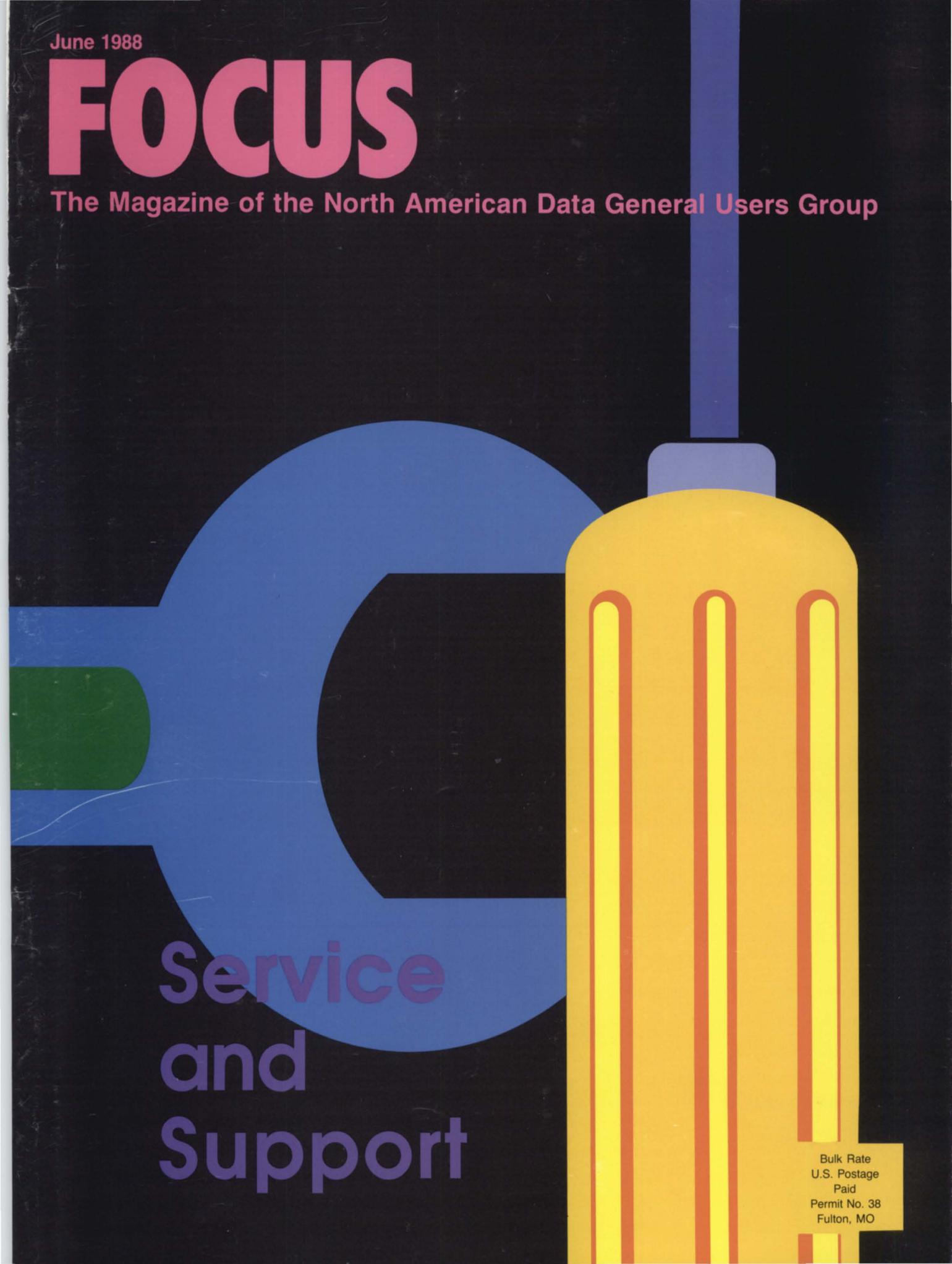


June 1988

FOCUS

The Magazine of the North American Data General Users Group

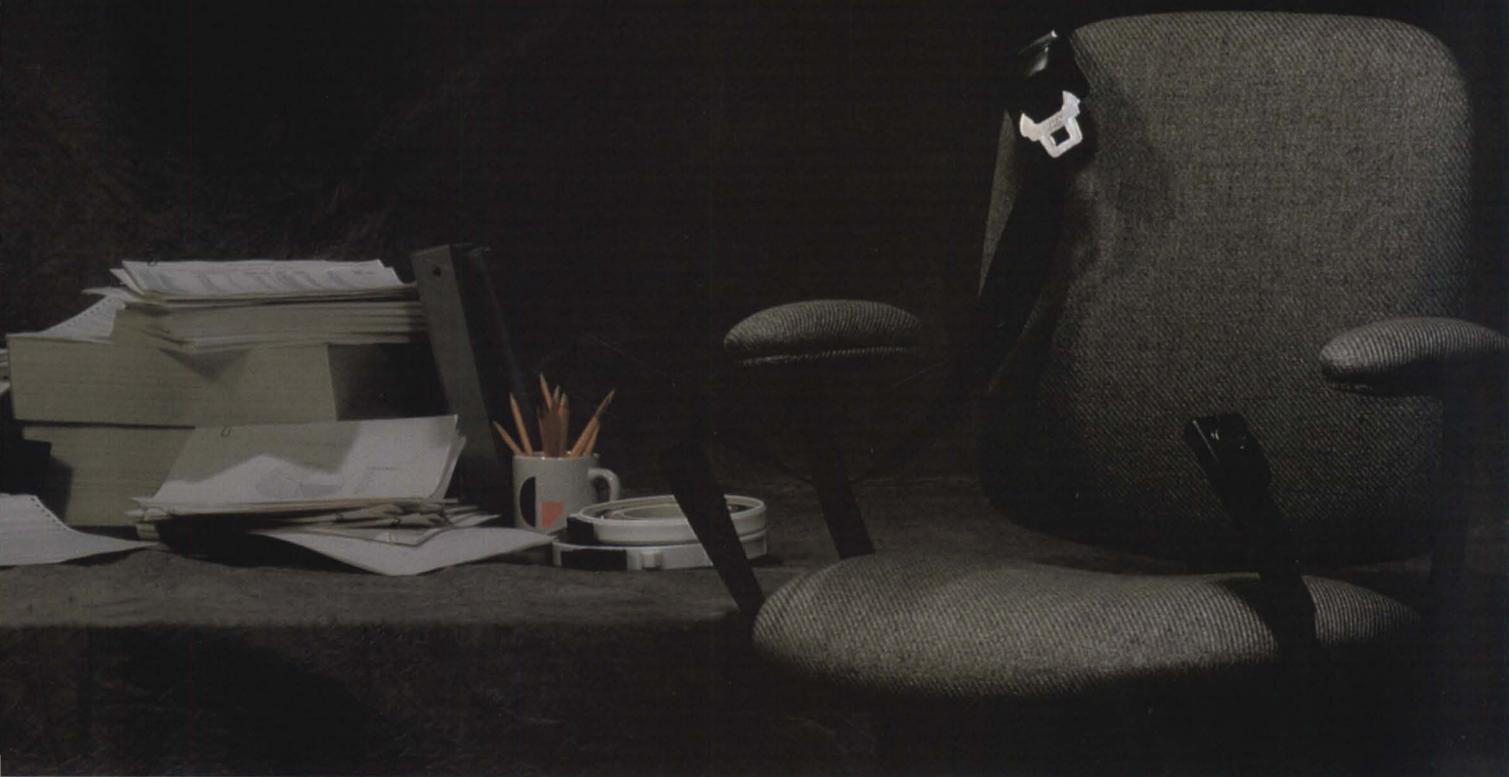


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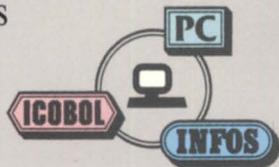
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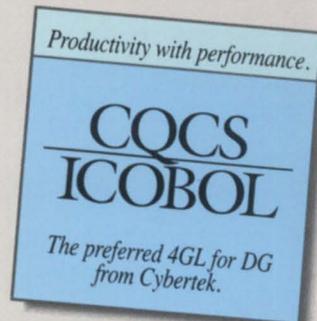
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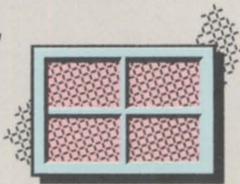


