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The Magazine of the North American Data General Users Group

September 1986

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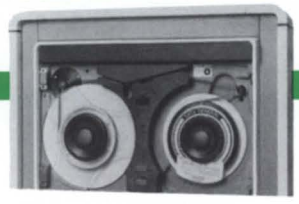

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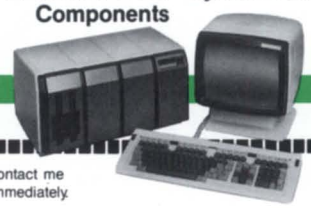

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CT REPORT WORDPERFECT REPORT

WordPerfect® Library ready September 1st

WordPerfect Corporation proudly announces the release of *WordPerfect® Library* for Data General AOS/VS computers. The library package, combined with *WordPerfect* and *MathPlan*, offers a broad range of high-quality office automation software.

Check out the features

The new AOS/VS library addresses the specific needs of DG system users and is *substantially* different from the PC version, in both price and features. WordPerfect Library for the DG includes electronic mail, a calendar and scheduler, a phone message system, and a shell menu which allows easy access to different programs.

The entire library is written in assembly language, providing substantial performance improvements over similar programs offered by the hardware manufacturer.

Check out the price

The price for WordPerfect Library is $2,000 for the MV/2000DC and the MV/4000DC, $4,000 for the MV/4000-MV/8000, $5,000 for the MV/10000, and $6,500 for the MV/20000. Discounts are available for subsequent licenses, and for government and school accounts.

Evaluation copies are available for a $35 media charge. And for those of you currently using WordPerfect, we offer a 20% discount on the library until the end of the year.

MathPlan® 2.11 and Trendview™

But the library isn't the only new item on the shelf. WordPerfect's spreadsheet software, MathPlan, has now been enhanced considerably, and will integrate with Trendview, Data General's graphics package. With MathPlan 2.11, Trendview, and the appropriate terminal, you can create pie charts, color and shaded graphs, etc.

Pricing for version 2.11 is $1,200 for the MV/2000DC and MV/4000DC, $2,000 for the MV/4000-MV/8000, $3,000 for the MV/10000, and $4,000 for the MV/20000.

WordPerfect news

The price for WordPerfect on AOS/VS systems has been adjusted slightly: $2,000 for MV/2000DC and MV/4000DC, $4,000 for MV/4000-MV/8000, $5,000 for MV/10000, and $6,500 for MV/20000.

Discounts are available for subsequent licenses, and for government and school accounts. And, if you purchase WordPerfect, MathPlan, and WordPerfect Library at the same time, you can save 10% on the total price.

WordPerfect version 4.1 for the Data General One has been renamed *WordPerfect 4.1 for 3½" Media*. The program runs on the Data General One, the Data General Dasher One, and the IBM PC Convertible. Documents created with 4.1 on the PC compatibles can, of course, be used with the AOS and AOS/VS 4.05 versions.

Make your move

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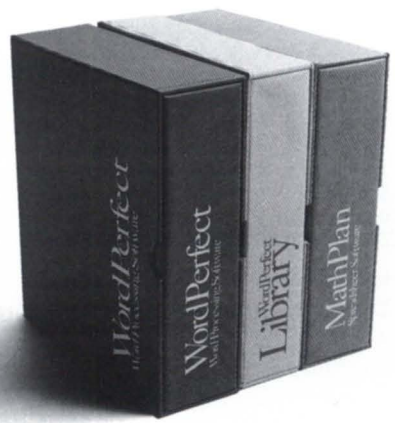
For more information, call WordPerfect Corporation at (801) 227-4100, or see your DG System Supplier.



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EDITOR'S NOTE

Happy birthday to *Focus*

A year ago I was chatting with David Novy in a hallway at the Conference 85 hotel—we were both feeling strange about being called "Mister" by some of the younger NADGUG members. I guess it was our graying temples that made them think we deserved the honorific.

As I've grown grayer, I've learned that birthdays are better for counting blessings than for counting years—and the past year has been full of blessings. My wife and I have a new child (our third, a girl). My family has enjoyed unprecedented good health. I just returned from a reunion with my three brothers—the first in 13 years. Our cars are still running, and the grass in the back yard is even starting to cover those stubborn bare spots!

However, some day in the future when I look back on this year, I expect to remember it primarily as the year NADGUG trusted my fledgling company to manage the metamorphosis of *Focus*.

It's been a year of astonishing change as *Focus* went from a bimonthly newsletter entirely supported by Data General to an independent monthly magazine supported by NADGUG dues and advertising. The September '85 issue felt like a dizzying leap forward, but was followed by a lurch backward in October, when the cover was printed wrong. By then, though, advertising was stabilizing. We could expand the staff to a more realistic size for the workload, and we began making fewer mistakes.

The content and look of *Focus* evolved quickly. It's amusing to look back at the editorial gymnastics we had to do to fill the first few issues. Now we have more contributions than we can use, and their quality gets better and better. A high point in this process was a visit to the publishing office by NADGUG's Editorial Advisory Board. We made many changes as a result of that visit, and more are on the way—as evidenced by the readership survey on page 15. (Won't you please take a few minutes to fill it out and send it in? It will help us make *Focus* more useful for NADGUG members.)

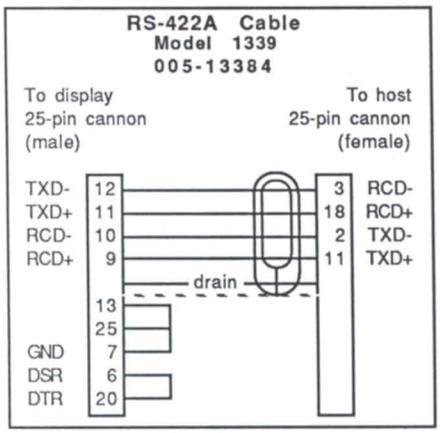
Another high point was the arrival of our DG computer last spring. Although the system has helped us in untold ways, it has also been the source of some frustration—and even occasional lapses from editorial objectivity. I keep thinking that someday I'll get around to writing up our experiences. The working title would be something like, "A little knowledge is a dangerous thing."

Which brings to mind another aphorism that seems to fit the subject: "That which doesn't destroy me makes me stronger." Happy birthday, *Focus*! Δ

—G.F.

LETTERS

Cabling gotcha



In keeping with the times and current IAC EIA RS-422 advantages, Younkers Inc. *(a retail merchant in Des Moines)* recently converted all 20 milliamp current loop circuits to RS-422.

The Data General Dasher D410 and D460 users manual (#014-000761-02) was used to pre-make our cables. We referred to the diagram on page 4-7, figure 4-5, of an RS-422A model 1339 host/controller cable to make the cables.

Much to our surprise, none of our CRTs worked when the system came up. After checking and rechecking cables, checking the configuration, and reviewing schematics, we were totally confused.

Thanks to our DG field engineer, Terry McDanel, a call was placed to Data General and a resolution found. It seems that an error was made in the users manual.

In figure 4-5, the host (RCD-) pin 18 and (RCD+) pin 3 are incorrect. They should be (RCD-) pin 3 and (RCD+) pin 18.

A correct diagram is supplied on the installation data sheet D410/0460 display terminal model 6255/6256 (drawing 000674 rev 02 sheet 5 of 5). If this schematic is used, you should not experience problems.

Mike McQuiston
Telecommunications Manager
Younkers, Inc.
Des Moines, IA

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Photo courtesy of the Austin History Center, Austin, Texas, Public Library.

Of pioneers and settlers

A realistic look at the role of QA

by Eric Christensen
Special to Focus

Every year at the users' group meeting roundtables, quality assurance takes a beating. Someone is always upset about a particular revision of some product or another, and can't understand why QA hasn't done a better job testing it.

We have an unrealistic view of the role of quality assurance in software development. We expect the QA cycle to be so rigorous that absolute confidence can be placed in the emerging product. Data General (or any other software vendor, for that matter), cannot release bug-free software. It's not feasible. If they tried, it would cost so much and be released so infrequently that we would look elsewhere for solutions.

No matter how good a job QA does, it only stands to reason that they cannot be as thorough as the entire customer base of Data General. It's just a fact of life that we are going to find problems that they miss.

We users bear some of the responsibility for quality assurance, not because it should be that way, but because it *has* to be that way. If you have an application that is very dependent upon a particular product, you need to test new releases carefully before you trust them with your company's health. And don't just try the routine things—try the things that you would resort to in emergency situations, like recovering from system failures, restoring files, etc.

Data General users can be divided into two classes: pioneers and settlers. Pioneers try out new releases of software when they are received. I can't tell whether it is necessity or weakness of intellect that spurs them on. They unearth most of the bugs in the products. They face the drudgery of filling out STR forms—or worse—talking to those incredulous product specialists in Atlanta ("There haven't been any problems reported with that product").

A settler, on the other hand, puts a new release of software up on the shelf until there are at least three update tapes for it. Settlers depend upon pioneers to debug a new software release. They follow the "safer" route of not installing software until it is stable.

Most of us are settlers. If you ask Data General, they will tell you to be a settler. And it's certainly easier to be a settler. Yet there are some reasons why you might consider being a pioneer.

One reason is that you are not running software whose support window has elapsed. If you routinely run one revision behind and a problem arises, you are in a ticklish situation. DG won't help you out unless you are running the current rev (even though the older one is formally supported). Being compelled to rev up is potentially much more dangerous than choosing to rev up.

Another advantage comes in dealing with site-specific problems. These are problems that are unique to your particular combination of CPU, peripherals, DG software, applications, and use of specific software features. No one but you can find and report these problems. The sooner these are reported, the sooner they can be fixed. If you delay finding these problems, you will again find yourself in a compromising position in the support window.

Of course, DG could make life a little easier for the pioneers. Since significant bugs are fixed only in a major release, reducing release cycles to a more manageable time frame might help. Currently, if you find a bug in AOS/VS or one of its utilities, you can expect to wait about eight or nine months before you have your fixes in hand. Waiting that long, you obviously have to take other measures to work around the problem, so it is tempting not to bother reporting the problem at all.

Data General is not really oriented to supporting pioneers, either. What Atlanta is geared up for is passing along news of the pioneers' problems to the settlers. It is ironic that Atlanta is vitally dependent upon pioneers, yet is of little direct assistance to the pioneer in the first place.

It would also be nice if some of the money that DG charges for its software support services were used to fund fixing bugs. Instead, the money goes to the field engineering people, who have assumed the role of an integrated software/hardware support group. But the actual bugs are fixed in software development, over which field engineering has no direct control. Software development is driven by the marketing organization, so it's not hard to predict what gets priority when the choice is features or fixes. Δ

Eric Christensen is a senior programmer for the Marathon Oil Company in Findlay, Ohio.

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Although the former divisions kept their basic identities, combining them in a single group demonstrated a change in strategy to target key vertical industries

This fall's lineup

Who's calling the plays after the latest reorganization at DG

by Karen Lewis
Special to Focus

In an industry noted for fluidity and rapid change, Data General experiences *at least* its share of reorganizations. Sometimes it seems that by the time the company completes one reorganization, it's time to start another. It can be as confusing as the constant changes in personnel and strategies for a professional football team.

The reorganization we're talking about today is the one last June—which followed the one in April, which followed the one last November. But according to company spokesmen, it's all part of the same reorganization anyway.

Let's see if we can get the team suited up and on the field so you can see them in their proper positions.

In the beginning (well, not the real beginning, but before this last round of reorganization set in), Data General sported four business divisions. They were designated by the type of products they sold—Technical Systems, Information Systems, Desktop Systems, and Federal Systems. Their marketing efforts were supported by widespread development and manufacturing operations, Field Engineering (which generated approximately 26 percent of the company's total revenues last year), Continuing Products, sales operations, and the usual administrative forces.

Then last November, Technical Systems and Information Systems were combined under Business Group Marketing. Although the former divisions kept their basic identities, still selling their own particular products to their own particular audiences, combining them in a single group demonstrated a change in strategy to target key vertical industries.

In the meantime, Desktop Systems donned a new uniform and was sent out onto the field as the Distribution Division. It no longer marketed particular DG products (the Desktop Generation and the DG/One), but began marketing *Data General* to third-party distribution channels. Federal Systems remained Federal Systems.

Before the spectators—or, for that matter, the players—could figure out where the ball was, Manufacturing called an audible from the line. Taking advantage of low prices in Silicon Valley, Manufacturing ordered a substantial cutback in production of proprietary semiconductor parts by its Sunnyvale Division, shifting that function to outside vendors.

In rapid succession, DG faked a pass and (1) closed the Austin and Hong Kong peripheral assembly facilities while (2) creating a new business unit, the Volume Products Division, to focus on the market for laptop and desktop computers, display terminals, and other high-volume computer products. (Sounds a bit like the old Desktop Division!)

Then, in their latest move, stating the intention "to improve worldwide operating efficiency, increase capacity utilization, lower costs, and improve sales," DG created a new business group, the Communications Systems Group, and renamed/reorganized the Business Group into the Information Systems Group.

If all of this sounds a tad confusing, try following along on the new organization chart while we look at who is doing what with whom in the new organization.

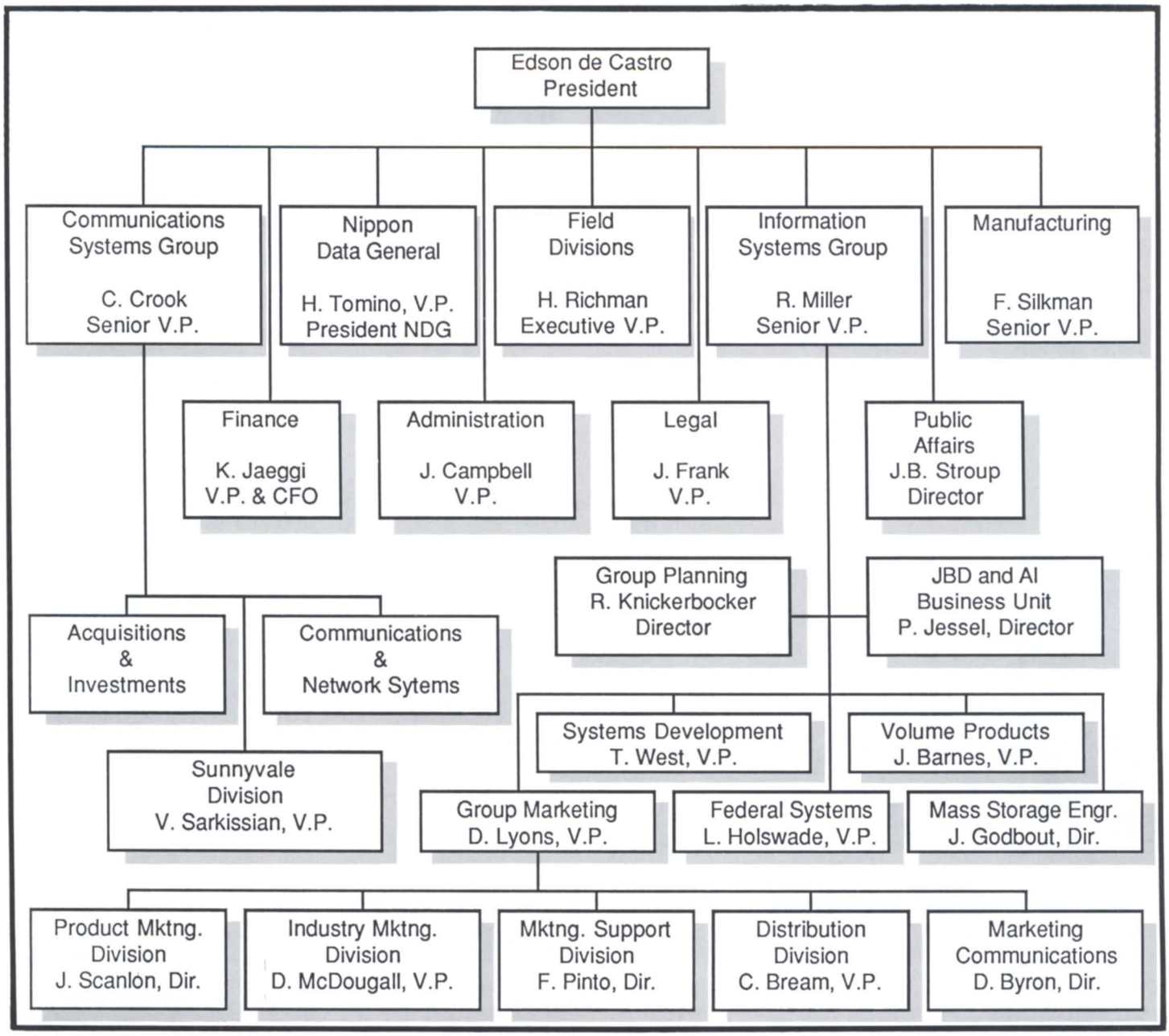
There is a new player in executive vice president Herb Richman's **Field Divisions**. Richard A. Camuso has been appointed senior vice president, worldwide field engineering. Replacing Frank P. Silkman, Camuso is responsible for field engineering operations worldwide, including product repair centers, customer support programs, and marketing and logistical support. He's a 25-year IBM veteran with a financial background.

