


July 1989

FOCUS

The Magazine of the North American Data General Users Group



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HEAD:
can DG win?**

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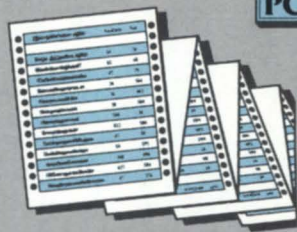
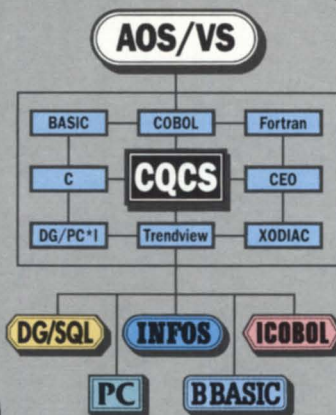
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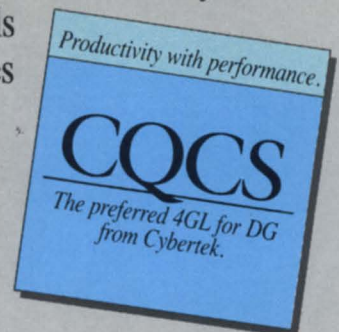
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The age of abuse

North America's rampant problems with alcohol and drugs have come so close to the center of attention that they are now a metaphor for almost every social ill. For example, clinicians now describe a whole range of "aholic" personalities—workaholics, stressaholics, and so on. In more innocent times, these people would have been viewed as compulsive or neurotic, rather than as victims of an addiction. Since journalists like to think of themselves as "fast sociologists," they have led the way in popularizing this new terminology.

Not to be outdone, I'd like to propose a new type of addiction, one that has largely gone unnoticed because its primary victims are companies, not individuals. I'm talking about earnings abuse.

Earnings abuse, often called unprofitability, starts innocently enough. Lots of companies lose money occasionally with no apparent ill effect. In fact, these "social losers" often make good use of a temporary lapse into unprofitability. It may be part of a planned expansion into new markets, or perhaps a warning signal for management to tighten up on expenses.

However, some companies cross the line and become chronic losers. They can't stop at just one or two unprofitable quarters. Their losses become a pattern that seems to dominate everything else. Without intervention, they may descend in a spiral of ever greater earnings abuse, eventually ruining their health and destroying the dreams of their loved ones.

There are no twelve-step programs for earnings abusers. If a company has become a chronic loser, it will have to look within to find the strength to turn itself around. Codependents in these relationships are relatively rare. Most investors, customers, and vendors recognize the danger signs early; they distance themselves quickly and leave the earnings abuser to sink or swim.

The prognosis depends entirely on the abuser's willingness to face its problems and change its lifestyle accordingly. Companies that admit to their addiction have a good chance of turning themselves around. However, unless they are pre-

pared to make radical and potentially painful changes, the disease is invariably terminal.

All this came to mind as the *Focus* staff began planning our coverage for this month's theme: DG versus the competition. It's a topic we approached with more than the usual trepidation. DG has not fared well for the past three years, and some observers had begun assuming the worst. There are a variety of theories that could explain why DG has had trouble staying profitable, but the theories only beg the real question: is this a temporary problem, or a case of chronic unprofitability?

Frankly, if it was going to be bad news, most of us would just as soon not know. As DG users, all of us have a big investment in our computer systems. We would get justifiably nervous if the evidence pointed to a chronic problem. However, it's too important an issue to ignore.

Our coverage this month looks at the question from many angles. Does DG still deserve its reputation for engineering excellence? For price/performance? How will the new RISC products fare in the emerging Unix market? What do the experts say about DG's strategy of offering continued support for MV customers while migrating toward Unix products? What are the prospects for success?

I would urge all DG users to look at the evidence and draw their own conclusions. Speaking only for myself, I have to say I think there were indeed some signs of a chronic problem three years ago. Recognizing that its expansion plans had been overly grandiose, that was when the company began a series of painful consolidations and cutbacks to get costs into line with reasonable revenue projections. About the same time DG announced its RISC strategy, it became apparent that the company was also going to clean up the channel conflicts that had afflicted the VAR program.

Painful as they were, these changes were necessary. Again, speaking only for myself, I believe they are beginning to work. Δ

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Guilty microcode?

Hello! I am a busy computer professional who has stored up some experiences on DG's computers. Now I'd like to communicate with DG's world in the United States; thus, send me *Focus* sometimes.

Don't fail this letter. DG in Italy is still not much known and there is a lot to do, and a lot for you to say to those like me. [In closing,] I give you an inspiration for the next column! The title is: a lot of problems on MV/1400—MV/8000.

First: When [there is] at least a connection with a slow device (300 to 1,200 baud) the other lines also are running slowly (this has happened on many machines).

Second: When the disk (160 MB) becomes full (rem. 50,000 blocks) the backup operations are very, very long (3 MB every 30 minutes with the command DUMP_II/BUFF=16384). Is the microcode guilty? That's all.

Carrero Giovanni
Informatica Veneta S.P.A.
Verona, Italy

Brian Johnson, our Italian affairs consultant, advises that both of the problems you cited probably have simple solutions. The culprit in the first case is most likely the software you are using to make the connection, rather than the connection itself. For example, if you are using DG/Gate or an old version of Blast for terminal emulation or file transfers, the software could be soaking up the majority of your machine's available CPU cycles. The result would be slower response for anybody else trying to do anything for the duration of the connection. The solution is to use better-behaved software—take a look at some of the options that Tim Boyer reviewed in the April and May issues of Focus.

The solution for the slow backups is to start

using the /MAXCAP switch with your DUMP_II command. That will put your system into streaming mode for the dump—piu rapido!

We're forwarding a copy of your letter to Brian. With a little help from Carla, his first-generation Italian secretary, he will send you more details in a letter. You can buy them both a glass of wine next time they're in Verona.

To Whom It May Concern:

In the April 1989 issue of *Focus* magazine, an article was published in the Prism section on the Holland & Hart law firm in Denver. This article focused on the recent sale of a Data General MV/20000 and PC*I networking software.

The article also mentioned that Holland & Hart is installing both word and data processing. CMS/DATA, a Data General VAR, was responsible for the sale of the word and data processing software—CLO*2, though no reference was made to CMS.

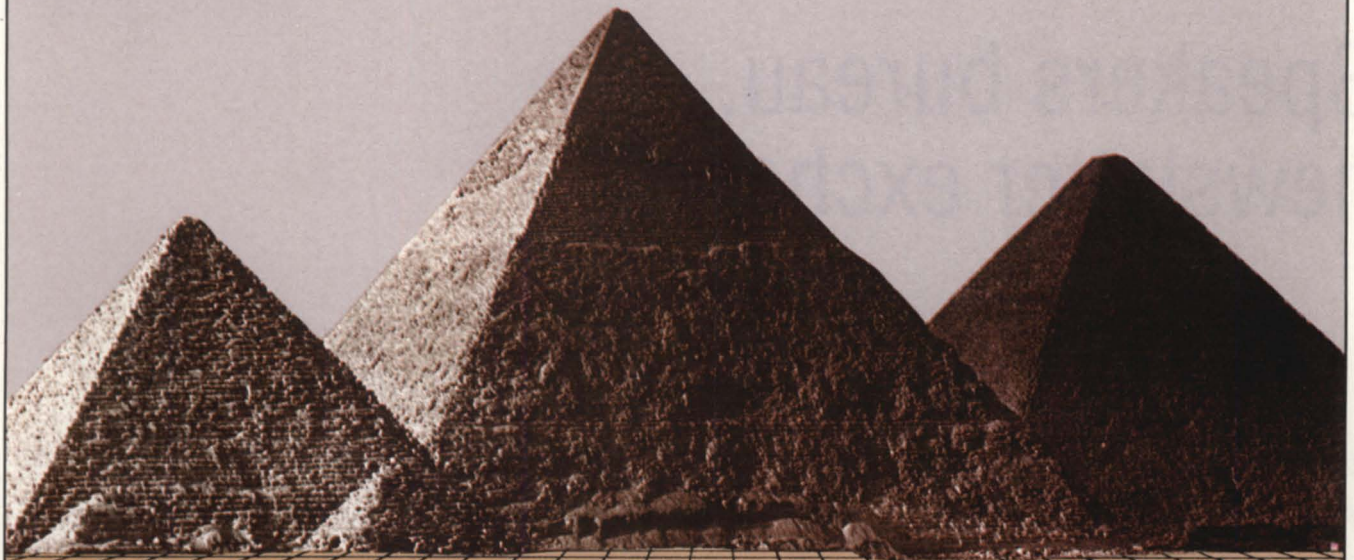
As the leader in the legal industry for applications running on Data General equipment, we feel that CMS/DATA deserves, at least, mention as the company supplying software applications. We do not understand this oversight.

We hope that this type of omission does not occur in future articles written about sales of other projects in which Data General and CMS/DATA are involved. We would also appreciate a clarification in your next issue.

Thank you for your attention to this matter.

Tracey M. Lowe
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Speakers bureau, newsletter exchange

NADGUG offers new ways to spread information about RIGs, SIGs, and Data General

Two of the most difficult aspects of operating a regional or special interest group are determining new meeting topics and finding people to talk about them. In order to help RIGs and SIGs find meeting topics and speakers, the **RIG/SIG Committee** is creating a speakers bureau.

Enclosed in this issue is a form to be filled out by *Focus* readers who are interested in speaking at RIG/SIG meetings. Please fill out the form and mail it back to me by August 1, 1989. You don't have to be a professional speaker or be considered an expert to be listed in the speakers bureau; you just need to have knowledge about Data General systems that you are willing to share. If there are certain requirements that have to be met before you will speak to a group, you may list them on the application form. The RIG/SIG Committee appreciates the help of NADGUG members in starting the speakers bureau. Questions about the speakers bureau should be directed to members of the RIG/SIG Committee.



To promote communication between RIGs, SIGs, and NADGUG officers, the RIG/SIG Committee sponsors a newsletter exchange. This program is designed so that RIG/SIG chairpeople can exchange newsletters with other group leaders and NADGUG officers at no cost to the groups. NADGUG pays the postage!

The idea for the exchange came about in response to several requests from RIG/SIG contact people. Some of the groups were sending their newsletters to all groups and officers at their own expense. Increasing costs of postage and frequent changes in the RIG/SIG roster made this impractical, however, and these groups requested that NADGUG subsidize the mailings.

To participate in the exchange, RIGs and SIGs should mail a package of 60 newsletters to me c/o *Focus* magazine, 4807 Spicewood Springs Rd., Suite 3150, Austin, TX 78759. I will mail the newsletters to all RIG/SIG contact people and NADGUG officers. For more information on the newsletter exchange, please call me at 1-800/877-4787.



The **Houston Area Data General Users Group (HADGUG)** held its May meeting on Thursday, May 11. Data General representative **Don McAfoose** was the guest speaker. Don showed a video introducing Data General's new Aviiion systems. He described the new machines, and assured members of DG's continu-

ing support for MV family machines, as well.

HADGUG is currently undergoing a revitalization effort. The goals of this effort are to restructure the group and bring in new speakers and programs that will encourage all Data General users in the Houston area to participate. Data General representatives will be working closely with the group and are offering their support. HADGUG organizers are planning to survey local users to see what they would like the group to do. For further information about HADGUG, contact **Jeff Campbell**, 713/853-9308, or **Lee Jones**, 713/681-2308.



On May 15, the **Willamette Valley Data General Users Group**, based in Oregon, hosted a meeting in Seattle to help rejuvenate the local users group there. Thirty-five people came from both Oregon and Washington to hear **Doug Kaye** of **Rational Data Systems** give a presentation on PC integration.

Plans are currently being made to form a new **Pacific Northwest** users group, which will be made up of users in Oregon, Washington, British Columbia, and Alaska. It would replace the existing Willamette Valley group and the inactive **Seattle Users Group**. This new group would hold quarterly meetings shifting in location around the area to accommodate members. For more information on the formation of this Pacific Northwest

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L.A. EDGE (**Los Angeles End-users of Data General Equipment**) held its May meeting at Brookside Country Club. Various methods of collecting data were discussed. These include bar coding and high-speed data entry. **Paul Lothrop** of **Epic Data** and **Jerry Burton** of **Processing Innovations** were the special guests, along with Data General representatives.

July 14 is Dodger night for L.A. EDGE members. Members will get a break from Data General computers and work concerns and have an enjoyable evening at Dodger stadium! Anyone interested in attending the game or joining L.A. EDGE should call **Bill Pearce** at 213/618-9905 or **Doug Reimer** at 818/793-2141.

Data General hosted the May meeting of **NO Cal FUDGE (Northern California Frequent Users of Data General Equipment)**. The focus of the meeting was new products from Data General. The MV/1000, MV/40000, and the 88000 RISC machines were introduced; CEO Light, AOS/VS II Re-structure, and DG/UX were discussed.

The July meeting of NO Cal FUDGE is tentatively scheduled for July 11. Contact **Charlie Crane**, 415/598-8069, or **Steve Tyler**, 415/680-0501, for more information.

Interest has been expressed in forming a new special interest group for **electronic publishing**. Questionnaires have been mailed to known users of Office Publisher to determine the amount of interest and to solicit volunteers to help with the formation of the group. The group hopes to have its first meeting at the NADGUG conference in New Orleans in September.

For more information, contact RIG/SIG Chairperson **Charlene Kirian** at 704/251-9551.

After a successful first meeting of the **New South Wales Data General Users Group** on February 27, officers were elected and a newsletter was published. The group will continue to publish newsletters for its members and will hold at least three general meetings this year. The group is considering holding an annual dinner meeting later this year as well as a conference in 1990.

A May 16 meeting was held, but due to the *Focus* printing schedule and the length of time it takes to get mail from "down under," the details arrived too late to include in this issue. Anyone interested in hearing more about this Australian DG users group can write to **Nick Southcombe** c/o **Data General Australia Pty Ltd**, 407 Pacific Highway, Artarmon, NSW, 2064. △

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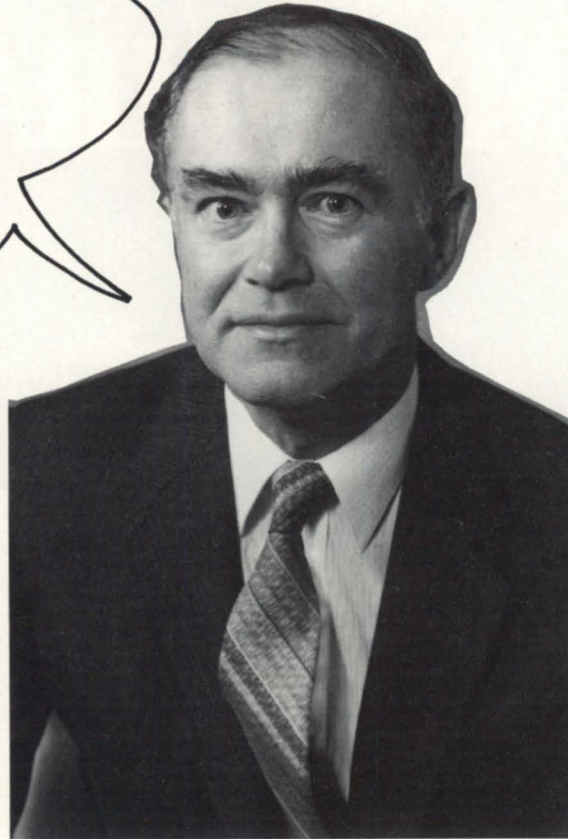
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How'm
I doin'?



We asked the experts what they think of DG, and here are their answers

New York Mayor Ed Koch must be terribly insecure . . . or perhaps amazingly confident . . . or maybe he's genuinely interested in what people think of him. Wherever he goes, he asks "How'm I doin'?"

Nobody has yet reported hearing DG President Edson de Castro ask that particular question, but there have been a lot of people asking about Data General. Their reasons are probably much the same as Mayor Koch's:

- Terribly insecure—Whether you're an MIS manager who recommended DG equipment for your company, a business owner who bought the recommendation, or a system manager who spent years learning to use DG's products, a little anxiety about DG's prospects is only natural.

- Amazingly confident—Data General is known for quality engineering and excellent proprietary products. During the last few years the company has paid a lot more attention to marketing and industry standards. Certainly those are requirements for success in today's market. Bad luck can't last forever . . . can it?

- Genuinely interested—after all, DG is an interesting company. Can risk-takers like these survive when market conditions get riskier? It's an interesting question.

So how's DG doing? We put that question to several people whose job it is to know. Here's what they said.

"Within five to seven years the new strategy could put Data General exactly where they have to be. It ought to make them one of the survivors."

— Robert Cameron
Associate Director,
Northeast Research
Dataquest

"My perspective is that DG has turned a significant corner. A lot of the momentum came from the effort that brought Ward MacKenzie in. Ward came into a muddled marketing environment and cleaned up a lot of the channel conflict, created a feedback mechanism for the sales force to give guidance to engineering, and also set up the sector marketing groups. He brought market focus into

what was up till then strictly an engineering oriented organization. The ability of DG to keep going with that shift is crucial to their survival. Of course Ward MacKenzie is gone now, and we'll have to see whether Steven Baxter will keep that momentum going.

"I believe that the new strategy associated with DG's 88000 RISC boxes is correct. Within a five to seven year time frame it could put Data General exactly where they have to be, with modular structure of software, object orientation, and the ability to develop and package products quickly out of existing capabilities. That's exactly where they have to go. It's a niche that ought to make them one of the survivors.

"The key difficulty between now and then is to make sure the transition is well funded. I see nothing to indicate they are weak-stomached about it, but they've got to make sure that the stockholders don't chew them up. They've got to keep selling the MV/40000s and MV/20000s while they're implementing this new architecture. That's a big risk area.

"However, I think the MV/40000 architecture is something they can move: it's a high margin piece, it's a growth path for the installed base, and it offers significant capabilities for new buyers. Problem: you've got to have applications on it. It's got client-server capabilities but they don't have applications to take advantage of it. The fault tolerant off-host communications controller gives very good transaction integrity, and that's a requirement for lots of applications. The effort Ward MacKenzie was putting into bringing applications onto the MV platform has to continue at a rapid pace.

"Installed base momentum is also significant. It takes a lot to move somebody from one environment to another. There's no portability from AOS/VS to anything else, and very little reason to shuffle off to something else as long as Data General continues to supply a growth path and new applications. The question is whether or not the flat growth in the U.S. can provide an adequate income relative to the high investment traffic they've got going, and whether or not the stockholders are going to be patient.

"Data General has amazing ability to keep the cost down. They manufacture extremely high quality equipment at a low cost. That's the style that will make

them survive, as long as they keep their marketing focus correct.

"The new architecture is at least equal to what other vendors are offering in terms of providing interfaces from the existing proprietary installed base to the new RISC platform. They've done a good job of not leaving the installed base behind.

"Regarding DG's choice of RISC chips, my bet is that the 88K is going to have a tough time. Motorola is not a weak company so they're very unlikely to fold, but it will be a tough market. I personally believe that the SPARC chip will not do extremely well. It'll do well through Sun, but not a whole lot more. The Mips chip will be more popular, because Mips has lined up existing successful workstation vendors like Ardent, Silicon Graphics, and Digital Equipment. Motorola has had some problems working with clients; for instance Stratus is dropping the 88K and going to the Intel I860. The 88K had a rough ride into market with a lot of rumors about stability; now that it's here we'll just have to wait and see. The 88Open consortium seems to be doing a good job of holding together, and if they can generate significant amounts of binary compatible code, they should be able to attract a lot of ISVs. Worst case, the 88K will not be a broad based chip. Best case, it will be an excellent platform.

"Data General is focusing very clearly on the commercial market for Unix. They're doing everything they can to grab pieces of the highly contested technical market, but their stated strategy is to bring Unix into the commercial world. From that standpoint, they may have less difficulty getting people to port their software, but the jury is still out. If they had gone with Mips I'd say they were a shoo-in.

"Data General's pushing of Hewlett-Packard's New Wave is a wonderfully exciting piece of their strategy. They're going in a direction that's a little way out because there aren't any applications for it yet, but it's an architecture that will support easy use of the systems. That's what will make the Unix world enticing. Proprietary products will have a hard time moving in that direction, and people like those at Data General who make a major shift to bring the object oriented capability to mid-range systems are going to do well."

"They have to stay profitable. Users don't like to buy computers from unprofitable companies."

— Jay Stevens
Senior Vice President,
Research Department
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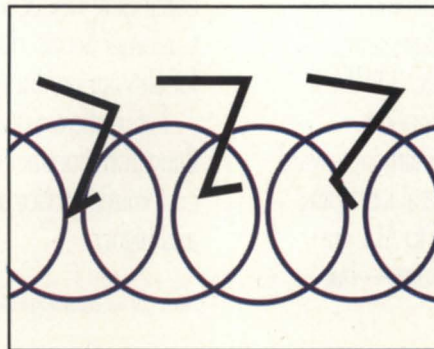
"Over the near term, Ed de Castro himself has indicated that they'll be operating around the break-even point—hopefully on the positive side of that—because there's not an awful lot of demand for the proprietary MV series, and because it will take time to have software written for the new RISC platform. While they go through that transition they will not be especially profitable.

"Going to the RISC platform is a major change in their strategy. That's why it's called RISC, right? I think the strategy is correct; they're moving to industry standards, and then concentrating on commercial applications rather than the industrial/technical side where DEC and Sun are playing. That makes sense.

"It's now a matter of waiting to get the software written for their RISC platform, then marketing hard to get their products accepted. It's a major transition that will take a year or a year and a half. In the meantime they have to keep their head down and stay profitable. Users don't like to buy computers from unprofitable companies.

"On the proprietary side, Data General is doing well with its MV/40000. VAX users will have to be a little patient until the Aquarius is announced in November, let's say, but I don't think DG will gain any market share in the meantime. They're just serving their regular base.

"I think DG's management can do the transition. I'm not critical of what their management has done. The question is whether the customers will stay with them through the transition."



"I feel very attached to Data General after spending 12 years working for them. They can definitely be a survivor, and I think they can be a thriving enterprise. But they have a lot of challenges to make that happen."

—Barbara Babcock
Vice President,
Office Information Systems
The Gartner Group

"Data General is a strange combination of strengths and weaknesses. They have historically done very well on technology, and that translates into some pretty strong system level products. But they don't always know from a marketing point of view how to leverage the technology. The company has gone through an excessive number of structural reorganizations to try to capture some marketing momentum, but they don't ever seem to let any one reorganization settle long enough to develop a momentum that could be perpetuated.

