confirms R. Eberhard’s research at the IBM General Products Div. Systems Engineering Laboratory, which demonstrates that CICS and IMS/DC support on-line response times in the DB2 environment that are extremely similar. The same New York user mentions an on-line response time of 4 seconds to 5 seconds for typical TSO/ISPF interactions. This supports the widely held view that TSO/ISPF provides poor response times compared to well-designed CICS or IMS/DC transactions.

The surveys indicate that many DB2 users load large DB2 tables and are correspondingly careful with the kinds of processing they permit against those tables. Relatively fewer sites have implemented high-performance transactional applications. However, such applications (including those featuring on-line data update) do exist and perform adequately in the view of their users.

The survey results suggest several areas of evolution for DB2. First, the number of applications in development indicate that there shortly will be many more production applications, especially those of a transactional nature with on-line data update. DB2 version 2 performance should speed this expansion in mainstream production use of DB2.

The high velocity of third-party software introductions will continue. CASE tools are especially intriguing: today, very few DB2 users employ DB2-based CASE. This should change drastically, if the prognostications of industry analysts are correct.

Will the industry standardize on one or two premier 4GLs? The evidence suggests that the fragmentation of the 4GL world has not been altered by the introduction of DB2. DB2 users employ the same crazy quilt of 4GLs that we have witnessed since their popularization in the early part of this decade.

Finally, what about the role of DB2 in distributed DBMS? Statistics from hundreds of DB2 users turned up only a handful that migrate either applications or data between DB2-based systems and SQL/DS environments. This holds true regardless of whether the SQL/DS host is VM- or VSE-based.

Furthermore, less than a third of the Midwest group’s respondents indicate any interest in the OS/2 Extended Edition Database Manager; even fewer show interest in distributed database applications. While we are confident that this will change as the OS/2 product becomes better known, it would seem that DB2 users presently show tepid interest in truly distributed database environments.

Given that IBM has disclosed aggressive plans for distributed database through user groups such as GUIDE and SHARE and its marketing forums, the company appears ahead of the DB2 community in recognizing the need for distributed systems.

Howard Fosdick is president of the Midwest DB2 Users Group. Linda Garcia-Rose is coordinator of the Knauer DB2 Users Group, a nonprofit, vendor-independent user group sponsored by Knauer Consulting Inc.
“The Data General difference: a laptop good enough to carry the Allen-Bradley name.”

J. Tracy O’Rourke, President and CEO
Allen-Bradley

Data General helps Allen-Bradley bring innovative products to market.

Allen-Bradley is one of the world’s leading suppliers of industrial automation solutions.

To maintain that leadership, they look to develop leading-edge products, such as a new “universal” programming device for their logic controllers.

They wanted the new products to be an alternative programming platform for their customers. The new devices would need to serve several existing and future generations of controllers, to perform new services such as diagnostics, and to be easily portable.

To speed time-to-market and save development costs, they wanted to base the new products on proven laptop computer technology.

After evaluating 20 laptop vendors as potential partners, Allen-Bradley chose Data General.

“The choice of the right strategic partner becomes critical to your success. We were impressed with Data General’s responsiveness and enthusiasm. They really became part of our team,” says J. Tracy O’Rourke, President and CEO. “We think the resulting products will serve our customers’ needs well—and increase the market for our controllers.”

To find out how the Data General difference can be critical to your success, send the coupon below, or call 1-800-DATAGEN.
This year's lineup of General Session Speakers includes:

- **Don Hutson**, an outstanding and inspiring speaker, will address “A Formula for Success... with Less Stress” (spouses invited).
- **Jake LaMotta**, former world boxing champion and subject of the movie “Raging Bull.”

**SIXTY (60) WORKSHOPS**

Conferees can attend 6 workshops over the three days. These 1¼ hour sessions, led by experienced practitioners, cover the entire spectrum of computer security concerns.

**THE “GRADUATE PROGRAM” FOR ADVANCED PRACTITIONERS**

A special 2-day program designed to meet the needs of the advanced computer security professional with at least 5 years experience.

**WORLD’S LARGEST EXHIBITION**

On Monday and Tuesday (November 14 and 15) there will be the largest showing of security products ever assembled. This year, attendees will have two scheduled visits rather than the traditional one.

**TOUR PROGRAM**

This optional 2 half-day program gives family and friends a chance to see highlights of the Miami area... and it's made available at CSI's cost of $55.

**What 1987 Conferees Said...**

"The CSI annual conference is a must for all individuals involved in computer security. It is the one place for maintaining computer security expertise, and staying on the leading edge." John T. Devell, Jr., System Security Administrator, Tenneco Oil Exploration

"An incredible opportunity to find solutions, give help, and reaffirm commitment: Almost exhausting: More useful knowledge than one person can assimilate..." John A. Blackley, Data Security Administrator, Capital Holding Corp.

"As a first time attendee—I was overwhelmed—the info, ideas, organization, and quality speakers. I'm already looking forward to attending the next conference." Richard Panneck, Chief, Internal Security Unit, Minnesota Dept of Jobs & Training

"This was the best run conference I have ever attended and I have attended many different vendor and user conferences; Also you had the best speakers and workshop leaders." Rita Stracka, Assistant Dir., Facilities/Security, State of N.J. Dept. of Treasury
Conference & Exhibition

November 14-16, 1988 • Miami Beach

WORKSHOP PROGRAM

1. Short and Long-Term Planning for Information Security
2. Establishing Workable Information Security Policies
3. Building an Effective Data Security Function
4. Security Review of Communication Networks
5. Architectural Comparison of CA-ACF2, RACF, & CA-TOP Secret: Pt. I
6. Planning & Implementing a Security Awareness Program
7. Multi-Level Security in a Commercial Environment
8. Computer Viruses: Part I—What They Are & How They Work
9. An Overview of Risk Management Tools
10. Introduction to Disaster Recovery Planning
11. Career Planning for Information Security Officers
12. Establishing & Managing the Security of Microcomputers
14. Security Considerations of Inter Company Networking
15. Architectural Comparison of CA-ACF2, RACF, & CA-TOP Secret: Pt. II
16. The Missing Link: Information Classification
17. Correlating Security "Incidents" to Deficient Organizational Policies
18. Computer Viruses, Part II—Protecting Your Systems
19. Controlling the Systems Programmer
20. Contingency Planning: What About Your People?
21. Management's Obligations: The Executive’s Checklist for Information Protection
22. Outstanding Security Programs: Making Them Happen
23. Controlling Security Risks of Personal Computers
24. Network Security: A Primer
25. Computer Fraud: Effective Prosecution
27. An Introduction to VAX/VMS Security
28. Halon 1301: Can We Live With It?
29. Security Penetration Evaluation Methodology
30. Disaster Recovery Planning, Economy Style

OPTIONAL SEMINARS

You can attend one or two of the optional full-day seminars offered Sunday and Thursday, November 13th and 17th.

1. Introduction to Computer Security
2. Applying Computer Security to Meet Organizational Objectives
3. How to Become a More Effective Data Security Officer
5. How to Conduct an Information Security Review
6. Introduction to Data Communications Security
7. Information Security in a DoD Environment
10. Developing a Structured Approach to Disaster Recovery Planning
11. Creating an Information Security Awareness Program

ABOUT COMPUTER SECURITY INSTITUTE

CSI, established in 1974, is a full-service membership organization dedicated to helping its more than 3,000 members safeguard their information assets. Services include a bimonthly newsletter Computer Security; the annual CSI Buyers Guide; a Hot Line telephone referral service; and reduced rates on CSI conferences, seminars, and publications. CSI also sponsors the annual IBM/DEC Users Computer Security Conference. CSI publishes the semiannual Computer Security Journal and the 500+ page Computer Security Handbook. CSI offers in-house training courses as well as a full program of regional public seminars throughout the U.S. and Canada.

ACTION

For an immediate registration, call Dianne Monroe at (508) 393-2600, or write her at Computer Security Institute • 360 Church Street • Northborough, MA 01532.

"You have me convinced that this is the premier security conference in the world." Melvin T. Swanson, Manager, Data Security, Borden Inc.

"Terrific! This is my 3rd CSI conference, and I get more out of it each time I attend." James H. McClelland, AVP/Data Security Administrator, Sovran Bank/Maryland

"In terms of content, value and organization, the conference gets better each year." Nicholas M. Saxtons, Assistant Vice President, The New England

"As always I come away from the conference re-energized in my field. I have made several contacts that have proven invaluable." Pamela Palubitskis, Security Consultant, CNA Insurance

"Still the fastest way to orient the new computer security professional; confirm direction for existing programs; become aware of future direction and strategies and broaden individual professional networks." Catherine W. Weyhauzen, Senior Consultant, Data Security Services, AT&T

"The CSI annual conference is an event which should be attended by all data security professionals. Excellent!" Andrea Richardson, Security Analyst, Canada Ministry of Natural Resources

"Outstanding, You did a fantastic job. This was my first CSI experience and it won't be my last." Kenneth Reed, Manager Data Security, Department of Motor Vehicles

"A sheer necessity!" Serge Montfils, Sr. Manager, EDP Security, Canada Post Corp.

"You have me convinced that this is the premier security conference in the world." Melvin T. Swanson, Manager, Data Security, Borden Inc.

"Terrific! This is my 3rd CSI conference, and I get more out of it each time I attend." James H. McClelland, AVP/Data Security Administrator, Sovran Bank/Maryland

"In terms of content, value and organization, the conference gets better each year." Nicholas M. Saxtons, Assistant Vice President, The New England

"As always I come away from the conference re-energized in my field. I have made several contacts that have proven invaluable." Pamela Palubitskis, Security Consultant, CNA Insurance

"Still the fastest way to orient the new computer security professional; confirm direction for existing programs; become aware of future direction and strategies and broaden individual professional networks." Catherine W. Weyhauzen, Senior Consultant, Data Security Services, AT&T
Only one expert system has all the key ingredients for creating successful applications—LEVEL5.

With over 10,000 users in companies like DuPont, Harris Corporation, and Ford Motor Company, LEVEL5 is certainly one of the world's most widely used expert systems. LEVEL5 facilitates the transfer of expertise into usable knowledge bases faster than any other product of its kind.

It runs on all the major platforms—IBM mainframe, DEC VAX, PC, PS/2 and Macintosh. What's more, a LEVEL5 application can easily be moved from one platform to another.

Another thing that sets LEVEL5 apart is its ability to read outside databases from all of its platforms. And LEVEL5 also works with all your existing applications.

LEVEL5 is a product of Information Builders, Inc., the developers of FOCUS—the world's leading fourth-generation language. IBI is a $100 million company and is supporting LEVEL5 from 45 locations worldwide.

So why not stop evaluating and start working? For more information on LEVEL5, call 1-800-444-4303. Or write Information Builders, Inc., 1250 Broadway, New York, NY 10001.
A Head Start
Down the MAP/TOP 3.0 Road

BY ROBERT S. ELLINGER

It has been said that all things come to those who wait. A lot of waiting has been done for MAP/TOP: while 2.1 products are available, the next incarnation, 3.0, has yet to hit the market. Managements at many plants and offices are concerned that if they attempt any network installations or improvements before the next generation of MAP/TOP products arrives, their efforts will be largely wasted along with the investment. But too long a wait to build a MAP/TOP network might bring more than the eventual 3.0 products—it could bring certain disadvantages. By postponing network installation, you not only delay the benefits such a network can provide, but you postpone gaining network experience, which will be invaluable when MAP/TOP 3.0 comes.

The fact is, waiting is not necessary. You can start right now on the road to successful network implementation, with hardware and software that, for the most part, can be integrated into MAP/TOP 3.0. You can plan the entire network cabling of your plant or office, and actually install cabling for one or two applications that you can develop and implement as a test of the system. When 3.0 products are available, you can complete the cabling and move ahead on the other applications on the model of the first few implemented and proved in practice.

Some network designers have created pilot plants cell by cell or department by department (see "Typical Pilot Implementation"). These cells are sometimes automated in groups while others are implemented singly. Such installations may be successful as stand-alone, but may not work in the final network. And, while they may provide optimum cell functionality, they usually suboptimize the eventual final network.

You don't have to wait until MAP/TOP 3.0 products are available to start on your MAP/TOP network. You can plan the system now, so that when they arrive, you'll be ready: plan the cabling system and install cabling for one or two applications. Select the application with care—a new one that will affect all work cells is best. Develop it, test it off the plant/office floor, and begin the cutover process.
For real MAP/TOP success, implementations have to be coordinated right to the top, to the plant host level, and right from the start—otherwise, difficulties will crop up later in unifying databases and distributed applications.

Planning the Network

A safer approach is to use the “umbrella” strategy, whereby you choose the cells or departments to be connected, plan the entire cabling of the network, and then develop several distributed applications that will serve as a model for the entire network. With this strategy, you avoid creating pilot plants that may or may not work in a MAP/TOP network. Instead, you will be creating completed, fully functional elements of an optimized MAP/TOP network.

Implementing the umbrella strategy may require the assistance of OSI networking specialists. In the long run, proceeding with expert guidance will control your costs.