Silkman, in the meantime, has moved to the position of senior vice president, **Manufacturing**, replacing David L. Chapman, who assumed a top position with Cullinet Software, Inc. Silkman's move to Manufacturing was just in time for the consolidation of peripheral operations and phaseout of the Austin and Hong Kong assembly facilities.

The new **Communications Systems Group**, under senior vice president Colin Crook, is responsible for the development and marketing of advanced communications and networking systems. The group is charged with "moving Data General to the forefront of advanced networking, telecommunications, and semiconductor technologies through proprietary development, joint development agreements, business combinations, and technology acquisition." The group includes three divisions—Communications and Network Systems, Acquisitions and Investments, and Sunnyvale.

Formerly the Business Group, the **Information Systems Group** reports to Robert C. Miller, senior vice president. This team continues to have responsibility for designing, developing, and marketing the company's computer systems, software, and peripheral products. According to Miller: "We see our customers moving rapidly away from discrete computing systems and toward totally integrated systems capable of access between people, departments, and locations worldwide. We have organized to insure that a complete, integrated systems strategy is maintained and delivered to customers."

Falling under the Information Systems Group umbrella is vice president Dave Lyons' expanded **Group Marketing** operation. It includes an Industry Marketing Division headed by vice president Don McDougall, the



Distribution Division led by vice president Cliff Bream, the Product Marketing Division directed by John Scanlon, the Marketing Support Division directed by Frank Pinto, and a consolidated Marketing Communications Group directed by Dennis Byron.

The Industry Marketing Division represents Data General's change from a product emphasis to a vertical market emphasis. The Division's efforts will focus on such top tier industries as petrochemical, rubber, paper, insurance, brokerage, banking, and financial services. "We aren't excluding other industries or our current customers who are not in these target industries," explains Ken Donoghue of DG's corporate public relations. "We are, however, relying more heavily on VARs (value-added resellers) to bring our products to other industries."

Also included in Miller's Information Systems Group is the new **Volume Products Division** with James R. Barnes as vice president and general manager. The division, located at the Durham, New Hampshire, facility, "will allow us to focus and control manufacturing, development, and marketing costs incurred in doing high-volume product business," explains Miller.

According to Donoghue, "this is the culmination of a process we began a year ago to reduce costs, consolidate manufacturing for efficiency, and restructure the organization to better service customers in a way we see them heading."

And what is that way? It's a way that no longer seeks discrete computer systems. A way that does business with minicomputer companies only if they prove they can meet the customer's immediate computer needs and still provide networking capabilities that will allow the customer to build comprehensive minicomputer systems in the future—systems that address the entire organization.

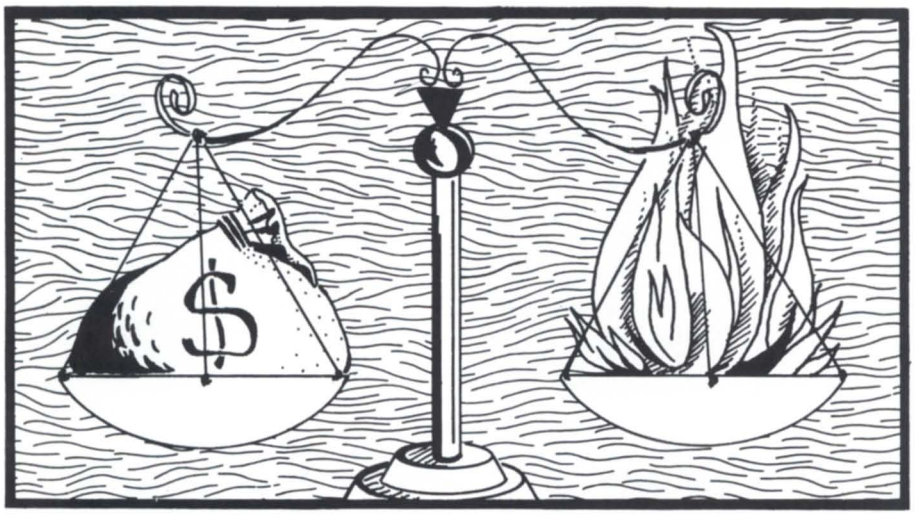
They always say you can't tell who's playing without a program. Check back at halftime to see if there are any more changes to the lineup. Δ

Karen Lewis was the editor of Focus in 1983 and 1984. She now operates a business communications consulting firm, Karen Lewis & Associates, 12 Goldthwaite Road, Worcester, MA 01605; 617/853-2272.

How much can you afford to lose?

DP managers need to weigh the costs between potential losses and disaster recovery systems

by Lana Frances Stein
Special to Focus



Editor's Note: This is the third in a series of articles on the topic of disaster recovery. This month's author is the coordinator of disaster recovery centers for NPA Systems.

Everywhere I travel, I see companies placing more and more emphasis on disaster prevention and recovery. I see precautions such as handmade cardboard shields used to protect MV/10000 On/Off switches from stray elbows. Small rotary fans are being used to redirect misguided air-conditioning breezes toward Eclipse machines. Solutions such as these may help prevent machine malfunctions, but in the face of real disaster—flood, fire, sabotage—these efforts are quaint at best.

When a system malfunctions—either from mechanical failure or programmer error—DP managers do indeed face a crisis. Nevertheless, they can usually bring the system back on-line. Some data may be lost, but the use of the machine can be recovered. If necessary, repairs can be completed fairly quickly, and recovery time is only how long it takes to restart the system or pull up yesterday's backup.

But what happens when the entire system is destroyed or disabled by a true disaster? The recovery time now depends on many factors—beginning with the availability of an alternate system and/or site for company operations while the damaged equipment is being repaired or replaced.

It is important to note that some small percentage of the Fortune 1000 companies have had disaster recovery plans in place for the past decade. Most of these recovery plans, and the type of backup sites they use, involve IBM equipment, specifically mainframes.

The Data General world is only recently awakening to the need for alternate recovery sites as an integral part of company-wide disaster recovery plans. Until recently, DG users have been in a small minicomputer environment. With the advent of the expanded capabilities of the MV/ series, large corporate data centers have proliferated. With the introduction of CEO, DG office automation functions have been strengthened, and there has been a sizeable increase in the variety of uses to which a DG system could be applied.

DP managers of DG sites are alert to the fragility of their environment. They realize that keeping the system going is important, but that realization alone won't ensure their good intentions. I have seen loose-leaf notebooks with large-lettered titles stating "Disaster Recovery," only to open them and find that although the intention was prominent, the contents were scanty and, in most cases, out-of-date.

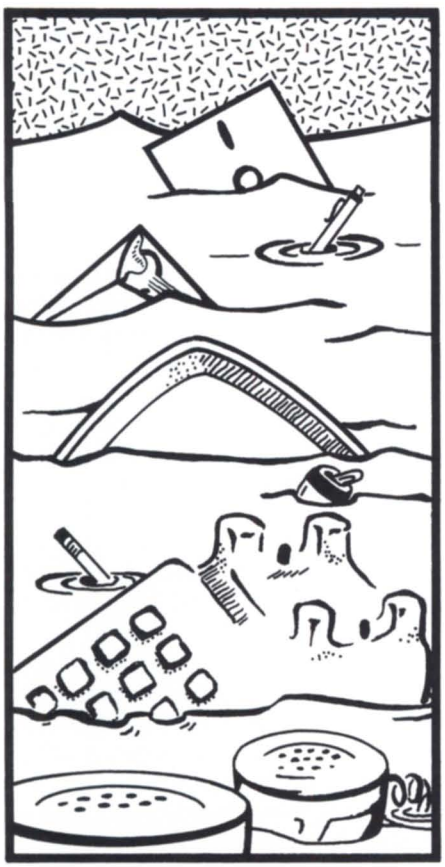
In assessing the potential loss that could occur to his business should a disaster strike, Nick Aroniades—president of NPA Systems and a 15-year veteran in the DG world—decided to create the operating procedure for NPA's new disaster recovery facility.

Although the original impetus was to establish an alternate site for NPA's needs, he found no alternate sites available for other DG users. It was at this juncture that NPA expanded its plans and constructed the client services building that currently provides disaster recovery capabilities for other DG users.

Every article published on disaster recovery planning stresses that disaster recovery is not, nor should it be, strictly a data processing problem. Recovery planning should be a corporate goal. These statements are true, as far as they go. But one must accept that in the real world there is a great deal of difference between Rousseau's "best of all possible worlds" and the Hobbesian philosophy that man is "alive, alone, and afraid." For the DP manager the world is built according to Hobbes. No one is going to tell the DP manager that it wasn't his fault when a disaster strikes the heart of his company, leveling its computer operation, and there is no immediate plan ready to be activated for continuing the processing necessary to keep the company alive.

In reading through the plethora of articles on disaster recovery published during the past few years, one thing stands out: the authors are outlining extremely complex and sophisticated procedures for designing disaster recovery plans. If the average DP manager even found the time to read these articles, he would probably shake his head at the enormity of the task and tell himself he doesn't have time to complete his daily workload, let alone to act as a full-time consultant to design a plan.

A common recommendation in these articles is that the individual who is going to be in charge of developing the company's plan should begin by analyzing data processing functions by priority. He is encouraged to poll individual company department heads for their



analysis of their departments' needs. But the inherent flaw in the logic of asking everyone to define their own priority level is that *everyone* will claim top priority. This step could take months to get even a biased response. In the long run, the DP manager must still prioritize data processing needs for the company as a whole.

Most MIS directors are acutely aware of the processing needs of their companies. They know who must have information daily, and who can wait. It should not be their responsibility, however, to determine corporate

Waiting for a total disaster recovery plan to be put in place is like the three-pack-a-day smoker saying that if he cannot stop smoking totally, there's no point in cutting down

recovery policies. The MIS director should define and recommend policies to maintain the DP environment. After all the clinical analysis is done, it is still the computer and its environment that will require immediate backup in most corporations.

Waiting for a total plan to be put in place jeopardizes the potential computer recovery of most companies today. It is like the three-pack-a-day smoker saying that if he cannot stop smoking totally, there's no point in cutting down. Often one individual in an organization starts to take a step in the right direction and eventually leads others to do the same. In most large companies it will be the data processing department that will, of necessity, begin to emphasize the need for recovery backup.

How much backup is necessary? In most cases the recommendation should be to subscribe for only as much immediate flip-switch backup as would be needed to operate critical functions for a period of four to five days. For instance, you may calculate that you could download your software and data to a 354 MB system so your team could continue to perform critical functions. If, however, you found yourself at the end of the first three days of your disaster recovery facing a prolonged recovery, the Data General systems could be field-upgraded quickly. Generating an operating system to recognize the added-on hardware would take only a matter of minutes. However, you should make sure that the hot site has ready access to the additional hardware you might need if you face a prolonged recovery.

Most insurance companies will pick up a substantial portion of your recovery costs. What they will not underwrite is the cost of subscribing to a hot site. Therefore, it is economical to limit hot site subscriptions to the most immediate and minimum configuration, thankful that in the Data General world it is easy enough to build on later.

For the DP manager who knows that he should have a backup site but is having trouble justifying the cost to top management, it is worth knowing that fully configured hot site facilities are available in the Data General world at costs averaging between $1,500 to $3,500 per month. In other words, coverage of the largest tragedy a computer-dependent company could experience costs somewhere between a clerical and middle management salary.

While that may still seem like a large commitment, it is comforting to know that in the IBM world these fees are considerably heftier, ranging as high as $15,000 in some cases. In addition, there are notification charges in other environments, and none in the DG world. These notification charges range in cost from $1,500 to $25,000 and average approximately $10,000.

One lower-cost option involves contracting for limited facilities that provide support only via communication lines. Another option is cold sites, which provide only an empty shell with adequate electrical outlets and air-conditioning. Warm sites offer furniture, etc. There are fully configured sites that provide an alternate work environment, with separate work areas, terminals, etc., for accommodating dislocated staff members from your company. Some of these sites offer dial-up support as well as on-site facilities.

A well-designed facility should have access to major transportation arteries—railways, airports, or major highways—and should be near adequate short-term housing (motels, hotels, etc.). There should be sufficient office space for management and work staff to establish themselves near the facility in the event of the loss of the company's offices. Moreover, the facility should provide safe off-site storage for your company's data and security password access for your personnel. There should be a minimum of two "fire drill" tests a year required by the facility, helping you to test your backup media and procedures.

Because of the lack of alternate facilities in the past, some DG DP managers have sought to shore up their disaster exposure by forming handshake agreements with other local DG users. In contemplating sharing access to another company's computer system, one should always ask these questions: "What if it were my busy season? Could I handle their workload? How can they be expected to handle mine? What if the local area itself is struck by disaster, putting both facilities out of commission? Who backs up the backup?"

In the same way that systems engineers and software vendors often act as "de facto" systems consultants, disaster recovery experts act as consultants and troubleshooters, pointing out shortcuts and shortcomings in your planning cycle. By using the services of a professional disaster recovery facility that supports the DG user, you're doing more than providing your company with immediate access to alternate computing power; you're also allying yourself with a team that can guide you through the steps required to build your company's recovery plan at the same time you are reducing the likelihood that a disaster will be irreversible. Δ

Stein serves as coordinator of disaster recovery centers for NPA Systems in New York. She may be reached at 761 Coates Ave., Holbrook, NY 11741; 516/467-2500.