"The new vice president of marketing, Steven Baxter, may be able to do something about that. His general marketing concepts are strong, and he seems to be knowledgeable about what needs to be done. He seems to have a personality and style that should enable him to communicate well internally, and potentially muster some support for his ideas.

"Data General is making a major product strategy change right now, moving to the 88K RISC based product line. I happen to believe that is a good decision—in fact, if they had not made that decision they would be looking at a very unpleasant situation right now. But there are a lot of complications, both technically and in a marketing sense.

"Whenever you make a strategy change of this magnitude, you're basically walking a tightrope until you get to the other side. It's an emotional drain on the company, and I mean that literally: there couldn't be even ten percent of the employees who don't grasp that they're going through a stage that is very critical to the future of the enterprise.

"I give Ed de Castro and Ron Skates a lot of points for making it visible like that. It's important that the employees be motivated to make this work. I think they have done a lot of the right things in terms of communicating with the employees, and keeping the strategy visible.

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"The tricky part is that the understanding of how to pull this off in a marketing sense isn't complete. That piece of the vision isn't finished. Data General needs to decide who is their target buyer and make sure they understand exactly what that guy needs.

"The computer marketplace is becoming so broad based that you cannot be excellent at everything. Data General doesn't have to reproduce the DEC product line any more than Digital has to reproduce IBM's. All it has to do is be very good at what it chooses to do.

"Data General is in a very good position to work through the transition from the MV product line to the new RISC platform. They have a very broad MV line that is generally competitive, and the technology that comes out of the agreement with Motorola can augment the competitiveness of the MV line. Generally speaking, it's in the best interest of existing customers to continue to milk the MV technology until the RISC technology is broad based enough to be a complete alternative. Technically, working through the transition should be very manageable. However, from the customer's point of view there's a certain degree of concern. Making a precipitous change based on that kind of concern could be a catastrophic economic decision on the customer's part, but the concern is real. It has to be managed. There may be some situations where DG will lose some business from existing customers, but by and large that doesn't have to happen.

"It's not as if DG's going to go bankrupt next week. They're not in that kind of trouble. They've had some losses, and of course they'd be in better shape if they hadn't had the losses, but they're pretty stable financially. They do very good cash management and asset management. While Data General has had some problems, they've been pretty good at quantifying and predicting their economic position.

"The risk for customers isn't that the company is going to disappear off the face of the earth and the product won't be supported. The real risk is the ability of the company to focus its research and development around a consistent set of technologies so it can stay a leading technology player.

"IBM and DEC will obviously continue to be leaders in the mid-range. Hewlett-Packard is making some moves that could

put them in a strong position—the acquisition of Apollo is interesting, as is the relationship with 3Com. They still have some marketing issues to address, but they have a critical mass. Oddly enough, I'm not sure I'd put Unisys in that ballpark—they seem to be having a little more difficulty. I think the companies that are at risk of no longer being independent enterprises at the turn of the century cer-

tainly include Wang, and I think you have to put Data General in that ballpark, too. I personally believe there's a strong likelihood that Data General would be a very interesting acquisition candidate if they get through this cycle reasonably well. Other than as a very narrowly focused enterprise, I think it would be very hard for DG to remain an independent entity by the year 2000." Δ

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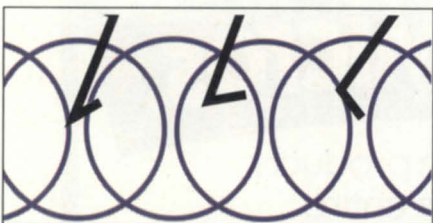
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Two screamers: a comparison of the AVX 300 and DECstation 3100

by Phil Lemmons and Mark Mallett
Special to Focus

Early
lead



On the cover of this month's Focus, we asked the question, "Can DG win?" There is evidence that in the RISC-based workstation arena, DG has indeed produced a winner. The April issue of MIPS, the Magazine of Intelligent Personal Systems, featured a challenge between the Aviion AVX 300 (referred to in this article by its code name, Maverick) and the DECstation 3100. The two machines were allowed to battle for placement on the magazine's cover, and the Aviion system won. Presented here are excerpts from two articles that describe the Aviion systems. The first is a comparison between the Aviion AVX 300 and the DECstation 3100. The second article weighs the AVX's benchmarks against those of machines from various manufacturers.

There are many similarities between the Maverick and the DECstation 3100. Both use RISC processors that have separate caches for data and instructions. Both have a SCSI bus for mass storage and other peripherals. Both have a built-in ethernet adapter backed by AMD's LANCE ethernet controller.

Both systems use windowing environments based on the X Windows interface. Data General's system is a strict X11R3 implementation, while the DECstation 3100 uses the X-based DECwindows interface. Both workstations offer System V-conformant Unix: DEC's Ultrix (actually based on Berkeley 4.3) on the DECstation 3100, and Data General's DG/UX kernel on the Maverick. Both support file sharing via NFS, as well as TCP/IP communications; the DECstation 3100 also includes DECnet software.

But there are some interesting differences between these two powerhouse Unix workstations. In the DECstation, the R2010 coprocessor is a separate unit, while the MMU is on-chip with the CPU. In the Maverick, the 88000's FPU is on the same chip as the CPU, but the MMU is on a

New machines have transformed the number-crunching landscape

by A.G.W. Cameron
Special to Focus

In Figure 1 I have put together my estimates of cost and performance for a wide variety of computers. The numbers in this table should be taken as only very rough, and you should look for differences of at least a factor of 2 to consider them very meaningful.

The floating-point performance (MFLOPS) represents a compromise be-

(see Estimates, page 18)

Figure 1: Rough measures of cost/performance ratios

| | MFLOPS | Cost(K\$) | K\$/MFLOPS |
|-------------------------|----------|-----------|------------|
| Cray (scalar) | 5 | 2000 | 400 |
| MicroVAX 2 | 0.13 | 40 | 308 |
| 8088/8087 (8-MHz) | 0.01 | 2 | 200 |
| Cray (vector) | 24 | 2000 | 83 |
| Sun 4/260 | 0.86 | 60 | 70 |
| Ardent Titan 1 (scalar) | 1.5 | 100 | 67 |
| 386/387 (25-MHz) | 0.25 | 15 | 60 |
| 386/3167 (25-MHz) | 0.5 | 17 | 34 |
| Ardent Titan 1 (vector) | 6 | 100 | 17 |
| DECstation 3100 | 1.8 | 20 | 11 |
| Maverick | 3.5 est. | 14 est. | 4 approx. |

the amount of disk storage. Most Cray systems come with four processors, so I have divided the cost of a typical system by four, to represent the single processor cost with its share of the peripherals cost. This may be relatively unfair to the Ardent Titan 1, since the figure of \$100,000 I have given is the price of the single-processor model, whereas the four-processor version costs \$150,000. If it had been treated the same as the Cray, the cost/performance values for the Titan 1 would have been reduced by a factor of 2.7.

The cost/performance values in Table 1 may startle you. From the viewpoint shown here, using a Cray to do computations on a strictly scalar problem is the least cost-effective way of proceeding given the menu of machines in Table 1. Using a Cray to do an efficiently vectorized problem is a more reasonable way to proceed, but it is far from the best among the machines in the table.

It is interesting that the first three machines listed in Table 1, the least cost-effective machines, include the least-expensive (an 8088-based PC) and the most-expensive (a Cray running a scalar problem).

Particularly noteworthy is the performance of the 386 chip coupled to the Weitek 3167 floating-point chip at 25 MHz. Until recently, this was more cost-effective than all the other machines in Table 1 except for the Ardent Titan 1 running an efficiently vectorized problem. The Ardent machine uses a faster variety of Weitek chips.

But the march of new technology and the decrease of the cost/performance ratios are relentless. The 386/3167 machines are now challenged by new workstations boasting new processors. The introduction of the DECstation 3100 set a new cost/performance milestone; this machine uses the Mips R2000 RISC chip. The price of this new workstation is comparable to that of such 386/3167 machines as the Compaq 386/25. Both the DEC and the Compaq seem to have plenty of room for further cost reduction, since their approximately 300-MB hard disks cost more than double what they cost from third parties. The performance of the DECstation 3100 is more than a factor of 2 better than that of any of the 25-MHz 386/3167 workstations.

Hard on the heels of the announcement of the DECstation 3100 came the

announcement of the Data General Maverick, using yet newer chips: the Motorola 88000 RISC chips. Preliminary information from Data General indicates that the performance of the faster 20 MHz version of the Maverick is likely to beat the performance of the DECstation by a factor of 2, as shown by the estimated figures in Table 1. Yet the price of the Maverick is significantly less than that of

the DECstation 3100. Thus for the second time while 1989 was still young, the cost/performance record was broken. These new machines have transformed the number-crunching landscape. Δ

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By using Motorola's 88000 chip set, Data General has built a very high-performance, low-cost workstation. At the same time, the company has taken a risk by being the first to use this new CPU in a major product, in spite of the fact that other RISC chips such as the SPARC have achieved major endorsement and wide acceptance. Other companies will undoubtedly soon follow suit and bring out

products based on the 88000. This month, for example, Tektronix is expected to announce its family of 88000-based workstations, which will be compatible with its 43000 series of workstations.

New architectures also carry the risk of bugs in implementation and unknown production levels, although both are offset by Motorola's position in the industry. Only time will tell what the final out-

come will be, but based on the Maverick's merits, Data General appears to have a winner. Δ

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Estimates, continued from page 16

tween the double precision Linpack and the geometric mean of the Livermore Fortran Kernels (LFK) where I have values for both of these. Usually these numbers agree reasonably well on scalar machines. There are two vector machines on the list, the Cray and the Ardent. Performance is specific to the single-processor versions of these machines. On the Ardent Titan 1, the Linpack gives 6 MFLOPS, but the geometric mean of the LFK is 2.5 MFLOPS. Since the LFK geometric is influenced by vector performance, I have taken 1.5 MFLOPS as a value that might be expected for a truly scalar, nonvectorizable computation. The Cray

**The march of new
technology and the
decrease of the
cost/performance
ratios are relentless**

is more of a problem. The vector value for the MFLOPS comes from the Linpack measurement. However, I have taken the scalar value to represent roughly the experience we have had running SPH, relative to our measurements on my Sun 4.

The prices are also extremely rough. For one thing, they are meant to represent list prices, and most scientists are able to get discounts of one sort or another, often because of university, government, or industry arrangements with vendors. The prices are also meant to represent whole systems, and systems can have a wide variety of peripherals attached.

Generally speaking, the faster the CPU, the greater the capability of the peripherals, particularly the amount of RAM and

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| 5-Initial IPC file: | | 27-Use IPC: | N |
| 6-Initial directory: | | 28-Use console: | Y |
| 7-Default user priority: 2 | 8-Max. queue priority: 1 | 29-Use batch: | Y |
| -----Extended Options----- | | | |
| 101-Initial user program: | :CLI.PR | | |
| 102-Primary start time: | 07:30 | 103-End time: 12:00 | 104-Days: 1-5 |
| 105-Secondary start time: | 13:00 | 106-End time: 17:00 | 107-Days: 1-5 |
| 108-Use time windows in batch: | N | 109-Mins. after window to logoff: | 0 |
| 110-User group number: | 0 | 111-Force new password selection: | N |
| 112-Use GET_PASSWORD macro: | N | 113-User choose own password: | Y |
| 114-Maximum concurrent logins: | 0 | 115-Number failed logins allowed: | 0 |
| 116-Consoles not allowed: | | | |
| 117-Other host ID#'s: | | | |
| 42-Comments: | | | |

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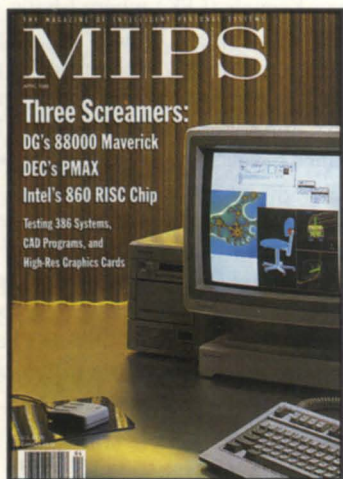
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separate chip and has 16 KB of cache RAM. System memory capacity of both systems is similar, but the Maverick's 100-ns main memory is faster than the 120-ns memory in the DECstation.

The DECstation 3100 and the base Data General workstation both run at 16.67 MHz, although the Maverick achieves higher throughput at this clock speed. The Maverick is also offered in a 20-MHz version.



In I/O, there are major differences. The Maverick uses Direct Memory Access for I/O, and the DECstation 3100 does not. Unlike the DECstation, the Maverick's mass storage is all external to the system box.

In display management and output, the Maverick uses graphics coprocessors, an NEC 72120 for monochrome and a custom gate array for color. The DECstation 3100's CPU does the graphics processing. In display size and resolution, the Maverick has a 20-inch, 1280 X 1024 monochrome monitor or a 19-inch 1280 X 1024 color monitor. The DECstation has a choice of 15- or 19-inch monochrome or color monitors, with 1024 X 864 resolution in all cases.

In Summary

The Maverick represents a sharp turn in Data General's product line. With a few exceptions, notably the DG/One MS-DOS laptop computer, DG's product line has traditionally been based on proprietary hardware and software architectures. With the 88000-based machines, Data General is showing a recognition of the importance of widely supported environ-

ments in both hardware and software. The Unix operating system, the externally developed RISC CPU, and the use of standard components and interfaces such as the SCSI bus, indicate Data General's awareness of the importance of standards in the workstation market.

Yet the Maverick is not just another one of anything. Although it follows a trend to obtain higher performance by

using RISC technology, it is the first 88000-based workstation to appear on the market. For the color system, Data General developed its own gate-array graphics coprocessor. DG chose to retarget its own DG/UX kernel for the 88000 rather than use someone else's port. In fact, DG says that it will license DG/UX for other 88000-based systems and has already negotiated one such license.

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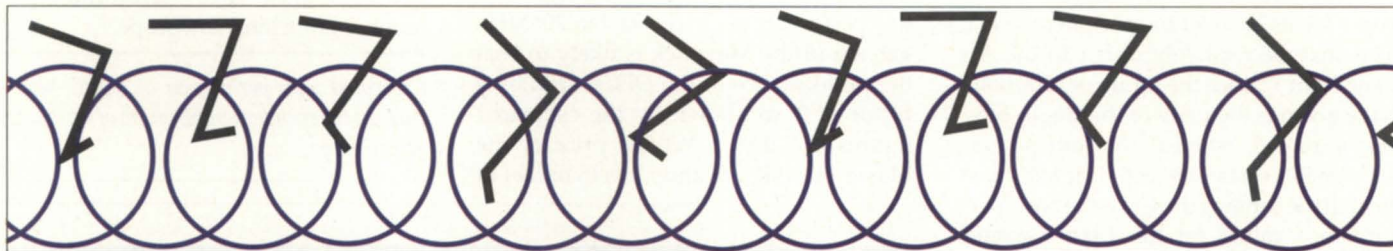


Photo finish

by Michael E. Marotta • Special to Focus

Which is better, Data General or DEC ?

It depends...

In 1965, Digital Equipment Corporation began marketing the PDP-8. The team that designed the PDP-8 was led by a young engineer named Edson de Castro. In 1968 de Castro and three colleagues formed Data General within 20 miles of DEC's home office.

Figure 1: Raw data

| | | |
|-----------------------|------------------------------------|--|
| <u>CHARACTERISTIC</u> | <u>MicroVAX2000</u> | <u>MV/2000</u> |
| Maximum memory | 14 MB | 12 MB |
| Maximum storage | 318 MB | 320 MB |
| I/O Bandwidth | 3.3 MB/sec | 8 MB/sec |
| Cache | N/A | N/A |
| Max. asynch ports | 8 (+4 more serial) | 24 |
| <u>CHARACTERISTIC</u> | <u>MicroVAX3500 (workstation)*</u> | <u>MV/15000 (mods 8, 10, 20)</u> |
| Maximum memory | 64 MB | 64 MB |
| Maximum storage | 1.1 GB | 20 GB |
| I/O Bandwidth | 3.3 MB/sec | 16.74 MB/ sec |
| Cache | 1 KB on chip 16 KB on board | 4 KB instruction 16 KB buffer |
| Max. asynch ports | N/A (comes with mouse) | 432 |
| <u>CHARACTERISTIC</u> | <u>VAX6000 (workstation)*</u> | <u>MV/20000 (model 1)</u> |
| Maximum memory | 14 MB | 64 MB |
| Maximum storage | 308.4 GB | 60 GB |
| I/O Bandwidth | 60 MB/sec | 35 MB/sec |
| Cache | 1 KB on chip 256 KB on board | 4 KB instruction 16 KB buffer |
| Max. asynch ports | N/A (4GL, LISP) | 1,008 |
| <u>CHARACTERISTIC</u> | <u>VAX8840 (4 processor)</u> | <u>MV/40000 (model 4)</u> |
| Maximum memory | 512 MB | 256 MB |
| Maximum storage | 310.4 GB | 320 GB |
| I/O Bandwidth | 30 MB/sec | 60 MB/sec |
| Cache | 64 KB on chip 256 KB on board | 16 KB instruction per processor 256 KB buffer |
| Max. asynch ports | "allows growth" | 3,456 |

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Figure 2: Help menus

```
AOS/VMS CLI Rev 07.64.00.00 29-APR-89
2:36:43
) help

Topics are:

*1_SWITCH *2_SWITCH *ADUMP
*ADUMP_LOOKUP *AFTER_SWITCH
*ALOAD *ANALYZE *CALC *CLI_INPUT
*COLLAPSE *COMMANDS *CONDITIONALS
*CONTROL_CHARS *CREV *CSSCREEN
*CSSORT *CURSOR_CONTROL *DBMS
*DBNET *DEBUG *DISPLAY *DUMP_II
*ELEMENT_SIZES *ENVIRONMENT
*EXCEPTIONS *EXEC *FED *FILCOM
*FILENAMES *FILESTATS *FIXUP
*GENERIC_FILES *GET_UNIT *HAZEL
*HELPV *ICDEBUG *ICEDIT *ICINQUIRE
*ICOBOL *ICX *ISAMVERIFY *L_SWITCH
*LABEL *LFE *LINK *LINKS *LOAD_II
*LOGCALLS *L_SWITCH *MACROS
*MASM *MASM_PSEUDO_OPS
*MIRRORINFO *MRA *MSCOPY
*M_SWITCH *NEWLINE *PATCH
*PATHNAMES *PED *PERFIT *PERFMON
*PERFSCR *PRESENT *PSEUDO-MACROS
*P_SWITCH *QUEUEJES *Q_SWITCH
*REBUILD *REORG *REPORT *SCOM *SED
*SLATE *SPRED *SWITCHES *TEMPLATES
*TOPICS *TRENDVIEW *UPDATE *VSGEN

Welcome to VAX/VMS version V5.1 on node
ONE 2:55 am Sat. (29-APR-1989)
$ HELP

Information available:

:= @ ACCOUNTING ALLOCATE ANALYZE
APPEND ASSIGN ATTACH AUTHORIZE
AUTOGEN BACKUP BASIC CALL CANCEL
CLOSE CONNECT CONTINUE CONVERT
COPY COURSE CREATE DAL
DEALLOCATE DEASSIGN DEBUG DECK
DEFINE DELETE DEPOSIT DIFFERENCES
DIRECTORY DISCONNECT DISKQUOTA
DISMOUNT DUMP EDIT ENCRYPT EOD
EOJ Errors EXAMINE EXCHANGE EXIT
FDL FORTRAN GOSUB GOTO HELP
Hints IF INITIALIZE INQUIRE INSTALL
Instructions JOB LATCP Lexicals LIBRARY
LICENSE Line_editing LINK LOGIN
LOGOUT MACRO MAIL MERGE MESSAGE
MONITOR MOUNT NCP NCS ON OPEN
PASCAL PASSWORD PATCH PHONE
PRINT PURGE Queues READ RECALL
RECOVER RENAME REPLY REQUEST
RETURN RMS RTL_Routines RUN
RUNOFF SEARCH SET SHOW SLIDE
SORT SPAWN Specify SPSSX START
STOP SUBMIT Symbol_Assign
SYNCHRONIZE SYSGEN SYSMAN
System_Services TFF TSM TYPE UIL
UNLOCK V50_NewFeatures VAXsim VIEW
WAIT WRITE
```

This is the story of computing. Engineers from one company, thwarted when their designs are rejected, form their own business to make and market a better machine. The Data General Nova line took on the PDP series. Then came the DG Eclipse, a 16-bit mini. Now the newest MV series machines compete against the latest VAXen.

There are other computers in the world, of course. IBM, Hewlett Packard, and the others all try to produce and sell the best machines that money can buy. Every product line has its loyalists. Sun, Apollo, Unisys, and the rest obviously have strong selling points. There is no doubt, however, that there is a clear division between "data processing" and "real computer" companies. Data processing can be done on 3- x 5-inch cards kept in boxes. IBM and NCR fit this mold. DEC and Data General take a different approach. For them, computing is the name of the game: general-purpose, programmable, digital devices based on the theories of John von Neumann.

Ignored by losers

To find out how close the competition is between DEC and DG, I sent letters addressed to "Marketing" to both Westboro and Maynard. Neither letter was answered after three weeks. Next, I called the local phone numbers for field service. The DG line rang and rang with no answer. The DEC line was answered after two rings and I was given the number for the area sales office in Midland, Michigan. I met with a DEC sales rep who took me to lunch and gave me two sales catalogs with the data I needed. I got the DG information from a *Focus* editor via overnight express. That same week, I got a call from Ed Simmons, a health care industry headhunter from Kansas City. I told him that I have no interest in working in an IBM environment, that I prefer Data General and Digital Equipment Corporation. He said that the companies that use Data General and DEC computers are "losers."

I also got a call from Greg McAbee who works for Management Recruiters in St. Joseph, Michigan. McAbee said that he has "some" DEC contacts but that he did not know that Data General machines were made "any more."

Based on these interactions, DEC is better than DG. DEC has a local office

that answers the phone. Data General must be running ads somewhere that say "DG had it yesterday."

How close is close?

Comparing hardware from different vendors is difficult. (Figure 1) The DEC sales rep showed me figures for a MicroVAX 3400 that would handle 10 users. Why 10 and not 8 or 16 is not clear to me. There is often no direct comparison in terms of main memory, disk capacity, and other features.