The goal of MAP/TOP and OSI-based networks is to allow different types of computers (mainframes, minis, pcs) from different vendors to interoperate. Fundamental to mapping out a complete MAP/TOP system is planning the communications cabling for cells or departments (see “Umbrella Pilot Implementation”). Without it, a MAP/TOP is like installing the electric utilities in a house, with electrical plans based on local building ordinances, which specify the type of wire to use, the method of installation, and the spacing of the outlets. Following MAP specifications for cabling a manufacturing plant, you have the option of choosing either broadband or fiber-optic cable.

Since broadband is the more mature technology, having been used in cable TV for at least 15 years, it is the most reliable and inexpensive choice. Broadband also has a wealth of network interfaces available, with voice, video, and data interfaces currently on the market; there are far fewer interfaces for fiber-optic, and the per-port connection to a fiber-optic network is more expensive.

In a factory environment, a MAP 802.4 token bus cable would be used. For an office environment, TOP specifies either 802.3 (Ethernet) or 802.5 (token ring). Of the latter two, Ethernet is probably the best to use in a multivendor environment because it is supported by the widest variety of office computing equipment. It is also the more mature product. The only wiring you’ll need to do initially is for the one or two applications you select for design and implementation.

Your cable system should provide for any application on the network to be migrated to any work cell or cells. This will also be cost-effective in assuring that every application, including the first, is written only once, rather than in separate versions for each cell. It also assures that applications programs will be written in a uniform way that will support all work cells.

Choosing the Application

What application should you select first for development and implementation? On what basis should it be selected? Starting with a good application is important because the effectiveness of the entire network may be judged by the first few applications.

Since the network is designed to enable work cells to communicate with each other, consider only applications that need to use the network. Although there are many applications that are lo-
We have a lot to offer a few of you.

Does your company use IBM mainframe computers? If so, we can improve your bottom line.

Our mainframe computers run IBM software faster than IBM's.

All our products—computers, communications and storage systems—will deliver better returns on your data processing investments, in great part because we specialize.

We serve only the few of you who need the most advanced equipment.

Specialization has been our strategy since we started our company 18 years ago. We aimed to offer mainframe users what they previously didn't have: Choice.

And they responded.

Today, we're a $1.5 billion company, with 7500 employees,

manufacturing plants in North America and Europe and sales/support facilities worldwide.

We rank first in our industry in service, technical and software support and ease of systems operation, according to an independent survey conducted by the Datapro Research Corporation.

This survey also reports that 97% of our customers said they'd recommend us to another user in their situation—the highest percentage in our industry.

So when your people recommend us, you know they're doing their jobs well.

Amdahl designs, develops and manufactures large-scale, high-performance computer and communications systems and disk storage products for corporations, governments, universities and research foundations throughout the world.

Amdahl Corporation
1250 East Arques Avenue
Sunnyvale, CA 94088-3478

Circle 56 on Reader Card
Is it Safe?

North Africa...U.S. paratroopers on the way to their next mission. (Credit: International News Photos)

Would You Like to Know a Way to Make Risk-free Decisions About Buying Mainframe Software?

Buy from On-Line Software—the safe buy in IBM® mainframe software. On-Line Software is "the safe buy" because it's the first and only company to offer you a lifetime guarantee that the money you spend with us today will still be available to meet your changing needs tomorrow.

No more waiting on vendors' promises for the ultimate solution—take advantage of today's technology today! IBM and others may be addressing the "big picture" of tomorrow, but
The Guarantee.

Any time your technical or business needs change and you can no longer use one of our products—or even if you just decide you don’t want it anymore—you can simply send it back. We will give you full credit for every dollar of your original license fee toward any other On-Line Software product. All products licensed and maintained under our standard contracts come with this trade-in guarantee.

our software solves your problems today. It’s simple. If tomorrow’s solutions make today’s problems obsolete, send us back our software and trade it in for any other product we offer. And while other vendors develop their solutions, you will be benefiting from the use of ours.

Let’s say you migrate from IMS to DB2. Simply trade in our IMS tools for our new DB2 tools. It’s as if you could suddenly trade in all your records for compact discs! And, of course, you’ll have our broad array of software products to choose from.

In fact, only two companies—IBM and Computer Associates—offer a wider range of IBM mainframe software than we do; but neither one has our products, nor offers a similar guarantee.

It’s like a lifetime trial. Think about it! Any reputable software vendor will offer you a 30-day free trial and a guarantee that the software will perform as expected. But what we are offering you is more. Our guarantee is our promise to you that our software will always be state-of-the-art, and that we’ll work so hard to please you that you’ll never have a reason to return an On-Line Software product.

So the next time you are evaluating software for your company, ask yourself the question, “Is it safe?” We can’t guarantee that technology won’t change, but we can guarantee you the purchasing power to change with technology. And we feel safe in making that statement, simply because our software is that good! Just think. If we didn’t have complete confidence in our products, would we make this kind of guarantee?

For “the safe buy” in software, call 1-800-642-0177. In Canada, call 201-592-0009.

On-Line Software
INTERNATIONAL

The Safe Buy in Software.
A Head Start
On MAP/TOP

Typical Pilot Implementation
(Shown as part of functional hierarchy)

CORPORATE/PLANT HOST

AREA MANAGER

PROPRIETARY NETWORK

WORK CELL DEVICE CONTROLLERS

PILOT 1

PILOT 2

PILOT 3

OTHER WORK CELLS

PROPOSED SYSTEMS

PROPOSED NETWORK

ACTUAL NETWORK

In a typical pilot implementation, work cells are islands of automation and integration is difficult to achieve.

Source: Based on NBS CIM Model.

Umbrella Pilot Implementation
(Shown as part of functional hierarchy)

CORPORATE/PLANT HOST

AREA MANAGER

WORK CELL DEVICE CONTROLLERS

UMBRELLA APPLICATION PILOT

OTHER CELLS

UMBRELLA NETWORK

PROPOSED NETWORK

In an umbrella pilot implementation, integration is easily achieved.

Source: Based on NBS CIM Model.

calized (optimized) for just one work cell, you should choose an application that affects all work cells, because it is more economical to develop one that can be used throughout the organization than it is to develop one that can be used in only a few areas. Also, it will be more visible and have a higher impact. Typical applications candidates that require communications are the central information database in the plant, and electronic mail in the office. But any application that requires file transfer might be selected.

The target application should be one that is not already communicating across a proprietary data communications network. An application presently going to the shop floor on paper would be an ideal candidate because of the productivity gains produced by computerization. Since it is likely to be automated at some point, it can be developed for the network from the beginning, rather than retrofitted to it.

The technological advances of the OSI network also facilitate development of a new application, making it simpler than retrofitting an existing application would be. An existing application would, in all probability, include functions routines that currently have to be performed by proprietary networks. These functions would have to be decoupled from the applications programs without destroying the rest of the application, a difficult and time-consuming job—unless structured program methodologies have been employed in writing the original application.

The target application could also be an existing application that is most in need of upgrade. A good candidate would be an application that is cpu-intensive or that requires considerable program maintenance, or constrains growth. Developing this application would not only enhance reliability, it would also move the application into a new communications environment.

Alternatively, if there are no applications that meet the above criteria, you could consider an application that requires the least retrofit, minimizing risk. An application currently on a proprietary network that has many of the same functions as the umbrella network would be less risky to retrofit than one that does not use networking.

In developing or redeveloping an application for MAP/TOP, the main thing is to write a separate module that communicates from the application to remote databases and applications on the network. This structural separation isolates, for example, the communications functions. As understanding is gained of an existing application layer protocol, or as a new protocol becomes available, only the communications routines (drivers/interface) will have to be changed. With this approach, MAP 2.1 and other protocols can be modified to MAP 3.0.

Just waiting for the appearance of MAP/TOP 3.0 products is neither desirable nor prudent. Positive action can be taken now to prepare the way for MAP/TOP, gain experience in the network and applications, and have your plant and/or office in the right condition for the final system.

Robert S. Ellinger is a senior communications planner at Grumman Data Systems in Bethpage, N.Y.
Executive Issues

Lease vs. Purchase

"Two years ago, the computer looked like a good investment.

Now, it doesn't have the capacity we need to handle the work load. But it has depreciated so much in value we can't get nearly what we paid for it.

What are we going to do with it? We own the thing. I've locked us in."

High technology today is high and dry tomorrow. So, how do you avoid investing in equipment that's declining in value? Make Comdisco leasing your high tech procurement strategy. When you lease with Comdisco, you aren't locked into equipment that's inadequate, or technology that's obsolete.

Calculate Your Financial Risks. Then Call Comdisco.

Comdisco Inc.
6111 North River Road
Rosemont, Illinois 60018

(312) 698-3000

Circle 58 on Reader Card
It's 10 a.m. Do you know where your terminal is?

The Equipment You Need, When You Need It.

They promised you a terminal two days ago. And now you're waiting. Your work is waiting. And your people are waiting. Next time, avoid the frustrating delays and call ERI—the leading source of business communications equipment for over 27 years. We can deliver within 24 hours. No waiting. No doubt.

And not only do we get it to you faster, we offer you one of the most extensive inventories as well. Whether you need an entire computer system or a printer, we carry full lines of top name equipment, including AT&T.

Does all this cost more? Absolutely not. We're a major value added reseller so we can offer you competitive prices on any size order. Plus, we can provide flexible leasing plans, rental options and maintenance programs.

Call ERI today. Our highly trained sales and technical support staffs are just a phone call away to answer your questions and help you get the most from your equipment.

Depend on ERI. Because when you need it on your desk first thing in the morning, we'll get it there.
Pursuing One Peripheral

Printers, copiers, scanners, and faxes have many technological elements in common. Given that, why haven't these functions been combined into a single unit? So far, the market has seen only fax-copiers and pc fax boards that double as modems. The biggest technological obstacle to a truly universal peripheral seems to be the ability to uniformly communicate and output the multitude of data formats. Still, digital printing and copying technologies are moving closer together. As communications and print standards converge, the promise of conserving the space that peripherals require could be realized.

A laser printer is a digital copier without an original. A digital copier is a fax machine that sends its results via modem. A fax machine is a modem with a scanner on top of it. A scanner is a laser printer in reverse.

Given the similarities in these peripheral devices, when will users be able to buy one box that does everything?

Two worlds exist in peripheraldom today—printing and communications. To date, units that effectively bridge the two worlds with quality output have yet to emerge. Fax-copiers, for example, are fine as faxes, but they are poor substitutes for standard copiers. Pc fax boards deliver data by fax, but conflicting data standards have precluded their providing efficient support for printing out and displaying that data. Even integrating some functions from the same world, such as printing and copying, presents technological problems. It will be years before anything like a universal peripheral hits the market. Probably before the technological improvements are ever realized, users must prove to manufacturers that there's a need for all of these devices to be integrated seamlessly.

Conversely, users won't put a scanner-fax-modem-printer-copier on their desks until attractive equipment that really works reaches the $5,000, $2,000, and $1,000 price levels. But there's a pot of gold at the end of the rainbow for the companies that create hybrid units to meet consumer needs, and many are taking up the quest.

Interim Combination Products Abound

Between here and there lie dozens of interim combination products, hundreds of choices about standards, thousands of arguments about the merits of various technologies, and millions of marketing plans, business plans, and magazine articles.

Still, in 1988, users can buy peripherals that share some functions, such as fax-copiers and fax boards for pcs that double as modems and that, sometimes, provide links to scanners. The fax machine is the first successful, integrated peripheral. Here, a single box combines many functions. There's a scanner—which transforms the page you're sending into a 200dpi (dots per inch) raster image—a modem to transmit that image under a standard format called Group III fax, and a thermal printer for incoming fax messages.

The market for this integrated peripheral is huge, says Don Ryan, director for image communications at CAP Inter-
DB2 can be a lot more work than you expected with quite a bit less help than you need. But when you've got BMC Software's comprehensive set of data base administration tools—which include standard interfaces and integrated function—you can reduce your costs and make your work fast, easy and error-free.

**DB2 ALTER**—provides complete support for changing, copying and migrating DB2 data structures; includes data conversions, authorization-id switching and restart capabilities.

**DB2 CATALOG MANAGER**—gives quick and easy catalog information, execution of SQL DDL and DB2 utilities, audit logs and extended SQL function.

**DB2 DASD MANAGER**—controls the life cycle of physical objects with comprehensive space analysis statistics; also includes space estimation, AMS command and utility jobstream generation and action triggers.

**DATA PACKER™/DB2**—reduces DASD requirements for DB2 tables an average of 50% to 70%; reduces EXCPs.

**DB2 REORG PLUS**—reorganizes DB2 tables 4-10 times faster than the supplied DB2 utility; provides dual image copy and statistical history.