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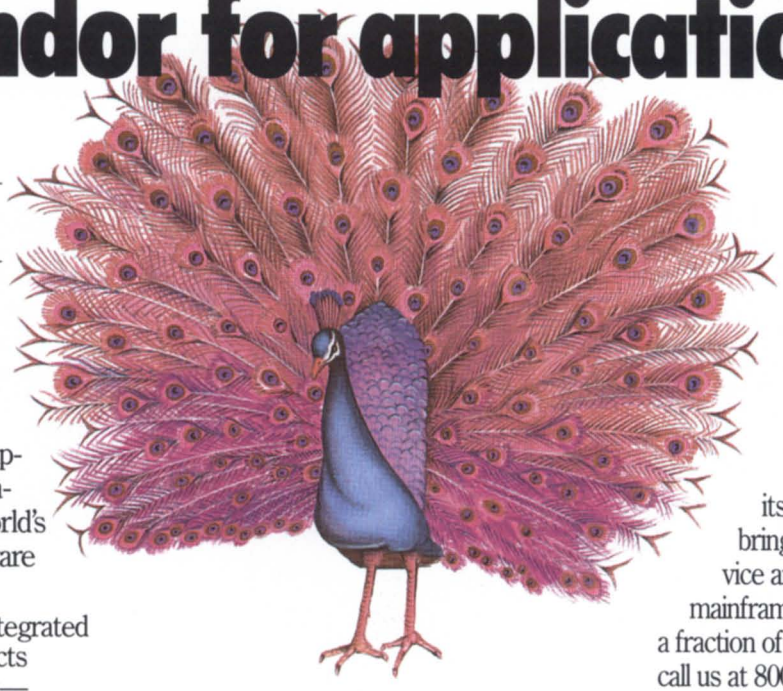

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Editors' Note:

Please take a minute to fill this survey out and mail it in. Its purpose is to determine exactly what you as readers of FOCUS like and want. Telling us about yourself will help us do our job better, making FOCUS even more effective for you.

If more than one person reads FOCUS, please have them photocopy the survey, and enclose it in an envelope.

ABOUT FOCUS

1. Approximately how much of Focus do you read every month?

☐ All ☐ Nearly all ☐ Only the ads ☐ Not much ☐ None

2. How useful do you find the following regular features of FOCUS? (Check one per item)

	very useful	somewhat useful	not very useful	do not read
EDITOR'S NOTE				
Feature articles ("FOCUS ON")				
LETTERS				
OPINION				
PRODUCT SPOTLIGHT				
PRISM				
RIG/SIG ROUNDUP				
Columns:				
AOS{/VS} TRICKS by John Grant				
BBASIC BUSINESS by George Henne				
DISCOVERIES by Jim Siegman				
INSIDE ICOBOL by Tim Boyer				
MV/ SYSTEMS by Tim Maness				
OA TODAY by Charlene Kirian				
SYSTEM MANAGER'S LOG by Brian Johnson				

3. How would you rate the information in the following regular features of FOCUS? (Check one per item)

	Too technical	About right	Not technical enough	Do not read
Feature articles ("FOCUS ON")				
PRODUCT SPOTLIGHT				
PRISM				
Columns:				
AOS{/VS} TRICKS by John Grant				
BBASIC BUSINESS by George Henne				
DISCOVERIES by Jim Siegman				
INSIDE ICOBOL by Tim Boyer				
MV/ SYSTEMS by Tim Maness				
OA TODAY by Charlene Kirian				
SYSTEM MANAGER'S LOG by Brian Johnson				

4. Is there any specific topic that you would like to see added as a regular FOCUS column or given more frequent coverage?

5. In general terms, which of the following aspects of FOCUS are important to you? (Check as many as you like)

☐ Corporate information on DG ☐ Diagrams ☐ Feature articles ☐ Illustrations ☐ News items ☐ NADGUG news ☐ Photos ☐ Profiles (user stories) ☐ Program listings ☐ Technical columns ☐ Cover art

6. How effective is FOCUS' use of the following items?

	Excellent	Very good	Good	Average	Needs improvement
Cover art					
Diagrams					
Illustrations					
Page design					
Photos					
Program listings					

7. How would you rate FOCUS overall? (Check one per item)

	Excellent	Very good	Good	Average	Needs improvement
Accuracy of information					
Breadth of coverage					
Clarity of writing style					
Depth of coverage					
Timeliness					

ABOUT YOU AND YOUR ORGANIZATION

8. What other computer publications do you read regularly?

9. How would you rate FOCUS in comparison to the other publications you read?

☐ FOCUS is much better ☐ Somewhat better ☐ The same ☐ Somewhat worse ☐ Much worse ☐ Does not apply

10. How many other people in your organization read your copy of FOCUS?

11. What are the positions of these people?

12. What is the total number of people in your organization who are members of NADGUG?

13. Does your company pay for your NADGUG membership? ☐ Yes ☐ No

14. As well as FOCUS, which NADGUG services do you use?

☐ Annual conferences ☐ Electronic bulletin board ☐ Membership in RIGS ☐ Membership in SIGS ☐ Voting rights

15. How many people in your organization use DG equipment in the following capacities? (Enter the number in the space provided)

Academic/education _____ Data processing _____

Accounting _____ Engineering/science _____

Application programming _____ Graphics _____

CAD/CAM _____ Sales/marketing _____

Communications _____ System management _____

Corporate management _____ Word processing _____

Data entry _____ Other (please specify:

_____

16. Which of these categories best fits your position? (Check up to four)

- ☐ Academic/education
- ☐ Accounting
- ☐ Application programming
- ☐ CAD/CAM
- ☐ Communications
- ☐ Corporate management
- ☐ Data entry
- ☐ Data processing
- ☐ Engineering/ science
- ☐ Graphics
- ☐ Sales/ marketing
- ☐ System management
- ☐ Word processing
- ☐ Other (please specify: _____

17. Please list the DG CPU(s) and operating system(s) your company uses. _____

_____

18. Does your organization use computer equipment from companies other than DG? ☐ Yes ☐ No.

If yes, please specify: _____

19. Are there any topics for which you would be willing to act as an informal advisor/expert to FOCUS?
☐ Yes ☐ No ☐ Maybe

Please specify_____

Would you be willing to write an article on these topic(s)?
☐ Yes ☐ No

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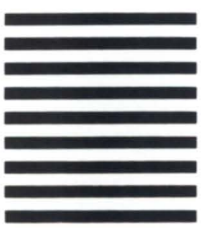

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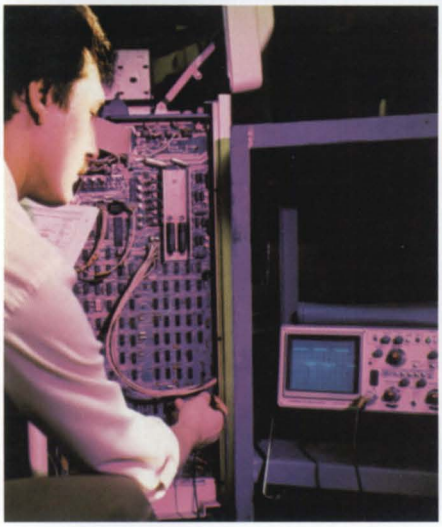

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When E.F. Hutton innovates

The integrated office is more than Hutton talking and others listening

by Barbara Haefeli
Special to Focus

What do you think of when the name E. F. Hutton & Co. is mentioned? Perhaps the television spot that shows hundreds of strangers eagerly eavesdropping for a snippet of investment advice? Or perhaps a picture of a high-powered financial services advisor comes to mind. If so, the millions of dollars Hutton has spent on advertising to promote its image as a worldwide financial institution have been a good investment. In a more practical vein, however, the company is helping to ensure its place among the leaders in the business with the aid of computer systems supplied by Data General.

With its goal as an integrated office automation system, E. F. Hutton is in the process of installing Data General computers in each of its 400 branches. At present E. F. Hutton has 7,000 terminals from Bunker Ramo, which the account executives use to keep track of current stock prices provided by the Bunker Ramo data base. According to Robert Fitterman, assistant vice president of E. F. Hutton and project manager for BIPS (Branch Information Processing System), the goal of the project is to integrate the Bunker Ramo terminals and Data General's CEO office automation software. Data General has provided customized programming to interface the DG software with the Bunker Ramo terminals. This combination, along with E. F. Hutton's current network, will provide office automation features such as word processing, electronic mail, and information retrieval in addition to data bases and personal computing.

A single branch office may staff up to 100 employees, with each averaging 30 employees. These offices will be using DG MV/4000s, /8000s, /10000s, and /20000s. In New York City, home of the corporate headquarters, each of the three locations will eventually have an MV/20000. At present across the country there are MV/10000s in three sites and MV/20000s in three sites.

The account executives will continue to use the Bunker Ramo terminals and will be able to access only a limited subset of CEO. For example, they will be able to view but not edit documents. The sales assistants will have Data General terminals (D410s and D411s) with the full features of CEO.

The computers are being installed gradually. Over 300 branches currently have DG systems. The transition is being performed in steps over roughly a three-year period. There are perhaps an additional 40 DG systems serving as message concentrators (16 bit Eclipse S/130s), at the intermediate level of the network.

The customer data base for E. F. Hutton will continue to be centrally located in New York City, but it will be divided into smaller data bases that define the customers of each office. These local customer data bases have been placed on the Data General equipment in more than 250 offices. Each office is thus provided with specialized local access for many applications.

There is also a central news data base, called HINT, which will eventually be accessed on all the DG computers via satellite. Corporate white notices will be shared the same way. A terrestrial line to California from New York will provide the uplink. The broadcast data will be received by satellite dishes at the branch offices.

E.F. Hutton has written two custom applications. The first makes life easier for computer operators: in-house programmers have written a package of menus for the operators to narrow and clarify the choices they have

to make during routine operations. The menu system saves the operators from having to master DG's CLI (Command Line Interpreter).

The second custom application is SKIPPER, an automatic restart facility. Once the system is started for the day, if a single program crashes—except for the operating system itself—SKIPPER will automatically restart it. SKIPPER is responsible for bringing up all the serving processes automatically when the system comes up.

One account executive who is enthusiastic about the new network and the associated transformation at E. F. Hutton is John Musgrave in the branch office in Austin, Texas. This branch office is operated by 18 account executives and 8 sales assistants. Each account executive has access to a Bunker Ramo terminal; sales assistants use seven DG terminals. The Austin branch is one of those for which the customer data base has been provided.

According to Musgrave, the business of E. F. Hutton is information. The faster the information can be gathered, the more current that information is. And the more quickly information can be disseminated, the better the service that can be provided to customers.

A variety of CEO's features help Musgrave and other Hutton employees maintain high standards of information retrieval and communication. Calendars and electronic mail facilitate daily communication within the office and between offices. For example, the "must see" label indicates urgent correspondence, and with certified mail the sender receives a return message confirming that the mail he or she sent was read.

Account executives can also keep better records by using the electronic drawers and files provided by CEO. Computerized files are easier to keep and retrieve than the hardcopy files that have been used in the past. Drafts of all types of correspondence are also at their fingertips, and skeleton copies only need to be composed once.

Items such as the spellchecker aid sales assistants in composing letters quickly and accurately. Once the letters are completed, a Hewlett-Packard laser printer provides high quality printing.

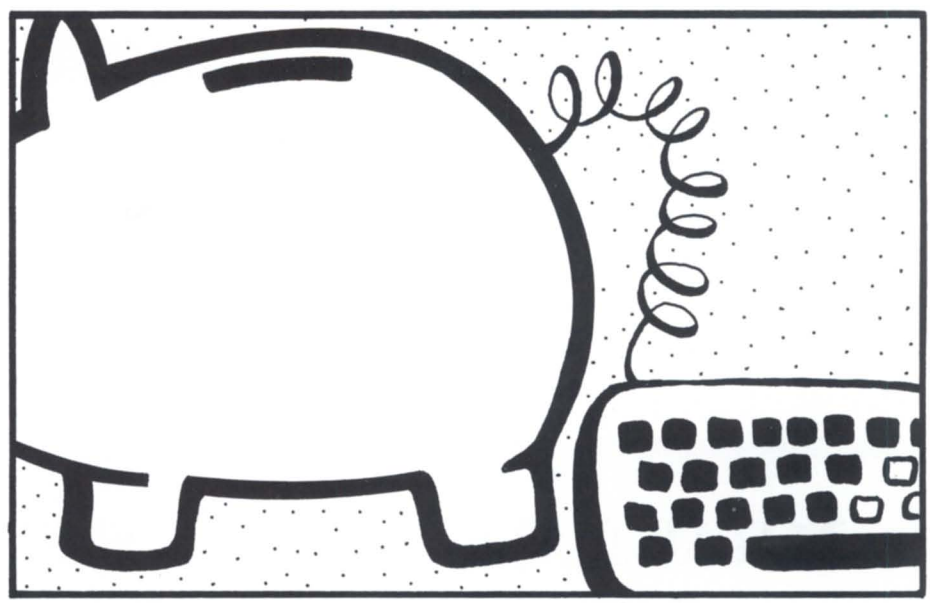
E. F. Hutton's new network combining the current E. F. Hutton network, Bunker Ramo terminals, and Data General software is an ambitious project that has a target completion date of 1990. According to Fitterman, Data General was chosen to provide the office automation because it was the best integrated OA package on the market, and its price/performance was "superb." Aided by this modern networking capability, E. F. Hutton plans to remain in the forefront of the financial services business. Δ

Barbara Haefeli is a computer professional in Austin, Texas.

Take it to the bank

BankMatic Systems puts banks on-line with DG equipment

by Andrea Beebe
Focus Staff



The world of monetary transactions—banking, at the everyman level—seems especially suited to automation because of its demands for immediate, accurate information. One software company meeting the needs of independent banks is BankMatic Systems, based in Oregon.

BankMatic Systems caters to smaller banks—banks independent from the nationwide banking chains. The company, which opened in 1979 and was reorganized under a Chapter 11 order last May, offers turnkey systems on Data General equipment. After the reorganization was completed, BankMatic signed a marketing contract with Software Alliance Corporation—a move that should relieve BankMatic of its marketing concerns while allowing it to concentrate on software development.

"Our banking software is totally written by us," says Carol Deters, BankMatic president. "It's an integrated package, meaning that all the applications generate entries into the general ledger, and they all communicate with each other. It's an on-line, real-time system, so transactions happen as they are processed, and they are posted during the day."

When installed, virtually every bank employee comes in contact with the system. Bank presidents, for example, are interested in the management reporting capabilities, while tellers use the system for posting deposits and withdrawals to the system, and for balancing their cash drawers after each transaction.

Most of BankMatic's clients are on commercial Eclipse machines based on the S/140 processor, although packages have been installed on MV/4000s and early models of the CS/40. Price reductions on the MV/4000s are making them more popular, Deters says.

"We really like the AOS/VS software (on the MV/4000s), and the terminal capacity is greater," she says, noting that the larger machines will enable BankMatic to expand its market to larger banks.

The BankMatic staff chose Data General equipment because of its support for COBOL, its across-the-line compatibility, and its remote diagnostic capability.

COBOL helps the development end, because BankMatic programmers prefer to write all their code in COBOL. Compatibility, on the other hand, is good for the business end. Says Deters, "We could go in and as a selling feature tell the customer they could start with a smaller system . . . and migrate to a larger system as they grow, and never have to go through a file conversion."

And the remote diagnostics are good for both sides of the business. Running off-site diagnostics saves time and money for both company and client. "If the customer were having problems," Deters says, "we can dial in to their system and see for ourselves what was going on.