There is no doubt that there is a clear division between "data processing" and "real computer" companies

While Data General is proud of its Whetstone and Dhrystone benchmarks, DEC prefers to rate its current machines against its earlier VAX 11/780 system. (Whetstones measure floating point operations; Dhrystones were developed to accommodate architectures that included floating point processor chips.) When first released, the MV machines could beat the VAX on Whetstones, but not Dhrystones. That was eight years ago and a lot has changed. DEC and DG can both point to winning machines in each category. Further, these tests are always run with configurations that make the machines look good. You don't load up a CPU with 128 users compiling Cobol programs even though this would actually be a better test environment.

FOCUS ON: DG HEAD-TO-HEAD

A MicroVAX 2000 is roughly equivalent to the MV/2000. The MicroVAX 2000 (also packaged as a VAXStation 2000), comes with 14 MB of on-board RAM; the MV/2000 has 12 MB. The MicroVAX 2000 can use a maximum of 318 MB of disk; the MV/2000 can run with 320 MB of disk. The MV/2000 is described as being an "under the desk" machine. The MicroVAX 2000 can fit on the top of a desk, but "under the desk" is also a good place to put the box.

The new MV/40000 competes against the DEC VAX 8840. Both machines can have from one to four processors. The

maximum of 310.4 GB. The MV/40000 Models 1 through 4 come with 64, 128, 192, and 256 KB of cache buffer. This is comparable to the VAX 8840, which supports 64 KB per processor.

The one area where the MV machines beat the VAXen cold is in I/O bandwidth. The MV/40000s will pump out 60 MB per second, while the VAX 8840 can only do 30 MB per second. Pricing information is generally irrelevant. In most cases, you can bargain with both DEC and DG: neither company is willing to lose a sale over a few percentage points of markup. There are times when governments and government-like businesses will make a choice on the basis of a sealed bid. However, even a sealed bid can reflect a company's willingness to win a client at the cost of some markup.

The sign of the dollar

When the first 8-bit microprocessors were introduced, an operating system was needed. The control program for microprocessors (CP/M), was developed by a company called (coincidentally) Digital Research. CP/M followed and improved on the command set from DEC's popular PDP-11 series. While CP/M-86 was being developed for 16-bit processors, Seattle Computer Products created a QDOS that kept the same fundamental user interface. This was sold to Microsoft. Meanwhile, DEC developed the VAX and its VMS operating system. Again, the old PDP RSX/RSTS user interface was streamlined. As a result, if you can do a DIR FOO*, COPY *.OBJ and TYPE MYFILE.TXT on an IBM-PC, you can do it on a DEC VAX.

You can get a feel for the command set of the operating systems by comparing the respective HELP screens. Figure 2 shows an MV/20000 (top) and a VAX 6620 (bottom). Note that if you key in the command DIRECTORY on an AOS/VS machine, the system tells you which directory you are in. Under VMS, if you key in DIRECTORY you not only see the path, the system actually lists all the files in the directory.

The one salient feature that DEC has seized is the prompt. On a VAX the system prompt is the dollar sign. As a long-time admirer of the works of Ayn Rand, I really appreciate seeing all those \$ prompts. DG's "close paren",), does look like a smile, however.

Figure 3: Stock prices over the years (no fractions shown)

| DATE | DG | DEC |
|----------|-----|-----|
| 11-11-70 | 27 | 80 |
| 04-28-71 | 38 | 72 |
| 12-29-71 | 56 | 77 |
| 05-03-72 | 89 | 82 |
| 12-20-72 | 110 | 94 |
| 05-02-73 | 33 | 80 |
| 12-12-73 | 28 | 84 |
| 05-22-74 | 45 | 116 |
| 09-25-74 | 18 | 75 |
| 03-19-75 | 21 | 79 |
| 12-31-75 | 36 | 132 |
| 04-05-76 | 54 | 175 |
| 12-20-76 | 43 | 53 |
| 03-14-77 | 41 | 41 |
| 09-12-77 | 48 | 48 |
| 07-03-78 | 54 | 46 |
| 09-11-78 | 66 | 53 |
| 04-03-79 | 69 | 53 |
| 07-27-79 | 69 | 57 |
| 07-06-81 | 55 | 98 |
| 11-30-81 | 55 | 92 |
| 05-31-82 | 28 | 76 |
| 07-19-82 | 26 | 68 |
| 01-03-83 | 39 | 96 |
| 03-28-83 | 59 | 127 |
| 04-23-84 | 46 | 89 |
| 01-14-85 | 58 | 112 |
| 10-26-87 | 20 | 133 |
| 01-13-88 | 25 | 122 |
| 09-20-88 | 18 | 95 |
| 01-04-89 | 19 | 100 |
| 05-30-89 | 18 | 91 |

MV/40000 model 1 has 128 MB on board; so does the baseline VAX 8840. The MV/40000 Model 4 has 256 MB on board; the fully configured VAX 8840 has 512 MB. The MV/40000 Model 1 can power 320 GB of disk. The VAX 8840 can run as many as eight of its 38.8 GB disks, for a

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|---|---|
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| MEMORY for all MV & ECLIPSE for all NOVA & MICRO | DISK/TAPE 354, 592MB 96, 192MB 73, 147MB 10, 12.5, 20, 25MB 6231 CART N/E 6026, 6123, 6125 6299, 6300, 6021 |
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Figure 3 shows the price of common stock for DG and DEC. Overall, both companies have stayed at about where they were over 20 years ago. When DEC and DG first issued their common stock, gasoline cost 18 cents per gallon and silver was \$1.29 an ounce. Both gasoline and silver cost five times what they did in 1967. DG split 2-1 in 1983. DEC has had three splits: 3-1 in 1969; 3-2 in 1976;

and 2-1 in 1986. Of course, there have been many opportunities to profit from the "buy low, sell high" strategy.

Data General's proprietary operating systems have not been well-received in recent years. DEC has been more assertive in marketing Unix, Unix-like, and MS-DOS compatible platforms. However, DEC has other problems. It depends heavily on foreign trade; the dollar has been

strong in recent years and overseas demand for the VAX line has softened.

Both DG and DEC are marketing RISC (reduced instruction set) machines. Neither company is likely to profit from these efforts for up to two years.

As of this writing, DG stock was selling at about \$16 per share. Its book value is given as \$21. At \$97 per share, DEC stock is priced exactly right (\$85 to \$103,

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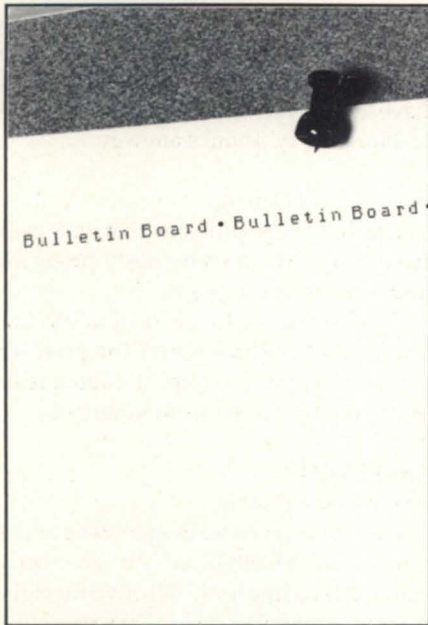
When DEC and DG first issued their common stock, gasoline cost 18 cents per gallon and silver was \$1.29 an ounce. Both gasoline and silver cost five times what they did in 1967

according to Dean Witter Reynolds, Inc., a leading broker).

DEC has been gaining its market share primarily at the expense of IBM and the other "data processing" companies. DG's markets expand because system integrators are successful at selling to vertical markets. The OEMs are able to offer a cheaper, faster solution to users who migrate to DG from other brands, though seldom from DEC. The bottom line is that if you have a DG shop, there is no overwhelming reason to change to DEC. Δ

Michael E. Marotta is a technical writer with a decade of experience on Data General and other equipment. He works in manufacturing and business environments.

Bits and bytes from the bulletin board



32-bit CLI

From: Walter Mossdrop

For DG to have, after all these years, a 16-bit program as the main interface to VS is ridiculous. At the very least they could recode it as a 32-bit program (no enhancements, just give us a larger user space).

Think about this: as DG enhances VS, it will also have to add new CLI commands, switches, etc. Where is DG going to put the code? That's right, they'll take over more user space (there is only so much that can be put in the overlay space). Right now you can't even turn on System Manager mode within the CLI, which makes this feature virtually worthless to us.

As far as memory requirements, I think that even a 32-bit CLI would look small compared to the memory required by CEO (especially 3.02). And, what about the system overhead needed to handle

the current CLI's overlays vs. shared pages?

From: Thomas Carey

At a DG class last fall the instructor made no bones about the fact DG was working on a 32-bit CLI. He couldn't reveal any details but said it had some very nice features. So I'm surprised that at this late date there is apparently a widespread understanding that they have no such product under development. I for one would appreciate better and less cumbersome handling of decision trees and error conditions.

From: Doug Rady

I have heard from four people in different areas at Webco that CLI-32 does exist. The main problems have been its size (too big) and speed (lack of) and getting it to work the same as CLI-16. If it ever does show up, it would be nice if various things like template expansion were in a shared library that users' programs could be linked against. As usual though, we have to wait and see/suffer.

Ethernet over twisted pair cable

From: Alan Peacock

Has anyone had experience with running Ethernet over twisted pair cable at 10 Mbps. If so, what hardware and software did you use? We are interested in using existing premise wiring systems for both PCs and MVs.

From: Doug Kaye

Alan, we have used Synoptics' Lattisnet for many customers with unqualified success. Software is irrelevant.

DISCO statistics

From: Eric Birch

I am trying to learn more about DISCO and how to use it to enhance our system performance. I would appreciate anything

anyone can tell me about what the figures mean in the columns of the display. In particular, what is a good average seek figure for the SKS-25 drives with a Zetaco controller? They are both 300 MB and are about two-thirds full.

From: Tom Moore

Eric, seek time is important, but more important is the busy time. When utilizing two (or more) disks, the percent busy time should be as even as possible.

AOS/VS II update

From: Thomas Carey

Another update on our AOS/VS II "trial." The Infos problem I previously reported was self-induced! Somehow the data base became corrupted, and the attempt to restore used an Infos dump file that I had on disk even though I used ILOAD(?). It took us two weeks to stumble onto the solution for an error this created.

Next item: After three weeks or so of running we started getting a 65201 error on invalid block ID revision number. Atlanta helped a great deal in getting this resolved after I sent them a memory dump. In about a week, they said a directory was corrupted on our UDD disk and they supplied two patches to avoid such corruption again.

DUMP_II in 7.50 VS

From: John Meyer

Has anyone else discovered that when using LOAD_II with the /DELETE switch and a template, nothing gets loaded?

From: Kevin Danzig

We STR'd several switch bugs (/DELETE and /RECENT were two of them) in LOAD_II back in 7.56 or 7.57. It took about 20 months but we got an answer: fixed in rev 7.63 (the initial comment was fixed in rev 8). We haven't felt it worth

the money to upgrade (our SPSA ran out at 7.62 and we run 7.57 because of the "improvements" of 7.6X.)

Cobol conversion

From: Olav Torvund

I have a bunch of ICobol programs that I also need in regular Cobol (actually, Wang VS Cobol). Do any of you know of a good conversion program that converts

ICobol source into Cobol? This would save me a lot of extra coding. Thanks.

From: Kevin Danzig

Having spent much of the past two years doing ICobol to AOS/VS Cobol, I know of no conversion program. The biggest problem that you will encounter is I/O handling. ICobol is very sloppy and extremely tolerant of file handling.

Aside from that, screens are machine specific and then there are very few reserved words in ICobol.

Good luck. (You're going to need some)!

From: Tim Boyer

Can you just run the ICobol on the Wang? Wild Hare has written the interpreter for a whole bunch of machines, but I don't know about the Wang. Give them a call and let us know what happens.

From: Olav Torvund

I have now called quite a few places, and no one seems to be able to convert into Wang Cobol. A couple of companies offered to convert from ICobol into AOS Cobol and then to RM Cobol. Guess I have to convert my programs the old-fashioned way. Thanks anyway.

From: Kevin Danzig

The only real problem that you will have is file I/O (a pretty nasty problem) and some reserved words.

I've been converting ICobol to VS/Cobol for the last three years. The problem is that ICobol is too simplistic about real-world data processing environments.

LMB ERROR

From: Kevin Danzig

We have a new one. Does anyone know what a LMB ERROR is? We have been running the same rev (7.57) of VS for eight months without a snag. Last week we patched BJ's patch to stop flushing of modified blocks (to speed up moves)—aside from that we're stable. I didn't get the panic code before we ran fixup. Any ideas?

From: Walter Mosscrop

Kevin, you didn't specify what machine you're using, but we have gotten this error once on both of the MV/2000s that we support. The error has not recurred in months. According to our local FE, it is some type of bus error (parity?) and can be caused by static, etc. I think that LMB stands for Local Multiplexor Bus or something similar.

From: Andy Uzick

Sounds like the same problem we had with our MV/2000 a couple of years ago. After much head scratching, DG finally determined that it was a hardware problem in the L-bus that VS couldn't handle. Δ

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Gen and jive

UUCP allows machines running Unix to communicate

by John Huddleston
Special to Focus

This is the second of a two-part article on UUCP (Unix-to-Unix copy), a program that allows machines using UUCP to communicate with one another. The first article (*Focus*, April 1989) described the system administration of UUCP under MV/UX and DG/UX. In this discussion, I will explain how UUCP can be used to send or receive mail and files.

UUCP was designed by M.E. Lesk of Bell Laboratories in 1976. The HoneyDanBer UUCP version written in 1983 by Peter Honeyman, David A. Norwitz, and Brian E. Redman is an improvement over the Lesk version. MV/UX runs the Lesk version and DG/UX runs the HoneyDanBer version.

Comparison to CEO under AOS/VS

If you use CEO, (excluding DG/UX users), you are familiar with how to send mail and files over a network using a menu-oriented system. Unlike CEO, UUCP is not a menu-driven system; rather, it consists of a series of programs and shell scripts that use a process called uucico to send and receive files. It is similar to using Xodiac with CEO to transfer files to other sites that have been "genned" into the network. Under AOS/VS, the MOVE/FTA CLI command requires that the username and password be the same on both machines. This is not the case with UUCP. All that is required is the program name (generally uucp or nuucp) and the password.

Figure 1: Sample .mailrc file

```
set DEAD=mail/deadhead
set MBOX=$HOME/mail/mbox
set crt=25
set folder=mail
set ignore
set outfolder
set record=mbox.out
set EDITOR=msspell
set keepsave metoo quite
set noappend
set onehop
set save
set Sign="John Huddleston\nComputer Systems
Analyst\nwntc2!wsfsjh\n"
set sign="John"
alias chuck wsfscb
alias charlie Equalizr!ceg
group soils wsfscb Equalizr!ceg
```

Sending mail to other machines

There are two things that the user must know before sending mail to another user on a different machine: the machine name and the username. The machine name for your machine can be found by typing the command "uname." The response will be a one-word machine name.

To find out if the other user's machine name is "genned" into your system, type the command "uuname." Your machine will respond by printing a list of all the machines in your UUCP network. (If you do not see the machine name you are looking for, contact your UUCP system administrator.)

Once you have the other user's name and you know that the other machine is "genned" into your UUCP network, you

can send that user mail by typing the command:

```
mail machine!username
```

The mail message is completed by entering "." in the first column and pressing the return key. The information that you typed (or redirected) will be mailed to a file for transmission by uucico.

HoneyDanBer is enhanced

The HoneyDanBer mailx command, available only with DG/UX, uses the .mailrc file for definitions (the same way that DG/UX and MV/UX use the .profile file upon startup). Users can define machine name and username combinations with an alias. Users can also define multiple combinations of machine names and usernames. A sample .mailrc file is shown in Figure 1.

If you cannot remember the machine name!username combination of an associate on another machine, but you do remember the alias, you can still send a message. To use an alias (e.g. charlie) from Figure 1., you would send mail to Equalizr!ceg with the command:

```
mailx charlie
```

The user manual explains many other features of mailx. Three of my favorites are "~v," "~e," and "~h." The "~v" command takes your input, creates a temporary file in the "tmp" directory, and starts up the "vi" editor. This is useful when

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you decide to reword a paragraph. At the conclusion of vi, you are returned to mailx with the revised information. With the "~e" command, you can execute a specific program, such as a spell checker. The third command, "~h", allows you to reenter the username (or alias) and its destination, and send a carbon copy (cc) or blind carbon copy (bcc) to other users.

Using UUCP to transfer files

The uucp command allows users to send and retrieve files from other machines using UUCP. You must have read access to the files and write access to the destination directory. The commands that are available to incoming UUCP users are listed in the /usr/lib/uucp/l.sys file (/usr/lib/uucp/Permissions file for HoneyDanBer). Typically these commands are mail, mailx, and sh. The uucp command syntax is:

uucp source destination

where source and destination can be a pathname on either machine. For example:

uucp machine1!~john/.profile .profile

UUCP will copy the .profile file in the user directory "john" on machine 1 to the file .profile. The user must have access to the directory "john" and read permission to the file .profile. To send multiple files in one command, the user would use the auto command. For example, to send all files in the current directory ending with a ".c" to the user ceg on machine Equalizr, you would type:

auto *.c Equalizr!ceg

UUCP accepts devices as destination points. You can make a poor man's LAN (local area network) by hardwiring machines together through the synchronous port and making use of high speed or laser quality printers (without buying one for each machine).

I hope that the discussion of UUCP system administration and usage has been helpful to you. If you have any questions, please write me c/o Focus or send mail to the address below. Δ

John Huddleston is vice president of NADGUG SIGUX. He may be reached at PO Box 4611, Portland, OR 97208.

It *could* happen

A fire in your data center would spoil
an otherwise perfect Saturday

by John Coan
Special to Focus



A 9.5 pound halon 1211 extinguisher

(Part 2 of 2. Last month, the author described several ways to physically protect your computer system. The discussion continues this month with a look at fire extinguishers and fire suppression systems.)

Recommendation 3: Purchase a halon fire extinguisher and consider putting in a halon automatic fire suppression system.

When dealing with fires in or near computer equipment, no type of fire extinguisher equals the convenience, safety, and effectiveness of halon gas. Halon is preferred for electronic equipment due to

its unique chemical action. It will not damage your equipment. Conversely, all other types of fire extinguishers have the potential to damage computer equipment.

For example, a BC-rated (flammable liquids and electrical fires) dry chemical extinguisher discharges a fine sodium or potassium bicarbonate powder throughout the entire computer room atmosphere. The discharge material is corrosive, and powder particles suspended in the air have the potential to enter non-sealed disk drives. Worse still, ABC-rated dry chemical extinguishers (the A-rating includes paper and wood fires) contain an ammonium phosphate powder that changes to a hard-to-remove paste when it comes in contact with a fire.

Pressurized water extinguishers drench your equipment, and can cause electrical short circuits. Soda acid extinguishers, which are still found occasionally in older buildings, have all of the shortcomings of water extinguishers and are corrosive as well.

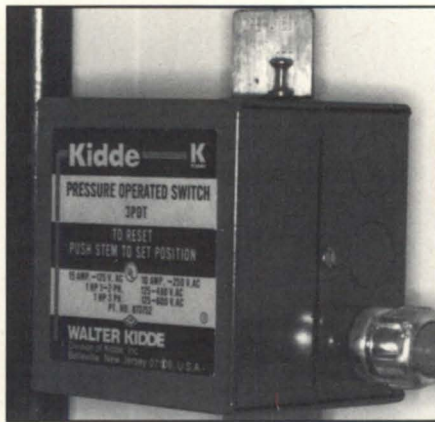
Carbon dioxide CO₂ gas is preferred to water and dry chemicals for electronic equipment fires, yet it has several important shortcomings. CO₂ extinguishers are pressurized to about 900 pounds per square inch at room temperature. When a CO₂ fire extinguisher is discharged, the gas expands rapidly and cools to sub-freezing temperatures (lower than -110 degrees F). This cooling effect is so pro-

nounced that the CO₂ freezes, producing a snow of dry ice.

As the cold gas and dry ice snow come into contact with hot equipment, the equipment may suffer thermal shock. The effect is similar to what happens to heated marbles when dropped into ice water. Rapid uneven cooling cracks the marbles, and the same thing can happen to the circuitry within your computer.

In addition, because CO₂ displaces oxygen in the closed environment of the computer room, the atmosphere may become toxic. This is not as much of a problem with hand-held fire extinguishers as with automatic CO₂ systems, which typically are designed to create a 40 percent gas concentration. Considering that a 9 percent concentration of CO₂ is about all most people can stand without losing consciousness in a few minutes, the magnitude of the safety considerations become apparent.

Halon, too, is a pressurized gas. It differs from CO₂, however, in that only a 5 to 7 percent concentration of gas will put



This pressure switch senses when halon gas is discharged, and cuts power to all equipment in the computer room.

out a fire. This results in a number of advantages over CO₂. The typical halon gas cylinder is pressurized to 360 pounds per square inch at room temperature with a mixture of halon and nitrogen. (The nitrogen is present only to provide a gas pressure sufficient to rapidly force out the halon.) The lower pressure of halon results in a higher discharge temperature that is much less likely to cause thermal

shock. Another advantage of halon in a hand-held extinguisher is that it weighs half as much as CO₂ for a given fire suppression rating, making the extinguisher easier to handle.

Halon is nontoxic in most situations. Thus, at the recommended 5 to 7 percent concentration it is safe for people to breathe—enough oxygen is left in the environment to support the user's life.

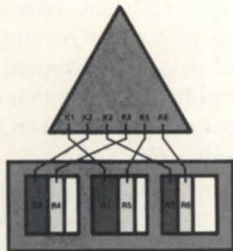
Halon works differently than other extinguishing methods. It does not deprive a fire of heat, fuel, or oxygen. Instead, it chemically interferes with the combustion process. Halon is a heavy gas that gives it a peculiar property. Similar to the way that breathing helium (a light gas) makes your voice high-pitched, the pitch of a person's voice in a room full of halon is lowered in pitch.