For more information or to begin a 30-Day-Plus Free Trial of any or all of these products, complete and return this coupon or call BMC Software, Inc., *The Complete DB2 Company.*

In the U.S. and Canada: 1-800-841-2031
In Texas, call collect: 713-240-8800
Japan (03) 837-8651
France (16-1) 48 77 77 77
Italy (02) 48193845
West Germany (069) 664060

---

**BMC Software, Inc.**
R.O. Box 2002
Sugar Land, TX 77487-2002
1-800-841-2031
or call collect: 713-240-8800

Contact me about:
- [ ] Free Trial
- [ ] More Info
- [ ] DB2 ALTER
- [ ] DB2 CATALOG MANAGER
- [ ] DB2 DASD MANAGER
- [ ] DATA PACKER™/DB2
- [ ] DB2 REORG PLUS
- [ ] All BMC DB2 products

Name __________________
Title __________________
Company __________________
Address __________________
City ____________________ State/Prov. ______ Zip/PC. ______
Phone __________________

Circle 60 on Reader Card
Pursuing One Peripheral

national, Norwell, Mass. "Last year," Ryan says, "sales were 475,000 units. This year, we're estimating 910,000. Next year, we're expecting 1.1 million to 1.2 million units to be sold." Dataquest Inc., San Jose, similarly estimates the fax machine market to have been 417,000 units in 1987, 785,000 units in 1988, and 1.2 million units in 1989.

Fax machines that copy are relatively simple machines, adds Bob Sostilio, associate director for copying and duplicating industry services at Dataquest. "If you took a photocopier and ran a chain saw halfway down," explains Sostilio, "the bottom half would be a regular photocopier, and the top half would be a digital scanner [something a fax already has], which replaces the mirrors and lens in an analog copier. The laser takes the place of optics." Sharp, Ricoh Corp., and Canon U.S.A. Inc. all manufacture fax machines that can be used as rudimentary copiers.

Russell Shaw, an Atlanta freelance writer who owns a Sharp UX-80 fax-copier, is thrilled with the unit he bought for $6,000. "If you took a photocopier and ran a chain saw halfway down," explains Sostilio, "the bottom half would be a regular photocopier, and the top half would be a digital scanner [something a fax already has], which replaces the mirrors and lens in an analog copier. The laser takes the place of optics." Sharp, Ricoh Corp., and Canon U.S.A. Inc. all manufacture fax machines that can be used as rudimentary copiers.

But if you run a laser printer all day, as businesses run copiers, it will burn out. According to Wilson, the market is not demanding the two tasks be combined. "You can copy at 25 pages per minute on a Kodak copier, and [even at that speed] there are people behind you waiting for that copier," so adding laser print work to that load would be absurd.

John Rizzo, vp of marketing for Weitek Inc., Sunnyvale, Calif., agrees. "It's easier for a copier to become a laser printer than vice versa—mechanically. But if you run a laser printer all day, as businesses run copiers, it will burn out.

Developers are working on two ways to bridge the performance gap between laser printing and digital copying technology. Rizzo adds. Some oems are building heavier-duty laser print controllers using new advanced printing chip sets from Weitek and National Semiconductor and integrating them into printers for desktop publishing.

Printers upgraded in this fashion would, with a speed of about eight pages per minute, help create the demand for even higher-duty laser print engines, such as those found in digital copiers, Rizzo says. Once the duty cycles for the two devices reached parity, it would be an obvious step to combine both functions in the same device, he adds.

Another way to bridge that gap, Rizzo says, is to put enough intelligence in the pc that documents could be sent electronically to any output device, including copiers. This intelligence, he says, could come from the same kind of pc add-in cards.

Xerox Corp. is already considering integrating the main copier function of its 4045 with a printing feature, according to John Caldwell, manager of advanced product planning in Webster, N.Y. As with other digital copiers, the 4045 needs only some chips and software to become a printer unit. Caldwell says this printing copier could be brought to market easily at just a 30% to 50% premium over the cost of a copier alone. "I think there's more value here than just the combined functions. We [users] are running out of space to put things," says Caldwell.

It would also be easy to make the 4045 a scanner-copier-printer, Caldwell says. "It has a light lens and laser printer in the same mechanism," he explains. "We're thinking of getting rid of the light lens, converting to a scanner array that could communicate to a pc."

Caldwell believes that such universal peripherals will appear first as a workgroup tool, not a workstation tool. "I'm talking about a server with a small work
First we created the UNIX® System.
Then we created the most inexpensive way to learn it.

The AT&T Videotape Library—definitive UNIX System training at a surprisingly affordable price.

Only one company brings you top quality UNIX System training at a price much lower than you'd expect to pay. The company that created the system. AT&T.

It's the AT&T Videotape Library. A complete series of videotapes that lets you study the UNIX System at your own pace. In your own office. And remains an invaluable reference tool for the entire staff.

With full color, high resolution graphics. Video blackboards. And a comprehensive workbook included with each course level.

You can choose from three levels of UNIX System training: Basic, Intermediate, and Advanced. Plus Shell Programming and C Languages for programmers.

And only the AT&T Videotape Library is backed by a telephone support line—giving you direct access to expert AT&T instructors.

The AT&T Videotape Library. Definitive. Affordable. Call now for more information.

AT&T COMPUTER TRAINING. Come right to the source.
1 800 247-1212, ext. 874.
Or send in the coupon below.

Registrar, AT&T Training, P.O. Box 45038, Jacksonville, FL 32232-9974

YES! I'd like to know more about AT&T's inexpensive way to learn the UNIX® System. Please send information about the AT&T Videotape Library.

Name (Please print) ________________________________
Title __________________________________ Phone ( ) ________________
Company ____________________________________________
Address ________________________________________________
City _______ state _______ zip __________

© 1988 AT&T

AT&T

The right choice.
Pursuing One Peripheral

Jim McNaul, vp of strategic planning for Datacopy Corp., Mountain View, Calif., discusses the technology involved in Datacopy's PC Fax, a fax board that doubles as a modem. With it, the pc can act as a fax machine using a synchronous, 9,600-baud, binary modem, and it includes an asynchronous, 1,200-baud, Hayes-compatible modem.

Linking the faster fax modem to the Hayes standard isn't possible, McNaul says. "The problem is that the chip set you use for the fax modem is not standard with the standard 9,600-baud protocol, V.32." Using the binary fax modem effectively will require standards that are not quite in place, he admits.

McNaul says that Ryan of CAP International has been directing meetings of fax board makers to settle on a binary standard that would make a fax board's modem available for any data transmission. "Fax boards would then appeal to a much larger market," McNaul says. "People who use the fax board could use it for large files, like desktop publishing files, or software engineering files. With a 9,600-baud modem, you can send 800 kilobytes of data in five to six minutes, with error correction. It might take almost an hour at 1,200 baud."

So far, the fax board market has failed to meet its expectations of a fax in every PC, McNaul admits. "I would guess there were around 10,000 boards sold last year, maybe 12,000," he says. "I would think if you include the lower-price boards, sales could double this year, to 25,000 to 30,000." Estimates of the fax board market by Dataquest aren't far from McNaul.'s. The firm estimates sales of 10,000 units in 1987, 22,000 to 23,000 in 1988, and 30,000 to 35,000 in 1989.

"Fax boards will be the next big boom," says Vincent Buccilli, national sales manager at the systems division of Canon U.S.A. in Lake Success, N.Y. But the boom isn't here yet. "They're not selling a lot" of fax boards, he admits.

Lee Cannon, vp of marketing for peripherals maker The Complete PC, Milpitas, Calif., believes that pc fax board prices of around $600 could jump-start the market and increase the number of units sold in 1989.

McNaul also has a problem with the idea of the fax board supporting scanners used in desktop publishing. "We put drivers in our software for most scanners," he says, but the plethora of competing scanners makes standardization impossible and support difficult.

Scanner maker Dest Corp., Milpitas, Calif.—which bought fax board producer GMS Inc. in 1987—and The Complete PC are two other vendors trying to improve the fax-scanner link. Larry Orr, vp of marketing for Dest, says, "I think you'll see more tight integration in a year."

The Standards Problem

The biggest problem in creating a peripheral that can fax, scan, print, and transmit any document is the number of page description languages (PDLs), graphics, and text file formats that desktop publishing and word processing systems emit.

Among PDL standards are PostScript and Document Description Language for graphics, and text file formats such as Microsoft Word or WordStar. Microsoft also licenses the TIFF format to, among others, Aldus for its PageMaker product. PCX was created by Zsoft Corp., Marietta, Ga., for its PC Paintbrush product.

Zsoft writes the translation software that lets users manipulate faxed document images with their existing applications. "In the fax card markets we're involved in," says Jeff Albertine, R&D program manager for Zsoft, "we've made a new DCX file format," allowing users to easily string together pages of graphics for transmission. Other translation utilities on the market, which allow users to move between file formats, include Hijak from Insight Systems, Danbury, Conn. Hijak "can go to TIFF to PCX to Mac, all sorts of formats," he says.

The dueling standards become an even greater problem when text is involved. "I don't know of anyone who tries OCR [optical character recognition] on a faxed image," says Albertine. The 200dpi resolution is too low for the OCR readers, he adds, and really to be sure that your text and graphics are getting across the line for reuse, you need to strip out the text and accept some degradation in the characters.

Buccilli agrees with Albertine on the difficulty of using faxed images effectively in a desktop publishing editor. "That would be real sophisticated," he notes. "Even the largest newspapers I've talked to hardly do that."

It is obvious that, once the hassles in faxing graphics and text are met, Federal Express starts to look cheap. Advances could be coming on these standards, however. In August, Intel announced what it called a "worldwide standard for communications" that it claims would allow, for one thing, any fax or modem to transmit any image or text regardless of its resolution. It would use a "stacked" approach to supporting protocols and it features a consistent user interface.

Many desktop publishing systems, such as Xerox's Ventura Publisher and Canon's Desktop Expression, are attempting to combine all of the peripheral functions—scanning, faxing, printing, transmitting, copying—into a single system. None of them, however, are integrating these input/output functions into a single box.

Print and communications standards come together over the next few years, however, the possibility of realizing one person, one peripheral looms large.

Dana Blankenhorn is a freelance writer based in Atlanta.
The anatomy of a prize Bull.

Bull printers are built to handle everything from tags, labels and bar codes to custom forms.

Fewer moving parts mean fewer tune-ups and repairs. And our straight-through paper path virtually eliminates jamming.

Finally, you don't have to change paper in order to change printers. Bull can handle green bar and a wide variety of other fanfold paper stocks.

We know how precious floor space is. At 64" x 30" we occupy far less of it than most high-speed printers.

At speeds of 60 and 90ppm, Bull gives you the capacity to print anywhere from 200,000 to 2,000,000 pages a month.

Bull's low price makes it the perfect printer for anyone who has outgrown a line printer but isn't ready to pay the high price of a laser.

First prize in the printing arena ought to go to the company that solves the toughest customer problem. It's a problem that anyone who needs to print more than fifty pages per minute knows firsthand. Because until now, they had to buy a printer with twice the capacity they really needed. And a price that took years to grow into.

But now there's Bull. A blue-blooded descendant of the $3 billion worldwide systems supplier, Groupe Bull. Thanks to a new non-impact technology Bull offers blue-ribbon performance for about half the price of a comparable laser printer.

To find out more about how well a Bull runs, call or send for free copies of an independent customer satisfaction report* and detailed data sheet. That way you can see for yourself why we call it a prize Bull.

1-800-541-BULL

*"Magnetography - A User Study" by Datek Information Services. Bull Peripherals Corporation, 303 Wyman Street, Waltham, MA 02154

Circle 62 on Reader Card
What looks like DOS, acts like DOS, is easy like DOS, can hook everybody up and keep 'em hopping from program to program, and costs less than an office chair?
If you can afford a nice leather chair for your office, you can afford a multi-user, multi-tasking operating system that's just as comfortable to use.

PC-MOS incorporates breakthrough technology that allows you to fully harness the power and capabilities of 80386-based computers, while maintaining the compatibility and ease of use of DOS. So now you can have up to 25 inexpensive terminals driven by a single 80386 processor. You can continue to use your favorite software programs like Lotus 1-2-3™, dBASE III™, and WordPerfect™, and you can keep using those familiar DOS commands like DIR and COPY. You can even run all those terminals as a single cluster connected to a Novell server.

PC-MOS comes in single, five and 25-user versions starting at $195. Your satisfaction is guaranteed or you get a complete refund.

For more information about PC-MOS and the name of the authorized dealer nearest you, call 1-800-451-LINK. Then you can sit back and relax.
A display of brilliance.

The New Lee Data SmartStation™
Featuring Mod 6: Two full screens in one.

Introducing a smarter way to work.

Even at its simplest, the Lee Data SmartStation is an enhanced, windowing display, complete with Mod 6, a unique, new presentation format that displays two entire Mod 2 screens at once. That’s a full 24 lines by 80 columns times two. No more scrolling around.

Automate Tasks and Add Local Processing.

At your option, add Lee Data’s API software and the SmartStation is programmable. Now you can automate and accelerate your most repetitious, labor-intensive tasks.

And if you need local processing, upgrade the SmartStation to run MS-DOS® programs.

Even the standard features stand out.

With Open Windows™ and All-in-One®, you can work with a variety of hosts in a variety of screen sizes simultaneously.

You’ll also save more keystrokes. Up to 30,000 at a time, thanks to the built-in diskette drive.

And, it doesn’t take technical genius to operate the SmartStation. A customizable menu provides an easy interface to system features, API programs, and MS-DOS so you can put your intelligence to work. Now that’s brilliant.

For details, plus One-Minute Customer Success Stories, call 1-800-LEE-DATA.

Lee Data Corporation

IBM is a registered trademark of International Business Machines Corporation.
MS-DOS is a registered trademark of Microsoft Corporation.