"A lot of our banks are in really remote areas, so they were reluctant to buy from a company in Oregon, since their biggest concern was support. They can get whatever they need from us over the phone 95 percent of the time. The other 5 percent may require an on-site visit or a package sent Federal Express to correct the problem. We just rarely have any down time because of software. It's usually hardware, and DG hardware is very good, so it isn't much of a problem."

BankMatic software is produced on a CS/200 based on an S/140. The office also includes two Model 10 Desktops, which are used for internal accounting, word processing, and classroom training. Deters is planning an upgrade from the CS/200 to an MV/4000, which will be used for development; a CS/200A will also be used as a DOS test machine.

As part of continuing support, BankMatic staffs five programmers to make enhance-

BankMatic staffs five programmers to make enhancements to the systems—a job that includes monitoring state and federal banking regulations and making adjustments as necessary

ments to the systems—a job that includes monitoring state and federal banking regulations and making adjustments as necessary. A five-member service staff is on call 24 hours a day, 7 days a week, to handle problems whenever they arise.

"We do all of the technical support here, so (the banks) don't have to have a sophisticated staff of people running the computer," Deters says. When a bank buys a system, BankMatic manages the entire conversion process and conducts the training sessions. BankMatic staffers remain at the bank through the conversion and the following week or two to help bank employees feel comfortable with the system.

The banking software industry is very competitive. NCR, Burroughs, and Omni, for example, also offer software for independently owned banks. According to Deters, most of Bankmatic's competitors offer ongoing support in the technical aspects of the system, but not in the customer service aspects.

So when BankMatic filed for bankruptcy under Chapter 11 in June of 1985, 31 of its 49 clients pooled their money and reorganized the company. "It was really interesting," Deters says. "We have an excellent reputation among our user base for the support that we've been able to give, and everyone feels our software is really one of the best packages available, so they were really great about pulling this together.

"They're all treated equally—owners versus non-owners—but the owners are shareholders and have a little more say over the day-to-day business than the customer would have," she says. "We have a board of directors composed of (representatives from) eight of these banks—some are presidents, some are cashiers." The board participates in the management decisions, but leaves the technical decisions to BankMatic.

One of BankMatic's current projects involves downloading data to PCs, which will enable banks to purchase various asset liabilities management packages that run on PCs. These packages will then be able to access data from the DG data base.

BankMatic's agreement with Software Alliance Corporation—which sells large banking systems to large banks—will place the active marketing of BankMatic systems in Software Alliance's hands. That agreement, plus the use of MV/4000s, should offer BankMatic access to a larger market with larger banks. BankMatic will continue to supply support and service, in addition to systems development. Δ

A typical institution might employ more than 300 people to handle paper, but only about 80 of them would be involved with the information the paper carries

The paper chase

Image capture technique cuts the float and streamlines payment processing

by Greg Farman
Focus Staff

Is there a person alive who hasn't written a rubber check? For most hot check writers, it's not fraud—just a matter of expedience. We don't have enough money in the bank to cover a check when we write it, but we know that bank drafts *always* have to clear through three or four intermediate stops—and maybe as much as a week's time—before they come back to be charged against our accounts. By then our end-of-month paycheck will be in the bank to make the check good. No problem—just a little short-term interest-free loan, courtesy of the "float."

Better not count on it.

Whether it's because of the innocent stretching of the rules that "everybody does," or the organized check kiting that some companies have made part of their standard operating procedures, rubber checks are a major concern for financial institutions. The "float" between the time a check is written and the time it is charged against the writer's account is an open invitation to fraud.

Take, for example, the Silicon Valley insurance broker who decided to engage in a bit of check kiting to bridge a widening gap between his obligations and the cash on hand. First he established checking accounts with banks in New York and Ohio. Then he began writing checks on one account for deposit into another, and using the deposits to cover still more checks that would be deposited in yet another bank. When a check made its way back to be charged against the account on which it was drawn, there would usually be enough deposits to cover it, but more and more often, the deposits were turning out to be hot checks. By the time the scheme unravelled there were more than $5 million worth of checks outstanding, with nowhere near that value in assets to cover them.

Even if every person who ever wrote a check were scrupulously honest, the float would still be an expensive problem for financial institutions. A check in transit is money on vacation: since it's not on deposit, it's not earning interest—clearly an affront to any self-respecting money manager!

The culprit is paper. Mountains of paper. The checks and payment documents that clear through the financial system each week are numbered in the billions. It's a massive problem not just for the people who keep the accounts, but also for those who move and manage the paper itself. In fact, a typical institution might employ more than 300 people to handle its paper flow, but only about 80 of them would be directly involved with the information the paper carries. The rest of them would just be logging, sorting, shipping, securing, and shuffling it.

However, institutions like the Philadelphia National Bank, Security Pacific National Bank, and J.C. Penney are already adopting a new technology that can dramatically reduce their float time and streamline the flow of information. Developed by Teknekron Financial Systems, Inc. of Berkeley, California, the new technology uses special cameras to capture the image of a paper transaction in a form that can be transmitted and processed electronically. The paper still has to flow through the system, but the transaction itself can proceed immediately.

According to Craig Sparkes, the company's corporate product manager, the key ingredient in making the new technology work is a very fast, very reliable computer—a Data General MV/ family machine.

Teknekron Financial Systems has been a subsidiary of Teknekron Industries since 1978, but its roots go back to 1970, when it was a division of the parent company. Since then it has been in the business of packaging systems for clients who need to gain control of the paper that passes through their doors.

A typical payment processing system would work as follows:

- The documents are passed through a high-speed reader/sorter. Teknekron orders these "transports" from different manufacturers depending on the volume of transactions to be processed. The transport moves the documents at up to 240 inches per second, automatically reading the account number from the pre-printed magnetic ink at the bottom of each check, and spraying the checks with a magnetic batch and sequence number. All of this information is stored to disk.
- Teknekron's proprietary image camera assembly, which is mounted on the transport, captures the image of each document as it passes through.
- The image and account information are stored together on Teknekron's mass storage units.
- Operators at high-resolution image data entry terminals call up the image and its accompanying account information. They read the dollar amount of the check, and enter it into the system.
- Power check encoders automatically print the dollar amount, and endorse the back of each check with magnetic ink so it can be deposited.
- A Data General MV system running AOS/VS and Teknekron's application software acts both as a controller for the payment processing system and as a front-end passing the captured data to the client's mainframe.
- Laser printers are available for high-resolution hardcopy output as needed.

The systems aren't cheap. Getting one that can process upward of 500,000 payments per month would cost somewhere in the range of $2.5 million.

According to Sparkes, getting these components to work together was an extremely complex undertaking. He refers to the image camera as the "crown jewel" of the opera-

tion. Although he gave no hints about how it works, he explained that it has to capture high-resolution images (minimum 150 pixels per inch) of the documents as they pass by the camera at rates of up to 240 inches per second. The assembly must also be able to filter out background clutter (pictures of deer or water skiers on personal checks, for example) while capturing a sharp image of the significant information.

Synchronizing the camera, encoders, reader/sorters, and mass storage units required "extremely complex" software, which Teknekron programmers wrote in COBOL, Fortran, and assembler. Since different clients have very different requirements, the code has to be "tremendously robust" to accommodate their needs.

Teknekron's earliest systems were built around DG Eclipse S/250s running RDOS. According to Sparkes, today's MV systems are much better—but the conversion from RDOS "wasn't fun, although it did provide us with an opportunity to streamline the code."

Reliability is a key concern, because the paper flow would quickly turn into a logjam if the system went down for an extended period. Sparkes acknowledged that the MV is a single point failure, but added that most customers have found their DG computers solid enough that they accept the risk of having only one. However, almost all of Teknekron's clients keep a Teknekron field service engineer on site.

The company is currently exploring new applications for its technology in the financial services market. For example, banks keep signature cards on file to use for validating the signatures on checks, but the cards generally stay at the branch where the account was opened. What happens when a check is written for cash at a different branch? A high-resolution screen linked to a central signature storage system would provide a quick verification.

The idea of a "paperless office" has proven a mirage in other industries, but for financial services, the goal is not so much to do away with paper as to free the flow of information from the flow of paper. You could say that Teknekron's future is riding on the idea that getting it in writing doesn't always mean seeing it on paper. Δ

The AOS/VS default is appropriate only on single disk, low-end systems, with low terminal counts or very low usage

Cache as cache can

Selecting the wrong size for your system cache could be a big drag on performance

by Brian Johnson
Contributing Editor

:SYSGEN:S_COMMAND

When it comes to choosing system parameters at SYSGEN {VSGEN} time (the S command), I'm a great fan of starting out with the defaults. Then after the system has been running under typical loads for a week or so I go back and reassess the parameters based on whatever performance data I've been able to lay my hands on.

For the majority of systems I see, I find that only one parameter needs to be changed: system cache size. (Don't confuse the system cache with the hardware cache on the MV/8000, MV/10000, and MV/20000.) If you make a poor choice for this parameter, it can have a dramatic effect on system performance.

Unfortunately, the default of 128 (0 for AOS!) is too low for many systems. For the average MV/8000, MV/10000, or MV/20000, the default of 128 gives very poor performance. My experience shows that the AOS/VS default is appropriate only on single disk, low-end systems that have low terminal counts (eight or less), or very low usage. The AOS default of zero is rarely appropriate.

:TRADE-OFFS

So what's a good value and how do you decide? Why not just pick 1024 (128 for AOS) and be done with it?

Like most things, selecting the cache size is a trade-off. Selecting too low a size increases physical disk I/O, especially on the system disk. Selecting too high a size costs two ways: it consumes extra system CPU required to search the larger cache, and it consumes memory with no corresponding benefit.

The cache is composed of 512 byte buffers (plus a handful of overhead words per buffer), so for each 100 cache buffers you specify, you only use 25 memory pages. A reasonable minimum for the average AOS/VS system is somewhere between 256 and 512 buffers (64 to 96 for AOS).

Oversizing the cache by selecting the maximum number of buffers costs between 128 and 192 pages, or 0.25 to 0.38 MB (8 to 16 pages, or 16 to 32 KB for AOS). On systems with more than 2 or 3 MB, giving away this amount of memory rarely affects the swap/page situation significantly. On systems with less than 2 or 3 MB (most AOS systems, and smaller MVs), oversizing the cache can cause memory contention problems.

The real disadvantage of oversizing the cache is the extra system CPU required to search it when it fails to find the disk block it's looking for, especially on the slower CPUs. Since AOS/VS takes advantage of the superior queue searching instructions in the MV hardware to look for buffers in the cache, a larger maximum cache size is allowed on AOS/VS than AOS. This is the reason why the designers of AOS{/VS} limited the maximum cache size. (Here's a suggestion for an STR: how come the default and limit are the same on an 8-user MV/2000 as they are on a 128-user MV/20000?)

The system is not much help when it comes to providing quantitative feedback on your choice of cache size, unless you have a performance monitoring utility that shows the cache hit rate. So let's start by looking at what the system cache is used for. Maybe we'll gain a little helpful insight along the way.

:IO_SURVEY

AOS{/VS} disk I/O falls into three categories: file data block I/O, shared page I/O, and "internal" I/O.

File data block I/O is just what the name implies: reading the blocks of a file that contain the data. Blocks (up to an element's worth at a time) are transferred directly between the disk and user buffers, in either the primary user address space or in the AGENT{/GHOST} space. Caching of this type of I/O is not possible except at the hardware level (intelligent disks).

Shared page I/O is an alternative to file data block I/O; it allows sharing of file pages between processes. Pages (multiples of four blocks up to the element size) are transferred between the disk and the process' working set. Recently used pages are cached in excess memory (assuming you have any) to speed up random access to shared files.

Internal I/O is single-block (512 byte) I/O done exclusively by the system to support the other two kinds of I/O. Examples are accessing disk bit map blocks, directory blocks, IPC spool files (:PROC:IPS.+), and the random index blocks used to locate file data and shared page elements. Blocks (one at a time) are transferred between the disk and buffers in the system space. Caching of recently used blocks is done in the system cache.

Of the three kinds of I/O, disk accesses for internal I/O are the least efficient since an access is used to get just 512 bytes.

AOS{/VS} attempts to minimize internal disk I/O by keeping the most recently used blocks around for a while, ordered by "age." If not reused, a block in the cache tends to "fall out," getting rewritten to the disk if it was modified. How long a block stays in the cache, and the probability of it being reused, depend upon a great many things. Two of the most important are how many things are competing for residence in the cache, and how frequently the blocks in the cache are being reused. In other words, the number of directories being accessed simultaneously, the number of random index blocks being accessed, the amount of IPC traffic, and the rate at which file elements are being allocated/deallocated in the disk bit maps all affect the effectiveness of the cache.

It's not unusual for AOS{/VS} to search

the cache 100 to 200 times a second under a medium to heavy on-line load. This means that every one percent decrease in the cache hit rate will result in one to two additional physical disk I/Os per second. A disk with an average access time of 25 milliseconds is generally good for about 20 accesses per second when the system is 50 percent busy (1/.025/.50). This means a 10 percent decrease in the cache hit rate can occupy the full attention of one of your disk drives. Obviously it behooves us to make sure the cache is not undersized.

:WHAT_NOW?

So how do we pick a number for the cache size? Let's start by looking in the manuals. According to *How to Load and Generate*, "The default is okay. Details are below." Looking below, we find, "You can time typical application programs to determine it." Well, that's a start, but as I said above I disagree that the default is okay. So what's a typical application? How do we time on-line applications? I recommend the following simple procedure.

Boot your system each morning. Answer "Y" to override default specifications, and default all the answers except cache size. On the first morning specify the maximum. On each subsequent morning, decrease the previous day's value by 128 (32 for AOS).

Those of you with performance utilities can capture the average cache hit rate at the end of each day and plot it against cache size. If you don't have a utility, you can use DISCO to capture the average disk busy percentages at the end of each day, and plot them. AOS users might be limited to using subjective response time measurements, but that's not so bad. If the difference isn't noticeable, then this whole column is nonsense, right?

In general, a cache properly sized for on-line operation will be overkill for batch, so don't worry about running a separate test for nighttime batch situations.

This exercise should be repeated periodically if you suspect your cache usage has changed. Some typical examples of things that alter cache usage dramatically are changing the hardware configuration in any way (adding memory or disks), changing the element sizes of commonly used files, adding more users, or making gross changes in the directory structure.

:PRIVILEGED_FEW

For those of you with performance utilities that display the cache hit rate, some further advice is in order. When you plot the cache hit rate, you'll get a curve that resembles either Figure 1, 2, or 3.

If you get something that looks like Figure 1, you're probably in good shape. The graph shows that a relatively small number of blocks is competing for the cache (less than the maximum cache size); the blocks all are being accessed frequently enough to remain in the cache. This graph is typical of systems with a low user count, low to medium load, and well-organized files (good file element sizes, good directory hash frame sizes, low file count directories, and a low active directory count).

If you get something that looks like Figure 2, things aren't bad, but they could be better. You've got too many blocks competing for the cache, but the rate at which you're accessing them is so low that increasing the size of the cache beyond a certain point won't help. This graph is typical of high user count systems under low to medium load. The system may or may not have poorly organized files and directories.