Halon fire extinguishers cost anywhere from \$20 to \$200. Automatic fire suppression systems, while costing quite a bit more than fire extinguishers, offer around-the-clock protection. As an example of what you might expect to pay for an auto-

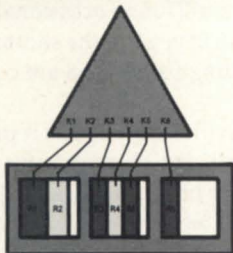
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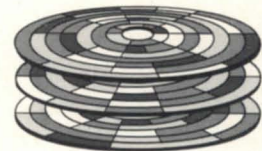
Before reorganization: Modifications have made the INFOS file disorganized. As each record is accessed, a different page must be read from disk. A large amount of I/O is required, and INFOS performance is poor.



After the VS.TOOLBOX: Data records have been re-written sequentially. During sequential processing, each page must be read from disk only once. The amount of I/O is reduced, and INFOS performance is improved.

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matic halon system, we were able to equip our 350-square-foot computer room for about \$6,000. This includes control panel, smoke detectors, audible and visual alarms, halon supply, discharge testing, installation, and integration into the building's fire alarm system. Our system also signals the fire department, and cuts power to all equipment in the computer room in the event of a discharge. Automatic halon systems are complicated in operation. A precise sequence of events must occur before gas release can take place.

Despite its many advantages, halon is still not perfect. The disadvantages to having an automatic halon system include its relative expense; and non-intentional gas releases, while rare, do occasionally happen. Halon itself is considered detrimental to the ozone layer. (The U.S. Environmental Protection Agency has implemented the recommendations of the Montreal Protocol as of January, 1989, which place certain restrictions on halon usage.) Halon is effective only when proper procedures are followed—for example, if the door to the protected area is propped open during a discharge the halon will dissipate and be ineffectual in putting out the fire.

The advantages, of course, are fire protection even during unattended operation, and probably a reduction in your fire insurance premium sufficient to pay for the system in three to five years.

If you decide to get an automatic halon system be sure that the purchase price includes a full discharge test (test gas is acceptable over halon for the discharge test, and even preferable due to environmental considerations). The test should include all phases of operation, in sequence. In addition, halon sensing equipment should be placed in the computer room so that gas concentrations can be monitored in three places: close to the floor (or under a raised floor), mid-level height, and near the ceiling. If the specified concentrations are not achieved at one or more levels, or if the graphs of halon concentration over time show substantial leakage, the problem needs to be corrected before acceptance.

Can it Happen to You?

Imagine this scene: it's 8 a.m. on a glorious Saturday, the start of a three-day weekend. You have just awakened and

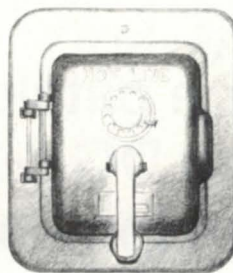
are peacefully sipping that first cup of coffee. Your court is reserved at 10 a.m.; you've still got time to scan the sports page and grab a quick bite of breakfast before setting off for the club.

The previous evening, just before you left work, you had submitted a number of long jobs to the batch queue of your \$500,000 MV/Super-Screamer computer system. As fast as your machine is, the

jobs still take quite a while to finish. You are confident that your computer system is safe and secure. After all, your company has 24-hour security guards, and your machine is locked up tight in an environmental cocoon of tempered, humidified air.

Switch scenes to your office, outside the building. Without question or warning, a person or persons unknown sees

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the outside evaporator unit of your computer room air conditioner cycling on and off, and turns off its power switch!

Perhaps it's the newly hired security guard trying to implement those cost saving measures. Perhaps it's a passerby meaning no harm, or teenage busybodies, or even a sinister competitor set out for sabotage. It doesn't matter why or how. All that matters now is that this one

senseless act has initiated a precipitous chain of unalterable events that is destined to ruin your weekend.

At first, nothing happens. Then, slowly but surely, the 50,000 BTUs of heat your Super-Screamer belches every hour begin to take their toll.

Without its outside evaporator coil and fan to extract heat, the internal pressures within your air conditioner's freon sys-

tem reach dangerous levels and its safety switch trips, shutting off the compressor. Meanwhile, the AC fan continues to blow ever warmer air over your delicate electronics.

Within the hour, the temperature in your computer room has reached 120 degrees. No one hears the sonalert alarm on your dedicated air conditioner (after all, your security guard has three other buildings to cover and is taking extra long to make his rounds this Saturday because he has to stop every few offices to cut off the lights).

Back at your house, breakfast is finished. Before departing for the club you decide to dial up your Super-Screamer to see if those batch jobs have finished. Your modem answers and you log on. But then, nothing. You can't even get a prompt.

This is really odd. It has never happened before. Something is wrong, but what could it be? Probably nothing to worry about, but just in case, you decide to make a quick detour by your office on your way to the club.

As you walk down the dimly lit corridor, your first indication that things are worse than you thought is the piercing high-pitched shrill of the sonalert alarm emanating from the locked computer room. When you insert your key and try to turn the doorknob, your hand involuntarily recoils from the heat. You somehow manage to get the door open only to have the heat from a searing blast furnace envelop your face. Well, maybe not quite a blast furnace, but the metal surfaces are too hot to touch comfortably. You cut all power and begin the long process of repair, replacement, and recovery from backup.

Is it just a bad dream, or can it really happen? Take my word for it, it can really happen, and although the non-essential facts in this story have been embellished somewhat, a similar experience happened to us a few years back.

What was the damage? Actually, remarkably little considering temperatures were above 120 degrees. An IAC in our MV/10000 had to be replaced, and one of our nine Argus drives failed. We were lucky. But we did learn a lesson. And it won't happen again. Δ

John Coan is an information systems manager at the State of North Carolina Department of Insurance.

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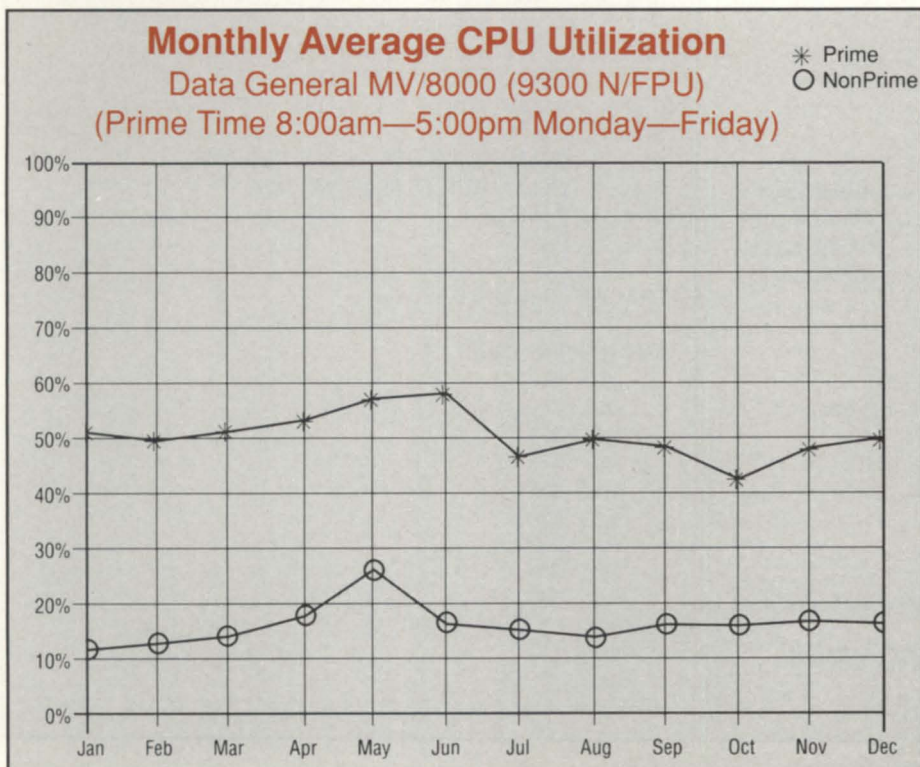
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The plot thickens



could not be done. Most of these little things were not project stoppers, but rather inconveniences that kept the project from looking totally professional.

Since those early years, both Present and Trendview have evolved. Unfortunately, Present still does not support all the capabilities that Trendview offers. Some of these items are:

1. The ability to produce a Present line plot that allows alphanumeric items on the x-axis. Only the Present bar chart option allows this.
2. The ability to add additional text to the chart and also control the text's position, color, font, or size.
3. The ability to control the position, color, font, or size of the legend on the chart.
4. The ability to select the x- or y-axis' reference lines, and percentage features.

A case of using Trendview to Present a better image

by David K. McGowan
Special to Focus

Imagine that you had just spent several hundred hours developing an in-house report/plotting system when you saw the Data General SE produce similar results during a half-hour demonstration of Present/Trendview? Don't despair, there were probably a lot of little things that your system accounted for that Present did not. In fact, why is it that many software products look and feel good during a demonstration, but suddenly give you a different feeling once you procure the product and start to use it? I guess the saying, "Don't go grocery shopping on an empty stomach," could also apply to selecting computer software.

From the moment Present/Trendview landed in our international office back in 1982, we began to notice little things that

These are just a few of the items that I can think of. If one would go through the latest Present and Trendview reference manuals, I'm sure that more could be found. So what can you do if you really need these capabilities?

Since most computer professionals enjoy finding a better way to do something, the term "work-around," coined probably around the time that man was created, has done as much for the data processing community as the ENIAC. The term work-around in itself is not necessarily an indication of a bad product. A bad product is one that after several months of work, paints you into a corner and then gives you no other alternative. The ability of a product to offer flexible solutions is a very important quality and, if possible, should be taken into consideration during the product's evaluation.

A product's flexibility can be difficult to measure, however, especially if we approach it in a single-minded fashion. If someone were to ask you what Present did and you responded, "It's a report writer with limited plotting capabilities," then there is a good chance that you could be suffering from the near fatal single-minded syndrome that claims hundreds of data processing projects each year.

Object generator

The key words here are "report writer." If you only think in terms of report creation, then that is all you will get for your efforts. But if we step back and look at the product as an object generator, we can paint a different picture. Why does it have to be a report? Why not have Present create a Trendview com-

mand file, an IBM JCL file, or a wordprocessing or spreadsheet text input file?

My department was asked to produce monthly comparison plots of computer resource statistics. Knowing that Present would not allow alphanumeric items, (Jan, Feb . . .), to be plotted on the x-axis of a line chart, another alternative was solicited. One

Figure 1: Contents of the file "CMON.MTH.CPU.PLT.PR.MAC"

| | |
|---|--|
| <pre> INPUT FILE 19XX.CRMON.PRIME FORMAT 19XX.CRMON.DF PAGESIZE 500 LINES 132 COLUMNS NOHEADERS TITLE 1 'RESET ALL' TITLE 2 'SERIES "Prime" &' TITLE 3 'DATA &' PARAMETER @TO_MM DISPLAY "Enter To Month (01-12):" " LITERAL length 2 @TO_YY DISPLAY " Year (19nn):" " LITERAL length 4 @FROM_MM DISPLAY " From Month:" " LITERAL length 2 @FROM_YY DISPLAY " Year:" " LITERAL length 4 COMPUTE RD_DATE = INT((RD_YEAR * 100) + @MONTH_CODES(RD_MTH)) COMPUTE TO_DATE = INT((@TO_YY * 100) + @TO_MM) COMPUTE FR_DATE = INT((@FROM_YY * 100) + @FROM_MM) SELECT (RD_DATE <= TO_DATE AND RD_DATE >= FR_DATE) COMPUTE CPU_USAGE = 100 - AVG_IDLE_PC BREAK AFTER RD_MTH "" RD_MTH COL +0 "" COL +0 CPU_USAGE PIC ZZ9.99 COL +1 '&' COL +1 TOTAL 2 "TITLE_1 'Monthly Average CPU Utilization' FONT MEDIUM" TOTAL 3 "[TITLE_2]" TOTAL 4 "LEGEND ON POSITION .855 .815 SIZE SMALL" </pre> | <pre> TOTAL 5 "Y_AXIS RANGE 0 100 MAJOR_TICKS 10 GRID ON PERCENT ON" "REFERENCE 55" TOTAL 6 "X_AXIS TITLE" "Period: " MIN(RD_YEAR) COL +0 "-" COL +0 MAX(RD_YEAR) COL +0 "" COL +0 "FONT BOLD GRID ON" TOTAL 7 "TEXT '(Prime Time 8:00am-5:00pm Monday-Friday)' " "POSITION .22 .815 SIZE SMALL" TOTAL 8 "MARKERS ON" TOTAL 9 "LINE" TOTAL 10 "DEVICE '?CMON.MTH.CPU.PLT' TYPE D450" TOTAL 11 "[?CMON.MTH.CPU.NONPRIME.TVS]" TOTAL 12 "[DEVICE]" TOTAL 13 "DRAW" PRINT ON ?CMON.MTH.CPU.TV TABLE @MONTH_CODES "Jan" "01" "Feb" "02" "Mar" "03" "Apr" "04" "May" "05" "Jun" "06" "Jul" "07" "Aug" "08" "Sep" "09" "Oct" "10" "Nov" "11" "Dec" "12" </pre> |
|---|--|

Figure 2: Contents of the file "CMON.MTH.CPU.NONPRIME.PR.MAC"

| | |
|--|--|
| <pre> INPUT FILE 19XX.CRMON.NONPRIME FORMAT 19XX.CRMON.DF PAGESIZE 500 LINES 132 COLUMNS NOHEADERS TITLE 1 'SERIES "NonPrime" &' TITLE 2 'DATA &' PARAMETER @TO_MM DISPLAY "Enter To Month (01-12):" " LITERAL length 2 @TO_YY DISPLAY " Year (19nn):" " LITERAL length 4 @FROM_MM DISPLAY " From Month:" " LITERAL length 2 @FROM_YY DISPLAY " Year:" " LITERAL length 4 COMPUTE RD_DATE = INT((RD_YEAR * 100) + @MONTH_CODES(RD_MTH)) COMPUTE TO_DATE = INT((@TO_YY * 100) + @TO_MM) COMPUTE FR_DATE = INT((@FROM_YY * 100) + @FROM_MM) SELECT (RD_DATE <= TO_DATE AND RD_DATE >= FR_DATE) COMPUTE CPU_USAGE = 100 - AVG_IDLE_PC </pre> | <pre> BREAK AFTER RD_MTH "" RD_MTH COL +0 "" COL +0 CPU_USAGE PIC ZZ9.99 COL +1 '&' COL +1 PRINT ON ?CMON.MTH.CPU.NONPRIME.TVS TABLE @MONTH_CODES "Jan" "01" "Feb" "02" "Mar" "03" "Apr" "04" "May" "05" "Jun" "06" "Jul" "07" "Aug" "08" "Sep" "09" "Oct" "10" "Nov" "11" "Dec" "12" </pre> |
|--|--|

Figure 3: Contents of the files "?CMON.MTH.CPU.TV" and "?CMON.MTH.CPU.NONPRIME.TVS"

| | |
|--|--|
| <p>RESET ALL SERIES 'Prime' & DATA & 'Jan' 51.01 & 'Feb' 49.95 & 'Mar' 51.89 & 'Apr' 53.06 & 'May' 56.54 & 'Jun' 56.95 & 'Jul' 46.00 & 'Aug' 49.66 & 'Sep' 48.25 & 'Oct' 43.18 & 'Nov' 48.15 & 'Dec' 50.03 &</p> <p>TITLE_1 'Monthly Average CPU Utilization' FONT MEDIUM [TITLE_2] LEGEND ON POSITION .855 .815 SIZE SMALL Y_AXIS RANGE 0 100 MAJOR_TICKS 10 GRID ON PERCENT ON REFERENCE 55 X_AXIS TITLE 'Period: 1987-1987' FONT BOLD GRID ON TEXT '(Prime Time 8:00am-5:00pm Monday-Friday)' POSITION .22 .815 SIZE SMALL</p> | <p>MARKERS ON LINE DEVICE '?CMON.MTH.CPU.PLT' TYPE D450 [?CMON.MTH.CPU.NONPRIME.TVS] [DEVICE] DRAW</p> <p>***:</p> <p>SERIES 'NonPrime' & DATA & 'Jan' 12.94 & 'Feb' 14.18 & 'Mar' 14.79 & 'Apr' 17.16 & 'May' 26.32 & 'Jun' 15.53 & 'Jul' 15.08 & 'Aug' 13.97 & 'Sep' 15.81 & 'Oct' 15.42 & 'Nov' 16.08 & 'Dec' 14.87 &</p> |
|--|--|

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solution to this problem was to tell Present to create a bar chart. After Present was done, SED was used to modify the .TV command file (created via the PRINT ON statement), and replace the BAR command line with the desired LINE command. Then Trendview was run again to reproduce the plot. This technique, which ran in batch, worked but added too much overhead.

The best approach to the problem was to have Present create the Trendview command file as if it were a report. Once Present was done, the command file was taken straight into Trendview. This work-around gave us the ability to create any type of Trendview plot. It is true that a multiple series plot requires a separate Present macro to be processed against the same file for each series, but it also allows for information to be pulled from different files. Furthermore, an INCLUDE file could be created to take a large detail file to a summary level that could be utilized by these plotting macros that only required summary data. Another advantage of this technique was that Trendview was only PROCed up once to produce all the desired plots as opposed to Present PROCing Trendview for each Present macro.

The Present macros presented with this article are run in batch with all the necessary parameters supplied from the Present command file. The first macro (Figure 1) builds the "Prime" series for prime time CPU utilization and the necessary Trendview commands to define the type of plot and reference the series file created via the second Present macro (Figure 2). Building the Trendview series is the most difficult part of this

approach. Since the information to be plotted is already summarized by month, only the Present BREAK command is required to build each data point.

The second Present macro will only build the Trendview "Nonprime" series file and uses a different input file. Notice that the PRINT ON statement refers to the same filename as the previous macro's TOTAL 11 line.

The PAGESIZE and NOHEADERS commands are necessary so that page breaks and headers are suppressed. The PAGESIZE amount should always be set larger than the number of report

Figure 4: Contents of file "TITLE_2":

```
TITLE_2 'DATA GENERAL MV/8000 (9300 N/FPU)' FONT BOLD
```

```
Contents of file "DEVICE":
```

```
DEVICE TYPE D450
```

and total lines that are to be generated. After reviewing the macros in Figure 1 and Figure 2, wouldn't it be nice if Present would allow external macro files for storing common commands and tables? Upon execution of the above two Present macros, the two output files in Figure 3 are created.

Trendview is then executed, referencing only the first output file on the command line. The second output file will be brought into Trendview via the bracket, [], command file reference. The two other external command files that are referenced, [TITLE_2] and [DEVICE], are used to override the plot's title and device type. Since our area supports six different MV class processors, this technique enables us to only have one Present macro to service all sites. Since each site's capacity information is stored and processed in different directories, the TITLE_2 and DEVICE files must also exist in each (Figure 4).

The format description file, .DF, used for the two Present macros was the same although the physical files were different. The fields used in the macros were defined in the 19XX.CRMON.DF file as follows:

```
05 RD_YEAR          UNPACKED DECIMAL UNSIGNED (4,0),
05 RD_MTH           CHARACTER LEFT JUSTIFIED (3),
05 AVG_IDLE_PC      FLOAT DOUBLE,
```

The Trendview device file, "?CMON .MTH.CPU.PLT," will contain the D450 graphic output commands. Utilizing an in-house program, HPRAST, this file is processed and sent to the HP Laserjet for processing. You can see the results in the chart on the first page of this article.

It's amazing what can be done with a product when looked at in a different perspective, especially before one starts a project. Stealing a little thunder from HP, one should ask "What if?" Eventually, DG will integrate Present and Trendview more fully. In the meantime, keep on sending DG those Requests For Enhancements and share your ideas and techniques with others. Doing these two things will ensure that everyone can benefit. Δ

David K. McGowan is a systems engineer for OXY USA in Tulsa, Oklahoma.

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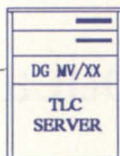
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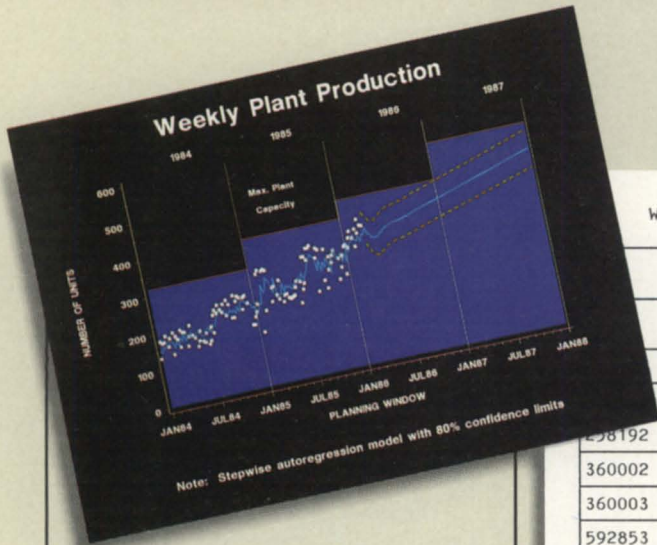
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| Rate | Lots Tested | Rejected Lot Statistics | Mean | Percent |
|------|-------------|-------------------------|------|---------|
| | | Lowest Highest | | |
| 30 | 4 | 1 4 | 2.5 | 0 |
| 40 | 6 | 1 6 | 3.5 | 33 |
| 50 | 6 | 3 8 | 5.5 | 66 |
| 60 | 6 | 4 9 | 6.5 | 83 |
| 70 | 7 | 4 10 | 7.0 | 85 |

One-way ticket

ICobol rev 1.50

General Admission

When you move up to ICobol rev 1.50, don't plan on going back

I've just loaded ICobol rev 1.50, and I've got my debugger back! For those of you who don't use DEBUG much, 1.30 and 1.40 had a bug that would not let you display COMP fields. I use DEBUG a lot, and this was like cutting off my right arm. I don't use COMP fields in working storage, for speed reasons, but I use them almost exclusively in file structures, for space reasons. Not being able to view them was a definite handicap.

That's the good news, and there's more to come. The bad news is that the move to 1.50 is, for all intents and purposes, a one-way move. Don't plan on going back a rev if you don't like this one. Allow me to elaborate.