Circle 64 on Reader Card
Today's IS managers have at their disposal an unparalleled collection of tools for building new systems. Here's how the Cincinnati Gas & Electric Co., the Veterans Administration, Manufacturers Life Insurance Co., and Home Box Office are exploiting the latest technologies.

Innovative In-house Development

BY EDWARD J. JOYCE

Never before have IS managers been blessed with such a wealth of tools for building automated systems. For software, there's computer aided software engineering (CASE), fourth generation languages (4GLs), expert systems, reusable code libraries, and smart editors, to mention a few.

On the hardware end, developers can now choose from optical disks, high-performance PCs, graphics workstations, voice synthesis and recognition devices, local area networks (LANs), and reduced instruction set computer (RISC) architectures, among other new technologies.

DATAMATION surveyed major innovative development efforts in different industries to assess what new tools are being brought to bear on automation problems. The approaches taken by four IS shops to improve their businesses through the imaginative use of the latest computing technology are profiled here.

CINCINNATI GAS & ELECTRIC CO.

In October 1986, CG&E set out to make customer service its "top priority." The goal, inaugurated by newly appointed president and CEO Jackson H. Randolph, was to "demonstrate to customers that we should be their energy provider of choice." As part of that effort, Randolph backed a comprehensive multimillion dollar overhaul of the company's customer information system.

To get users in on the ground floor of the revamping of CG&E's customer information system, the company formed a new department called Customer Systems. It's comprised of 60 IS staffers and 16 end users, says department manager Irma Thoma. "Our old systems had been installed between 1969 and 1974," she explains. "In one application, we were actually a beta test site for IBM's CICS. Today, those systems are extremely inflexible. The programs require a lot of rigging to respond to even relatively minor changes in corporate and governmental reporting requirements."

CG&E surveyed customers to determine how service activities could be changed and expanded to best meet customers' needs. Thoma's group, working with the results of those surveys, spent one year in design and analysis before it wrote a single line of code. Programming began in the summer of 1988, but some design activities
will overlap program development for the next six months. The new system totally revises billing, customer inquiry, and accounting, among other functions. "Besides addressing existing is operations," says Thoma, "this system extends automation to new areas. For example, service vehicles will have onboard PCs that communicate directly with the mainframe by radio transmission. When a customer calls our offices to request service, the request can conceivably be transmitted to a service vehicle within 10 seconds."

Development work, estimated at 180 man-years, began on the new customer information system in 1987 and is scheduled for completion in 1990. At peak periods, 105 people will be assigned to the project. CG&E is supplementing its IS staff with contract analysts and programmers from Computer Systems and Applications Inc., Houston, and Computer Sciences Corp., Washington, D.C.

The software, designed to run in a CICS/DB2 environment and to handle up to 1.5 million customer records, is being developed with structured design techniques and the latest CASE tools, reports Thoma. "We've been very formal about our methodology, paying attention to software reusability and stubbing in prototype software," she states. "In one case, we have a routine that is reused 400 times throughout the system."

Through stubbing, or the use of partially written programs with stubs rather than fully written implementations, the developers can test user reactions to prototype software long before a program has been completed. "For example, we considered a multipage bill format because customers wanted more documentation," says Thoma. "They reacted against the format. So we used a slightly wider page, a redesigned page layout, and condensed laser printing to fit the information on a single page."

In the CASE area, CG&E is relying on graphics workstations from Apollo Computer Inc., Chelmsford, Mass., running Teamwork CASE software from Cadre Technology Inc., Providence, R.I. Tim Lister, a consultant with the Atlantic Systems Guild of New York widely recognized as an expert in software management, says CG&E is using CASE technology in a "serious" way. "This is not a half-baked investment," says Lister. "The CASE tools alone probably cost at least half a million dollars. I don't know anyone else exploiting software reuse concepts and CASE design tools to the extent CG&E is."
The new agency system, a 44-man-year effort, will be developed under Netron/CAP for an IBM DB2 database environment. "DB2 has matured considerably in the past six months," notes Innell. "We benchmarked it in small pilot applications against our existing IDMS database from Cullinet. In some cases, applications work that required three days in IDMS was finished in three hours under DB2. It will give us the capability to respond quickly to changes in the business." Innell describes Netron/CAP, made by Netron Inc. of Toronto, as a CASE tool for prototyping, developing, and maintaining applications in COBOL. He expects overall programming productivity improvements from CAP in the range of 20% to 50%.

"CAP is quite different from what people are accustomed to doing," explains Ian Cannell, a systems manager at ManuLife. "It usually takes an experienced programmer or analyst six weeks to become conversant in using CAP, but once they know it, they like it."

"The approach is different," agrees Innell. "Users are involved throughout design and implementation. For example, this fall we'll start an iterative prototyping process in which screen, report, and data prototypes will be introduced every month or two for review by headquarters and branch office personnel. In the past, we'd disappear for six months before the user would see any working part of a system." Innell and Cannell predict that the $2.7 million (in Canadian currency) investment in the new agency system will reduce expenses by 35% and pay for itself within two years.

"We've made a long-term commitment to the CAP/DB2 technology for all new development," states Innell. "We plan rewrites of several major systems, an endeavor estimated at 91 man-years. This is forcing us to change our approach to developing systems, but it will [be] significant to the company's prosperity."

**HOME BOX OFFICE, INC.**

HBO, the pay-tv programming and marketing subsidiary of Time Inc., recently installed an order entry system called STAR (Satellite Television Activation Request).

"Under STAR," says Abe Cytryn, HBO's director of information services, "a satellite customer's tv set can go from snow to a clear picture within 60 seconds of placing a telephone order for HBO, Cinemax, or other pay services. It still boggles my mind to think that our IBM 3909 mainframe here in New York can effectively address hundreds of thousands of satellite dishes across North America."

The need to address satellite dishes individually stemmed from unauthorized use of satellite-transmitted programming by motels, bars, and other commercial enterprises. To restrict delivery of HBO broadcasts to paying subscribers, HBO scrambled the signal. A $400 descrambler box and a monthly subscription fee are required to receive a clear picture. "The heart of the system is the microcircuity in the descrambler box," explains Cytryn. "It starts descrambling after receiving a turn-on signal from the satellite. Each box has its own unique address, so it will only respond to on signals meant for it."

When scrambling began in 1986, HBO relied on an outside service bureau to activate and deactivate descrambler boxes. As more and more dish owners subscribed to HBO, however, the company decided to develop its own order entry and activation system.

"Seven people spent nine months developing our system," continues Cytryn. "We used Mantis to write 99% of the code which runs under CICS. Mantis let us easily build user-friendly pc-like interfaces with pop-up windows and color-coded displays on terminal screens." He adds that Mantis, a 4GL product from Cincom Systems Inc., Cincinnati, cut overall development time by 40% and makes the software much easier to maintain.

With the new order entry system, installed in February 1988, a customer places an order with an HBO-affiliated cable tv company that relays the order to HBO's telemarketing center in Chicago. A customer service representative keys the order, along with the customer's descrambler ID code, into one of 12 terminals attached to an IBM 3090 in New York. The mainframe sends the descrambler code to a computer at General Instruments Corp., La Jolla, Calif., which transmits an encrypted activation message to HBO's uplink center in Hauppauge, N.Y., where it is beamed to a satellite and echoed back down to earth.

Descrambler boxes, designed by General Instruments and attached to satellite dishes, decipher encrypted messages. The addressed box responds to the activation message. From the time the customer places an order, the entire process may take less than a minute.

With sources predicting 24-inch $400 satellite dishes capable of two-way communications (compared to the present-day 72-inch dishes, which cost a minimum of $2,000 and possess receive-only capability), the direct market ultimately may explode. "General Instruments, for one, appears to be moving that way: its boxes are ready to handle personal e-mail, facsimiles, and other two-way communications when satellite operators support those functions."

Edward J. Joyce is a consultant based in Lexington, Ky.
What should every company demand from a computer system?

Growth.

Introducing the IBM Application System/400.

When your business is small, you can buy an IBM® Application System/400™ and it will be just the right size.

Later on, you’ll still be smiling.

That’s because as your company grows, your Application System/400 can grow right along with you. And the investments you made at first—in software, training, and peripherals—will still be working for you.

That’s what the IBM Application System/400 is all about. It comes from IBM’s leadership with over a quarter million mid-size computer systems in place, and it does what growing companies have told us they want.

It lets you grow into what you need, without outgrowing what you’ve paid for.

Today: Solutions for your business, from the leader in business solutions.

Never before has a mid-size computer system been introduced with so much proven software
ready to go. Thousands of programs that run on IBM’s System/36 and /38 can run on the IBM Application System/400.

Even better, any program you start with, you can stay with. No matter how big your Application System/400 gets, your software will always work.

**Tomorrow: Protection for your investment as your business grows.**

Most models of the IBM Application System/400 come rack-mounted like a stereo system. Components slide in and out, so you can upgrade right on the spot. You’re not locked into any particular setup. Your system’s only as big as you need, and making it bigger is easy.

What’s more, the Application System/400 comes with a state-of-the-art education system, plus customer support that’s unmatched in the industry.

For a free brochure, or to arrange for a detailed discussion about the Application System/400, call 1-800-IBM-2468, ext. 82.
Most disaster recovery plans, when put to the test of a real disaster, fail to serve the corporation. Commitment and integrity are key ingredients in designing and maintaining an effective plan. It is important to recognize the inherent limitations of testing, and to devote some attention to avoiding disaster in the first place.

You can imagine the movie advertisements: "A sea of flames engulfs telco switch... phones dead... even beepers bite the dust... it's... The Telco Switching Center Disaster." Somehow, it’s difficult to believe that even an all-star cast could make it a box office hit.

The fact is, the cause of most computer room disasters is far more mundane than the images of towering infernos and devastating floods conjured up by the word disaster. Nonetheless, when a recent fire damaged a telephone company switch in Hinsdale, Ill., business at dozens of Illinois companies was severely disrupted. While such a fire may not have much dramatic potential, it could have grave implications for those companies affected.

Unfortunately, most companies are ill-prepared to recover from the typical computer disaster, as mundane as its origins may be. Indeed, despite the best of intentions, significant investment, and mass quantities of documentation, most disaster recovery plans are likely to fail just when they are needed most. Despite positive test results, few plans succeed on their own merits. More often than not, luck plays as large a role in successful disaster recovery as skill and effort.

Jack Bannan is the manager of information security for General Electric and the cofounder and president of the Delaware Valley Disaster Recovery Information Exchange, the oldest and perhaps largest user group in this field. He points to a "residual situation... where plans are written to satisfy auditors or outside accounting firms, and really don't do an effective job. The plans are just put on a shelf." He admonishes: "Don't just give it lip service."

In the simplest terms, a disaster recovery plan ensures a business's survival in the face of a traumatic IS disruption. A good disaster recovery plan, like a good insurance policy, will be most effective if all the risks and threats are
Ensure Disaster Recovery

carefully and realistically assessed. Unfortu­unately for some businesses, this is not always the case.

In the most fundamental of terms, the components most often missing from such plans are commitment and integri­ty. Answering the following questions should help you ascertain the viability of your plan in this regard.

At what level in the organization is the commitment to disaster recovery? Is there an explicit, documented, corporate mandate to protect critical business functions?

In the corporate environment, for disaster recovery to be effective, commitment must come from the highest lev­el and permeate every area of the organization. If the disaster recovery mandate comes from the ceo, president, or board of directors, it stands a much better chance of success than if it origi­nates within is, audit, or another line or­ganization. According to Bannan, “Very few board chairmen, presidents, or gen­eral managers would run a business with­out insurance. And yet [they] don’t look at disaster recovery planning in that same light . . . or even as a meaningful function.”

Is the disaster recovery function ade­quately funded and staffed or is it con­stantly struggling to survive?

Many contingency planning/disas­ter recovery departments are in a con­stant battle for budget and staffing. In the face of more glamorous new develop­ment projects, disaster recovery often takes a backseat, especially during lean times. While it is perfectly rea­sonable to review the cost-effective­ness of the contin­gency planning function, the disas­ter recovery plan should not be justi­fied primarily on the basis of cost-effective­ness, unless it is done in a truly broad sense, just as someone would evaluate insurance coverage. Justifying a disaster re­covery plan within the context of insurance premi­ums, policy cover­age, probability, and the scope of loss may be partic­ularly effective.

An ongoing commitment of re­sources and dol­lars defines the difference be­tween a functional disaster recovery plan and an ineffectual one. The commit­ment clearly should include mainte­nance, testing, and auditing, which are likely to be overshadowed by the major expenses of a hot-site agreement and off­site media storage.

Was the development and implementa­tion of a disaster recovery plan preceded by and based upon a business impact analysis?

There isn’t a whole lot of protective value to a disaster recovery plan if it is based on an incomplete picture of what is being protected, and of what is likely to be a threat. A business impact analysis thoroughly and objectively examines all of a firm’s risks and obligations, identifying and prioritizing critical processes, functions, and resources. All too often, the mere survivability of the data center is the myopic focus of the plan. You have to be aware, however, of how all facets of the business interrelate and what the role of is is in relation to them. The busi­ness impact analysis process is likely to uncover areas or resources that may not have been addressed by the disaster re­covery plan.

Is disaster avoidance an integral as­pect of the plan—that is, has there been a sincere effort to ensure that the integrity of the firm is not unnecessarily compromised?