If you get something that looks like Figure 3, that's bad. It indicates that a huge number of blocks are competing for the cache, so huge that none of them is able to remain in the cache long enough to be reused frequently. This is typical of systems with a high user count under heavy load, usually with poor file and directory structures.

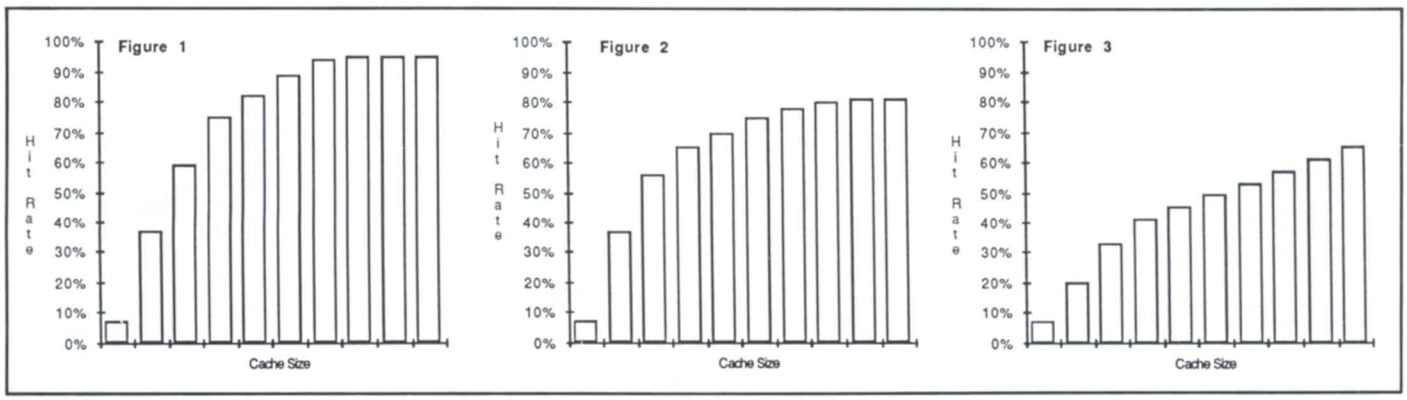
:NET:NET

Making the cache too small can have catastrophic effects on overall disk activity, far in excess of the reduction in disk I/O that comes from making the cache memory available to processes.

You can reduce both the number of blocks competing for the cache and the frequency of cache searches by using file element sizes that result in fewer index blocks.

You can improve directory access time for random directory accesses like OPENs if you use directory hash frame sizes that produce fewer overflow blocks. This is because fewer I/Os will be needed to find the files. However, you can't expect optimizing the hash frame sizes to produce any improvement in directory searches (anything that uses templates, e.g., FILESTATUS). The net effect on the cache will depend on the ratio of random directory accesses (where optimum hash frame sizes will decrease the number and frequency of directory accesses) to sequential directory searches (where it has little effect since the same number of blocks are required to hold the filenames).

The real solution for directories is to convince users who work in heavily populated directories to break them up into a number of smaller directories (e.g., the CEO drawer/folder/document model). This decreases the number of blocks competing for the cache and decreases the cache search



frequency (fewer blocks to examine for things like F/AS/S).

Heavily populated directories with proper frame sizes that are used mainly for storage of files and are rarely used as a user's default directory are not a problem.

:ERRATA

In the June issue on multiplexors, I misplaced a decimal point. The per-character time of 0.69 ms. on the top of page 22 should have been 0.069 ms. I found the mistake while reading the magazine myself; nobody called or wrote. I know you're reading this stuff because you swamped me with requests for the RUNAWAY program, so don't be shy about letting me know. Δ

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Imposing 20 percent overhead just to accommodate people who are too cheap to have sufficient disk space is going too far

A disk in time

Here's a technique for checking your disk space—before your program aborts

by Tim Boyer
Contributing Editor

Last year, a very reliable source told me why revision 1.31 of ICOBOL is about 20 percent slower on WRITE statements than the previous rev. It seems rev 1.31 contains code that says something like, "Now look, I'm not about to write a record—but if I *were,* just supposing now, would I run out of disk space?" It does this before each and every write!

I'm usually willing to coexist peacefully with code and utilities that make no sense to me, as long as they don't slow me down. SETFORMS, for example, is "a menu-oriented utility for those who use the Data Royal printer, model IPS-5000-A with option 190168." I'm sure the millions of ICOBOL users who have that printer just love SETFORMS. Me, I just ignore it.

But imposing a 20 percent overhead just to accommodate those people who are too cheap to have sufficient disk space—now, that's going too far. I'm usually fanatically opposed to hardware solutions for something that could be solved in software. However, in this case I think Data General would be perfectly entitled to say, "Gee, if you keep running out of space and clobbering your files, maybe you should think about buying one of our nice new disk drives!"

Failing that, since we can now run assembler routines in ICOBOL, why not supply callable routines that can be linked in or not, depending on the needs of the user?

If our friends at Research Triangle Park do decide to eliminate disk space checking on the next release—and you still can't afford a new drive—here's a way to check your remaining disk space. In ICOBOL.

The file MAP.DR contains all of the information about your disk usage. For the purposes of this article, I'm going to use our 5 MB 6045 for an example, but the same information applies to any disk. LIST MAP.DR, and the size shows as 1222 blocks. Do a DISK command, and the total disk size is 9776 blocks—which is 1222 multiplied by 8. Each BIT in MAP.DR corresponds to a block of your disk.

Try doing an FPRINT of the file. It may look like garbage, but it's really very easy to decipher. Each time you see 177777, it means 16 used blocks, corresponding to ICOBOL's HIGH-VALUES. All of the zeros represent 16 empty blocks, or LOW-VALUES. That part is easy enough. It's the values in between that take a little bit of work. I picked one at random, and found 077431. If this is translated into binary, it becomes 0111111100011001, which indicates 10 used blocks and 6 unused.

You can probably see by now that to find the number of used blocks on a disk, you need to read MAP.DR, convert the values to binary, and add up all of the ones. The number of contiguous blocks is simply the longest consecutive string of zeros.

Now for the fun part—writing that in ICOBOL! The only tricky part is the conversion to binary, so I'll tackle that last.

Select MAP.DR as you would any other sequential file. The FD looks like this:

```
FD MAP-FILE
   LABEL RECORDS ARE STANDARD
01 MAP-RECORD.
   03 ASCII-CHARACTER PIC S9(2) COMP.
```

My procedure code is as follows:

```
READ-AND-CONVERT.
   READ MAP-FILE RECORD AT END GO TO DISPLAY-SCREEN.
   ADD 8 TO DISK-SIZE.
   IF MAP-RECORD = LOW-VALUES
   ADD 8 TO CONTIGUOUS-BLOCKS,
   ELSE IF MAP-RECORD = HIGH-VALUES
   ADD 8 TO NUMBER-OF-USED-BLOCKS,
   PERFORM CHECK-CONTIGUOUS,
   ELSE PERFORM CONVERT-TO-BINARY,
   PERFORM CHECK-CONTIGUOUS.
   GO TO READ-AND-CONVERT.
DISPLAY-SCREEN.
   SUBTRACT NUMBER-OF-USED-BLOCKS FROM DISK-SIZE
   GIVING NUMBER-OF-LEFT-BLOCKS.
   DISPLAY USED-LEFT-SCREEN.
```

The procedure CHECK-CONTIGUOUS simply checks if this run of empty blocks is larger than the last run. If so, it swaps them.

```
CHECK-CONTIGUOUS.
   IF CONTIGUOUS-BLOCKS > NUMBER-OF-CONTIGUOUS-
    BLOCKS
   MOVE CONTIGUOUS-BLOCKS TO NUMBER-OF-CONTIGUOUS-
    BLOCKS.
   MOVE ZERO TO CONTIGUOUS-BLOCKS.
```

Then, in your screen section, you would display NUMBER-OF-LEFT-BLOCKS, NUMBER-OF-USED-BLOCKS, and NUMBER-OF-CONTIGUOUS-BLOCKS.

For the purists, I should point out that this will give only a close approximation of the number of contiguous blocks. The actual algorithm would count the number of trailing zeros in the word before the zeroed words, the zeroed words, and the leading zeros in the word after. My method, however, will run much more quickly, and will be off by no more than 14 blocks. If you're *that* tight on disk space, nothing is going to help you!

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There are two ways of converting a word to binary—the slow, understandable method and the fast, obscure one

And now for the fun part—the binary conversion routine. There are two ways of converting a word to binary—the slow, understandable method and the fast, obscure one. By now you know I don't like to write code that is either slow or understandable. However, for purposes of illustration, I'll give you both methods. The first way will make the second a little clearer (I hope). It's just an ICOBOL adaptation of the technique I learned for converting decimal to binary.

I'll use the number 175 for an example (all of these numbers are decimal). The highest value that can fit into a byte is 255. I take the next lowest power of 2, 128, and subtract it from 175. The remainder is greater than 1, so there is a 1 in the first binary position. I then divide the divisor in half, giving 64, and subtract it from the remainder, 47. The answer is negative, so there is a zero in the second position. The process is repeated until the divisor is less than 1. Figure 1 shows this procedure.

Figure 1: Binary conversion algorithm

Operation	Binary Value
175 - 128 = 47	1
47 - 64 = -17	0
47 - 32 = 15	1
15 - 16 = - 1	0
15 - 8 = 7	1
7 - 4 = 3	1
3 - 2 = 1	1
1 - 1 = 0	1

So the binary equivalent of 175 is 10101111, and would correspond to two empty and six full blocks.

There, now—isn't that easy? Actually, the code is easier to understand than the explanation:

```
CONVERT-TO-BINARY SECTION.
INITIALIZE-VALUE.
    MOVE 128 TO BINARY-SUBTRAHEND.
COMPUTE-BINARY-NUMBER.
    SUBTRACT BINARY-SUBTRAHEND FROM ASCII-CHARACTER.
    IF ASCII-CHARACTER > = ZERO
    ADD 1 TO NUMBER-OF-USED-BLOCKS,
    ELSE ADD BINARY-SUBTRAHEND TO ASCII-CHARACTER.
    DIVIDE 2 INTO BINARY-SUBTRAHEND.
    IF BINARY-SUBTRAHEND > = 1
    GO TO COMPUTE-BINARY-NUMBER.
CONVERT-TO-BINARY-EXIT.
EXIT.
```

This procedure sizes a 5 MB disk in about 15 seconds. The next method will do it in less than half that time. Consider what we're trying to do with this binary conversion routine. We're not doing an actual conversion—we don't care where the ones and zeros fall, we're just counting them. But we're counting them each time, throughout the whole file, even though there are only 256 possible values that can occur. What if we set up a table with each of the possible values, and just did a lookup?

The table looks like this:

```
01 BINARY-CONVERSION.
    03 CONVERT-BINARY.
    05 FILLER PIC X(32) VALUE "01121223122323341223233423343445".
    05 FILLER PIC X(32) VALUE "12232334233434452334344534454556".
    05 FILLER PIC X(32) VALUE "12232334233434452334344534454556".
    05 FILLER PIC X(32) VALUE "23343445344545563445455645565667".
    05 FILLER PIC X(32) VALUE "12232334233434452334344534454556".
    05 FILLER PIC X(32) VALUE "23343445344545563445455645565667".
    05 FILLER PIC X(32) VALUE "23343445344545563445455645565667".
    05 FILLER PIC X(32) VALUE "34454556455656674556566756676778".
    03 CONVERT-NUMBER REDEFINES CONVERT-BINARY
     OCCURS 256 TIMES.
```

Each entry is the number of ones in that particular number. With this table, the binary conversion becomes trivial:

```
ADD CONVERT-NUMBER(ASCII-CHARACTER + 1)
    TO NUMBER-OF-USED-BLOCKS.
```

This procedure will give you the disk size in less than 7 seconds.

The procedure can also be used for partitions, which is where I use it most. I have a couple of really big files that I keep in their own partition, to minimize head movement. As far as I'm concerned, telling me—in the middle of processing—that I'm about to run out of disk space isn't that helpful. So, before each posting run, I take a few seconds to make sure I've got plenty of partition space. It could save a day's work!

An ongoing project of mine is to write a CLI in ICOBOL. Mixed among my forthcoming articles will be such utilities as LIST, PRINT, and others. The only difficulty I'm having in writing these CLI-type utilities is that I can't figure out how to rewrite SYS.DR from inside ICOBOL. If anyone out there can help, please get in touch with me.

Next month, I plan to review DISCOS—a multiground RDOS. Yes, there really are people out there writing programs for RDOS! Δ

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Minimally unique switches/Part = 1

How to design interactive programs for maximum flexibility

by John A. Grant
Contributing Editor

This is the first in a series of three articles based on a presentation by the author at NADGUG's 1985 annual conference, titled "Designing and writing interactive programs using AOS CLI switches and arguments." This month Grant discusses various approaches to designing an interactive program. Part 2 will focus on program design to make the most effective use of CLI switches and arguments. Part 3 will demonstrate how to implement (in code) a method for handling program switches to allow minimal uniqueness and trap invalid switches with appropriate error messages.

As is often the case, whenever you want your system to do something clever or complex, you must abandon the CLI and its macro capabilities, and write a program. Although the CLI is an excellent interface to AOS{/VS}, it is not as complete a programming language as are the Unix shells.

Both AOS{/VS} and the CLI have features to allow macros and programs to access arguments and switches. The CLI uses the %n/% entities and AOS{/VS} provides the ?GTMES system call to access the arguments and the switches on each argument. Both methods have one thing in common: they do not provide facilities for recognizing minimally unique switches or unrecognized switches. CLI macros can be made to recognize minimally unique switches and to trap invalid switches—but not without a lot of awkward code.

SWITCHES/1/A/What is an Interactive Program?

Good interactive programs are, above all, robust. They must be able to reject invalid entries without terminating. The program should inform users of errors or invalid input immediately so they can correct the problem before continuing. To let the user know *how* to correct the problem, the error messages should be in plain English, with proper reference to the context in which the error occurred.

Too often, programs are written for one particular level of expertise, without considering other users. Ideally, the programs should be designed to be easy to use for the novice, but not frustrating to use for the expert.

The program should provide some sort of confirmation of keyboard entries. Otherwise, users will never be sure if they have selected the option correctly. An interactive program may have many options, and almost every noncritical option should have a default value. This way the program can be run in a default mode by inexperienced users, with minimal interaction. The program should *not* require users to refer frequently to a manual that describes the options. The default mode should be the most common mode of operation. This approach does not necessarily require that the program be simple; it can still have numerous options and features that can be selected for special applications.

Finally, the interactive program must make users feel they are in control of the situation.

Many end-users still write application programs and utilities that are designed to run in a noninteractive mode. Their programs read specifications and/or data from an input file that is "attached" to the program via the DATAFILE command. While such programs may be invoked either from a console or QBATCHed, they are still noninteractive, and hence essentially "batch" programs. Generally the input files contain only data that is read in a particular sequence. This is simply the modern equivalent of a deck of cards. (Remember cards?)

With programs like this, it is difficult to devise a scheme to select program options without resorting to a pre-defined sequence of "cards" with special keywords. The same number of cards will always be required, whether or not any special options are to be selected. Users who create these input files and run the programs may have little confidence in the outcome.