Data General has increased the maxi-

mum size of the index file to 4 GB, allowing you to put more records into an ISAM file than any sane person ever would. In order to do this, rather extensive changes were made to the filing system. To run under 1.50, you will have to run the new MINISAM_CONVERT on all of your files. A move in this direction may be automated by using Brian Johnson's BUILD macro:

```
BUILD/ENAME FILES_TO_CONVERT +XD
MINISAM_CONVERT/A=CONVERTED_FILES
((FILES_TO_CONVERT))
```

By the way, the first change I made on this system was to add a %0/% after the REORG statement in MINISAM_CONVERT.CLI. You *bet* I want an audit trail of this procedure!

If you want to go back a rev, DG recommends the following: ANALYZE the file you want to convert, delete the .NX portion, rename the .XD portion to a file

with no extension, use the old REORG to rebuild the file, specify keys, key lengths and positions, and number of records, and then delete the file with no extension. What's that? You say you have *how* many files? Well, better plan on shutting the system down for a couple of weeks. Or plan on sticking with 1.50, once you get there.

The other problem with the file conversion is disk space. I've got a bunch of large history files sitting out on one of the drives, and, since I'll never be writing to them, I used COLLAPSE to pack them to 99 percent key density to improve access time and decrease disk space. Since MINISAM_CONVERT uses REORG to convert the files, it automatically packs the keys 50 percent full. This resulted in an increase of 60 percent in the size of the .NX files, and an increase in my disk usage from a barely acceptable 80 percent to an unacceptable 93 percent. No problem, right? Just run COLLAPSE on . . . whoops. No COLLAPSE. No REBUILD. A new facility called ICOMPACT will be available in 1.51, but that doesn't do much good now.

The file structure change has rendered inoperable all of the code written by those of us who like to fool around with header records. My UNDELETE program (*Focus*, March 1986) doesn't work any more. Since the number of deleted records is being carried in the .NX, logically undeleting a record in the .XD without updating the number of deleted records will cause ISAMVERIFY to flag it as a corrupt file. Gerry Manning's CSISAMFIX, which is floating around a few thousand installations, gives incorrect information. If you try to change a file using CSISAMFIX, I guarantee that it will corrupt it. For some unknown reason, DG—even though it hasn't changed the size of the .XD header,

and even though there were some 400-odd unused bytes in it—has put the revision number at the front of the file. Anyway, archive these programs until we have time to update them.

But on to additions and enhancements. The two additions to 1.50 are the ACCEPT <id> FROM ENVIRONMENT, and the WRITE/REWRITE IMMEDIATE.

ACCEPT <id> FROM ENVIRONMENT returns a wealth of information. The structure is as follows:

- 01 ENVIR-STRUCTURE.
- 03 SYSTEM-CODE PIC 9(2).
- 03 REVISION-CODE PIC 9(2).
- 03 PROGRAM-NAME PIC X(28).
- 03 PID-NO PIC 9(5).
- 03 CONSOLE-TYPE PIC X(1).

SYSTEM-CODE returns a 1 for AOS /VS, and a 2 for MS-DOS. REVISION-CODE returns, and I quote, "the revision level of the environment information," which is currently 00. What that means, I don't know. CONSOLE-TYPE returns a "V" for virtual, "W" for workstation terminal, "C" for console, "B" for batch, or "T" for Telnet.

This is going to be immediately useful. System developers can tailor their code for MS-DOS or VS, and then execute particular portions depending on SYSTEM-CODE. PROGRAM-NAME is something that I've been wishing for. I'd like to put the name of the program that's currently running on the screen, and on all of the printouts. Ever have a program bomb out, and couldn't figure out which one was to blame? Here's an easy way, and all I have to do is add a few lines in my DECLARATIVES section. Given a little time to think, I'll figure out something useful to do with the other data.

The other addition is the WRITE/REWRITE IMMEDIATE. This will force all updated pages associated with the file—including those in use by other terminals—to be flushed to disk. Although I'll be using this one sparingly, I will be putting it into certain critical applications that aren't time-dependent. It is much slower than a regular write. Writing 1,000 random records takes 8 seconds normally, and 98 seconds using IMMEDIATE, or a 1,200 percent increase. Realistically, though, that still breaks down to less than a tenth of a second per WRITE. In an interactive program, it would never be noticed.

As an aside, just to see how far ICobol has come (and how spoiled we've become), I dragged out the same benchmark for ICOS 4.20 on my CS-40. One thousand WRITES in only 225 seconds!

Fixes and enhancements

There are two new MINISAM global servers, MLS and EMLS. MLS will handle PIDs less than 513, and 511 unique ISAM files open concurrently. EMLS will handle PIDs less than 4,096, and 4,096 concurrently open files. This should be adequate for the foreseeable future. Of course, I'm the same guy who couldn't figure out why any micro needed more than 64K memory. If this isn't sufficient for your needs, I'd really like to hear from you, or at least send you a copy of my resume. Server lock counts have also been increased from 32 per file to 100.

The new file structure has resulted in some other changes. The number of deleted records is now being kept in the .NX header. This means that ANALYZE will now tell you the number of deleted records without asking, and without taking hours to read through the entire file to do so. ANALYZE has been enhanced with four new global switches that will allow it to be efficiently used in batch mode.

ISAMVERIFY has been renamed ICVERIFY. The new ICVERIFY outputs some useful additional information, such as number of records examined and number of deleted records. Number of deleted records comes in handy if—like me—you're a little remiss in doing REORGs to clean up your files. Now I can look at a printout of the verify of files used yesterday, and take the appropriate action if the number of deleted records is getting large. ICVERIFY also includes two new global switches: /B causes those files with the reliability bit set to be reported, but not verified; /R reports and verifies files with the reliability bits set. It is also no longer necessary to specify relative or indexed files—that information is now kept in the .NX header, and ICVERIFY will determine the file type.

ICVERIFY will also handle multiple filenames, and no longer deletes the audit file after each use. Now you can use BJ's BUILD macro and do the following:

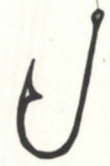
```
BUILD/ENAME/AFTER/TLA=[!DATE] +.XD FILES_
TO_CHECK
```

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All Data General users in Mississippi who are not yet Mississippi Data General Users Group (MS-DG-UG) members should join soon and plan to attend the August meeting. If you are already a member of MS-DG-UG don't let the August 3 meeting pass you by either. At this important meeting, MS-DG-UG will be holding a drawing for a free registration to the NADGUG conference in New Orleans September 18 - 21.

Besides exciting drawings with fantastic prizes, you have a lot to gain from MS-DG-UG. You'll be able to mix and mingle with other Mississippi DG users and established those very important contacts and networks. Programs are designed around those subjects that are most important to you as a Data General user.

Don't miss your big chance! Come out on August 3 to the Dixie National Life Bldg., 155 North, Jackson MS. For more information on MS-DG-UG membership contact Thomas Bounds, McCarty Farms, P.O. Box 366, Magee MS 39111, 601/849-3351.

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ICVERIFY [FILES_TO_CHECK] AUDIT.LIST/A

and you will get coherent output. Best of all, when writing to an audit file, ICVERIFY no longer writes to the file each time it processes 100 records—just at the end of each key. And to top it off, the TLM is no longer changed unless it is necessary to update the reliability bits. I'd consider this utility a done deal—it now does everything that I want, and it's quick. Good job, DG!

REORG will now set the ISAM file element size, using the form `NX_SIZE:XD_SIZE/Z`. DG has also returned some of the tape handling facilities that it removed when porting REORG from RDOS to AOS/VS—you can now specify a blocking factor using the `/B` local switch. Now if they'll just put back ASCII-to-EBCDIC conversion, I'll stop submitting STRs. REORG also has a `/C` global switch to convert files from the old filing system to the new. If only DG had included a switch for going back the other way, I wouldn't have lost so much sleep.

Miscellaneous language enhancements

As I mentioned in my last column, underscores no longer terminate an accept. This means that you can now have a file in `dir OLD_FILES`, and `ANALYZE` will accept the name without flinching. The only current restriction is that trailing underscores are replaced with spaces. An interesting bug/restriction/whatever has cropped up with this one. Say you're using some code that looks like this (and if you came from MCBA, you are):

```
77 ULINES PIC X(5).
SCREEN SECTION.
01 ITEM-1 LINE 1 COL 1 PIC X(6) FROM ULINES
TO DATA-NAME.
01 VALUE-ITEM-1 LINE 1 COL 1 PIC X(6) USING
DATA-NAME.
DISPLAY ITEM-1, ACCEPT ITEM-1.
DISPLAY VALUE-ITEM-1.
```

In 1.50, if your `ULINES` field is longer than or equal to your `ITEM-1` field, you'll have no problems. If it's shorter, a CR will work just fine, but a NL or function key will leave the trailing underlines in `ITEM-1`—which is not what you wanted.

All 01 and 77-level data items are now word-aligned. For the vast majority of you, this doesn't matter. For those of you doing your own system calls or using `SCREEN DEMON`, this means that it no

longer matters where you put these data items.

Removals and good riddance

ICEDIT is dead! Someone finally got tired of maintaining all of that stupid code! DG has included the source code for ICEDIT in this release, and it will be gone from the next. I suppose that I should be philosophically opposed to the deletion of code that someone, somewhere, is still using—but I can't seem to get too upset about ICEDIT. It was a dog when I first saw it in 1978, and on AOS/Vs it's a dog without the limited justifiability that it had under RDOS. SCREEN, ICINQUIRE, and XICINQUIRE are also going away in the next revision. Just when I finally got ICINQUIRE to work . . .

As mentioned before, COLLAPSE and REBUILD have also disappeared. I still haven't figured out exactly what REBUILD was for, so I can accept that. Coming from RDOS, I'd never seen a version of COLLAPSE that actually worked until this one. It's kind of a nasty trick to yank it without a replacement until 1.51.

On the whole, however, I'm extremely pleased. I usually try to avoid releases that end in a zero, but 1.50 seems to be as bug-free as anything that DG has ever released. I've been running it for two months now, and it's made it through month end—and anything that makes it through month end around here must be pretty solid. A round of applause to DG for an upgrade well done.

P.S.

I just received rev 1.51 of ICobol, which includes the new ICOMPACT utility. This is a big improvement over COLLAPSE. It provides a useful screen showing exactly what it is doing. The program allows you to specify whether logically deleted records are to be physically deleted, as well as packing densities for each key. This was obviously a major (if not complete) rewrite, and I'm glad to see that it got out so quickly to users. Now I can get that disk space back. Δ

Tim Boyer is EDP Manager at Denman Tire Corporation. He may be reached at P.O. Box 951, Warren, OH 44482, 216/898-2711 or on the NADGUG bulletin board at 415/924-3652.

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Emulation sensation

Softerm allows custom script writing, transfer between computers

by Richard Hankins • Special to Focus

When deciding which terminal emulation and file transfer products to use, the most important step is to determine your requirements. At our site, we determined that the following options were needed:

- The product should be able to perform true D410 terminal emulation at 19.2k baud;
- The terminal emulator should be accessible from any program;
- The software must contain a user-friendly method of transferring files.

We began by reviewing four different products: CEO Connection, Blast, Smarterm, and Softerm. CEO Connection had problems emulating all of the D410 functions. Blast didn't contain a D410 emulator. Smarterm had a good emulator, but we didn't like the file transfer interface. After several weeks of research, we decided to purchase Softerm.

Softerm can be executed two different ways, depending on your requirements. If you need only terminal emulation and file transfer, then you should not load the entire Softerm system. By not loading the entire system, considerable memory is saved. However, if you need the ability to transfer files from within existing applications, then the full system is required.

The complete Softerm system contains several different modules, each with a distinct purpose. The most important is the communications agent. This program, which always resides in memory, allows

the PC to process files and commands in the background while allowing the user to continue to work in other programs. It also contains a script language containing several programming features, such as file processing and conditional logic.

The file agent sets up file redirection with the host computer and allows most PC software to read and write files to your DG computer. The default file redirection sent with the package is for pseudo drive letters "P:" and "Q:". In most cases, the user will need to add additional drive identifiers to handle Wordperfect, DOS, and graphic binary data files. We also modified the script files to force our users to enter the username and password at logon, instead of storing them in the script file.

The background mail monitor informs the PC user if any messages have been received from the MV or other computers. If you edit the "bmailmon.com" file, you can customize the monitor to ring the bell when a message has been received, instead of just displaying a message on the screen.

Finally, the terminal emulator can be loaded into memory or executed as a standalone program. If the program is loaded into memory, it can be called from any program by using any user-defined hot keys. Even if the user decides against loading the terminal emulator into memory, it is still possible to communicate with the MV from any program by using the TTY emulator that is built into the communications agent.

The terminal emulator also contains options to allow for keyboard translation. Using this method, it is possible to map the DG Wordperfect function keys to the PC function keys.

Multiple messages

A nice feature of this software is its

ability to communicate with four computers at the same time. For example, you could be transferring a file from your PC to your DG at the same time you are running terminal emulations on another DG or other computer.

My office is hooked to two computer systems. One contains financial data and the other is used for pipeline control. Even when I'm working on the pipeline control computer, Softerm will notify me if any message has been received from the financial computer. It is also possible to transfer a file from my PC to the financial system or even to another PC while doing terminal emulation to the pipeline control system.

Custom files

The ability to write custom script files is the best feature provided by Softerm. The script language is a pseudo-programming language that allows file processing as well as screen processing. The script language could be used to send a Wordperfect E-Mail message to another user, print a file in the background, or create a simple calculator.

Our site uses script files along with the file agent for several different tasks. The most used script file allows users to print files on laser printers that are attached to our MV/7800 XP directly from any PC program. Unlike using a LAN (local area network), the user doesn't have to know printer commands. To print a report from Lotus, the user selects the output file option and enters "S:HPLASER.P16." Softerm will upload the file to the DG and execute the proper commands to send the file to print in portrait 16 pitch on the HP laser printer.

Both Wordperfect (4.2, 5.0) and Planperfect can be configured to send files directly to the MV in binary mode using the file agent redirection. The MV then

queues the documents to the correct printer. Note: printing using this method does not use printer redirection. All LPT ports are still available for use on the local PC. Applications that require output to be sent to an MS-DOS printer port will not work.

Softerm can also be used for other PC tasks unrelated to the MV. A good example is an application that requires the user to wait while a document is being printed. A few of our secretaries use Volkswriter III, which ties the computer up while documents are being printed. Printing on IBM Quietwriter IIs may take 15 minutes to an hour to complete. The secretary now tells Volkswriter to print to disk file "L:filename." As soon as the file has been copied to disk, the document begins to print and the user is free to use the PC again.

Auto fax

Another application we developed is an automatic fax package. This application allows any user logged on to the DG to fax a document to any of our customers. It works by creating a file and associated phone number, then building a macro that is passed to a special batch stream. When the batch job becomes active, it sends a "GO" message to the PC using the CLI send command. Softerm on the PC waits until it receives this message, then executes an MS-DOS batch file that will download the file and execute the proper command to fax the downloaded document. After the PC has faxed the document, Softerm is automatically recalled to wait for another request.

While Softerm is an excellent product that can be used in a variety of ways, it has some problems, including a low level of technical support. Also, be warned that the manual included with the software is very technical. It requires several hours of reading to grasp the functionality of the system. Another problem is that Softerm only uses limited file redirection, and does not support the PC directory command. Other vendors, such as Rational Data Systems, handle true file and printer redirection. Δ

Richard Hankins is a computer specialist with Explorer Pipeline. He may be reached at P.O. Box 2650, Tulsa, OK. 74033.

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How to spot a good engineer

And how to keep one once you find one
(Hint: Stock up on Jolt Cola and Cheetos)

This month I'm going to dispose of a cluster of scraps of paper recently impaled on the topic spike. None of them were big enough items to make a column by themselves, so I just let them accumulate until they reached critical mass. Critical mass was achieved late yesterday afternoon.

:FIELD_SERVICE

Several people have asked me recently to advise them on alternatives for servicing their systems. Generally, my advice goes something like this: the specific engineer involved is more important than the company behind that engineer. Price fades in comparison. It only takes one or two unnecessary afternoons of being down for the lost productivity and salary costs to erase whatever gains you may have realized by going with a low-priced service vendor. Then again, a high-priced service vendor does not necessarily guarantee better service and less downtime. As I said, it all gets back to the specific engineer involved.

So the next question usually is, "How can I be sure that the engineer assigned to my account will be a good one?" You can't. But there is something you can do to spot a good engineer when one shows up, and to keep one once you find one.

To spot a good engineer just ask yourself the following questions:

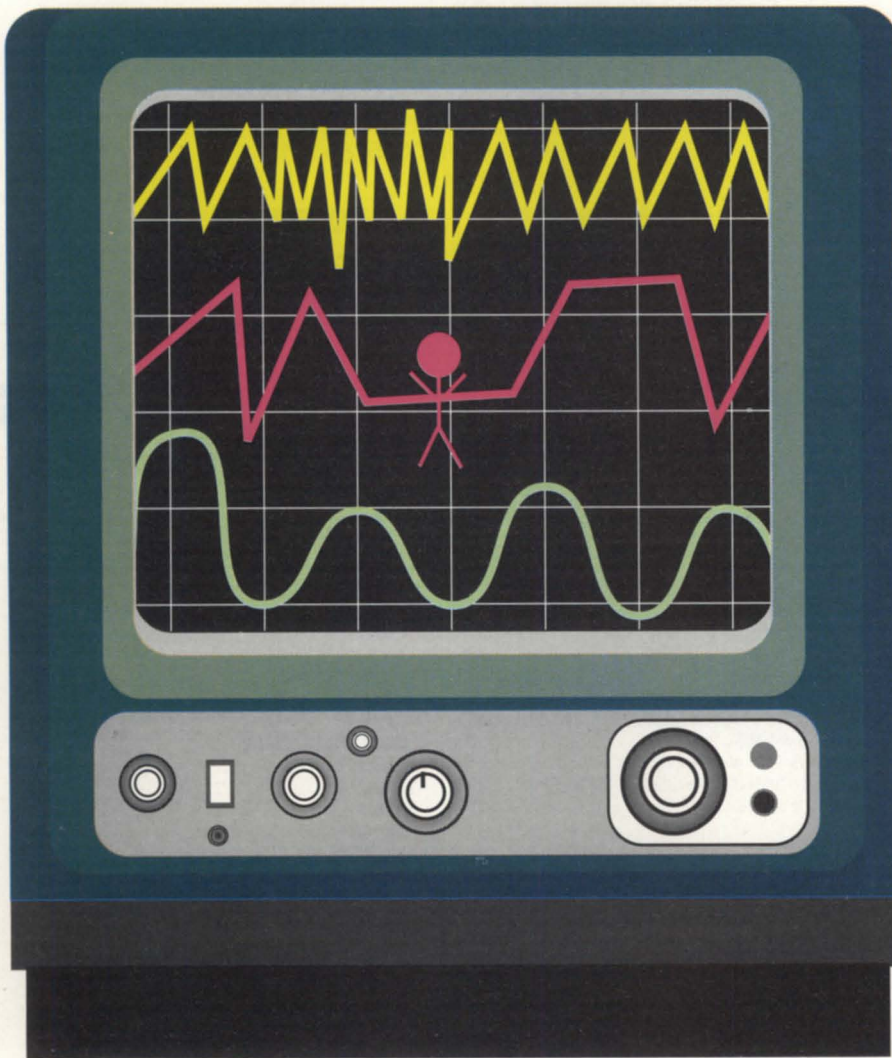
Are many of your service calls direct results of problems not completely fixed during a previous visit?

Are many of your service calls a direct result of problems introduced during a previous visit?

Are any of the panels on your cabinets currently off?

Are any of the cable connectors on the back of your processor missing hoods?

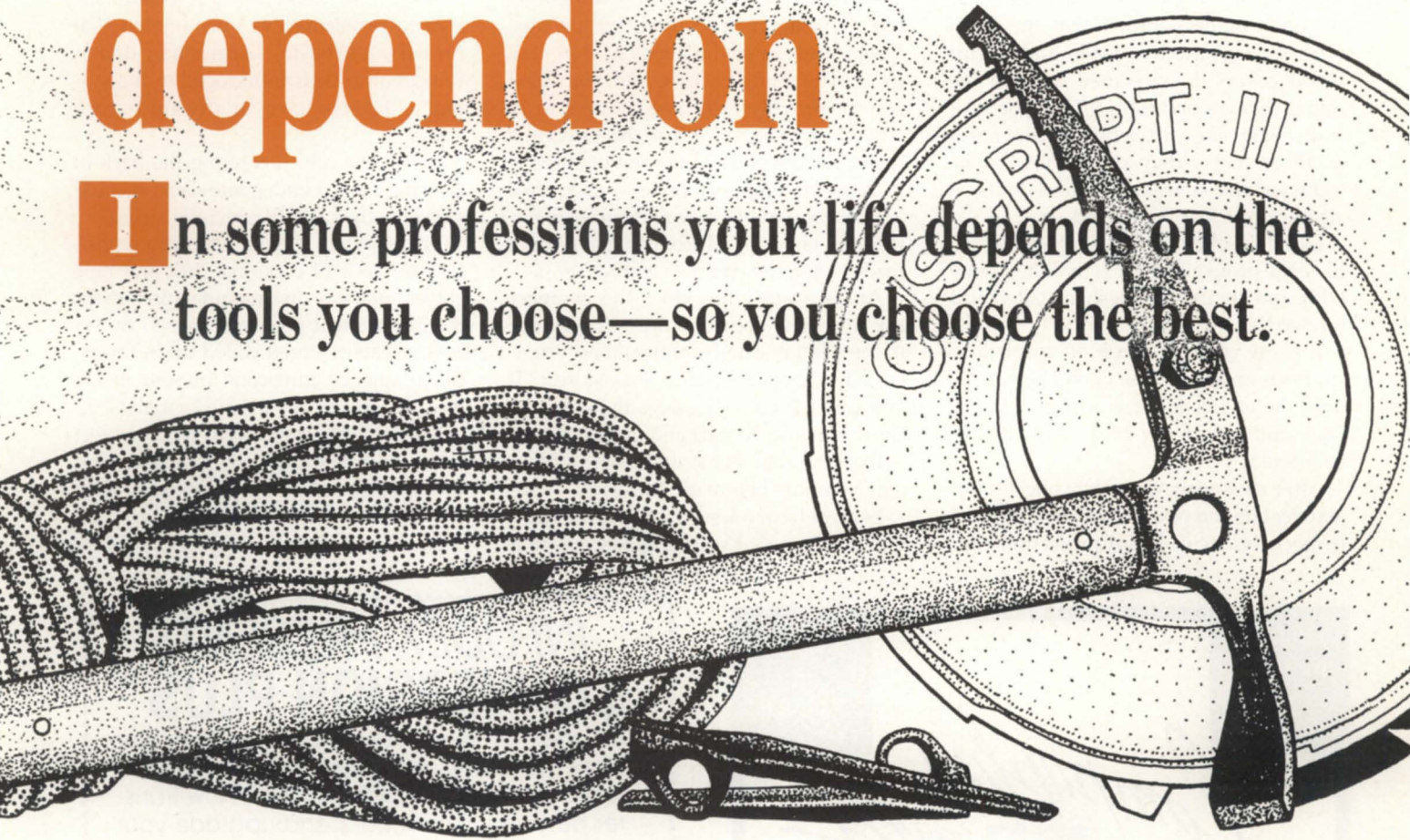
Are all the cable connectors (new style DB connectors) on the back of your system screwed in and/or attached to strain relievers (especially cables to the older



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style paddleboard connectors)?