Very few disaster recovery plans focus directly on disaster avoidance, which can minimize the probability of ac­tivating the plan in the first place. Disas­ter avoidance combines engineering, maintenance, reliability, safety, training, and testing (see “Disaster Avoidance: Taking the Preventive Approach”). If ef­fectively implemented, the disaster avoidance plan will pay handsome divi­dends through the improved level of reli­ability and quality brought to day-to-day business functions, in addition to the re­duced exposure to major outages. An­other bonus of an aggressive disaster avoidance program is the enhanced abili­ty to recover from a disaster—that is, the recovery process is likely to be a whole lot less painful.

Are disaster recoverability and disas­ter avoidance integral to planning throughout the organization?
Ensuring Disaster Recovery

The least painful way to achieve a reasonable and appropriate level of recoverability, as well as a prudent, minimal level of risk, is to include contingency planning in any new business or functional plans. Aside from obvious activities, such as the startup of a new data center or turnover of a new production application, any substantial functional, technological, and business change warrants a fresh examination of the exposure to disruption, as well as the possibility of creating new sources of threat.

Are there adequate, impartial controls and reviews of the disaster recovery plan’s effectiveness?

The internal or external audit role is crucial to the integrity of the plan. In addition, the use of impartial, external consultants to review the technical, technological, business, or organizational aspects of the plan may detect weaknesses that are not obvious from within.

Is your disaster recovery plan preceded by a realistic assessment of your needs or has it evolved as a function of vendor offerings?

Many firms elect to use external hot-site vendors that provide access (for a fee) to fully configured backup data centers and even office facilities. These firms provide a valuable service to many companies. Unfortunately, in all too many cases, the commitment to a hot-site approach or vendor comes before a full awareness of the business contingency requirements.

It should be clear that a hot-site agreement is only a basic tactic for providing a backup; the focus should first be on what kind of strategy to use in the disaster recovery plan. It may be that a physical second site is a more appropriate solution for your business.

Is the plan maintained, updated, and tested continually and effectively?

Creating a disaster recovery plan without a commitment to periodic testing and ongoing maintenance can actually be worse than doing nothing at all. There is the tendency to assume that the plan is the company’s salvation when disaster strikes, but a poorly maintained or inadequately tested disaster recovery plan is certain to fail when the going gets tough. Even such seemingly obvious aspects of the plan, such as telephone contact information or configuration details, can quickly become outdated, impeding recovery efforts. Without exercise, a disaster recovery plan, like the human body, is likely to become flabby and ineffectual.

Where in the organization does the responsibility for disaster recovery and contingency planning reside?

In the typical corporate setting, disaster recovery is headquartered in the IS organization. The risk to the company, however, is not confined to IS. The bottom line is this: survivability of the organization in the face of a catastrophe is the responsibility of every single employee. The most effective contingency plans are based upon an organizational commitment to integrity and survivability. This is often initiated by a clear, concise management mandate, which is incorporated into the job descriptions of all employees.

Does the contingency planning function have enough cloud to rise above the politics and personalities?

Objectivity is critical to the success of a disaster recovery plan. Too often, the politics overshadow the pragmatic considerations of disaster recovery. In one major Wall Street organization, a small, highly visible group with a potential financial exposure on the order of $50,000 to $100,000 a day, obtained a commitment to support processing recovery in a matter of seconds after a disruption. Meanwhile, a bread-and-butter, back-office department with a financial risk considerably over $1 million for each day of an outage was positioned to recover in a 36- to 48-hour period.

Disaster Avoidance: Taking the Preventive Approach

An ounce of disaster prevention may be worth a pound of disaster recovery cure, but fewer than 50 sites nationwide have included disaster avoidance concepts in their risk-management planning. In most organizations, disaster avoidance is such an obvious issue that it is everyone’s responsibility, and yet no one is in charge. Kenneth Brill, president of Computersite Engineering of Cambridge, Mass., and a pioneer in the emerging field of disaster avoidance, says, “Avoiding a disaster in the first place must be given an even greater priority,” than planning disaster recovery. “Physical disasters don’t happen randomly. They are caused by preexisting, identifiable, disaster-prone conditions . . . Every data center has physical vulnerabilities, which are often unknown to senior dp management,” he warns.

For example, every year, water abruptly shuts down hundreds of sites, sometimes for days at a time (35% of all data center insurance claims relate to water damage, according to consultants Contingency Planning Research Inc., Glenwood Landing, N.Y.). The problem rarely originates within the computer room, but the computer room is affected because inadequate planning enables the water to get in. Broken pipes, backed up drains, failed condensate pumps, roof leaks, ground or flood water, or discharging fire sprinklers can deliver hundreds of gallons of water per minute. Where will it flow? If your computer room is at the low point on the floor, you know where! Lest you suffer a similar soggy fate, give these questions some thought:

Where in the organization do employees have a clear understanding of the organization’s risk profile?

A good deal of preparation for the possibility of a disaster is gained by understanding the company’s risk profile, which includes the factors that contribute to the operational reliability and integrity of the data center, as well as to the business areas. He stresses the need for an annual physical audit in addition to plan review, updating, and maintenance.

Clearly, avoiding a corporate heart attack makes a lot more sense than the risk, pain, and expense of an attempt to recover after one strikes.
Even if Bill's ditch digger doesn't get you, lightning will. Or ice storms. Or squirrels.

The fact is, you can't afford to expose your systems to erratic outside power.

Even a minor disturbance in power undermines your ability to provide systems availability. Sidelines your best people. And erodes management confidence. Enter Powerware® Systems.

Utterly reliable power solutions only from Exide Electronics. Cool, quiet, compact and cost-efficient. Configured for virtually all installations. Backed by the strongest customer support group in the industry. And expressly designed to keep folks like Backhoe Bill out of your status reports.

Call 1-800-554-3448 for more information on Powerware® Systems and the company that stands behind them. In North Carolina, please call 1-800-554-3449.
The right computer could increase your bank’s revenues by 20%.

© 1988 UNISYS CORP
But it takes a company like Unisys, with over a century of experience in banking, to give you that computer system.

Consider Unisys branch automation. It gives your customer service representatives online data for every customer and product, and lets you personalize those products to meet your customers' needs. It means more time to develop good customer relationships. And that's good business.

Then there's our host application system. It provides an integrated customer data base with the applications necessary to efficiently run your bank.

And we offer the most cost-efficient check processing systems available, from single pocket encoders to the fastest reader/sorter in the world—(2600 documents per minute).

Our goal is to help you serve your customers better. Today, 13 of America's top 25 and nine of the world's top ten banks depend on us to do just that.

Better information leads to better decisions.

And investing in a computer system from a computer company that understands banking is a decision that can pay dividends.

BETTER INFORMATION. BETTER DECISIONS.

The power of $^2$
Planning for Protection: User Group Support

Odds are that any contingency you might need to plan for (not to mention those you might not expect), has been encountered by someone before. These user groups foster the valuable exchange of contingency planning concepts and practices. Since new groups are forming all the time, this list is not exhaustive.

**Association of Contingency Planners (ACP)**

National Headquarters
Tom Doemland
P.O. Box 73-149
Long Beach, CA 90801-0073
(213) 932-3891

**San Diego**
Lonnie Adams
California First Bank
1450 Second Ave.
P.O. Box 2428
San Diego, CA 92112-4170
(619) 230-3441

**San Francisco**
Thomas E. VonNovak
2101 Webster St., Suite 1700
Oakland, CA 94612
(415) 446-7828

**Tennessee**
Ed Carmichael
AT&T
1200 Peachtree St., Rm. 11058
Atlanta, GA 30309
(404) 873-8589
(group is being formed)

**Independent Groups**

**New York**
Contingency Planning Exchange
Barbara Matthews
Irving Trust Co.
101 Barclay St.
Contingency Planning Dept.
7 West
New York, NY 10007
(212) 815-2063

**Boston**
Jim Stempleski
Bank of New England NA,
P.O. Box 2197
Mail Code M030SC
Boston, MA 02109
(617) 742-4000

**The Carolinas**
Contingency Planning Association of the Carolinas
Bill Holt
The Charlotte Observer
P.O. Box 32188,
Charlotte, NC 28232

**Cleveland/Akron**
Contingency Planners of Ohio
Mike Briener
American Greetings
10500 American Rd.
Cleveland, OH 44114
(216) 252-7300

**Connecticut**
Connecticut Disaster Recovery Information Exchange
Lewis Vasquez
Aetna Life & Casualty Co.
Mail Stop C-12E
151 Farmington Ave.
Hartford, CT 06156
(203) 273-1187

**Florida**
Disaster Avoidance and Recovery Information Group (DARING)
John Toigo
P.O. Box 5214
Largo, FL 34294-5214

**Philadelphia**
Delaware Valley Disaster Recovery Information Exchange Group
Jack Bannon
General Electric Corp.,
Bldg. 205-1
P.O. Box 8511 (08002)
Cherry Hill, NJ 08038
(609) 486-6056

**Pittsburgh**
Three Rivers Contingency Planning Association
Ed Appelt
c/o Consol Plaza
1800 Washington Rd.
Pittsburgh, PA 15241
(412) 831-4921

**Seattle**
Contingency Planning and Security Information Exchange Group
John O'Donnell
Data Base Inc.
307 S. 140th St.
Seattle, WA 98168
(206) 241-1855

**Toronto**
Disaster Recovery Information Exchange
Rod Cross
Corporate Business Systems Inc.
3 Director Court, Suite 103
Woodbridge, Ont. L4L 4S5
(416) 748-1191
Comdisco's Plan Automation System

Expert Navigation

Chart a reliable course for disaster recovery. ComPAS will help develop, test and maintain a full recovery capability tailored to your specific industry and your unique business requirements. Simply. Dependably.

ComPAS utilizes leading-edge artificial intelligence and expert system technology without sacrificing user-friendliness. Development time is shortened, yet all issues are addressed to best ensure your company's survival. Further maximize your investment and minimize your risk by utilizing our expert consultants and a full range of other Contingency Services.

ComPAS, the ultimate tool from the company that you expect to lead the way.

For a free brochure and free demo disc, call 1-312-698-3000.

Comdisco Disaster Recovery Services
6111 North River Road
Rosemont, Illinois 60018
312-698-3000

Circle 66 on Reader Card
Ensuring Disaster Recovery

The corollary risk to politics is personality. Face it, in establishing business priorities for recovery, how many employees or managers would come out and say, "I'm not very important"? You are dealing with human nature: the "me first" syndrome can overwhelm what should otherwise be an orderly procedure. The effective contingency planner will work through the scenario where every process is assumed to be the first priority.

Is the disaster recovery plan concise, directed, and effective as implemented? The most effective disaster recovery plans are often the least impressive. One insurance company's contingency planner recently pointed with pride to five, 3-inch binders containing that company's disaster recovery plan. It is not impossible for a plan that big to be effective, but it becomes exceedingly difficult to maintain a plan so large and complex.

Clearly, there are benefits of both effectiveness and cost in keeping the plan simple. One of the best ways to do this is by integrating disaster recovery plan-related functions, responsibilities, and maintenance directly into the day-to-day business environment. For example, maintenance of the emergency contact information for employees and vendors could be routinely handled as part of the company phone directory maintenance. Restart/recovery and control information for production processing could be captured at production turnover of new or modified systems. Management of off-site data backup could be largely automated.

Is the disaster recovery plan activation or declaration process and responsibility explicitly defined? The best plans are worthless if not activated when calamity strikes. Many disasters do not involve obvious physical destruction. Some may be essentially invisible, such as the corruption of critical data or a major computer failure. Experience has shown that the tendency of many professionals, particularly technical and operational personnel in these kinds of situations, is to deny the extent of a disaster initially: "We'll be back to normal in an hour... maybe another three hours," etc., until time is measured by the calendar, not the clock.

Declaration of a disaster is a business decision, not a technical decision. Therefore, the individuals responsible for declaring the disaster should be identified by name and function and the declaration process should be explicitly documented.

Clearly, some flexibility will be built into this process; the caveat is to ensure that this flexibility isn't fatal. While there is usually a significant, direct cost—as well as risk—associated with declaring a disaster, odds are that denying the disaster will increase the costs and risk exponentially.

Upon a disaster declaration, the corporate hierarchy is going to be shaken mightily. Unusual skills, methods, strategies, and relationships will be needed. The traditional hierarchy simply will not work—a crisis management organizational structure must be defined explicitly, and that new structure must be empowered through a mandate from the highest level.

Activation of the disaster recovery plan does not necessarily mean, in the case of a hot-site subscription, incurring large vendor declaration fees. It may be nothing more than advising the vendor to stand by, and beginning the preliminary processes, such as locating backup media and warning key vendors and staff. However, an understanding of the escalation process and the timing must be clear to all parties.

Is the human element consciously and explicitly considered in the disaster recovery plan? Human nature presents many conflicts in an actual disaster, the major implication being unpredictability. Explicitly allowing for the uncertainty introduced by the human element is the best way to deal with this issue. Providing fallback options is another.

One company's recent experience after a physical disaster exemplifies the human element. One of the key technicians needed for the initial recovery was contacted by phone. His wife took the call and assured the caller that the technician would be told immediately. For whatever reason, the wife didn't mention the phone call. As a result, several hours were lost in recovering to a backup site.