At first glance, the NAMELIST feature found in some versions of Fortran may appear to be a good solution. However, it is my firm belief that users should never be faced with any mention of variable names. (That type of intimacy should only exist between a program and its creator.) While "batch" programs must always be run from a "canned" input file, interactive programs have the benefits of both worlds. They can be run either interactively at a console, or in an unattended mode with PROCESS/INPUT=<filename>, where "filename" is an input file that contains commands normally entered from the keyboard.

SWITCHES/1/B/Structure of Interactive Programs

Most interactive programs have two distinct phases: option selection and data processing. The interactive part of the program is usually at the start of the program. It involves option selection and/or data input. This is followed by a period of noninteractive data processing that concludes with termination of the program or return to the start for the next set of data. The processing stage may be punctuated by brief interactions with the user following the display of intermediate processing results.

Programs such as word processors and editors follow a different flow, because data input (text) can be intermingled with option selection and commands in random order. These types of programs are necessarily more complex than most. In the following discussion, I want to focus on the option selection phase of application programs, since that is the stage for which switches are particularly suitable.

Several models can be used to describe interactive programs; shell, menu, function keys, and screens are some of the most common.

Shell. A shell command interpreter (like the CLI) is good for experienced users, because they only need to enter the commands required for a particular application, while

Programmers can implement help files quite easily in a shell, by having a special command like HELP that accesses help files directly

ignoring (but having full knowledge of) the other commands and options. The programmer can implement help files quite easily in a shell, by having a special command like HELP that accesses help files directly. This is often much easier to program than context-sensitive help functions (e.g., function keys or HELP in response to a query) that have to keep track of the current state or location of the program. However, a shell program requires that the programmer have some knowledge of parsing and lexical analysis techniques. In addition, novice users may have difficulty using such a program because they don't know where to start, and sometimes can't distinguish between optional and mandatory commands.

Screens. Programs with screens are very easy to use and relatively easy to write using modern screen generator utilities. These types of programs are well suited to commercial applications such as order entry and personnel files. A blank annotated form is presented to the user, and all he has to do is fill in the blanks and go. All options are up front, and the user does not have to worry about forgetting something. Some fields can be pre-filled with default options, to minimize keyboard entry for standard applications. The fields can also show the user what type of data is required. Unfortunately, the use of such programs may be restricted to one particular type or brand of terminal, because the program uses special screen handling characteristics. Such a program can't be used on a hardcopy terminal. If the program is used at low baud rates, the screen ''painting'' may make the program too tedious to use. The availability of an appropriate screen generator for a particular language may also restrict this technique.

Sequential question and answer. The simplest and most common type of interactive program often consists of a sequence of questions and/or menus. These types of programs can be very unforgiving, because there is often no way to back up to the previous question or menu if a wrong selection or entry is made (this can be extremely frustrating, especially if the error was made after having

Programs with screens are very easy to use and relatively easy to write using modern screen generator utilities

successfully answered a dozen questions or so). On the other hand, the programmer can use this style of program to force the user to enter information in a particular and required order. This type of program may appeal to novice users, but experienced users will quickly find it quite tedious.

Hierarchical menus. A variation on the sequential question and answer model uses several menus arranged in a hierarchical fashion. The first menu should have one selection to show the current options and another that starts the program. Each of the other menu selections allows users to explore a different set of program options, knowing they will return to the main menu so they can head off in another direction. The common point of reference is important—if there are many menus, it is often difficult to know where you are located in the hierarchy. Each menu should also have an option to return to the previous menu or question.

Such a program can be easy to use, because only one menu selection (to start the program) might be required if the default options are satisfactory. The users need only select those options that are of interest, leaving the others at their default values. However, in these types of programs it is often difficult to allow users to go directly to one particular menu: they may have to follow several branches of a tree or "unwind" several levels back to the main menu.

Function keys. Generally, programs that support function keys use them as an adjunct

(continued on page 45)

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Circle 2 on reader service card

Once you set up a layout with all of the characteristics you want, you can use it over and over—you only need to set up the characteristics once

Fine print

Whatever you call it, CEO's print layout is a useful tool

by Charlene Kirian
Contributing Editor

"Print layout" sounds like something you'd spread out on the table in front of you to see if things are where you want them. Actually, that's not a bad functional description for the print layout menu in CEO.

"Page layout" might have been a more descriptive term, but Data General's CEO developers named it a print layout—so that's what it is. Whatever you call it, it's a way of telling the system how you want the document to look when printed. It's worth learning about because once you set up a layout with all of the characteristics you want, you can use it over and over—you only need to set up the characteristics once. You can pass the same set of characteristics to any document you choose just by inserting the pre-defined layout in your print specifications. If you want the same set of characteristics to be present in most of the documents you will print, you can even insert the print layout in your personal profile.

First, let's look at how the print layout works. Figure 1 shows the characteristics that can be controlled with the print layout menu.

If headers and footers are to be included, they will appear at the top and bottom of the page. They can also set the top and bottom margins. The right and left margins will be determined from the format ruler in the document. However, depending on where your paper is positioned in your printer, the margins can be altered at print time to correspond with letterhead stationery or memorandum paper. You can also choose whether or not to justify the right margin. If you prefer numbering each line, you can do so either in the print layout or at print time.

To define a print layout, starting from the main menu, choose (7) Utilities, then (1) Other printing activities. Next, choose option (2) Print layouts. Your screen will display the print layouts menu. To create a print layout, choose (4) Create.

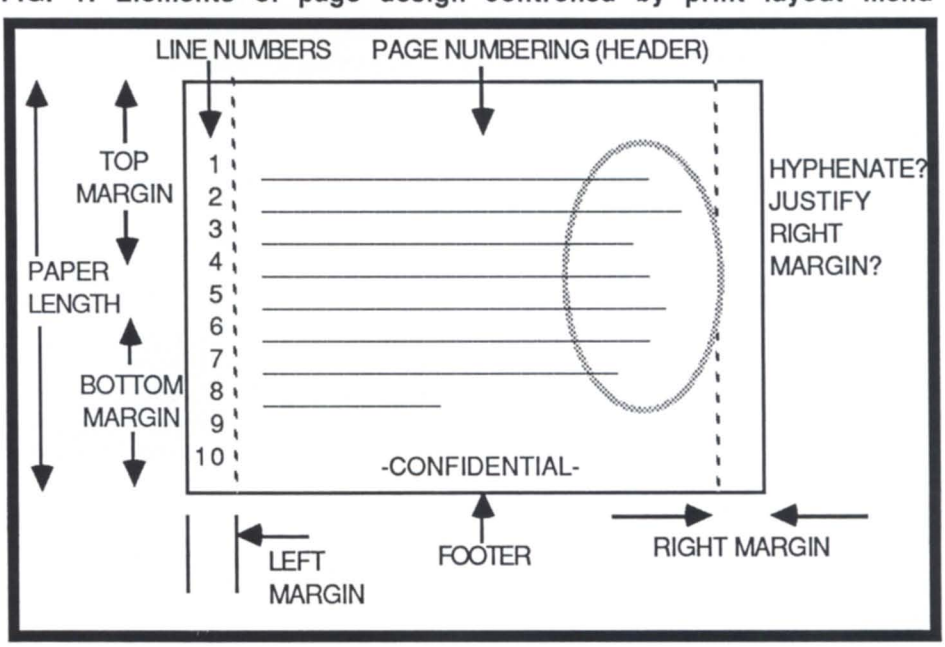
The first step in creating the print layout is to give it a name. It's best to give it a name that has significance for how it will be used. For example, if it is going to be a layout you will use with memos, you could call it "MEMO." Give a brief description of what its settings will be—perhaps the pitch and margins. Insert your default printer and the necessary printer information, such as tray designations, etc. The offset margin should correspond to the placement of the trays on your printer. Then specify whether or not to justify the right margin, to create headers and footers, or to include footnotes.

If you choose to use line numbers, remember that your format ruler in the document must be set to at least "6" for the left margin to accommodate the numbers. If an index was created, you can specify at this time that it should be printed. It could be useful to print the notes that were inserted during an editing session so they could be used for proofreading. This option also can be specified in the print layout. If you choose interactive hyphenation for the document, the print layout will hold this characteristic as well.

When you execute the new print layout, it will remain on the system until it is changed or deleted. It can be inserted in your personal profile for continuous use or inserted in the print specifications menu at print time. Either way, it will set all of the characteristics in the layout as a group. Any of the information in your layout that appears on the print specifications screen can be changed for that printing. It will not change the original print layout, but will modify the characteristics for printing.

There is one "gotcha" to all this. If you borrow someone else's layout to put in your personal profile, and then modify the printer information it contains, it changes the original layout—even if you make the changes

FIG. 1: Elements of page design controlled by print layout menu



If you borrow someone else's layout and then modify its printer information, it changes the original layout—even if you make the changes within your personal profile

within your personal profile! I would have thought the system would make a copy of the original, and then allow you to modify it to your own specifications. You won't find out about this until the original owner uses it, only to discover it doesn't have the information he or she created in the first place.

Data General could remedy this problem by having CEO produce a copy of the original when it is brought into a different user's profile. That way any changes made by the borrower won't be reflected in the original layout.

I use a print layout for just about any document that repeats the same format from one time to the next. For example, when I print this article I'll use a print format that has the headers and footers already set up. At print time, all I need to do is insert the layout into my print specifications and change the date within the header. It saves me the time it would have taken to recreate all the necessary information.

With your help (Software Trouble Report time, folks!) maybe Data General will correct the problem I mentioned above. That would make it an even better tool, because we'd be able to share print layouts instead of having all users create their own. Δ

Charlene A. Kirian is OA training specialist for the Online Computer Library Center, Inc., 6565 Frantz Road, Dublin, OH 43017; 614/764-6435. She also serves as president of NADGUG's OASIS Office Automation Special Interest Subcommittee.

There are many instances when hard errors occur with the mini-cartridges, perhaps because the limits of the media are being stretched

Revisiting the MV/2000

Did Data General do too good a job of designing the user interface?

by Tim Maness
Contributing Editor

As I sit trying to think of something relevant to write about this month, it occurs to me that this is the thirteenth issue of *Focus* in its magazine format. It's hard to believe a whole year has passed since I started writing these columns. It's been an interesting challenge—a rare form of torture might be more like it!

Actually, I've found it very rewarding, because it's given me the chance to talk to readers and get letters from all kinds of interesting places. There have been a disproportionate number of letters from countries like Jordan, Israel, Venezuela, South Africa, Australia, France, Sweden, England—all sorts of places I'd like to visit.

Although I've been writing mainly about things that intrigue me or problems I've been having, I like to think other people have the same questions and problems. It would be nice to get more ideas from other MV system users. The hardest part of this process is deciding what to write about—the writing usually follows easily. The next time you say to yourself, "What is this stuff? I wish these guys would write about something I could really use!" just pick up the phone and tell me!

Rumors

I saw a note in the June 23 issue of *Computer Systems News* to the effect that Data General is working on a mid-range system that uses the same technology used in the MV/20000. According to the article, this machine will replace the MV/8000 II and the MV/10000. You'd think they would name it the MV/12000, but the article called it an MV/7000. Maybe the marketing guys aren't done yet. Anyway, it could be an interesting new machine—especially if it was priced like an MV/4000.

I also heard a rumor about an MV/4000-type board that will replace the CPU board of an S/140 to turn the older model into an MV type of machine.

(Editor's Note: the two rumors appear to have the same source—the MV/7800, which was announced a week after Maness submitted this column, and two days before the September issue went to the printer. See page 46 for highlights of the announcement.)

MV/2000 revisited

Backing up the MV/2000 using the mini-cartridges is still an interesting challenge. The problems that were causing the system to hang when using the tape drive seem to have been fixed with the new revision of the microcode (rev 2.0). But there are still problems that make it difficult to get completely through a backup. There are many instances when hard errors occur, perhaps because the limits of the media are being stretched. We never get hard errors using the 12.5 MB cartridges for our MV/4000. The MV/2000 cartridges hold 22 MB and are specially formatted to use 12 rather than 9 tracks. I don't know what the density is, but suspect it's a lot more than the 6400 bpi of the 12.5 MB cartridges.

The other problem I've noticed is that there are instances where data is not getting written. Because there is no read head after the write head, there really isn't any way to know if the backup was successful, except to read the tape after the dump. I don't usually do this, but do frequent backups instead. My theory is that if you have a lot of backups, missing a little here and there is usually not a really serious problem—but it *can* get you!

Other than the backup problems, I still think the MV/2000 is a fine machine for the money. The only other problem I've discovered has to do with users, not with hardware. We installed an MV/2000 at a site where a data base system and a statistical package were going to be used for data entry and analysis. They also wanted to do word processing, and bought a nice laser printer and enough terminals to support their staff of eight people. Our initial reaction to the System Managers Interface was that it was a really good way to allow an inexperienced operator to manage a system. The operator at the user site is a highly motivated individual, but without any type of computer experience at all.

We installed the hardware in about 2 hours. It was a very painless operation. With an additional couple of hours spent defining users, setting up macros for the printer, and installing the other software, the entire procedure took only half a day. We then spent three more full days training the new operator to reboot the system, do incremental and full backups of the system, define new users, manage the word processing files, etc. At the end of the week, we felt that it had been a remarkable week, that the user now had a very workable system ready to start doing "real" work.

All of the system that is normally hidden from the casual operator is now hanging out there where anyone can change it

Returning home smiling smugly, we felt our first MV/2000 installation was a great success—and wasn't the MV/2000 a fantastic machine! The next two weeks proved to be an incredible disappointment, and I'm still

puzzling out why. The new operator was constantly on the phone asking questions. The hardware seemed to have creeping problems—first the modem quit working, then the printer, then a word processing document was garbled, and so on. With the modem not working, it was very difficult for me to do much more than coach over the phone. Things went from bad to worse.

After getting someone to the site to straighten things out, it appears that most of the problems can be traced to the use of SMI by an inexperienced operator. I'm sure there are lots of formal studies done by instructional specialists that apply here, but my impression now is that SMI is perhaps too easy to use. All of the system that is normally hidden from the casual operator and buried in manuals where only the experienced will find it is now hanging out there where *anyone* can change it by answering YES on some menu. The interface has been made very easy, but "easy to use" is only a menu choice away from "easy to mess up."

Based on my unfortunate experience with lines being redefined as modem lines, the printer setup macros being overwritten by SMI when someone redefined the printer, and other equally disabling but unintended changes, I now believe that SMI is *not* useful for an inexperienced operator. It makes the inexperienced operator a danger to the system.

We have decided to disable SMI and make a set of macros to handle only the specific tasks that need to be done routinely. Without the temptation to cruise through the SMI menus, hopefully the system will survive intact longer.

Well, next month, back to the technical stuff. Δ

Tim Maness is president of DMS Systems, Inc., a software development firm specializing in data base management. He can be reached at 1111 Brickyard Rd., Salt Lake City, UT 84106; 801/484-3333.

If you write to a high address, AOS/VS will give you an element there, but it doesn't create all the elements to fill the space

When information is sparse

A technique that takes advantage of how AOS/VS allocates disk space

by George Henne
Contributing Editor

Last month, I wrote a little about the FILESTATUS command and how it tells you the largest address you've written to in a file (and not the actual size of the file). I also promised to get into a couple of interesting observations that come as a result.

AOS/VS allocates space to files in chunks of space as defined by the element size you specify. The chunks are only allocated as they are needed by WRITE statements to the file. The operating system maintains index blocks to tell it where the blocks are on the disk.