When you need to unscrew a cable connector from the panels in the back of your system or from the back of a terminal, do you first have to spend a day at the gym building up your arm muscles? A good engineer knows that the small screws on connector heads and circuit board covers are designed to keep the things they connect from *falling* apart, not from being *pulled* apart by kids and other small animals—they don't need to be tightened the same way the head bolts on a pickup truck are tightened.

Do all the circuit boards in your system have the protection covers that they came with, and are they properly installed and screwed on?

Are the covers broken off from their supports on any of your circuit boards, or does the engineer carry a tube of Super Glue and repair any broken covers encountered?

After each visit, does the collection of leftover bits and pieces of hardware grow? (Especially circuit board protection cov-

ers and the little black screws that hold them on.)

After each visit, does stuff disappear (e.g., the diagnostic tape, schematics, or service manuals that arrived with your system)? If the engineer says something like "You don't need this stuff anyway, I'm the only one who needs it," don't fall for it. The stuff is yours, and your next service provider will need access to it. Anyway, chances are that the next time the engineer needs it, it won't be there.

Does the engineer review your error log files as part of every preventive maintenance visit? (And do you have them ready when the engineer arrives?)

At the same time, does the engineer ask to review your operator's log binder to see what crashes or unusual occurrences have happened since the last visit? If you don't keep a log, does the engineer show you how to start and maintain one?

Does the engineer struggle with a problem for hours before escalating it?

Do you have a long-standing intermittent problem that your engineer has told

you to just learn to live with?

After a circuit board is removed and repaired, do you ever see it again? A good engineer will return your board and reinstall it during the next preventive maintenance visit. Some day I'll recount the bizarre problems I've encountered that turned out to be quirks caused by under-rev circuit boards introduced to the system as loaners to cover a board out for repair.

Do all the cables entering the back of your system have adequate slack; or could you play the cable like a violin string?

Is the bottom of your cabinet a repository for coils of excessive disk and tape cables? Ask any disk manufacturer about the intermittent problems caused by excessive cables stored coiled up in the radio frequency hurricane present inside most power supply-infested cabinets.

Does the engineer *always* write-protect *all* of your disk drives before powering the processor down, and especially before running any diagnostics?

Does the engineer always try to read a

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known good tape (single drive systems) and run a tape interchange test (multi-drive systems) before pronouncing a tape drive healed? I use the latest AOS/VS release tape as my "known good tape." Don't use a tape previously written on your drive. Especially, don't use a diagnostic tape the engineer brought from another system.

Does the engineer take off before you've rebooted and logged back on?

Does the engineer fix any of the problems mentioned above, no matter who caused them?

Does the engineer try to explain problems and what their causes may have been, or does the engineer just treat you like an ignorant jerk who wouldn't be interested in "all this technical stuff?"

Okay, so now you know how to spot a good engineer. What can you do to make sure that engineer is the one permanently assigned to your account? That's easy; become the engineer's favorite account.

Find out what the engineer's favorite soda pop and snack food are, and stock up on them. Provide the engineer with a desk and a phone to use while on-site. Invite the engineer to lunch (at a time convenient to the engineer). Put the engineer on your Christmas card list. Send a birthday present. In short, do whatever it takes to make sure that whenever this engineer thinks of you, the memories are fond ones.

I have one client who did exactly these things. Later the engineer quit and went to another service organization. My client immediately switched his maintenance contract to the engineer's new employer.

What do you do if the engineer is assigned other accounts and you are assigned somebody new? Easy; if the new one is good, make this engineer a pal, too. If the new one is a Bozo, then call your account manager and threaten to switch vendors unless you get your pal back. If that doesn't work, switch vendors. You have nothing to lose. At worst, you'll get somebody just as bad as the Bozo they tried to force on you.

Footnote: Bozo is a registered trademark of Larry Harmon.

:AOSVS_7.64:TIDBIT

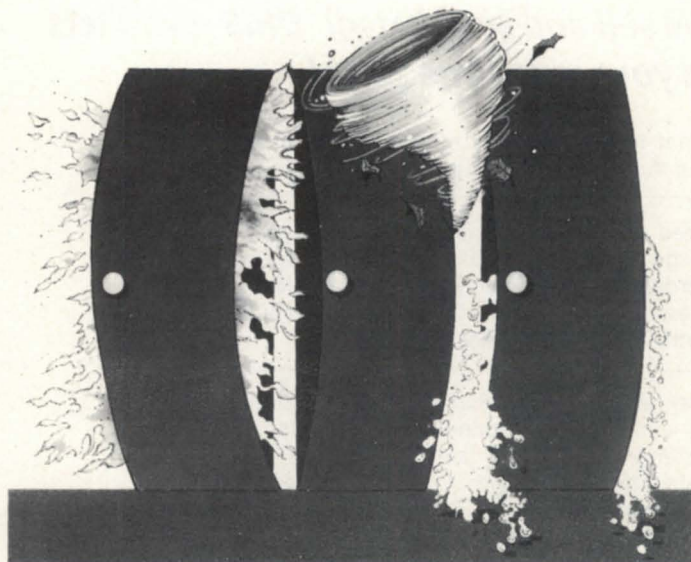
If you've experienced problems with terminals wrapping at column 79 instead of 80 in the CLI and in SED, or if you've had trouble editing long lines (longer than

80 columns) in SED, then chances are that you've been wondering, like I have, how the AOS/VS group could have screwed up the terminal wrapping logic this late in the ball game, and not noticed before the software got out the door. Well, it turns out that the terminal wrap logic in PMGR is just fine; the new PED might be the culprit. I say might be, because I have not completely tracked the problem down

yet. I just know that resetting my terminal window after running PED makes the problem go away.

PED now checks your terminal ID in order to determine if your terminal is capable of compressed mode. If your terminal supports windows (D4xx series), then PED apparently sets up a 79 column-wide window—if all the stuff you've asked for or defaulted will fit on an un-

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compressed screen. Unfortunately, PED doesn't seem to reset your terminal to 80 column mode when it exits. Tsk, Tsk.

Add the following line to the end of the standard :UTIL:PED.CLI macro to solve the problem:

```
WRITE [!ASCII 236]FJ[!ASCII 236]FX004?
```

Unfortunately, those of you who XEQ

PED instead of using the macro will still see the problem. The only solution for you is to either start using the macro, or make a macro called D4XX.CLI that does the above command and remember to use it after exiting PED.

Around our shop, our full D4XX.CLI macro is a little fancier; you may want to consider using it in place of the WRITE command above, so here it is:

```
[!EQUAL,%/W/WI/WID/WIDE%,]  
WRITE [!ASCII 236]FJ[!ASCII 236]FX004?  
CHARACTERISTICS/CPL=80  
[!ELSE]  
WRITE [!ASCII 236]FK[!ASCII 236]FX0086  
CHARACTERISTICS/CPL=135  
[!END]
```

D4XX/WIDE puts your screen into true wide screen mode (unlike the N/C function key that changes the screen but not the margin or the /CPL= value). D4XX by itself puts your screen back into normal mode.

:STOP_PRESS:INFOS_5.00

Normally, I have this policy that I don't install any piece of software when the last two digits of the revision number are "00." Well, AOS/V5 INFOS 5.00 and RIA 2.70 arrived yesterday and I was intrigued by several items in the release notice that claimed that "significant" speed increases had been realized by eliminating some unnecessary packet and data movement back and forth between ring 4 and the caller's ring. The Infos tape was also accompanied by an RIA 2.70 tape whose release notice claimed an improvement in remote Infos performance by virtue of "streamlining" the interface to the network.

The appeal of these two claims and the chance availability of one of the MV/4s last night (it was in standby mode running on only its system disk due to the failure of its second disk controller) caused me to go ahead and temporarily install the new releases on the crippled system.

"Significant" appears to translate to about a 50 percent increase in the rate at which records can be written randomly, and an 85 percent increase in the rate at which existing records can be read sequentially. That's pretty impressive. I don't know who back at DG is responsible, but I'll buy the first couple of rounds the next time we find ourselves bellied up to the same bar.

Ever since getting egg on my face over being unable to duplicate test results on the XLPT CPU consumption, I'm a little more rigorous these days about keeping track of my test scenarios. For those of you who want to duplicate these tests, here's the procedure:

Use ICREATE to create an Infos data base; select the default for everything but

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duplicate keys (Y).

Use SORT (I used 3.30) to read :UTIL:PARU.16.SR (I used 7.64's) as data-sensitive records and COPY (not SORT!) them to the data base using the entire line as both the record and the key.

Use SORT to read the data base records and COPY (not SORT) each record to @NULL as a variable length record. Use the "Copy Pass" CPU times for comparison.

Because Infos' system call load is low, and because SORT has little to do other than issue Infos calls (because I COPYed, not SORTed), the CPU time reported by SORT can be safely assumed to be 99 percent attributable to Infos in ring 4. Using :PERFMGR's CPU histogram during the test runs bore this out.

Here are the actual results for processing a 6,375 record PARU.16.SR file on the MV/4:

| | Pass | CPU | Recs/sec | |
|-------|-------|-------|----------|------|
| 4.30: | WRITE | 03:06 | 34.3 | |
| | READ | 01:55 | 55.4 | |
| 5.00: | WRITE | 02:03 | 51.8 | +51% |
| | READ | 01:03 | 101.2 | +83% |

Bear in mind that these results are for a relatively small data base and, as they say at the Harley dealer, "Your mileage may vary." If past history is any indication, the speed at which Infos reads and writes slows as the data base grows in size. I didn't have a chance to check the new rev against the old rev on a huge data base before the deadline for this column. Maybe one of you will do that and call me with the results

I also didn't have time to do any tests on the new RIA, mostly because it would mean upgrading the entire network to the new revs of Infos and RIA, so I don't have any news to report. RIA is not that critical to us anyway because we appreciate the fact that remote data base accesses are always going to be considerably slower than local data base accesses; so we avoid all but casual access to remote data bases. "Casual" means not often, and not time critical.

:UPDATE:INFOS_5.00

As luck would have it, *Focus* didn't dial in and pick up my column for 48 hours. Earlier today we took a chance and installed Infos 5.00 and RIA_2.70 on all three systems on the network. Several

hundred heavy Infos batch programs have so far run with only one difference; they run a lot faster. Yippee!

:REMOTE_V.S._LOCAL

Speaking of networks, that brings up another item of conversation that keeps recurring when programmers meet over a sud or two. I keep hearing network programmers and users complaining that

networks are so slow. They seem to think that as soon as the hardware designers come up with a light-speed LAN rig, all their network performance problems will go away. Dream on.

The real problems are that networks: a) were designed for "casual" (same definition as above) exchange of data, and b) are not a substitute for local peripherals and processors.



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By becoming a member of HADGUG and attending regular meetings, you will meet other DG users who are only a phone call away when you have a question or problem with your system. You will also be the first to hear all the news about Data General's new products and policies. With Data General's support and your interest, the Houston Area Data General Users Group will be a valuable source of information and contacts. If you haven't already been informed of HADGUG's activities, contact Jeff Campbell 713/853-9308 or Lee Jones 713/681-2308 for details.

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Let me give you an example of why a networked application will never be as fast as a non-networked application. Suppose you had two MVs connected together using an infinite speed connection (metallic wire, optical fiber, laser beams, or microwave guide, take your pick), and the connection was yours to use exclusively. Would a disk access across this network come anywhere near the speed of a disk access to a local disk? Of course not. The networked disk access is going to take the cooperation of at least eight pieces of software; the operating systems on both nodes (several reschedules on both nodes and a trip through the disk driver on the remote node), the network software on both nodes, the network link drivers on both nodes, the application program on the local node, and the surrogate program on the remote node. This is somewhat akin to reading a disk with the assistance (?) of a committee.

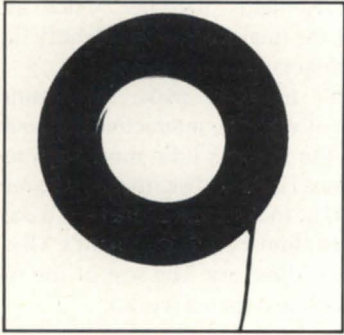
What about networked users called across a net to run a program? The same analysis done on disk I/O holds for the terminal I/O, but the situation is even worse when the program does its I/O using small fields. Each request has to make a round trip over the net (the request and the response). Gak! Now crank the link back down to sub-light speed and add a pile of other network users fighting you for access to the network. . . .

Three quarters of the popularity of local area networks these days is directly attributable to the lack of multi-programming facilities under MS-DOS. LANs are the easiest way to simulate a multi-programming system using MS-DOS constrained PCs.

The moral of this story: just as with disk I/O, the best way to speed up network accesses is to avoid doing them in the first place. Δ

BJ is the President of B.J. Inc., a San Francisco-based consultancy specializing in system auditing, system management, and performance analysis. :SYSMGR is a division of B.J. Inc. BJ can be reached at 109 Minna St., Suite 215, San Francisco, CA 94105, 415/550-1444. The :SYSMGR bulletin board number is 415/391-6531 (1200/2400 with optional MNP level 4, CHAR/605X/AUTO-BAUD) or 415/550-1454 (voice).

A complete listing of the NADGUG software library



All NADGUG members interested in receiving the NADGUG software collection should send a 1,200-foot tape to:

Randy Berndt

American Urological Association
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MV/2000 and MV/1400 users should send one tape cartridge. Software contributions should be sent to the same address. Be sure to include your membership number. (Special thanks to Kevin Danzig for help with preparing the MV/2000 cartridges.) Allow 4-6 weeks for delivery.

People with AOS/VS rev 6 should send a 2,400-foot tape and specifically request DUMP_II instead of the usual compressed version. The decompression program is rev 7 specific.

Please include a self-addressed envelope with sufficient return postage. In compliance with postal regulations, do not date the postage. Either disable the date printing completely, or set the date to "--" or zeros.

Big Brother

Automatic log-off program written in Fortran 77. Donated by the U.S. Forest Service. 181 blocks.

B.J.'s BBS contributions

This addition to the library consists of about 20 items, including various programs, documentation, and macros. Some of the more interesting items include the :SYSMGR benchmark suite, a continuous incremental backup, a clean-up file maintenance program, a program to find strings

in files, and a type-backward program. 5,749 blocks.

Black Jack

Kim Medlin of Data General presented this at the Las Vegas conference. 15,079 blocks.

CRTEDIT

This is the old RDOS screen editor ported over to VS. 51 blocks.

DBCHECK

This program checks the open status of an INFOS file and examines the check-pointing status of a file. 230 blocks.

DUMpload

DUMpload is a Macintosh program to dump and load AOS/VS-compatible dumps on a Macintosh. 140 blocks.

ERP

A process-termination program developed by NASA and modified by Manville. In Fortran 77. 338 blocks.

FILEMNGR

With this new version, you can move, copy, delete, view, and perform several other options faster. This is distributed as shareware. If you try it and continue to use it, you are requested to pay a registration fee. From Kim Geiger. 459 blocks.

FTNCVT

This is a Fortran 5 to Fortran 77 translator. 287 blocks.

Games

Games is a collection from various places. A new version of Conquest has been added as of April '89. 19,516 blocks.

Glossary

Glossary is a program from John Grant that builds a list of words used in a document and shows where they are used. 416 blocks.

IMSLUTIL

This is a collection of CLI macros, Cobol routines, and assembly routines callable from Cobol. By IMSL of Houston. 6,154 blocks.

JAG_UTIL

JAG_UTIL consists of several programs: Filecount, Userspace, Scan, and Laminate. 1,501 blocks.

Kermit

Kermit is a file-transfer protocol developed at Columbia University. Uses 9,328 blocks.

Logout

Another auto log-out system. 246 blocks.

Look

Look is used to view text files. It allows you to move forward and backward in a file. This program was donated by Data

General. 438 blocks.

Macros

This is a collection of macros from various sources. 452 blocks.

MENUDIR

This is an initial user menu that can chain to other applications. It features a password-control system. From the Fed SIG. 492 blocks.

Misc Kerm

An expanded version of AOS Kermit, this now includes other versions of Kermit including DG/One Kermit. 6,298 blocks.

Notify and Prior

Two contributions from Concept Automation. Notify tells you when a process has terminated. Prior lists the priorities of processes. 273 blocks.

QHelp

QHelp is a tree-structured help facility. 2,277 blocks.

RDOS Kermit

Now available. You must request the Kermit tape (rather than the library tape) to get RDOS Kermit.

SKLSCRN

This is the Cobol standard entry screen featured in George Burns' article that appeared in the April 1988 issue of *Focus*. 385 blocks.

Softrans

This is a file-transfer protocol written in Fortran 77. It's used to communicate with proprietary PC communications packages. 496 blocks.

Spell

Can check the spelling of a word or spell-check a document. Submitted by Richard Kouzes. 5,163 blocks.

SWITCHES

SWITCHES is the GET.SWITCHES routine from John Grant's column in *Focus*. 1,297 blocks.

TEX 2.25

TEX (Terminal Emulator with Xmodem) is a terminal-emulation program written by David Down. He has recently revised the TEX software to include a command language. TEX is being distributed as shareware. At the end of 30 days, either remove it from your system or send the author a \$45 fee. 495 blocks.

VT100KER

VT100KER is the VT100 emulator from John Grant. 1,135 blocks.

Xfer

Xfer is a tape-conversion utility. 653 blocks. Δ

Lend me your oars

Backups, a bug fix, and software support

Imagine that you are formatting a new disk on your MV/2000. Just after you start the surface analysis, you realize that the machine is formatting the *system* disk, not the new disk. You cancel the job, but it's too late. The surface analysis has written over enough of the system disk to have effectively erased it.

One of our clients found himself in this situation. He was equipped with a menu-driven backup system and could have used it to replace his software, applications, and data. He *could* have, that is . . .

Up the creek

Unfortunately, the client had not used his backup system on a regular basis. In fact, he had backed up only one of two data directories, and had an old systape from a system upgrade five months prior. The backup tapes made five months ago when testing the menu-driven system were lost.

Looking for a paddle

His system software backup was five months old. Half of the data was two days old, and the other half of the data was 10 months old. The application software had not been backed up since the conversion from RDOS nearly three years ago. About half a person-year of maintenance had been performed on the application during that time, and the backup that was available was done before the conversion was finished.

No paddle? Use a stick.

It took several hours to recover all of the data files and program files from the damaged disk. As it turned out, only the

root directory, the diagnostic area, part of the util directory, and some of the middle of the disk, had been overwritten. Most of the data files and program files were on the disk. I just needed to find the directory entries and RIB blocks. Once that was done, it was just a matter of piecing the file elements together. Once assembled, the final step was to identify the files by their contents.

(I don't mean to make this sound simple, but with the interactive software I wrote, the job was little more than tedium. Once I got the disk image on to our MV/4000, it took a little more than a day to recover almost all of the client's XBASIC source directory. The rest of the recovery took less than a week.)

The moral of the story

It's been said that you can lead a horse to water, but you can't make it drink. Likewise, you can give your clients (or users) a simple, menu-driven backup system, but you can't make them use it.

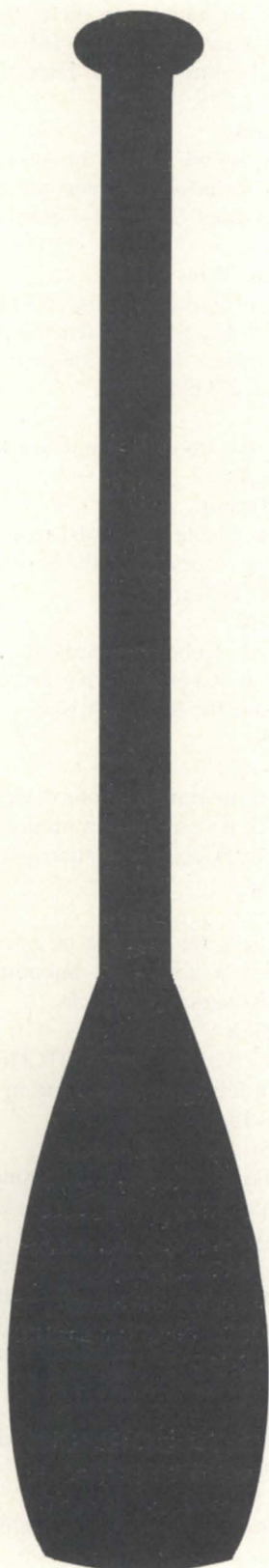
In order to protect your investment in software and data, you must not only have a good backup strategy, you must practice it. Just what is a good backup strategy? That's what I intend to cover in this month's column.

What do I back up?

Everything. But in order to make life easier, start with a checklist of your directories at the root level. Decide how often the contents of each directory change. This will give you some idea of how often the contents of that directory should be backed up.

Some directories such as :UTIL and :SYSGEN only change during system software update cycles (maybe one to four times per year). Others, like :MACROS, may have regular changes, but the changes are normally so insignificant that a couple of backups a month should suffice. Others, such as a :PRODUCTION directory, may have subdirectories in several categories and should be best handled from inside the directory.

Once you have separated your directory tree into frequency groups, then you can look at how they are logically related and decide what utilities would best serve your site.



What strategy does one use?

That depends. Each system manager must develop a set of backup standards and see that they are adhered to. The two most important factors in designing your strategy are your off-line media and filing system. Note the emphasis on off-line. I ran into a site once that had a disk unit partitioned as DPF0 and DPF1. The system manager was unaware that a third-party controller made his system emulate two disks, while in reality there was only one drive in the unit. The system manager used PCOPY daily to move data from one "disk" to the other. Imagine his surprise when he lost the disk and had to go to the previous month-end backup. You can get into a similar situation with mirrored disks if you never copy them to off-line storage.