A few companies are actually being advised to incorporate an industrial psychologist into their disaster recovery
For CICS/VSAM Data Recovery, Integrity Solutions is the Global Choice.

These leading IBM mainframe companies trust the integrity of their corporate data to Integrity Solutions. They selected Integrity Solutions' DATA RECOVERY SYSTEM (DRS) because it provides the most comprehensive forward and backward recovery for files accessed by CICS/VS and VSAM batch processing.

Integrity Solutions introduced DRS more than 8 years ago, and with over 1000 product installations worldwide, Integrity Solutions will continue setting the data integrity standard. By providing leading-edge products and the highest level of support...to serve your data recovery needs now and in the future.

Guided by what users say they need next, Integrity Solutions is setting the data integrity standard for the emerging electronic vaulting and mirror processing marketplace as well.

The DATA RECOVERY SYSTEM from Integrity Solutions, because your data is worth it.

Integrity Solutions, Inc.
1-800-289-9900
1-303-794-5505

© 1988
Ensuring Disaster Recovery

Plan development and testing process. The psychologist can be particularly valuable in attending to the human dimension of disaster recovery, namely, stress. This can be the result of either physical injury that may have been suffered by others or of the extended, unreasonable demands placed upon individuals during the recovery process.

Fatigue, frustration, anger, denial, resentment, even guilt and depression, are very real and potentially devastating aspects of recovering from a disaster.

Providing a nurturing and supportive environment for the recovery team can make or break the recovery process. Even the slightest creature comforts should not be overlooked; individual needs, including support in handling personal or family issues, should be addressed, preferably through a dedicated staff position.

Does the disaster recovery plan address the management of exceptional risk during the recovery period, as well as restoration of operations following a disaster?

Most disaster recovery plans focus on the critical initial period of recovery of basic operations following a catastrophe. Once the initial recovery period is over and the backup-mode operation is reasonably stable, the focus needs to return to restoration—that is, going back to the way things were before the catastrophe.

The disaster recovery plan should explicitly address the considerations and steps in this reverse process. After all, the transition back can be as fraught with risk as the precipitous cutover to backup operation had been. Even physical restoration of damaged premises, documents, media, or equipment should be considered.

A further risk during both the recovery and restoration phases is, simply, too few warm bodies. Key people are stretched to the breaking point; nerves are frayed; more often than not, there simply aren’t enough hands to get everything done.

An explicit triage function should be staffed to address damage assessment and salvaging, in parallel to the teams supporting recovery. This team will be particularly valuable in coordinating the rollback once the crisis has subsided.

Is your contingency planning function staffed by professionals?

Frequently, newly appointed contingency planners are former operations, tech support, or line personnel. In any other technological or business role, training and experience make the difference between success and failure; contingency planning is no exception.

Support contingency planners with training and external consulting; provide opportunities for growth through a contingency planning user group.

The bottom line is this: whether or not your business exposure is significant, and regardless of the existence or lack of an explicit disaster recovery plan, it is better to deal with the issues of disaster recovery from a position of knowledge rather than from one of assumptions. The “it can’t happen here” mentality is not going to help you or your company when “it” happens.

Philip Rothstein is a consultant based in Ossining, N.Y., and is president of Rothstein Associates Inc.

Three-Phase Uninterruptible Power Systems

Unless you want a dinosaur in the computer room, an 8000 Series UPS is the answer to your power problems.

Forget any preconceived notions you may have about the size, efficiency, or cost of providing on-line, uninterruptible power to your computer system. RTE Deltec has made a technological breakthrough that brings you the most advanced, reliable power protection available at prices you won’t believe.

Introducing the 8000 Series UPS

- 10KVA to 25KVA three-phase power ratings
- Smallest footprint available at this power range
- An astonishing 95% typical efficiency
- Complete microprocessor monitoring & control

Call or write for our free Product Guide

RTE DELTEC
2727 Kurtz Street • San Diego, CA 92110
(800) 854-2658 • (619) 291-4211 (in California)
Exporting your artificial hearts and other medical technology to Seoul isn’t such a far fetched idea. Exporting means business. Increased sales for your special electrical instruments, catheters, syringes, hypodermic needles, and more, all over the world.

Don’t miss the boat. Call U.S. and Foreign Commercial Service. And discover the profits in exporting now. Dial 1-800-343-4300* Operator 199.

*In Alaska call 1-800-331-1000
WHAT TO DO IF YOU YEARN FOR THE POWER OF A 386, BUT CAN'T GET THE TREASURER TO YEARN QUITE AS HARD.

Introducing the NEC PowerMate' SX and PowerMate Portable SX. 386 power without the 386 price.

You've probably been through it before. Trying to get the company treasurer to approve funding for your dream machine: a 386 computer. And always with the same results.

From now on things will be different. Thanks to the new PowerMate SX and PowerMate Portable SX.

We're not talking about a sale here. Or a clearance. This is a technological breakthrough that will bring mainstream business users to a whole new plateau of power. And all without having to go crawling to the company treasurer for approval.

How on earth is this possible, you ask. Simple. These SX machines, based on the new Intel 386SX™ microprocessor, use the same 32-bit memory architecture as all other 386 systems.

The difference is, our new SX uses a classic 16-bit data bus, which means they're compatible with existing hardware and software.

The result? Now you can run industry standard operating systems like MS-DOS®, OS/2™ and XENIX®. As well as handle all the other sophisticated 386 operating systems, application software and operating environments you've been dreaming about like UNIX® System V/386, Paradox 386 and Windows/386.

The PowerMate SX and PowerMate Portable SX join the most comprehensive line of high quality, industry standard personal computers in the world. And every one of them is manufactured right here in the USA, backed by NEC, a $17 billion company.

The PowerMate SX and PowerMate Portable SX. Exactly what you (and the treasurer) have always yearned for: 386 power without the 386 price. For more information, call NEC Information Systems at 1-800-343-4418.

Software compliments of Microsoft Corporation.
American VDTS May Get Safer, whether or not local legislatures follow the lead of Suffolk County, N.Y. Its Resolution 378-1988, "A Local Law Providing Employee Protection Against Video Display Terminals," went into effect this year, intensifying the debate over terminal worker safety (see "Suffolk Law, New Studies Reinforce VDT Debate," Aug. 15, p. 39). But while a national employees' association reports that attempts to pass similar laws in 24 states have failed, one company is finding a strong domestic market for its new terminal that exceeds even stringent European standards.

The MCS VDT from Link Technologies Inc., Fremont, Calif., is based on custom VLSI technology. It has a 14-inch flat screen and 78Hz screen refresh, which, the company claims, is the fastest in the industry, and, more important, completely eliminates screen flicker. Display overscan allows the full screen of the display to be used, eliminating distracting borders. Characters are constructed using a 10-by-16 dot matrix to provide very precise character definition. Further, the reverse mode screen is touted to be easier on the eye, as no adjustment is necessary in going to the screen from paper.

Charles Lejsek, president of Link Technologies, reports that the company strove to meet the European standards to be competitive there, with an eye to a stateside payoff. "A lot of trends in ergonomics start over in Europe and find their way here," he says.

But Link may not have to wait. "There has been a lot of publicity over the legislation that came out of Suffolk County," observes San Jose-based Dataquest analyst Greg Blatnik. With employers more sensitive to ergonomics issues, a terminal that meets stringent standards could be an attractive buy. Blatnik says Link's strategy "certainly is a good move."

Indeed, Lejsek reports 20 major oem deals in the U.S. already, with 20 more expected. "We're very bullish on our next generation," he says.

The MCS is a multisession, multiple-emulation terminal designed for ASCII, ANSI, and pc use, as well as local peripherals. It provides 17 different emulations for a variety of host environments and can function as a virtual terminal for similar or dissimilar hosts. It's available now and is priced at $549.

New Connectivity Package For AS/400 & System/3X

Fibronics product uses fiber-optic and twisted pair technology.

BY ERIC BRAND

In many cases, cabling costs exceed the cost of the devices being interconnected. Fibronics International Inc. has introduced a fiber-optic and twisted pair connectivity package that aims to address this very issue.

SilverPak, designed for IBM's AS/400 and System/3X computers, is a package of matched components available in nine different versions—four are local and five are remote.

The remote versions use fiber optics to connect AS/400 and System/3X peripherals up to 2½ miles from the computer. Fibronics says this eliminates the requirement for the remote control units and the associated performance degradation. The local versions, used for the attachment of peripherals up to 1,000 feet from the computer, use existing twisted pair wiring. All versions use a star topology and connect up to 32 terminals.

Pricing for the SilverPak begins at $1,100 for the local versions and at $1,990 for the remote versions and ranges up to $6,450. All are available now. The offering comes complete with a money-back guarantee with every purchase. FIBRONICS INTERNATIONAL INC., Hyannis, Mass. CIRCLE 202

Multiuser Machine

80386-based, entry level computer supports one to eight users.

Altos Computer Systems' latest addition to its 80386-based multiuser family is the Altos 386 Series 500, positioned as the entry level member of the clan. The Series 500 supports up to eight users and runs on MS/DOS 3.3 or Altos System V (compatible with Unix V.3). As a result, says the company, users can run all Altos vertical market software.

The Series 500 is being offered in four configurations, with from 2MB to 16MB of main memory and 40MB to 70MB of hard disk storage. Options include eight serial I/O ports and a 60MB streaming tape drive. Prices range between $4,000 and $10,000. ALTOS COMPUTER SYSTEMS, San Jose. CIRCLE 204

Network Communications

LAN and controller from Harris are based on Intel 80386.

Harris Corp. has promised that on Nov. 1 it will make its first shipments of its new SuperNet Series, a family of networking products based on the 386 running Unix System V. Family members include a high-end pc local area network with pc...
communications capabilities for both token ring and Ethernet LANs.

Also included is a 3270 controller that supports both co-ax A and ASCII devices with multiple protocol communications, local applications processing, and spooled printing capabilities. Harris claims SuperNet can integrate previously disparate communications functions into one system.

The LAN, called Super Gateway, combines into a single system multiple SNA gateways, full NetBIOS PC file and print serving, token ring and Ethernet PC connections, and an Ethernet TCP/IP gateway, the company says. It supports up to 128 pcs. Unix System V, release 3.0, will migrate to support the forthcoming AT&T/Microsoft Unix-386 standard, which will allow standard applications that run on an AT&T 3B mini to run with-out modification on Super Gateway, says Harris. They can be accessed by networking pcs and directly attached ASCII and 3270 terminals.

The SuperNet Controller provides standard 3280 SNA/SDLC full-duplex host communications for 3270 terminals, ASCII terminals, and for pcs on both token ring and Ethernet LANs. It can communicate with four SNA hosts concurrently, with line speeds of up to 64Kbps each, says the company, and it supports up to 32 co-ax 3270 terminals and printers.

Harris says that prices for SuperNet range between $14,000 and $21,000, depending on the configuration and the options chosen by individual users. HARRIS CORP., Dallas.

**Tape Subsystem**

Memorex Telex Corp.'s peripheral device is 3480-compatible. A magnetic tape subsystem is now on the market for current IBM System/38 users and for select models of the AS/400 by the year's end. The 5461, from Memorex Telex Corp., attaches to any System/38 model supporting IBM 3430 or 3422 magnetic tape transports. No software or operation modifications to the host are required to integrate the subsystem.

The 5461 packages an integrated controller, with either one or two tape transports, in a single cabinet. A two-channel switch is available, as are configurations that comprise from one to four transports. It uses the same cartridge as the IBM 3480 and Memorex Telex 5480 tape drives, according to Memorex Telex.

The company also offers the 5463 Automatic Cartridge Loader as an option. It claims the 5463 has the capability of staging up to 10 cartridges to a single transport, with recording capacities of up to 2GB of memory.

The single-unit price of the 5461 is $42,509, with a one-year maintenance agreement. The optional 5463 costs $4,252. MEMOREX TELEX CORP., Tulsa, Okla.

**High-Quality Scanner**

Macintosh device is for line art, halftones, and gray-scale images. The Apple Scanner is an optical image scanner that allows the user to integrate high-quality line art, halftones, and grayscale images into Macintosh applications, according to its manufacturer, Apple Computer Inc.

The 8½-by-14-inch flat-bed scanner uses AppleScan and HyperScan software and is capable of importing previously created images and graphics in any popular painting, drawing, or page layout application supporting Picture File Format, Tag Image File Format, or MacPaint. Using an SCSI interface for high-speed data transfer, the device can scan at resolutions of up to 300 dots per inch. Gray scale can be captured in 4-bit/16 levels per scanned pixel.

The Apple Scanner is yours for $1,045. APPLE COMPUTER INC., Cupertino, Calif.

**BRIEFS**

**Maximum Storage Inc.,** Colorado Springs, has announced a new high-speed 5¼-inch, write-once, read-many optical disk subsystem designed for the permanent storage of valuable data. The 500MB Maximum APX-4000, in an external-mount version, costs $4,450, and, in an internal-mount version, costs $4,250.

**Radio Shack,** Fort Worth, is offering adaptive devices for Tandy computer users with special needs. The Unicorn Expanded Keyboard for easy access costs $325. The Pneumatic Dual Switch for oral control costs $220. Each requires the PC Serial A.I.D. interface, which costs $300.