Things get interesting when you realize that if you write to a high address, AOS/VS will give you an element there, but it doesn't create all the elements to fill the space in between. For example, the BBASIC program:

```
10 OPEN FILE(0,5),"GHSPOOL"
20 WRITE FILE(0,10000000),"HI"
30 CLOSE
```

will add only one element to the file. Only one block will be used according to the SPACE command. However, the FILESTATUS command will claim the size of the file is 10000002 bytes long.

It's possible to take advantage of this situation in some applications that use "sparse files." A sparse file is a file with information scattered throughout it, but with lots of blank space in between. Usually, these files are accessed by some sort of hashing function: you use a formula to calculate the address where the information should be stored—but not all possible outcomes from the calculation will have a data item.

Since AOS/VS will only create elements when there is actual data to go in them, the areas of the file that don't have data won't take up disk space. The advantages are obvious, but you should pay careful attention to the element size to get the maximum effect.

As usual, however, the rules about free lunches won't be violated. For example, you could set up a product file quite simply: multiply your product number by the record length to get the address, and do away with your main index file entirely. What you are essentially doing is letting AOS/VS do the work of managing your index file, instead of leaving it to BBASIC. I haven't run benchmarks to compare performance, but I know AOS/VS does *not* do things for free.

Choosing the proper element size is critical to the effectiveness of a sparse file technique. If you make the elements too small, your access times will increase dramatically, especially if AOS/VS has to go to more than one level of index blocks.

On the other hand, if you make your elements too large, the effectiveness of the whole methodology is compromised. Since each element will use up a lot of space, your total savings in storage may not be significant. Refer to the appropriate AOS/VS manuals to get a better idea of what the constraints may be.

Another consideration: while AOS/VS is very handy at adding space to the file when you need it, there's no way to just give it back when you're through with it. You have to rebuild the file.

It also can be tough to budget properly the amount of space the file really needs. I know of a retailer who set up his main inventory file using a sparse file. He had many products and many stores, but not all products were carried in all stores. He set up a huge file as a sort of matrix. Access to the records was handled by a simple formula: the store number, multiplied by a relative number of the product, multiplied by the record length.

The retailer allocated the file by writing out the record for the highest store and relative product number. FILESTATUS reported a satisfactorily big file, and his SPACE command assured him he still had lots of disk space left.

Things ran fine for a while. As different products were shipped into the stores, new records were created and new elements assigned to the file. Of course, some products were no longer carried in other stores, but the space assigned to them was never given up. One day, his disk drive just ran out of space.

One of the most useful applications of sparse files is in the management of BBASIC logical files. By putting several logical files into a single physical file, you can get around the BBASIC limit on the number of channels you can have open in a program.

A constant problem with this approach has been how to expand files. To expand a logical file at the beginning of a physical file that holds several logical files, you must move all of the files to new addresses to create space after the first file so it will have room to grow.

These rebuilds can be time-consuming and complex. It's also a procedure to be avoided if at all possible when your user is at the other end of a phone a few thousand miles away.

Under AOS/VS, the solution is simple: just make the physical file so big it will never get full. Leave lots of space between the logical files. It doesn't matter, because if you never write anything out to this in-between space, AOS/VS will never allocate any storage to it. If a file needs to be expanded, just change the limits in its header to grab more of the void between it and the next file.

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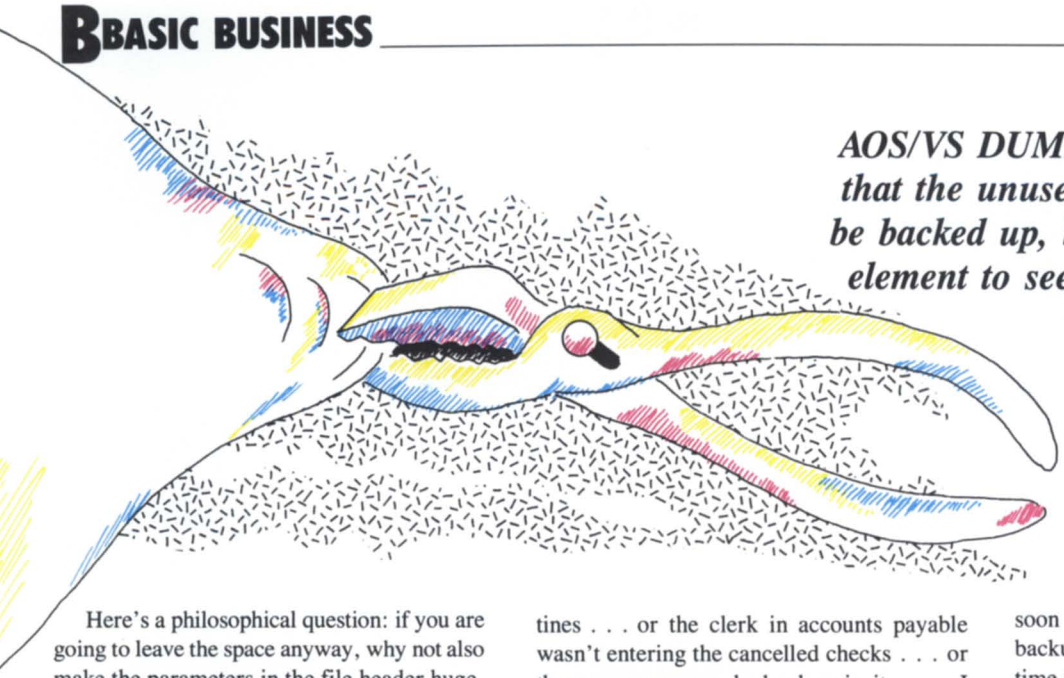

AOS/VS DUMP and DUMP II realize that the unused space doesn't have to be backed up, but they still check each element to see if there is anything to back up

Here's a philosophical question: if you are going to leave the space anyway, why not also make the parameters in the file header huge, so they never have to be changed again and the files will never get full? Well, files get full for several reasons. Sometimes it's because there is more information that needs to be kept, but I've also seen it happen because users weren't running the purge routines . . . or the clerk in accounts payable wasn't entering the cancelled checks . . . or the purge program had a bug in it . . . . I think it's wise to put a reasonable limit on the size of a file, and then ask a couple of questions when that limit gets exceeded.

Back to the use of sparse logical files. The people who started using them heavily soon discovered another problem. Their backups were taking forever, and a lot of the time the tape drive wasn't moving. It seems AOS/VS DUMP and DUMP II are smart enough to realize that all that unused space in the files doesn't have to be backed up. On the other hand, they still have to check, element by element, whether there is anything to back up.

We've heard stories of it taking up to 6 hours to back up a single file. The best solution for this problem is to do the backup in two parts: do all the normal files first, then mount another reel for the sparse files, start the backup, and go home. If all goes well, it will be completed by morning.

Apparently, there is some sort of system call which will return the next block that is actually used in a file, so an application wouldn't have to sift sequentially through each one. However, this call is not currently used by DG's backup utilities. I understand there is work being done on DUMP II to fix this and a few other problems, but I have no idea when we will get to see the results.

In summary, sparse files can be used to great advantage in certain applications. However, they also have several drawbacks that should be carefully considered (and probably benchmarked) before implementing.

The whole area of disk space management is an important one. If you have any interesting approaches or ideas, feel free to pass them on to me. I'll be happy to include them (with credit, if desired!) in a future column. Δ

As vice president of MICOM Computer Systems, George Henne has worked with many Business BASIC users during the past 7 years. Send questions or comments to him at 575 Madison Ave., Suite 1006, New York, NY 10022; 416/445-4823.

Fooling the system

Memories of RDOS, a previous AOS site, recovering files, and DIRS.CLI

by Jim Siegman
Contributing Editor

Although I usually stick to AOS{/VS}-related issues, the following RDOS tip was so elegant and illustrated so important a system management point that I wanted to share it with you. So I promptly called the author, David Glover of Creative Synergy Corporation, and obtained his permission to use the following excerpt from one of his bulletins. Here it is, along with some of my thoughts about how to prepare for the worst—and maybe even get some files off a disk that "can't be read." Thanks go to David Glover. (If you need more information, call him at 404/438-0033.)

■

Creating a Bootable Partition on a Single-Disk RDOS System

One of the nice things about a multi-disk system is that if something prevents you from booting your primary disk, you can usually boot from a secondary disk (that is, if you set your secondary disks up properly!). On a single-disk system you lose this advantage. Imagine running RDOS on a single-disk system and your CLI is accidently deleted. You will find out about the accident at a very bad time. That time is called "too late!"

Now, if you are running RDOS rev 7.40 or later *and* you have a starter tape, you can use the RESTORE feature. But there is an easier way. By using the CLI you can set up a partition with the necessary items needed to bring a system up.

```
CPART partition-name 800
INIT partition-name
MOVE/A/V partition-name BOOTSYS.
  <SV,OL> CLI.<SV,OL,ER>
```

When you boot your system and the "Filename?" prompt appears, enter:

```
Filename? partition-name:BOOTSYS
```

This makes "partition-name" become your master directory. You can now DIR to DZ0, MOVE things to DZ0, Release DZ0, and so forth. Let your imagination take over from here.

■

Glover's tip not only demonstrates the utility of "fooling" a system into booting a "disk" other than the only drive attached to your RDOS system—it can be applied to the AOS{/VS} world as well.

At one of my previous sites we had a C/350 running AOS with two 190 MB disk drives, DPF0 and DPF10. We had DPF0 set up with the AOS operating system and DPF10 set up with all of our INFOS files. We used PCOPY to back up the INFOS pack every day and the system pack once a week. We not only made a bootable PCOPY tape, but we also installed the PCOPY program as the default system on the data pack.

This had two advantages. First, if we accidentally booted from the wrong disk pack, we would know it immediately, since PCOPY would come up instead of AOS. Second, it allowed us to boot PCOPY from DPF10 and answer the questions while we were removing the system pack from DPF0 and spinning up the scratch pack for backup.

Our advantage was even greater, because we had two controllers, and could therefore PRLOAD from the second controller by flipping one additional switch on the C/350's front panel. The only restriction to doing this from unit 1, 2, or 3 of the controller was that we had to be sure to PRLOAD sysboot from unit 0 before spinning it down. (For those of you who haven't been around DG systems long enough, PRLOAD is the equivalent of typing "B" at the SCP-CLI prompt—the unit number was read from switch settings on the machine's front panel. These new MV machines with only two or three lights on the front r :el don't look like "real" computers!)

Tricks like this are even more important now that fixed disk technology has become so widespread. I recall more than one instance when a system manager with a two- or three-drive MV system complained that he lost his whole system drive and a complete day's work just because the system or its directories got corrupted. Had he formatted his secondary drives with "Y" to the system disk prompt, he could have loaded the starter system (or his generated system!) onto the second drive, booted it, INITed the drive that was corrupted, and gotten to its files—all in just a couple short hours, and possibly with no data loss. I know it works, because I've done it many times.

That's one reason why many system experts recommend that you format all disks on all drives as system disks, whether or not you intend to use them that way. It not only makes your formats more uniform, but it also gives you one more recovery option in case of trouble. All at the cost of a handful of disk blocks. (I don't know the exact number, but on disk drives with 100 MB or more, it just isn't all that much.)

■

Last month, Tim Boyer's column *(Inside ICOBOL, page 57)* itemized what it could cost you *not* to join the users group. I can add a footnote on the subject because during my first year of membership, the company I worked for saved at least $13,500. Data General had quoted a ballpark figure of $20,000 to upgrade our S/130 hardware to C/150 hardware suitable for AOS. Through the users group I learned we could have it done by an OEM for $6,500. This saved the difference in the short run, and in the long run we saved several times that amount. Unfortunately, management did not fully appreciate all of the time, effort, and money the users group saved us. I guess it's the same old story . . . .

■

I'd like to close this month with a short macro that has come in handy lately. It is called DIRS.CLI, and simply shows the directory structure of the system. It accepts two

DIRS.CLI shows the directory structure of the system; its two optional arguments allow you to show a different directory and specify a template

optional arguments. If neither is supplied, it shows the directories in the current working directory. Argument 1 allows you to show a different directory, and argument 2 allows you to specify a template other than the default +.

Assuming you are in :udd:yourname, any of the following commands would be legal:
DIRS (shows sub-directories in your directory)
DIRS : (shows sub-directories in the root)
DIRS : u+ (shows sub-directories in root starting with letter "U")
DIRS ^ (shows all user data directories)
DIRS,,m+ (shows subdirectories starting with m+)
DIRS : # (shows all directories on the system)
DIRS :U+ # (shows all directories under :util, :udd, :upd, etc.)

The macro reads as follows:

```
push ; prompt pop
string +
string/l=@null %2%
[!nequal,%1%,]
   [!equal,[!path %1%],:]
   string :[!string]
   [!else]
   string %1%:[!string]
   [!end]
[!end]
f/s/as/type=dir/type=cpd/type=ldu%0/% [!string]
pop
```

Δ

Jim Siegman is chairman of the NADGUG publications committee, and treasurer of the Chicago Area Data General Users Group. Send comments or questions to him c/o Focus Magazine, 5332 Thunder Creek Road, suite 105, Austin, TX 78759-4022.

Implementing function keys in a program can be a burden, because all READ statements in the program must be able to handle function key input

(from page 34)

to the shell model, where function keys are used as a time-saving alternative to a command string. They may also be used to select a feature or option of the program that is not related to the current prompt (e.g., "refresh screen" or "start CLI"), or that is related to the current context (like "help"). While function keys are easily implemented (sometimes) in assembly language, they have varying levels of support in high-level language I/O procedures (Fortran 5 has none; Fortran 77 can handle them, but not particularly well).

Implementing function keys in a program can be a burden, because all READ statements in the program must be able to detect and handle function key input, regardless of whether the expected input is numeric or character. If an interactive program is written to handle keyboard interrupts while processing data, then function keys can be particularly useful to change program options such as display mode. As with screens, designing a program to use function keys often restricts the program to a particular brand or model of terminal.

Hybrid models that combine several of these techniques are also very effective. In fact, many programs such as word processors use all of these techniques. There are also graphics methods for selecting options (mice, icons, pop-up windows, etc.) that are generally only available on workstations or personal computers.

I won't attempt to evaluate the relative merits of any of these models; the suitability of each model must be evaluated in the context of the requirements of the program and the user. However, all of the above models have one thing in common: they require a keyboard input, and hence are interactive. In addition, while the programs have default options, they are often those that have been selected by the programmer, not the user. In /PART=2, I will discuss the design of programs using an alternative method to set program options: CLI arguments and switches.Δ

Geological Survey of Canada Contribution 27686. John A. Grant is a geophysicist with the Geological Survey of Canada. He is also the "system manager, chief cook, and bottle washer" for the Exploration Geophysics Subdivision's MV/4000. He may be contacted at 601 Booth St, Room 591, Ottawa, Ontario, K1A 0E8; 613/996-2325.

MV upgrade for select Novas and 16-bit Eclipses

Introduced at the end of July, Data General's new MV/7800 processor could be just the ticket for a sizeable chunk of DG's installed base of 16-bit processors.

The MV/7800 is a single-board implementation of the MV/ family architecture. It puts four proprietary VLSI (very large scale integration) chips and two custom gate arrays on a 15-inch square circuit board, with enough room left over for 2 to 4 MB of memory. With performance rated at 1 MIPS (roughly equivalent to the MV/8000), the MV/7800 is available for as little as $10,000.