Magnetic tape is the only type of off-line storage that is widely used for backups, although there are other forms that are starting to become practical. Standard 1/2-inch reel-to-reel magnetic tape is currently the mainstay for a variety of reasons, but the use of cartridge tape is on the rise. Most PC users rely on floppy disks, while most mini vendors recommend tape. The early system 32s from IBM had 8-inch floppies for backing up the Winchester disk. A single full backup of a loaded system took 10 hours and several hundred floppies! For the purposes of this article I will assume you are using standard magnetic tape.

The other major factor in determining a backup strategy is how your application works. For example, if you use Infos as your filing system, you should take into account whether or not you have differential file mode, comlog, or any of a myriad of other factors that will affect your plan. Disk mirroring is available to anyone who can afford redundant hardware. This adds a whole new set of options to the backup plan.

Pick your backup utility

The software that is used to copy your system to off-line media is probably the most-often discussed part of the process. I prefer to use DUMP_II or the equivalent CLI DUMP, DUMP_2, or DBRDUMP. This allows me to perform most of my backups while the system is running. I prefer to avoid PCOPY or its equivalents under AOS/VS. DUMP_II runs just as fast, and it gives you the ability to retrieve single

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files and, if properly handled, to perform most of your backups during system uptime.

The best strategy uses a combination of methods in order to prevent total reliance on any one utility. After all, many people were relying on DUMP and DUMP_II for months before it became widely known that the early MV/2000 cartridge tapes were unreliable, and that even DUMP and

DUMP_II couldn't overcome the problems inherent in the system. I wrote some backup systems for a client that would write a tape with DUMP_II and then read it back with LOAD_II/N to make sure that the tape was legible. Approximately one out of every eight backups on his system had to be redone because the output couldn't be read back in.

I'm starting to run out of space, so next

month I'll continue on this topic, including a discussion of hardware.

A bug in VS/Cobol?

Before I get into too much trouble, I want to state that I have found what I consider to be a problem with AOS/VS Cobol. I thought I remembered reading about it somewhere, but I couldn't find it. Either way, bug or restriction, it bears being reminded about occasionally.

If you have a numeric data field with no sign, it is treated as if it is signed. For example, the following code produces the output of the word "TRUE."

```
01 GROUP-A.
   05 NUMBER-A PIC 99 COMP.
01 GROUP-B.
   05 NUMBER-B PIC S99 COMP.
...
MOVE -10 TO NUMBER-B.
MOVE GROUP-B TO GROUP-A.
IF NUMBER-A < ZERO
  PRINT 'TRUE'
```

If you check the contents of NUMBER-A it will be negative. You can display NUMBER-A and it will print "-10." You can not move a negative value directly to NUMBER-A. In the case of a group move (as occurs when reading a record from a file), there is no validity check on the data.

The only thing I found that was even close to this situation was a warning that COMP-3 data is always signed and thus always has a "C" or "D," never an "F," as the last hexadecimal digit internally. I will be filing an STR on this and keep you posted on the response. I have reproduced this under both 3.20 and 3.30 Cobol.

A bug in B32

We are currently running revision 7.039 and 7.040 of B32 at various client sites. Linnea Levy of Data Group, Ltd., isolated and fixed a bug in the BUILD_INDEX utility. This bug manifests itself when using the B32 INDEXBLD to create an index. It uses IBUILD instead of KADD to make it run faster. On some occasions if you have duplicates and the index you are building doesn't allow them, the utility will generate multiple entries for the same record. In one case it generated over 3,400 index entries for a record. This doesn't happen all the time. Linnea suspects it works fine unless the duplicate

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falls at the cut-off point for an index block.

All records do get added to the index, so random access with K FIND is not a problem. Reading the file sequentially with K NEXT will retrieve the offending record many times and you may suspect your program has gone into the dreaded infinite loop. Never fear, it will come out eventually; but if you were printing statements to your customers at the time, one guy is going to be a little mad about the size of his bill.

The old code in BUILD_INDEX is:

```
2060 PRINT "Duplicate . . .
2070 END IF
2080 LET LAST_K$=KEY$
2090 END IF
2100 GOSUB 10100 : Add a key
2110 NEXT KEY_REC
```

The corrected and tested code for BUILD_INDEX is:

```
2060 PRINT "Duplicate . . .
2070 ELSE
2075 GOSUB 10100 : Add a key
2080 END IF
2085 LET LAST_K$=KEY$
2090 ELSE
2095 GOSUB 10100 : Add a key
2100 END IF
2110 NEXT KEY_REC
```

I thank Linnea for this information. Users should watch the Maxon newsletter for additional information.

Software versioning

When DG announced its software versioning strategy last year, the company claimed that other manufacturers follow the same policies. Since I don't deal with any other manufacturers, I had no way to verify this. I recently received an interesting letter from the Unigraphics User Group. I now have information about another manufacturer that has joined the versioning bandwagon.


In Unigraphics version 6 a feature called "CURVES HIDING CURVES" was developed. McDonnell-Douglas decided to

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charge an additional \$2,000 per module above and beyond the normal software maintenance contracts for version 6 of Unigraphics. The letter was not clear if this feature was the "excuse" (reason, cause, deciding factor) for the additional charge for this version, but Unigraphics users have found themselves in the same position as DG users.

The letter speaks for itself with the fol-

lowing: "During the last 3 1/2 years . . . we were told that hidden curve and hidden line removal . . . software enhancements would be coming. For the last 31/2 years we've paid over \$18,000 in software maintenance. We think that it's a completely untenable marketing position . . . to ask us to pay for this software enhancement that has been promised for a long time." Δ




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Life with the Buffers

Queuing up for a great performance



The story so far

In our last episode, Mr. and Mrs. Single and Double Buffer had many children. One particular child, whose stories are rather interesting, is Bill Buffer. Bill Buffer was introduced to Mary Memory, and after a short time they were getting queued with each other. Once they were linked together, they were virtually inseparable. Bill Buffer had a steady job; whether he actually worked or not, he was responsible for holding down any data that Mary Memory could manage. Mary's work, on the other hand, kept shifting her from active duty to waiting on the dole queue. Life, as we shall see in this month's episode, goes on . . .

Creating the headers and buffers

By last month's definition, buffers are large, and the entity called the header is relatively small. (As an example, in dealing with tape drives, 16 KB and 32 KB buffers are not uncommon.) Since the headers are so small (typically, only a few words long), it makes sense to acquire the memory for them from the Heap. In C programs, this is accomplished by calling the "alloc" function, or one of its variants.

It is probably not a good idea to get the memory for the buffers from the heap, for several reasons:

The buffers are large (creating a performance issue);

It could cause unnecessary fragmentation of the heap;

The buffers are possibly going to be used with the BLOCKI/O functions and, therefore, it would be nice to align them with page boundaries. If they come from the heap, it would be tough to control their alignment.

(Remember: since the actual number of buffers to be used might not be known until runtime, we do not allocate them from "global" memory.)

Main() listing

Figure 1 shows fragments of the main() function, and demonstrates one of the ways in which these requirements can be met, along with a few other tidbits. The first of the two trivial samples shows how to get the PID number for this invocation of the program by using the ?PNAME system call, and the second finds the main task ID with the ?MYTID call. The sample then illustrates how to determine how much memory is really available (check your link switches!), by using ?MEM. This is a critical step, in that it returns the last used memory address, after which will come any memory that we acquire in the future with ?MEMI. Some simple testing and readjustment of the number of buffers is done, if required.

Building the headers and buffers

What is seen next in the listing is a simple way to build both the headers and the buffers in one easy loop (up to the maximum number of buffers desired). Taking the size of the header and calling alloc() gives us memory from the heap, pointed to by bh_ptr. The buffer, of a specified number of pages in size, is acquired by ?MEMI. The header is then filled out to link it to the buffer, and initialized to any other parameters as seen fit by the application. ?MEMI also returns the last used memory address, which shows where the next buffer starts. Once the spaces are made available from memory, the header is enqueued to the tail of a queue called the free_chain. This procedure is done until the required number of buffers and headers is acquired, or an error is encountered.

The actual work is done by the tasks that are started. The main() module can now do some of its own work, or wait for a message that indicates that all is done, at which time processing is complete. (Use of the intertask messaging was discussed in my May 1989 article.)

Reader() listing

The sample fragment for a task that reads is shown in Figure 2. The first thing it does is dequeue a header from the free_chain, giving us a buffer that is available for use. Should there be no headers on the queue, this task will wait for a message in the free_mailbox, and try again when a "postcard" arrives. When a header and the associated buffer become available, the loop is exited, and we now have a free buffer. The read request would then be built and performed (not demonstrated here), with the incoming data placed directly into the buffer. Any information

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Figure 1: Main() function

```

typedef struct buf_hdr {
    struct buf_hdr *fwd;
    struct buf_hdr *back;
    /* other things in header */
} BUF_HDR;

struct queue free_chain = {QNULL,QNULL};
struct queue write_chain = {QNULL,QNULL};

main(int argc, char **argv)
{
    BUF_HDR *bh_ptr;
    BUF_HDR dummy_hdr;

    /* get our PID so we can find our TASK ID */
    ac0 = pid_name;
    ac1 = -1;
    rac1 = &ac1;
    if (sys_error = sys_pname(ac0,ac1,rac1))
        fatal_error(SYSTEM_CALL_ERROR,"?PNAME",sys_error);
    else
        our_pid = ac1;

    rac0 = &ac0;

    rac1 = &ac1;
    rac2 = &ac2;
    if (sys_error = sys_mytid(rac0,rac1,rac2))
        fatal_error(SYSTEM_CALL_ERROR,"?MYTID on main()",sys_error);
    else
        main_id = ac0;

    /* find out how much memory we can get */
    rac0 = &ac0;
    rac1 = &ac1;
    rac2 = &ac2;
    if (sys_error = sys_mem(rac0,rac1,rac2))
        fatal_error(SYSTEM_CALL_ERROR,"?MEM",sys_error);
    num_free_pages = ac0;
    last_used_adr = ac2;

    if (ac0 < ( pages_per_buffer = tape_buffer_size >> KB_TO_PAGES )) {
        num_buffers = ac0 / pages_per_buffer;
        if (!num_buffers)
            fatal_error(NOT_ENOUGH_MRMORY,NULLBPTR,0);
    }
    else
        num_buffers = MAX_NUM_BUFFERS;

```

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```

/* get the memory for the buffers (and buffer headers)
   and put them on the free Q */

for(i=0;i<num_buffers;i++) {
  /* get a pointer to a buffer header
     acquired from heap memory */
  if (bh_ptr = (struct BUF_HDR *) alloc( sizeof( struct buf_hdr)))
    /* now get a buffer using ?MEMI */
    ac0 = pages_per_buffer;
    rac1 = &ac1;
    if (sys_error = sys_memi(ac0,rac1))
      fatal_error(SYSTEM_CALL_ERROR, strcat(" ?MEMI on
        buffer: ",
          otoa(i,octal_str),sys_error);
  /* stuff the address of the buffer into the header */
  bh_ptr->badr = (short *) (last_used_adr + 1);
  bh_ptr->num_blocks = 0;
  bh_ptr->start_block = 0;
  last_used_adr = ac1;
  /* and Q it onto the free chain */
  insert_tail(&free_chain,bh_ptr);
}
else fatal_error(SYSTEM_CALL_ERROR,"?MALLOC on

```

```

buffer_header. ",0);
}

/* start the various tasks */

if (mtask(task1, TASK1_STACK_SIZE, TASK1_ID, TASK1_PRIORITY))
  fatal_error(SYSTEM_CALL_ERROR,"Could not start task1 ",
    lasterror());
/* more task starts here
   ... */

/* something to wait for completion ...
   like wait for a final message */
ac0 = &final_mailbox;
rac1 = &ac1;
if (sys_error = sys_rec(ac0,rac1))
  fatal_error(SYSTEM_CALL_ERROR,"?REC from final_mailbox ",
    sys_error);

printf("\n\nProcessing complete.\n");
exit(0);
}

```

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regarding the identification of the buffer, starting byte or block number, sequence number, valid length of the buffer, etc., would be placed in the header.

When all of this management is done, the buffer header is sent to the worker task(s) by enqueueing the header onto the appropriate queue (in this case "write_chain"); then a message is sent to the tasks waiting at the "write_mailbox." (Note that ERXMT "Signal to address in use" is ignored.)

When the reader task has finished all of its work, it will get out of the "do { . . . } while (done == NO);" loop, and conclude by submitting an empty header to the write chain as a flag.

Writer() listing

Figure 3 shows the reciprocal code for a sample task that would handle the data that is in the buffers. (You are, by no means, restricted to just one type of handler task.) This sample starts, after the loop initializations, attempting to dequeue a buffer header from the write_chain. If one is not immediately available, this task stands in front of the mailbox, alongside any other tasks waiting on the same mailbox. When the notification from AOS/VS comes that mail arrived, the queue is checked again. It is possible that, yet again, nothing is in the queue. Imagine, if you will, 15 greedy tasks waiting for a single postcard to arrive. The doorbells of all 15 apartments are rung by the mail carrier at the same time. They all get out of bed and run to the warehouse to get the real parcel (the header). However, only

Figure 2: Reader task

```
void reader(int main_id)
{
    do {
        do { /* get a free entry */
            if ( bh_ptr = remove_head(&free_chain) )
                break;
            else { /* none available, then wait to be told about one */
                ac0 = &free_mailbox;
                rac1 = &ac1;
                printf("READER waiting for a free buffer.\n");
                if (sys_error = sys_rec(ac0,rac1))
                    fatal_error(SYSTEM_CALL_ERROR,
                        "?REC from free_mailbox ",sys_error);
            }
        } while( 1 /* FOREVER */ );
        /* we now have a free buffer */

        /* prepare and perform the read request
        ... */

        /* once it is done, fill the relevant parameters into the buffer header */
        bh_ptr->num_blocks = num_disk_blocks;
        bh_ptr->start_block = disk_block_num;
        /* etc */

        /* now enqueue the filled header onto the output queue */
    }
}
```

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```

insert_tail(&write_chain,bh_ptr);
/* and tell them about it */
ac0 = &write_mailbox;
ac1 = WRITE_SOMETHING;
ac2 = BROADCAST;
if (sys_error = sys_xmt(ac0,ac1,ac2))
    if (sys_error != ERXMT)
        fatal_error(SYSTEM_CALL_ERROR,
            "?XMT to write_mailbox ",sys_error);

    } while (done == NO);
/* we are done reading everything
... enqueue an empty header to signify the end */
bh_ptr->num_blocks = 0; /* no more blocks */
bh_ptr->start_block = 0;
insert_tail(&write_chain,tape_bh_ptr);
/* and tell them about it */
ac0 = &write_mailbox;
ac2 = BROADCAST;
ac1 = END_OF_THE_WORLD; /* wake'm up */
if (sys_error = sys_xmt(ac0,ac1,ac2))
    if (sys_error != ERXMT)
        fatal_error(SYSTEM_CALL_ERROR,"?XMT to final_mailbox ",
            sys_error);

mkill();
}

```

one of the tasks wins the race (unless subsequent parcels are delivered to the warehouse before they all get there), and the others are told to go home empty-handed. When they get back home, they go back to sleep, waiting for another card to arrive in the communal mailbox.

To the victor of the race, the job is to now take the information that is in the buffer header, and use it in a meaningful way. It *must not* remove or change the link between the header and the buffer, as doing so would cause the program to forget the location of the buffer. When finished with the buffer, this task would put it on the free chain, and send a message to the reader.

The message to the reader task is sent in case the reader is waiting for a free buffer. For maximum throughput, it is a good idea to have at least one buffer more than the total number of potential users of the buffers.

The writer task will finish processing when the flags (or other indicators) tell it to. The sample has the writer clearing the header, enqueueing for the next task, and after announcing it, killing itself.

Caveats

This caution is for those who expect to be able to type in this month's listings, and expect them to compile cleanly. Although the figures enclosed in this article do work (in several variations for various purposes), they have been stripped of all of the #include definitions, and almost all of the variable definitions.

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Figure 3: Handler task

```

void writer()
{
    int ac0,ac1,ac2,*rac0,*rac1,*rac2,sys_error;
    BUF_HDR *bh_ptr;

    for(;;)
    {
        do { /* get something to do. */
            if (bh_ptr = remove_head(&write_chain))
                break;
            /* got it! */
            else {
                /* WAIT for something to do */
                ac0 = &write_mailbox;
                rac1 = &ac1;
                if (sys_error = sys_rec(ac0,rac1))
                    fatal_error(SYSTEM_CALL_ERROR,
                        "?REC from write_mailbox ",sys_error);
                /* Someone is knocking. Go back up and see if they are
                still at the door. It could be that one of our neighbors
                got to it first, if so, then go back to sleep */
            }
        } while(1);

        if (!(bh_ptr->flags))
            break; /* looks like we were told to do nothing . . . exit */

        /* got data . . . work on it
        . . .
        now finished working on the data
        return the header to the free chain . . .
        */
        insert_tail(&free_chain,bh_ptr);
        /* now tell our good buddy that we have put something out there */
        ac0 = &free_mailbox;
        ac1 = READ_SOMETHING;
        ac2 = FOR_YOUR_EYES_ONLY;
        if (sys_error = sys_xmt(ac0,ac1,ac2))
            if (sys_error != ERXMT)
                fatal_error(SYSTEM_CALL_ERROR,"?XMT to free_mailbox",
                    sys_error);

        } /* end for(ever) */

        bh_ptr->num_blocks = 0; /* no more blocks */
        bh_ptr->start_block = 0 ;

        insert_tail(&write_chain,bh_ptr);
    }
}

```



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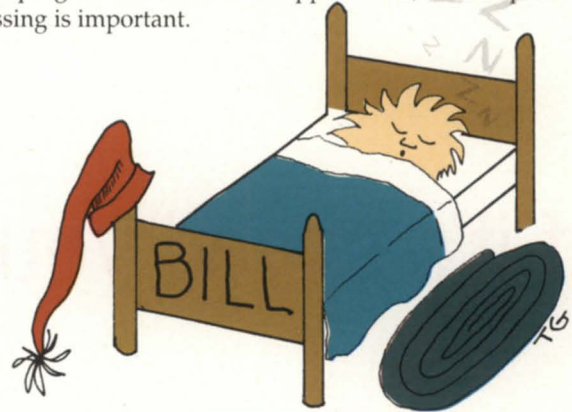

```

ac0 = &write_mailbox;
ac2 = BROADCAST;
ac1 = END_OF_THE_WORLD; /* wake'm up */
if (sys_error = sys_xmt(ac0,ac1,ac2))
    if (sys_error != ERXMT)
        fatal_error(SYSTEM_CALL_ERROR,"?XMT to write_mailbox ",
            sys_error);

printf("Writer has handled %i requests.\n", number_of_requests);

ac0 = &final_mailbox;
ac2 = BROADCAST;
ac1 = END_OF_THE_WORLD;
if (sys_error = sys_xmt(ac0,ac1,ac2))
    if (sys_error != ERXMT)
        fatal_error(SYSTEM_CALL_ERROR,"?XMT to final_mailbox ",
            sys_error);
mkill(); /* kill myself ( this task ) */
    
```

The original purpose for this program was to copy a file from tape to disk. The tape file was large (50 MB) and had a large buffer size. Since many such tapes had to be read in a day, it was mandatory that they be processed quickly. The buffer header originally contained a sequential block number as it was read from the tape, thus giving the file position at which to write to the disk file. Without significant changes, I have been able to use this program for three other applications, where speed of processing is important. △



Michael Dupras is senior consultant for the Software Products and Services Division of DG Canada. He may be reached at Data General, 1827 Woodward Dr., Ottawa, Ontario, Canada K2C 0P9.



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If it's speed you want...

Unix implementations provide platform for B32 on the 386

A few months ago, I was able to give you the first review of a product that could run Business Basic code effectively on a PC. This month, we'll take a look at B32 for the 386.

In my last couple of columns, I've had some performance numbers for various versions of Business Basic on different platforms. Now I have the results of a hands-on test of B32.

B32 is a 32-bit product (of course) and it counts on having a 32-bit environment to be effective. As a result, it is not possible to port it to 16-bit machines (such as the 286), or to systems operating under MS-DOS.

On the other hand, the advent of good implementations of Unix on the 386 provide the perfect environment for B32. The work was started in the fall of '88, and completed this spring. The port to the 386 was done by Murray Haszard, who used many of the same techniques that he used for the original Data General version.

From the beginning, it was taken for granted that to get good performance, plenty of care would have to be taken to optimize all areas of the code. This assumption proved to be quite wrong: the 386 is a much faster machine than anybody counted on.

This became clear when the first serious multiuser tests, using live applications, were run by S.P. Richards Company in Atlanta. The company has a suite of Business Basic programs that were taken from its order entry product. The test results are shown in Figure 1.

Using the same tests and the same machines, B32 ran about twice as fast as Transoft. The results also show a 386 running 12 terminals at about the same speed as an MV/7800 XP running 6! Had the MV/7800 been running B32, its speed might have been comparable to the Dasher 386.

The bottom two tests show something else interesting. The Dasher 386 used in the tests is a 16 MHz machine using a disk with 30 ms average access time. The AMI is a 20 MHz with a 15 ms drive. The faster 386s appear to be capable of delivering faster times in the test.

Data General is now shipping a 25 MHz 386, and drives are available with 6 ms average access times. The 33 MHz machines have been announced. It would be reasonable to expect these new machines to deliver proportionately better performances. What's more, Intel now has a 486 chip, which promises to at least double the performance again.

One final note: even after I saw these speed results, I was incredulous. I knew this test was based on 12 terminals running without actual keyboard input. Surely having real operators hitting real keyboards would expose the 386 for what it really was—just a souped up PC. So I set up a 16-terminal system with human beings running different accounting applications. The users indicated that they wished the response time was as good on their MV/15000 mod 8.

My conclusion: The Dasher 386 running B32 is a real computer, as capable of running Business Basic applications as a low-end Data General machine.

Having established the viability of the 386, what does it take to actually use it?

Data General's Dasher 386s are well-built machines: the 16 MHz is from Zenith and the 25 MHz is from Intel. They support industry standard peripherals; most of the ones you'll need you can get directly from Data General, including a

variety of disk and tape drives, upgrade memory, and multiport cards.