**Niwot Networks Inc.,** Boulder, Colo., has designed a plug-in card to bridge NetWare-based LANs into a wide area network over 1.544Mbps T1 facilities. For $3,000, the AT/T1 provides D4 framed T1.

**Hyundai Electronics America,** Santa Clara, has announced a 10MHz IBM XT compatible, the Super-16TE. It supports both ¾-inch and 5¼-inch floppy drives, features 640KB RAM, five expansion slots, one parallel and one serial port, and a real time clock. Pricing starts at $1,045.

**Cipher Data Products Inc.,** San Diego, has unveiled its range of 3000i half-inch cartridge tape drives. The drives, which provide 320MB of storage on a 3480-type cartridge, sell to oems for between $1,380 and $4,400.

**Zirco Inc.,** Wheat Ridge, Colo., has introduced the Laptop Car Seat, which secures laptop computers for use while driving. Available only in black, the device costs $69.95.

**3X,** Mission Viejo, Calif., has made available the Twinax Printstation, a dual-session, dual-port, twinax attached printer controller for IBM midrange systems. The three-pound, standalone device is priced at $995.

**Western Graphtec Inc.** has announced the GP2100-JC, an eight-pen, pinch roller plotter with a speed of 25 inches per second. Accommodating media sizes A through D, it has a resolution of .001 inches and a repeatability of .0035 inches. It's priced at $3,995.

**CIRCLE 203**

**CIRCLE 204**

**CIRCLE 205**

**CIRCLE 206**

**CIRCLE 207**

**CIRCLE 208**

**CIRCLE 209**

**CIRCLE 210**

**CIRCLE 211**

**CIRCLE 212**

**CIRCLE 213**

**CIRCLE 214**

**CIRCLE 215**
YOU CAN WAIT UNTIL APRIL, 1989 AND GO TO — PHILADELPHIA

OR YOU CAN WAIT UNTIL JULY, 1989 AND GO TO — BOSTON

BUT, in fact, while you’re waiting for others to present the latest and greatest in Computer Graphics technology in cities remote to you — some time next year — how are YOU staying current with the rapid growth of products in your industry? Reading the trades? Attending trade shows? Countless hours with visiting sales reps? If you’ve time left and enough money saved, you can travel a long distance — sometime next year — to see what’s “in vogue” in Computer Graphics.

Or you can get current with us — The Regional Computer Graphics Expos are heading your way with the latest technology in Computer Graphics. The atmosphere promises to be relaxed and neighborly, and we’ve targeted the theme of the Expos and seminars to your specific interests. You can request invitations from any Regional Computer Graphics exhibitor or directly from us.

HOST CITIES

SEATTLE (2/9/89) DETROIT (4/18/89)

SAN FRANCISCO (5/15/89) NEW YORK (11/8/88)

PALO ALTO (12/1/88) WASHINGTON, DC (11/3/88)

LOS ANGELES (3/28/89) ATLANTA (12/8/88)

DENVER (4/6/89) ORLANDO (1/25/89)

DALLAS (1/19/89)

REPRESENTATIVE PRODUCTS

DIGITIZERS • DIGITAL FILM RECORDER • UNIX • IMAGE PROCESSORS • MONITORS • PC 386 GRAPHICS BOARDS • WORKSTATIONS • PRINTERS • PLOTTERS • SOFTWARE • SCANNERS

REGIONAL COMPUTER EXPOSITIONS • P. O. BOX A6-233 • LAGUNA NIGUEL, CA 92677 • (714) 249-8070

Circle 73 on Reader Card
You read it first in DATAMATION when a major software glitch was linked to the deaths of patients. Once again, the editors of DATAMATION went beyond business as usual to get the full story and its precedent setting legal ramifications for producers of software and hardware.

In addition to keeping MIS professionals informed on the subject, the article also provided important background and a clear mapping of the borderline between technology and the law for the producers of an ABC 20/20 tv segment.

DATAMATION - The Leader in Information Technology Coverage
TRENDS
Flood. Fire. Lightning. Terrorist Attack. Armageddon. There's no predicting what form a disaster will take. But when it does, you've got to be prepared. Traditionally, disaster recovery plans centered on the dp center—after all, that's where the computers were. But with the pc revolution, the advent of departmental computing, and the addition of newer and more widespread applications to IS's workload, a corporatewide disaster recovery system makes sense (see "Up and Running: How To Ensure Disaster Recovery," p. 86).

One company has developed just such a system. RecoveryPac, from Profile Analysis Corp., Ridgefield, Conn., takes a database approach to disaster recovery planning, allowing the development in one place of any number of disaster recovery plans, utilizing a central set of corporate data. This facilitates coordination of the plans, says the company. Further, any change in the corporate data would be distributed to the various plans, guarding against human oversight.

"What RecoveryPac has done," says Jeff Maronstein, vice president of Contingency Planning Research Inc., a Glenwood Landing, N.Y., disaster recovery consulting firm, "has been to take a database system and interface it to a project management system."

The pc-based RecoveryPac, which runs under Paradox database software, requires 640KB. It includes guidebooks, forms for data collection, project management capabilities, and documentation. RiskPac, Profile Analysis's data collection product, can be included in a package with RecoveryPac.

Profile Analysis claims that the database approach it uses in RecoveryPac is unique. It is evidently popular, too: the company reports 30 sales since March. Maronstein expresses no surprise. "The trend set by this product is where the market will have to go," he says.

Contingency Planning Research has an agreement with Profile Analysis to supply one of its products to RecoveryPac clients. "Contingency Planning Strategies/90" is a 150-page source guide developed by the consulting firm. According to Contingency Planning Research, the document includes a listing of available technologies and a reference guide to disaster recovery, and reflects field testing of every disaster recovery product on the market.

If you'd like additional information about products covered in this issue's software Trends, please circle 271 on the reader service card.

SOFTWARE

DEC Unveils New Ultrix
And Ultrix/VMS Products
Upgraded OS is touted as complying with all industry standards.

By Eric Brand

Digital Equipment Corp. has announced a new release of its Ultrix operating system and connectivity and resource sharing products for Ultrix and VMS users. Ultrix-32 is an enhanced, native-mode, Unix-based OS, which includes over 200 commands and utilities, such as program development tools and compilers. The just-released version 3.0 complies with all major industry standards and specifications, according to the company, allowing applications to run on computers from multiple vendors. Those standards include the IEEE 1003.1 Posix standard, the National Bureau of Standards interim Posix FIPS, the base-level specification X/Open Portability Guide (XPG2), the System V Interface Definition (SVID) release 2, volume 1, and Berkeley Distribution 4.3 enhancements. Ultrix-32 prices range from $2,100 on the MicroVAX 2000 to $56,058 on the VAX 8820.

The following are the new products integrating Ultrix and VMS:

Ultrix Worksyste Software
provides a single, common X User Interface running across all major DEC workstation platforms and is the first implementation of DECwindows. Prices range from $1,575 on the VAXstation 2000 to $3,150 on the VAXstation II/GPX.

The VMS/Ultrix Connection provides VMS services to Unix users by adding TCP/IP and NFS on VMS, enabling a VAXcluster system to act as an NFS server to Unix-based workstations. It's priced from $7,500 on the MicroVAX 3600 to $126,000 on the VAX 8978 or equivalent VAXcluster systems.

Ultrix Mail connection V1 provides a connection to DEC's MAILbus message transfer service. It enables Ultrix Mail users to exchange messages with users of All-in-1; VMS Mail; other X,400 systems; IBM PROFS and DISOSS/Personal Services; and non-DEC Unix-based systems. On the VAXstation 2000,
it fetches $656 and ranges up to $15,876 on the VAX 8800. DECnet-Ultrix V3 enables users of Ultrix systems to all operating systems supported by DECnet Phase III/IV; it supports the VAX 6210/6220 and VAX 8810/8820 systems. Pricing for the new Ultrix on the VAX 8820.

Xerox Presents, a software product that supports the VAX 6210/6220 and VAX 8810/8820 systems. Pricing for the new Ultrix.

Coattail Languages

Two compilers are now available for the new Ultrix. On the tails of DEC's introduction of the latest release of its Ultrix OS, Philon Inc. has announced that its Fast/COBOL and Fast/Basic-M languages are now available for Ultrix-32, version 3.1. Fast/COBOL is an ANSI '74 compiler with extensions to provide RM/COBOL compatibility. Additional features include record and file locking facilities to support random, sequential, and indexed sequential files, as well as the ability to call C subroutines. For VAX/Ultrix systems, prices range from $2,800 to $15,000.

Fast/Basic-M is a true compiler that conforms to ANSI standards and is compatible with Microsoft Basic. It features separate module compilation, the ability to call Ultrix utilities from within a program, and user-selectable IEEE or BCD arithmetic. For VAX/Ultrix systems, prices range from $1,000 to $12,000.

LAN and PC Connector

Networking products allow connection to several environments. Rabbit Software Corp. has introduced a family of local area network products, called RabbitGate II, intended as a LAN and pc connectivity utility environment for the end user. According to the vendor, RabbitGate II enables a user at a DOS workstation or on a LAN to connect to SNA, X.25, BSC, and IFT coax mainframe sessions simultaneously from multiple windows, with concurrent DOS and notepad.

Standard RabbitGate features include editor-based host file transfer, multiple gateway connectivity, pooling of sessions, and IBM send/receive file transfer. Features added or bundled into the company's SNA family include greater LU capacity; a gateway monitor; a configuration display; Novell's IPX LAN interface protocol support; CICS IND$FILE file transfer support; and RabbitScript, a high-level, BASIC-like language interpreter. RabbitGate II for SNA is $2,395 for an eight-session gateway, $4,995 for 40 sessions, and $7,995 for 64 sessions. RABBIT SOFTWARE CORP., Malvern, Pa. CIRCLE 263

AGS Management Systems, King of Prussia, Pa., has announced version 1.2 of PAC EV, the cost and performance measurement system for IBM VM/CMS and MVS/7090. This version, which is a microframe system sells for $44,000, provides greater flexibility in producing detailed cost and performance trend analysis, says the vendor.

Claris Corp., Mountain View, Calif., has introduced Claris CAD, a two-dimensional CAD software program for the Macintoch. The vendor says Claris CAD merges the Mac's graphic interface with the full range of design and drafting tools for engineering, architectural, and graphic design. It costs $799.

Emerging Technologies offers several products providing wide area network packet switching datacom for the IBM PC, XT, and AT using Western Digital's WD4025A X.25 adapter board. Prices range from $195 to $685.

MVS Software Inc., Houston, has added an end-user automation facility to its automated system operations product, OPS/MVS, which makes it possible to automate functions requiring an operator to use an MVS, JES3, IMS MTO, or NetView console, freeing help desk or computer operators, the vendor claims. OPS/MVS is priced from $9,500 to $95,000, depending on cpu size and features.

Control Data Corp., Minneapolis, has released a federally validated Ada compiler for the Cyber family. Ada/VE supports the entire mainframe line, which runs the Network Operating System/Virtual Environment. It costs $25,000 on a Cyber 930-11.

General Information Services Inc., Philadelphia, is marketing Simplefax, which, the company says, allows fax transmission from Wang V5 systems. Simplefax consists of image generation and transmission equipment attached to a tty-compatible TC port and to an outbound phone line, as well as proprietary software loaded on the V5 to provide menus on screen. It costs $5,700.

Relay Communications Inc., Danbury, Conn., has begun shipping version 3.0 of Relay Gold, its pc communications and micro-to-mainframe software. It includes the Adaptive Computer Technologies' Compressor compression algorithm. The price is $295.
**Departments**

**CALENDAR**

**OCTOBER**

*Software Productivity Conference.*

*Electronic Printing and Publishing Conference.*
Oct. 19-21, San Jose. Contact CAP International Inc., 1 Longwater Cir., Norwell, MA 02061 (617) 982-9500.

*American Society for Information Science.*

*Northeast Computer Faire.*

*American Society for Information Science.*

*Ninth International Conference on Computer Communication.*
Oct. 30-Nov. 4, Tel Aviv, Israel. Contact KENES USA, 271 Madison Ave., Suite 903, New York, NY 10016, (212) 986-8300.

*Unix Expo.*

*DPMA Dallas '88.*

**NOVEMBER**

*Excelerator User Conference.*
Nov. 1-4, Boston. Contact Index Technology Corp., 1 Main St., Cambridge MA 02142, (617) 494-8200.

*European Hard Copy Supplies Conference.*
Nov. 2-4, Amsterdam, the Netherlands. Contact Martha Johnson, CAP International Inc., 1 Longwater Cir., Norwell, MA 02061, (617) 982-9500.

*Comdex Fall '88.*

---

**SOFTWARE DEVELOPMENT OPPORTUNITIES**

**Banking Environment**

IBM in Charlotte, North Carolina, has a continuing mission to develop and manufacture superior systems and products for the finance industry. We're actively involved in the use of image technology to provide customer solutions in item processing.