The new machine comes in three packages:

• The MV/7800-U is a board-level upgrade that can replace the CPUs in the following systems: Nova 4 (model X, S, or C), Eclipse S/120, Eclipse S/140, Eclipse S/280, any CS system based on the preceding CPUs, and MV/4000. Pricing starts as low as $10,000, depending on the system to be upgraded. In many cases communications boards and disk drives would need upgrades as well.

• The MV/7800-C is a 16-slot rack-mounted version that sells for $19,050 with 2 MB of memory.

• The MV/7800 comes in a meter-high cabinet with power supply and AOS/VS license. A system with 4 MB of memory is priced at $27,550.

The MV/7800's single board does as much work as the 16 boards it took to implement the CPU and 2 MB of memory on the MV/8000. According to a Data General spokesman, this compactness makes for better reliability, lower power consumption—and better profit margins for DG. Improved reliability lets the company reduce the price of maintenance contracts to about half of what it costs to keep an MV/4000 under maintenance, the spokesman said.

Data General also introduced a new software product, DG/DBUS, that will allow applications to be ported from Datapoint's Databus to Data General systems running AOS/VS with few code changes. The spokesman said three companies that had been beta testing DG/DBUS have placed first-day orders for DG/DBUS. All of them reported substantial improvements in performance when they ran their applications on Data General machines.

DG is also raising the prices of older hardware by an average of 6 percent. Products announced after February 1985 will not see price increases, and outstanding price quotes on the older machines will be honored. Software prices will increase by an average of 10 percent.

■ ■ ■

News of these products arrived too late for Focus to provide a full report. A more detailed account will appear in next month's issue. Δ

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Oracle gets enhancements, new tools, SQL extensions

Belmont, CA—Oracle Corporation has announced Version 5 of its Oracle relational DBMS, six new fourth-generation language (4GL) and decision-support software (DSS) tools for application developers and end-users, and extensions to the SQL language.

The new version of Oracle boosts performance for typical jobs by 100 percent and provides further extensions to Oracle's IBM/DB2-compatible SQL language, according to the vendor.

The new software tools include:

- SQL*Forms, a 4GL application generator and runtime system, featuring screen painting and other facilities for developing and prototyping portable applications
- SQL*Plus, a 4GL interactive command utility for ad hoc data access and report writing
- SQL*Menu, a tool for creating portable, easily customized, secure menu trees to provide end-users with a simple operating environment for all of their applications
- SQL*Graph, a business color graphics decision-support system for displaying data retrieved with SQL in bar, pie, and line charts
- Easy*Link, an enhanced, full-screen, point-and-select interface to Oracle's micro-mainframe intelligent link product
- Pro*Ada, a programmatic interface to Oracle from the Ada language.

The company also released a statement of direction on a three-tiered set of interface standards for its development and end-user software tools:

- Easy*, a point-and-select, full-screen interface for novices and infrequent users
- SQL*, a command-line interface providing the full power of SQL to experienced end-users and developers
- Pro*, a programmatic interface allowing all Oracle facilities to be used from high-level programming languages, such as COBOL.

Oracle also recently announced further enhancements to SQL. The performance improvements cited by Oracle are due to a number of major enhancements.

All of the new and enhanced products are in full production release for the DEC VAX/VMS environment, and will be available within 30 days on IBM mainframes running VM/CMS and VMS/SP or XA. The company also specified 30- to 90-day availability for the rest of the products for DG superminis under AOS/VS, IBM PCs running PC/DOS, and a wide range of Unix systems.

Oracle Corporation, 20 Davis Drive, Belmont, CA 94002; 800/345-DBMS. Δ

Eagle offers INFOS file reconstruction, new utilities

Salina, KS—Eagle Software, Inc., has announced a new service for INFOS users who are unable to successfully IVERIFY a file.

Many times after an INFOS or system crash, IVERIFY finds structural problems in an INFOS index or data base, and will not accept the file. When recovering from backups is not an acceptable solution, it may be possible to minimize data loss and application down time by reconstructing a portion of the file so that IVERIFY will accept it.

According to the company, in most cases this procedure can be performed by the Eagle service immediately, using dial-up modems, and the file can be available for use only hours after initial contact. More disastrous cases may require a copy of the file to be sent to Eagle for more extensive analysis, or a period of on-site consulting.

Eagle has also introduced three new utilities for the VS Toolbox, bringing the total of Toolbox utilities to 15.

- PARA_MEDIC allows data to be recovered from a corrupt INFOS data base.
- TAILOR allows the user to examine the file name distribution using different hash frame sizes, to see which size fits best in a directory.
- ENFORCER locks new users out of an INFOS file, and automatically starts a backup procedure after all current users have closed the file.

Companies that have already purchased the Toolbox will receive these three utilities at no additional charge.

Eagle Software, Inc., P.O. Box 16, Salina, KS 67402-0016; 913/823-7257. Δ

DG D410 emulation from Perfect Terminal

Fremont, CA—Perfect Terminal Inc., has expanded its offerings for the Data General terminal emulation market with the introduction of the P411, an emulation of DG's D410 and D411 terminals.

The company describes the P411, with its windowing capabilities and horizontal scrolling, as the only terminal in the DG market that fully emulates the D410 and D411. The P411, at $795, is priced $400 less than its DG counterparts.

The horizontal scrolling feature of the P411 gives users the opportunity to view 162-character lines on its 14-inch green or amber screen. This feature is useful in applications such as spreadsheets, where a wide display area is necessary. The P411 also offers a total of 38 programmable function keys.

The P411 joins the company's P210 terminal, an emulation of Data General's D210 and D211, which was introduced by PTI in late 1985. The P411, like the P210, includes DEC VT100, Wyse-50 and TeleVideo 925/910 emulators.

The P411 is ANSI X3.41/3.64 command compatible and offers an optional 20 mA current loop communications interface. It also features a small footprint, low-profile keyboard and tilt/swivel display.

The P411, which comes a one-year full warranty, was scheduled to be available for shipping in July.

Perfect Terminal, Inc., 3319 Seldon Court, Fremont, CA 94538; 415/656-8383 or toll-free (outside California) 1-800/624-6422, (in California) 800/472-2900. Δ

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AD INDEX

CLASSIFIED ADS

"The information was accurate, but . . . the slant was bizarre," said a nonplussed DG public relations rep about *The Wall Street Journal's* coverage of the MV/7800 announcement. The Journal's July 30 report spent most of a paragraph explaining the 6 percent price increase that DG levied on hardware introduced before February 1985. However, it said nothing at all about the hardware or software DG introduced at the same time. (News of the announcement reached *Focus* too late to include all the details, but the highlights appear on page 46. Stay tuned for a complete report next month.)

■

The same PR rep couldn't shed much light on why MV/7800 was chosen as the official name for DG's new single-board 32-bit processor. Some had liked "MV/5000" because it had the sound of an upgrade for the MV/4000, but others thought the number 5000 would imply lower performance than the board actually delivers—rated at 1 MIP, it's more equivalent to the MV/8000. "MV/7000" was also considered, but another company already owns the trademark on "7000." Is there any truth to the suggestion that MV/7800 might have been derived from the old DEC VAX 11/780 designation?

In any case, the code name for the MV/7800 was not "micro-Eagle," as many trade reporters had supposed. That would have made sense, because the new machine is a compact version of the original Eagle—the MV/8000. During development, the MV/7800's name was "Kite"—not the toy, but the bird. The avian kite is a smaller relative of the eagle.

■

As this issue was going to press, NADGUG's officers and staff were holding their breath and watching the registration figures for Conference 86. Last year's conference had the biggest attendance ever and nobody could say for sure whether Orlando in August could match the draw of Boston.

However, there were several encouraging signs. NADGUG VP Calvin Durden was glad he decided not to release part of the 550 room block of hotel rooms the user group contracted for last year. All 550 of the rooms were booked by the end of July, with about 70 more reservations at the overflow facility next door. The exhibit area will feature products and representatives from 35 companies this year. A full report on Conference 86 will appear in the October issue.

■

The newly formed Metropolitan New York RIG has scheduled its next quarterly meeting for Tuesday, September 16, from 9:30 am to noon. The location will be DG's midtown New York City offices: 757 Third Ave., Floor 3. Topic of the presentation will be auditing and the computer. Anyone planning to attend should contact Stephen Kern at 201/327-6300, ext. 368.

■

Data General is preparing an announcement to spotlight a milestone in the sales of MV/ family machines. The public relations department wouldn't say what the milestone was, except that it is about the *nth* machine to be shipped, where *n* is a big number. In the past 18 months DG has sold as many MV family machines as it did in the first four years after the original MV/8000 was introduced in 1980. Frank Keaney, DG's vice president for North American sales, said in July that the company already had orders for more than two thousand MV/2000s, and had shipped more than a thousand of them worldwide.

■

DG has joined with Digital Transmission Inc. in a cooperative marketing agreement that will let DTI integrate MV/ family computers with DTI's Model 585 digital switching systems. The DTI switches were originally developed by Rockwell International, and include both private branch exchanges (PBXs) and automatic call distributors (ACDs). DTI plans to package the physical data connection capability of its switches with the MV/ family's support for a wide variety of data communications interfaces and protocols. It will market the package as a solution for communications problems in industries such as health care, education, and financial services.

■

More than 270 people from the U.S. and Canada, Australia, France, Belgium, and Germany came to Baltimore in June for the eighth annual meeting of the Penta Users Group. Penta produces editorial and typesetting systems based on Data General equipment.

Newly elected officers for PUG include Jeff Barrie (University Graphics, New Jersey), president; Nancy Danke (The Board Room, Detroit), first vice president; Bob Elliott (Waverly Press, Baltimore), second vice president; Carl Lehmann (Photo Lettering, New York City), recording secretary; and David Steitz (Typeworks, Inc., Houston), treasurer. Calvin Cox (Maryland Composition, Glen Burnie, MD) was elected for the eighth time as managing director and secretary.

■

Lynn Lively, of Gulf Coast Systems in Houston, says he is thinking about developing a public domain bulletin board system to run under AOS. If interested, contact him c/o the Houston Area Data General Users Group bulletin board, 713/681-9629 after business hours and on weekends. The HADGUG board currently is hosted on an IBM PC.

■

Cognos Corporation will open its 34th sales office in early September. With 30 percent of its sales coming from Europe, and 12 percent of European sales coming from Belgium, The Netherlands, and Luxembourg, Cognos will open the new office in Utrecht. Cognos officials expect the new office to generate $1 million in sales of the company's Powerhouse 4GL in its first year.

The June issue of *Software News* put Cognos in 22nd place on its list of top independent software vendors. The company reported revenue gains of 51 percent in 1985.

■

Jacobson & Associates, Inc. sends news that the following companies have joined its list of manufacturing and financial information software clients: Centaure Vision Corp. (Irvine, CA), Data Exchange Corp. (Camarillo, CA), Kennedy Technology (San Diego), P. Larochelle Equipment Co. (Quebec), National Can Corp. (Elk Grove Village, IL), L.S. Starrett Co. (Athol, MS), Transaction Technology, Inc. (Marina del Rey, CA), and E.H. Wachs Co. (Wheeling, IL).

■

Computer Associates International, Inc. announced record results for the quarter ended June 30. Revenues increased 60 percent to more than $50 million. Net income was up 69 percent, to $2,360,000.

■

Robert A. David was promoted to sales and marketing manager for Kimtron Corp. Previously in charge of marketing the firm's network, workstation, and DG-compatible CRTs, David's new responsibilities include expanding the sales department.

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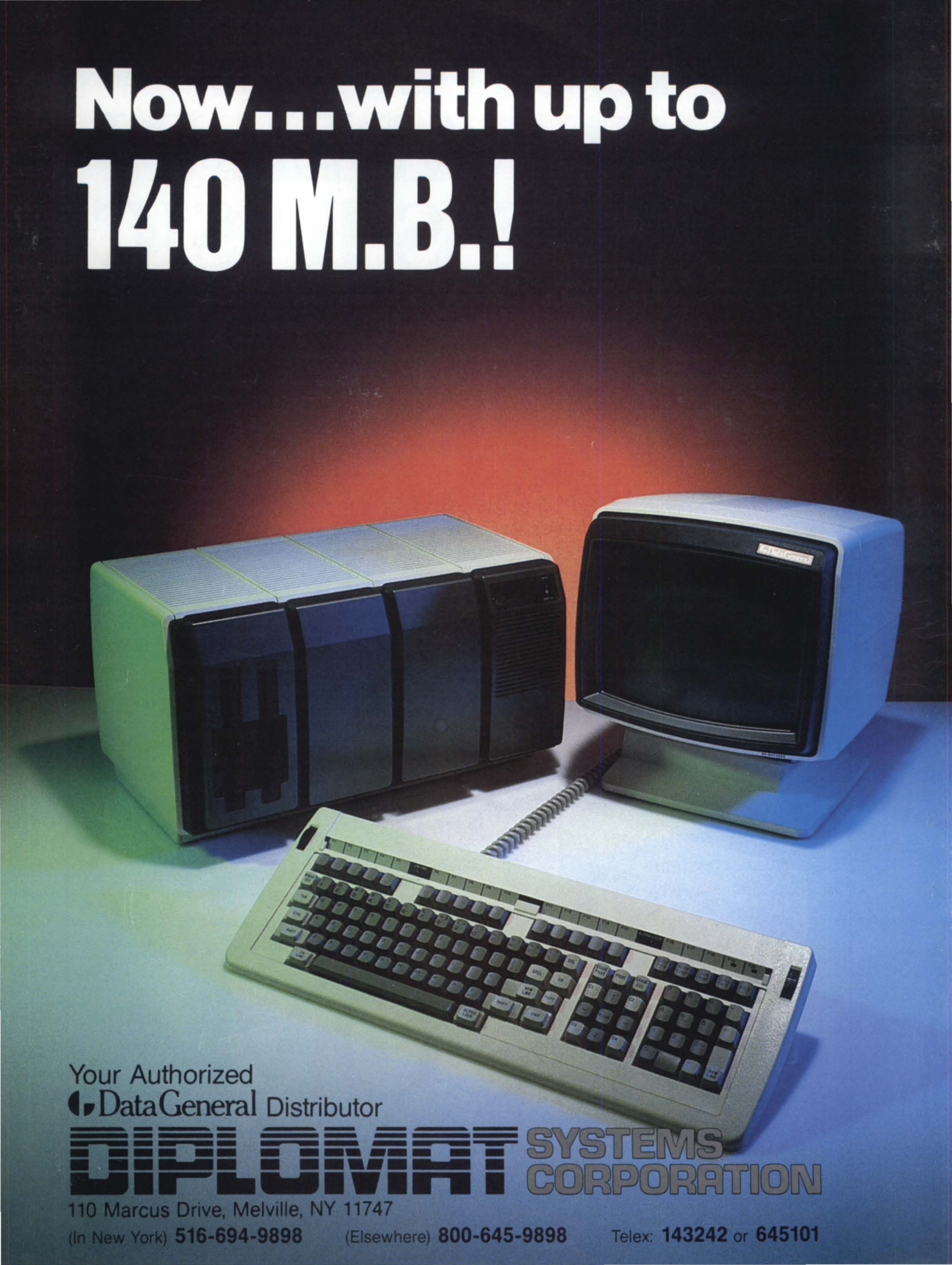

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