The operating system of choice appears to be Xenix from the Santa Cruz Operation (SCO). This is the most widely used Unix operating system, with good reason. Originally written

by Microsoft, it went nowhere until SCO took over the marketing. It has the best documentation I've seen for an operating system, and is easy to install and use. I particularly like the fact that most of the defaults seem to be thoughtfully set to exactly where I want them.

Data General ships 386ix for free with its 386. This version of Unix is also widely used, but the documentation is terrible. I had a lot of trouble installing 386ix. No reference manual was included, so I

Figure 1: Transactions per minute

| Hardware/OS | Language | 6 users | 12 users |
|-------------------|----------------|---------|----------|
| DG/500 RDOS | BBASIC 8.20 | 12.9 | |
| MV/2000 AOS/VS | BBasic 5.01 | 23.9 | 10.4 |
| Dasher 386 Xenix | Transoft Turbo | 28.1 | 13.6 |
| MV/7800 XP AOS/VS | BBasic 5.01 | 35.9 | 17.5 |
| Dasher 386 Xenix | B32 | 54.9 | 27.5 |
| AMI 386/20 Xenix | B32 | 64.6 | 35.0 |

couldn't look up what I was doing. I also could not get the on-line help facility to work.

In comparison, Xenix had a permuted index in the manual, so I could find Xenix commands that corresponded with AOS /VS commands. I installed Xenix on my first try, and felt as though I knew what I was doing. It worked, too. In any event, Xenix is easy to use; 386ix is not for Unix beginners.

Moving Business Basic applications to

(Note: all Unix commands are case sensitive. This will drive you stark raving bonkers.)

There are two problems with this approach. MS-DOS will accept neither file names longer than eight characters, nor files larger than one diskette. By being creative, you can work around this.

A better alternative seems to be to use a file transfer utility in Unix. Blast will work, but Kermit is free, so some effort is being made to make Kermit available.

B32 on the 386 is pretty straightforward. The tough part is getting them on the 386 in the first place. The most common way is to move them to a DOS diskette using a standard file transfer facility, then use the Unix doscp command to import the files.

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This will probably be accomplished by the time this article is published.

There's a good trick you can use in these transfers: Use the !DUMP command within Business Basic to combine the files you want to move into a single disk file. Once you've transferred the file to the 386, the !LOAD command under B32 will unpack all the files with their names, etc., intact.

Programs must be moved in the LIST format. A macro is provided that allows you to SAVE them. It runs quickly. If you use some operating system-dependant features, such as STMB 24, you'll have to make changes. In general, though, it's much easier to move to Xenix than to move from RDOS to AOS/VS. SYS(30) can be used in your code to decide which operating system is running.

If you are already running B32, rest assured that all of the statements that you are accustomed to using exist under Xenix as well, including \$DO WHILE and \$SCREEN_SAVE. All of the utilities (!LIST for example) are implemented in the same

SHORTCUT:

Use the !DUMP command within Business Basic to combine the files you want to move into a single disk file. Once you've transferred the file to the 386, the !LOAD command under B32 will unpack all the files with their names, etc., intact.

way.

Once onto the 386, neither your users nor your programmer will be able to tell whether they are running on an MV or a PC.

If this all sounds too good to be true, I have to note one possible problem: not all the software that is available on the MV is available on the 386. The editors supplied are not as nice as SED. SNA /SDLC and RJE80 counterparts will have to be found from a third party. CEO is not available, nor will it be.

(I'm looking for a good 2780/3780 package for the 386 right now; anybody know of one?)

To summarize, the quality of B32 under Xenix seems to be every bit as good as B32 under AOS/VS. Δ

*George Henne, a contributing editor to **Focus**, has worked with Business Basic users for more than a decade. He is the vice president of Maxon Computer Systems, 575 Madison Ave., Suite 1006, New York, NY 10022; 416 /445-4823*

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The latest products for DG systems

@Con/PC provides terminal emulation, file transfer on IBM and compatibles

Southampton, NY—Flying Point Software has announced the release of @Con/PC (Atcon) Data General terminal emulation and file transfer software for IBM and IBM-compatible personal computers. @Con/PC provides exact emulation of DG terminals from mod-

els D210 through D411.

Features include compressed screens with memory-resident operation and mouse options. The software's branch-to-branch and branch-to-text editors allow users to perform other functions while on-line, without loss of connection.

@Con/PC Plus, an enhanced version of @Con/PC, features file transfers with Xmodem, ASCII, or Flying Point Software's ConX file transfer protocol.

Flying Point Software, 33 Flying Point Rd., Southampton, NY 11968; 516/283-4994.

Δ

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RDS to implement Netware on AOS/VS

Pasadena, CA—Rational Data Systems, Inc., has announced that it will implement Novell's Netware under Data General AOS/VS and AOS/VS II operating systems.

Under the terms of a three-way agreement between RDS, Novell, and Data General, Rational Data Systems will port Novell's portable Netware to the AOS/VS operating system. Netware for AOS/VS will be independently distributed by both RDS and Data General.

The announcement of Netware for AOS/VS is the third phase of integration of RDS' products with those of Novell. Last year RDS updated PC/VS, its flagship integration product, for full compatibility with Novell's IPX protocols, so that a PC workstation may simultaneously communicate with Data General minicomputers and Novell file servers.

(continued on page 72)

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ON-LINE HELP *Who to call for answers about NADGUG and FOCUS*

NADGUG's electronic bulletin boards

(300 or 1200 baud modem)
 Rational Data Systems **415/499-7628**
 OIS (to get an OIS ID and password, contact a DG field engineering telemarketing representative) **800/325-3065**
 In Massachusetts **800/952-4300**
 In Canada **416/823-7830**

NADGUG membership, address changes

Suzanne Himes **800/877-4787**
 (Outside the U.S.) **512/345-5316**

Information on RIGs or SIGs

Cathlene Gentry **800/877-4787**
 (Outside the U.S.) **512/345-5316**

Editorial questions, comments, article suggestions

Greg Farman or Robin Perry
 (please send product announcement to the address listed below) **512/345-5316**

Information about advertising in FOCUS

Sharon Dennis **512/345-5316**

Back issues of FOCUS

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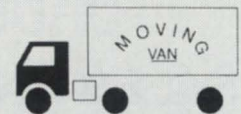
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New SIGs on the block!



Special interest groups bring together DG users who share interests in common products, technologies, or applications. SIGs communicate through meetings at NADGUG conferences, newsletters, and periodic workshops.

NADGUG welcomes two new SIGs — SMBasic and CQCS. SMBasic is organized for DG shops using SMBasic to share information and ideas on the best use of this computer language. The CQCS SIG is organized to make the most efficient use of the fourth generation language, CQCS, on Data General machines. Membership in one of these groups places your name on the mailing list, enables you to attend meetings, and introduces you to a network of users who are available to share concerns about SMBasic or CQCS issues.

Special interest groups connect users who are concerned about the same things. SMBasic enthusiasts should contact Ken Smith, McGean-Rohco, Inc. 1250 Terminal Tower, 50 Public Square, Cleveland OH 44113; 216/621-6425.

CQCS advocates can receive information from Ray Walther, AIM Management Group, Inc., 11 Greenway Plaza, Suite 1919, Houston TX 77046; 713/626-1919.

(Continued from page 68)

Network for AOS/V5 is expected to ship in the fourth quarter of this year. Pricing is not yet available.

Rational Data Systems, 5725 Paradise Dr., Corte Madera, CA 94925; 415/924-0840. Δ

Circle 78 on reader service card.

Ironwood offers ZIM conversion utility

Mississauga, Ont., CAN—Ironwood has released BBZ, a Data General Business Basic to ZIM conversion utility. BBZ allows DG customers with third-generation software to electronically upgrade to fourth-generation relational data base systems. BBZ runs on AOS and AOS/V5 systems.

BBZ converts existing file maintenance tables into ZIM definitions, with the option of converting data files and indexes to ZIM entity sets and indexes. Ironwood is expecting to announce other utilities to convert BBasic functions and ICobol later this year.

Ironwood Computer, 425 Britannia Rd.,

East Bldg., "A" Unit #120, Mississauga, Ontario, Canada L4Z 3E7; 416/890-4747. Δ

Circle 76 on reader service card.

Eagle software releases Disk View

Saline, KS—Eagle Software, Inc., has released Disk View, a disk management utility that allows users to examine disk organization/fragmentation, and easily determine when an LDU needs to be re-organized.

Disk View draws a picture of the logical address space of an LDU, shows how it is organized, and if there is fragmentation. Disk View can also "magnify" a certain area of a disk, showing the utilization in that portion in detail.

Disk View is being added to Eagle's Disk Pak product, and users that have already purchased Disk Pak will receive Disk View at no additional charge. Disk Pak is priced at \$850 for low-end CPUs, \$1,450 for mid-range CPUs, and \$1,950

for high-end CPUs.

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

Circle 74 on reader service card.

ARTS Quote offers brokerage automation

Westboro—Data General Corp. and Standard & Poor's Trading Systems (S&PTS) have teamed with American Real-Time Services (ARTS) to introduce ARTS Quote, a comprehensive package for brokerage automation.

ARTS Quote, a significantly enhanced version of the DG/S&P Stockmate application, provides real-time market data. It runs on the entire line of MV family computers with S&PT's market information, and provides an integration platform for the broker's desk.

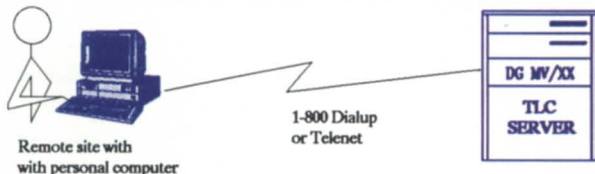
Data General, 3400 Computer Dr., Westboro, MA 01580; 508/898-4051. Δ

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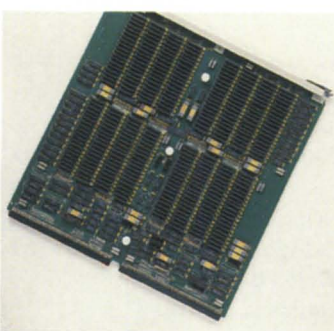
Circle 40 on reader service card.

Memory Boards for MV/15000, MV/20000 Computers

Dataram DR-1520 memory comes in 8, 16 or 32MB board capacities. The add-in memory uses 1Mb RAM technology to upgrade processor performance, and does not affect DG service arrangements. Boards are user installable, have Enable/Disable switch and LED indicators.

Dataram Corp. Phone 1-800-822-0071 (NJ 609-799-0071).

Circle 23 on reader service card.

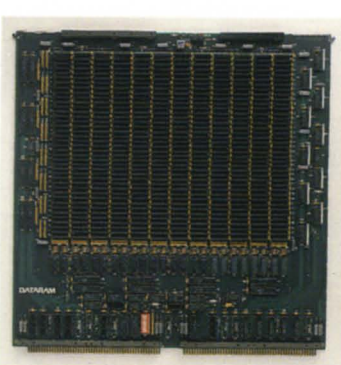


Now up to 16MB Total Memory for MV/6000, MV/8000, MV/8000 II

Cost-effective DR-6080 memory boards improve response time, add power for more users, applications. Expand to full 16MB capacity with 4MB, 8MB, or 12MB boards, trade up to higher capacity. Full lifetime warranty.

Dataram Corp. Phone 1-800-822-0071 (NJ 609-799-0071).

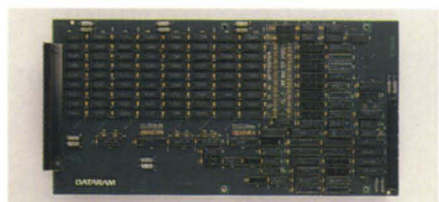
Circle 27 on reader service card.



Main Memory Upgrade for MV/4000 and MV/10000

DR-280 series memory offers a choice of 2, 4 or 8 MB of main memory per board. The DR-280 operates with highest reliability DRAM technology and can be installed in minutes — without hardware or software changes. **Dataram Corp. Phone 1-800-822-0071 (NJ 609-799-0071).**

Circle 24 on reader service card.



Lifetime Warranty on Memory for MV/1400, MV/2000, DS/7500

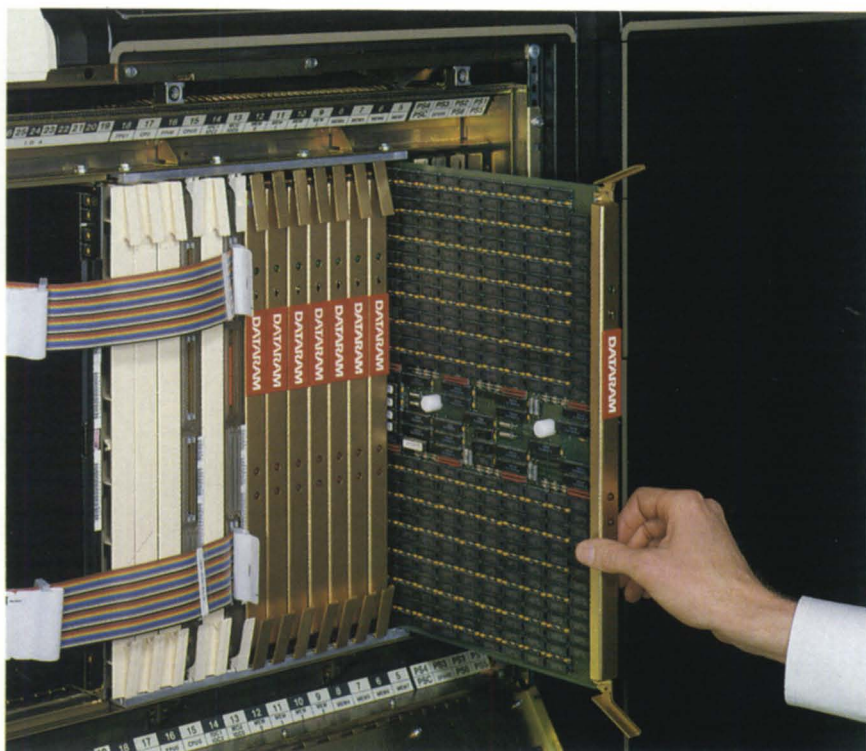
High-reliability 1Mb DRAM technology on 4MB and 8MB boards brings low-cost boost to processor performance. Dataram DR-1420 memories plug directly into all three processors, do not affect DG service arrangements. **Dataram Corp. Phone 1-800-822-0071 (NJ 609-799-0071).**

Circle 25 on reader service card.

Up to 16MB Extra Main Memory for MV/2500 Series

Dataram's DR-2500 memory boards, available in 8MB and 16MB capacities to improve processor speed and power, are fully compatible with hardware and software for DG's MV/2500. The plug-in memory needs no maintenance, has a lifetime warranty, and is available on a 30-day trial basis. **Dataram Corp. Phone 1-800-822-0071 (NJ 609-799-0071).**

Circle 26 on reader service card.



Memory is power.

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No matter which DG computer you own, Dataram has memory to fill it. Totally DG compatible. Designed and built maintenance-free, to keep costs down. Backed by a lifetime warranty that delivers spares overnight — and pays the shipping!

Dataram add-in memory is the efficient path to maximum performance. With up to 32MB on a single board, it can overcome system restrictions on your MV/1000, your MV/20000, or

any DG in between, for more speed or users, or for expanded applications without sacrificing speed.

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Circle 28 on reader service card.

3CI Inc. releases new version of InFoCen management system

Fort Collins, CO—3CI Incorporated released version 8.2 of its InFoCen information management system. Data Gen-

eral customers will receive the new version this summer.

The new release includes improved variable length text handling, an easy-to-use menu system, expanded macro module capabilities, and enhanced virtual view processing. It also includes new internal structures for more efficient storage and retrieval of variable length text data.

InFoCen 8.2 runs from \$10,000 to \$120,000, depending on machine class.

3CI, 2057 Vermont Dr., Fort Collins, CO 80525; 303/223-2722. △

Circle 80 on reader service card.

Ryan McFarland's RM/Cobol-85 enhancements offer DG compatibility

Austin, TX—Ryan McFarland Corp. has released enhancements to its RM/Cobol-85 compiler, including compatibility with Data General ICobol users.

The enhancements include open exclusive files and data items, DG-style screen selection, new unit-names, and accept from status key and exception status phrases.

Ryan-McFarland Corp., 6907 Capital of Texas Hwy. N., Suite 290, Austin, TX 78731; 512/343-1010. △

Circle 79 on reader service card.

B32 Means a Winning Performance!



Like an Olympic hurdler, B32 combines blinding speed and amazing agility.

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Circle 41 on reader service card.

Threshold product simplifies conversion to ICobol 1.50

Auburn, AL—Threshold, Inc., has created a product that simplifies the upgrade from earlier versions of Data General's ICobol to the latest version, 1.50. The product, MULTISAM, can be used with either the 1.40 or 1.50 ICobol interpreter and, once installed, will allow the interpreter to simultaneously access both 1.40 and 1.50 format files.

According to Threshold, MULTISAM addresses a number of the concerns expressed by ICobol users. Using MULTISAM, a user can install 1.50 but leave the data files in 1.40 format. If a particular file needs to be converted to 1.50 format, perhaps to take advantage of the larger file size supported under 1.50, that individual file can be converted. MULTISAM will automatically determine the file format when a file is opened and use the correct file handler. The user can

specify which format to use when creating new files.

Using MULTISAM will allow files from systems not running 1.50, including RDOS and MS-DOS, to be imported without conversion to 1.50 format. MULTISAM is priced at \$250.

Threshold, Inc., P.O. Box 831, Auburn, AL 36831; 205/821-0075. Δ

Circle 81 on reader service card.

Pacer provides connectivity for DG /Macintosh users

La Jolla, CA—Pacer Software, Inc., has announced the availability of Pacerlink software, a terminal emulation product that integrates Apple Macintosh personal computers with Data General MV/family systems. This announcement follows the signing of an Independent Software Agreement (ISV) last December between Pacer and Data General.

In addition to terminal emulation, Pacerlink offers file transfer, print spooling, command procedure scripting, and virtual disk capabilities.

Pricing is server-based. Prices range from \$2,000 for five concurrent sessions, to \$10,000 for 50 concurrent sessions, to \$37,500 for 500 concurrent sessions. Pacerlink is available immediately.

Pacer Software, Inc., 7911 Herschel Ave., Suite 402, La Jolla, CA 92037; 619/454-0565. Δ

Circle 77 on reader service card.

NIDS/Genisys Connection to aid users of NIDSPORT management system

Salt Lake City, UT—DMS Systems, Inc., and National Investor Data Services (NIDS) have introduced NIDS/Genisys Connection, an add-on product for users of the NIDSPORT portfolio management system.

The NIDS/Genisys Connection uses the

recently released Genisys ICobol interface to allow NIDS customers to view their NIDSPORT data, make ad-hoc queries, and format reports. Connection customers will receive a runtime license of Genisys, the NIDSPORT data dictionary, a collection of predefined screens and reports, and one day of training.

Genisys is a user-oriented data base management system designed to allow

access to sophisticated data processing functions by users who have no programming experience. The price of NIDS/Genisys Connection and full licenses of Genisys vary according to CPU size and start at \$3,500.

DMS Systems, Inc., 1111 Brickyard Rd., Salt Lake City, UT 84106; 801/484-3333. Δ

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Softsolutions of Orem, Utah, has been accepted into the Authorized Data General System Distributor (ASD) program. The company markets automated software to law firms and legal departments.

Data General and Softsolutions recently won a major contract to automate the corporate law offices of **H.J. Heinz Company** and its two subsidiaries: **Star-Kist Seafood Company** and **Weight Watchers, Inc.**

Three new members have been added to Data General's board of directors. They are: **John G. McElwee**, former chairman of the board and chief executive officer of **John Hancock Mutual Life Insurance Co.**; **Donald H. Trautlein**, former chairman and chief executive officer of **Bethlehem Steel Corporation**; and **Ronald L. Skates**, executive vice president and chief operating officer of Data General. Skates joined the company in 1986 as a senior vice president in charge of finance and administration.

Data General has elected **Ellen Richstone** vice president and corporate treasurer. Richstone, 37, has been with Data General for eight years, and has been serving as corporate treasurer for the past year.

WANDer why? **Applied Business Computers** of Pineland, S.C., has signed

an 18-month, \$13 million value-added reseller (VAR) agreement with Data General. Applied Business Computers is a Wang Authorized National Distributor (WAND). It will reportedly be using the new Wang Cobol conversion utility, DG/WCC, to convert Wang VS Cobol source code to AOS/VS Cobol.

Karen Taylor, director of Information Systems at **AMI Regional Hospital** in Columbia, Missouri, was the winner of a pair of DG/Microcom modems given away in a drawing sponsored by **DG/Direct** telemarketing offices in Westboro. The 301-bed hospital depends on two MV/10000 computer systems and one MV/8000 computer system for patient accounting, diagnostic tracking applications, and automated office functions.

Data General and **Oracle Complex Systems Corporation** will supply **Baker Equipment Engineering Company** with an administrative and manufacturing automation package worth several million dollars. The package includes a DG Eclipse MV/40000 HA Model 3 superminicomputer, Oracle relational data base management software, and system inte-

gration services from Oracle. Baker Equipment Engineering Company, with headquarters in Richmond, VA., manufactures and assembles truck bodies, digger derricks, cranes, and aerial devices for utility companies and fire departments.

Data General was one of 11 sponsors of the first international symposium on integrated network management held May 14-17 in Boston. DG showcased its **DG/Open Network Management System** and other **Open Systems Interconnection (OSI)** solutions.

Aviion catches MUMPS. Data General has signed Independent Software Agreements (ISVs) with **Intersystems Corporation** and **Micronetics Design Corporation** to make MUMPS software available on DG's RISC-based Aviion workstations.

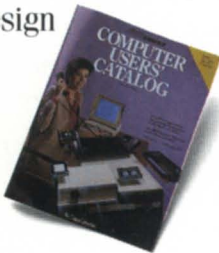
Intersystems Corporation and DG will jointly market M/SQL, Intersystems' relational data base management system and application generator. Micronetics Design will provide its standard MUMPS (Massachusetts General Hospital Utility Multiprogramming System) for Aviion machines, the MV family product line, and personal computers running MS-DOS.

MUMPS is a high-level programming language for data management applications in medicine, banking, shipping, and other industries. The ISV announcements were made at the **MUG (MUMPS User Group)** conference in Seattle. Δ

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