Opportunities now exist for career-oriented professionals with various levels of experience. Currently, we are seeking candidates with ALL THE FOLLOWING CREDENTIALS:

- Minimum of two years installing, modifying, and/or maintaining item processing applications such as Check Processing Control Systems (CPCS) or DOSCHECK.
- Minimum of two years S/370 Assembler programming in MVS/370, MVS/XA, or DOS/VSE environments. Experience with COBOL, VM/CMS, and SCRIPT/GML helpful.
- Experience in application development, including requirements, design, code, unit test, integration test, system test, and project management.

As part of The Bigger Picture of information handling and processing in Charlotte, you’ll discover all the advantages offered by the largest city between Atlanta and Washington, D.C. Our broad range of cultural and recreational attractions includes museums, performing arts theatres, a world-class motor speedway and an NBA team—the Charlotte Hornets. Close proximity to our pristine beaches and mountains, and a year-round moderate climate are also ideal for the outdoor person.

Qualified applicants may explore these opportunities further by sending their resume in confidence to: IBM Corporation, 1001 W. T. Harris Blvd., Dept. 16P/Bldg. 667-4, Charlotte, NC 28257-3000.

---

**IBM**

**The Bigger Picture**

An equal opportunity employer
CTG has the power to take you into tomorrow's technology

A global consulting, systems integration and professional services firm, Computer Task Group has the power to take systems professionals to new technical levels.

With over sixty offices in the U.S., Canada, the United Kingdom, and Europe, CTG works with industry leaders. In fact, 85% of the Fortune 100 companies are our clients. As a result, our three thousand consultants develop solutions in leading edge hardware and software environments.

CTG professionals have hands-on experience in systems integration, expert systems, CASE tools and relational databases. We offer the right people excellent assignments, extensive educational opportunities, highly competitive compensation, comprehensive benefits and a stock purchase plan.

If you're the right person — with a strong background in advanced systems development — join Computer Task Group on the road to tomorrow. Call or send your resume to: Computer Task Group, Office of Recruitment, 800 Delaware Avenue, Buffalo, NY 14209, 1-800-752-6284. Equal Opportunity Employer.

CTG
a career that touches tomorrow
Sr. Software Engineers:

Join the software development team that made our network management system #1, with these comprehensive capabilities:

• Traffic Routing
• Problem Determination
• Network Restoral
• Configuration Management
• Ease of Installation, Operation
• Ease of Expansion (Hardware/Software)
• Performance Management
• Multivendor Compatibility
• Report Generation
• Software Performance
• Overall Performance

Racal-Milgo is an international supplier of digital, analog and fiber optic data communications equipment. In a survey of network management users, the well-respected Datapro Research Corp. concluded: "Racal-Milgo Communications Management Series received the highest ratings for Overall Performance." We're proud of our systems and the people who develop them.

Join our #1 development team working on “next generation” products at our beautiful Ft. Lauderdale headquarters. As a Sr. Software Engineer, you'll have opportunities to work with the latest software development tools (including CASE), utilizing your BSCS and 3-5 years of experience that includes several of the following: "C", UNIX®, communications protocols, RSX11M, CASE tools, ORACLE® database, Macro II Assembler, configuration management.

In addition to challenging assignments, supportive management, and opportunities for career growth, you'll appreciate our comprehensive compensation-benefits package, which includes medical/dental/life insurance, 3 weeks of paid vacation your first year, 401K savings plan, 100% paid tuition, and more.

Tell us about your software development specialties.

Join Racal-Milgo... thumbs up on the future

Racal-Milgo®
COMPUTER SECURITY SPECIALISTS

Northrop Aircraft Division in Hawthorne is currently seeking computer security professionals who demand of themselves the highest standards and who understand that safeguarding the next generation of defense technology is of paramount importance.

Using your knowledge of ISM (5220.22-M), DIAM's 50-4 & 5 and NACISM 5203, you will evaluate, develop and implement computer security specifications based upon customer requirements. You will help guide the technical design of systems including the development, analysis of results and documentation of programming and procedural tests. Requires 10+ years of security experience. An understanding of Tempest requirements and a BS degree a plus.

For immediate consideration, please forward your resume to: Dawn Roy, NORTHROP AIRCRAFT DIVISION, Manufacturing & General Staffing, Dept. DM/5773, 12540 S. Crenshaw Blvd., Hawthorne, CA 90250.

U.S. CITIZENSHIP REQUIRED. Northrop is an Equal Opportunity Employer M/F/H/V.

NORTHROP
Aircraft Division

ASSOCIATE DIRECTOR
Advanced Computing Facility

The Advanced Computing Facility (ACF) of the Cornell Theory Center is involved in the development of highly parallel processing resources for the scientific community. The Associate Director will be responsible for setting the strategic direction for the ACF communicating with the scientific community regarding software needs and conversion to parallel processing, procuring funding and controlling budget, and providing technical direction to staff. The successful candidate will possess experience with a variety of parallel systems, including MIMD architectures and transputers; extensive knowledge of UNIX; a demonstrated ability to obtain funding; experience administering advanced computing projects. The minimum of an M.S. in a scientific discipline is required.

Interested candidates should send a resume and letter of interest by November 30, 1988 to: Cynthia Smithbower, Dept. A3701-D, Staffing Services, CORNELL UNIVERSITY, 160 Day Hall, Ithaca, NY 14853.

DID YOU KNOW? . . .

- 77% of over 182,000 of the most qualified Computer Systems/Operations/Data Processing and Software Engineering Professionals read DATAMATION regularly; at least 3 out of 4 issues.
- The DATAMATION reader spends 1 hour 14 minutes reading each issue, and has been doing so for 8 years.
- More than 64% of these readers go through each issue page-by-page, and pass the magazine along to an additional 5 people.

NOW, the DATAMATION CAREER OPPORTUNITIES section will bring you the latest in current job opportunities!

For more information, and to reserve your ad in our next issue call:

Roberta Renard 201/228-8602
National Recruitment Sales Manager
"YOU CAN'T DO THAT"

Build a large scale mainframe computer that will outperform the competition's leading model?

"IMPOSSIBLE!" they said.

But Amdahl did it back in the early 1970s. And today we are a leader in the development, manufacturing, marketing and support of general purpose and scientific computer systems, storage products, communications systems and software.

In less than two decades we have grown from 5 to more than 8,000 "can do" employees around the globe. Our success is a result of teamwork, innovation and commitment to achieving the impossible. If you are ready for challenge, creativity and growth, explore your opportunities with Amdahl in one of the following areas:

Based in Sunnyvale, CA

MACROCODE DEVELOPMENT AND SUPPORT

Macrocode is the layer of firmware embedded in Amdahl processors which makes "compatibility-plus" a reality. Macrocode, besides providing the environment in which MVS, VM and UTS run, makes possible innovative new features like MDF, our Multiple Domain Facility. MDF is a significant development in operating system power, performance, and flexibility. Macrocode developers work at a level closer to the mainframe than any other type of programmer. Our macrocode developers are working on features and facilities the rest of the computing world won't even hear about for two to three years.

VM SOFTWARE DEVELOPMENT

You can be involved at the architectural level, creating and testing detailed simulations of processor architecture for upcoming Amdahl products. Our processor simulation group is tackling the architectural issues of the '90s. To contribute to this important project, you'll need strong 370 Assembler skills and experience developing software at the system control program level in a VM/CP environment. Strong VM internals and 370 XA/ESA architecture skills are a must.

COMPATIBILITY SOFTWARE

Amdahl's breakthrough development of a processor that handles more than 100 million instructions per second has created a whole new set of challenges in software compatibility. Meeting these challenges at system control program level will strengthen your 370 XA/ESA architecture skills, MVS or VM internals, and 370 Assembler skills.

DIAGNOSTIC SYSTEMS DEVELOPMENT ENGINEERS AND MANAGERS

Amdahl's reputation is the result of our intense commitment to quality assurance at every step of the design and engineering process. Our R&D expenditure per employee is the highest in the industry, and our products show the result of our commitment.

YOU CAN be part of our quality revolution in the development of diagnostics software. Our diagnostics developers enjoy a high level of interaction with other engineering groups and the thrill that comes with breaking new ground.

The high-energy candidates we seek will possess a BSCS/EE, or equivalent, with 3 or more years 370/XA architecture experience, strong 370 Assembler skills, and C/*UNIX* knowledge.

PERFORMANCE ANALYSIS

YOU CAN participate in the performance breakthroughs of the 90s, developing new methods for the measuring and enhancing mainframe system performances. Use your expertise in 370 XA/ESA architecture, mainframe operating systems, and modeling to enhance the performance of our current products and create simulations of future product performance. Opportunities in workload development, analysis tools, DASD peripheral performance, and modeling all provide a high level of visibility and technical challenge.

VALIDATION & TEST

Amdahl's reputation as a leader in product reliability, performance and customer satisfaction didn't happen by accident. Our exacting requirements for design verification and reliability testing have sparked the development of some of the most sophisticated validation tools and methods in the industry. You can be part of our quality revolution, in one of the following areas: Test Tools Development Manager, System-Level Bringup, Software QA/Product Validation, Operating Systems Validation, and Product Certification.

TPF SYSTEMS SOFTWARE SPECIALISTS

YOU CAN play a leading role in developing and enhancing Amdahl's commitment to TPF software support. Your TPF internals knowledge and software testing experience will help you make a major contribution to compatibility assurance and support-planning issues as Amdahl makes its entrance into the TPF arena.

YOU CAN join in the excitement of creating the computer systems of the future, while enjoying the benefits and competitive salary you would expect from an industry leader.

YOU CAN contact Susan Raskin at (800) 538-8460, extension 6191, or send your resume to her at Amdahl Corporation, Employment Department 10-4, P.O. Box 3470, M/S 300, Sunnyvale, California 94088-3470. Principals only, please.

Amdahl Corporation is proud to be an equal opportunity employer through affirmative action.

*UTS is a registered trademark of Amdahl Corporation.

**UNIX® is a registered trademark of AT&T Bell Labs.

YOU CAN AT Amdahl

DATAMATION OCTOBER 15, 1988 109
The Continuum Company, located in the beautiful green hill country of Texas, is the leading provider of computer software, and services for the life insurance industry. We are an international company that expects substantial future growth. Continuum has immediate opportunities if you have related experience in one of the following positions.

TECHNICAL SPECIALISTS—Design, programming, and maintenance with high level of independence heavily experienced in several of the following technical areas: IMS, CICS, VM/CMS, TSO, JCL, ALC, COBOL, PANVALET, VSAM, Utilities, DB2, MVS. Must be willing to travel or relocate.

DATABASE ANALYST—Knowledgeable and experienced in data analysis, logical and physical design in IMS/CICS/MVS environment. Knowledge of conceptual data modeling, relational database theory a plus.

DATABASE ADMINISTRATOR—Must be knowledgeable and experienced in data analysis, logical and physical design of IMS. Performance and tuning of IMS databases, backup and recovery, database sharing, and problem resolution in an IMS/CICS/MVS environment.

SENIOR SYSTEMS ANALYST—3+ years experience in life insurance data processing. Non-traditional product experience required. Strong communication skills and offers advancement to Project Management positions. Previous experience with L/70 or LIFE/COMM is a plus. Some travel is required.

SYSTEMS ANALYST—2+ years experience in life insurance data processing. Non-traditional product experience required. Strong communication skills required.

SENIOR PROGRAMMER ANALYST/PROGRAMMER ANALYST—3+ years experience with structured COBOL in an IBM MVS environment with TSO or VM/CMS. System design, online and database experience needed. Life insurance data processing would be a plus.

SYSTEM PROGRAMMER—3+ years experience with MVS/XA internals, JES2, SMP/E, Assembler, IOCP, MVSCP (JOCEN), and IPCS (dumps reading/problem determination). SAS and VM knowledge would be a plus.

If a high energy and challenging career with an international leader in financial software is desired, you are asked to send your resume and salary requirements to:

The Continuum Company, Inc.
Human Resources
9500 Arboretum Blvd.
Austin, TX 78759-6399

EOE M/F
ALL MIS, DATA PROCESSING, ENGINEERING, COMPUTER & SALES PROFESSIONALS

Explore your career opportunities at CCC Career Conventions – in Los Angeles.

Find your way through the job market jungle by attending the most complete career conference for experienced MIS, Data Processing, Engineering, Computer Science, Programming, Technical Sales and Marketing Professionals.

Two full days of FREE Career Development Seminars will guide you along the fast track to getting the right job offers. Learn what they never taught you in school - How to Win the Interviewing Game, The Art of Networking: One-on-One, Inside Tips on the Employment Process, How to Make a Career Change, and much, much more!

Visit an open-house exhibition featuring hiring managers from over 40 of the nation's leading companies. Talk with more potential employers in two days than you'd normally see in a whole year. Career opportunities that haven't even been advertised are waiting for you!

There'll also be a FREE resume evaluation service on-site in the exhibition hall and FREE copies of Datamation and NOT JUST The Classifieds.

This window of opportunity to see your future will only be open FRIDAY, NOVEMBER 4 and SATURDAY, NOVEMBER 5 at the Long Beach Convention Center. Friday's exhibit hours are 12:30pm to 6:00pm, with seminars beginning at 11:00 am. Saturday's exhibit hours are 9:30am to 2:00pm, with seminars beginning at 8:30am. Call for your FREE Admission Tickets and Seminar Schedule NOW! (213) 450-8831

Take a Good Look at Your Future.