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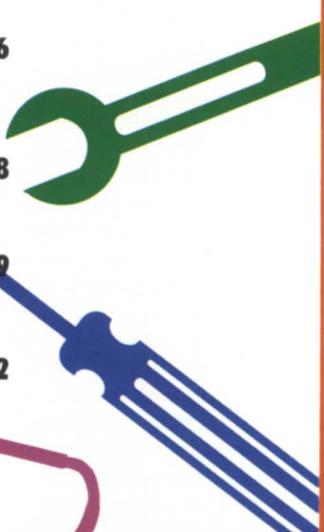
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Tale of two cities

London and Philadelphia share desirable traits

by Joyce Carter
NADGUG president

Conference 88 will soon be here. I hope all of you are planning to attend. I know I'm looking forward to this conference even more than last year's. The Meetings Committee has already made a lot of the preparations. This conference will have six simultaneous sessions—again targeted to technical, end-user, and management audiences—and the slate of topics looks intriguing. Aside from the conference, Philadelphia is an interesting city, and you will find a lot of things to do and sights to visit. I encourage you to spend an extra day to get to know the city and see some of its history.

I just returned from an even more historic place: London, the site of the U.K. users group's annual meeting. The U.K. conference was held at the St. Ermin's Hotel, which is more than 100 years old (although a lot of renovation has been done), and the site has a very interesting history. The dining room and ballroom looked like rooms from an elegant castle.

All sessions except for some of the demonstrations were scheduled one after another in the ballroom. Turnout was high, with Data General people from both the U.K. and North America in attendance. Several Americans who were not Data General employees came also. It was nice to be able to attend all of the sessions (something that cannot be done at our conferences.)

The sessions were organized very professionally. A big screen was used for slides, videos, etc. Each session started with the title and presenters' names showing on the screen, and the agenda was updated on the screen throughout the day. Between sessions, upbeat music played, and delightful cartoon videos announced the coffee breaks and other necessary breaks. A packet handed out at registration included the session material, the general session information, and a list of attendees, including the table number that they were assigned for the banquet.

The banquet speaker, Brian Johnston (not to be confused with our own B.J., who also made a presentation at this conference) was delightful. Apparently, he is known in England as Mr. Cricket, because

he has spent about 40 years as an announcer for the game. He told a lot of funny stories, and even though I didn't understand some of the references and humor, I did catch about 90 percent of the funny lines.

The people who attended the sessions were nice to talk to, and dialect was not too much of a barrier. I came home with some new additions to my English vocabulary, such as "lift" for elevator, "lorry" for truck, and "trolley" for cart. Of course, I started craving afternoon tea.

Many of the people I talked to had attended one of our NADGUG conferences, and many more hoped to attend in the future. I was surprised at the number of people who worked for companies with branches in both countries or who were part of companies doing business in the United States.

The U.K. users seemed to have a very good relationship with their Data General representatives in the United Kingdom. I heard nothing but praise. I had expected the United Kingdom to be a little behind the United States in technology and in computer usage, but I was wrong. Integration of systems, networking, and connectivity are all big items over there.

Disaster recovery was as big a topic there as it is here. One of the presenters showed a film made by a disaster recovery company that interviewed people who had experienced computer disasters. This particular disaster recovery company dispatches a trailer with a computer, furniture, facilities, and equipment to be set up as close to the site as possible. Doing this instead of transporting employees, forms, and files to another site, they believe, makes it easier on the employees.

Of course, I stayed for a few days after the conference to do some sightseeing. We took the opportunity to go to the countryside during the weekend. It was so lovely and different from anything I have experienced here. We returned home a little tired, suffering from jet lag and a depleted bank account, but we were glad we had the opportunity to go to London.

Our counterparts in the U.K. assure us that NADGUG members will be welcome at next year's meeting. If it's in the cards for you to make the trip, I can assure you that you will find it both enjoyable and educational. Until then, I hope you are already making your plans now to attend the conference in Philadelphia. I will see you there. Δ

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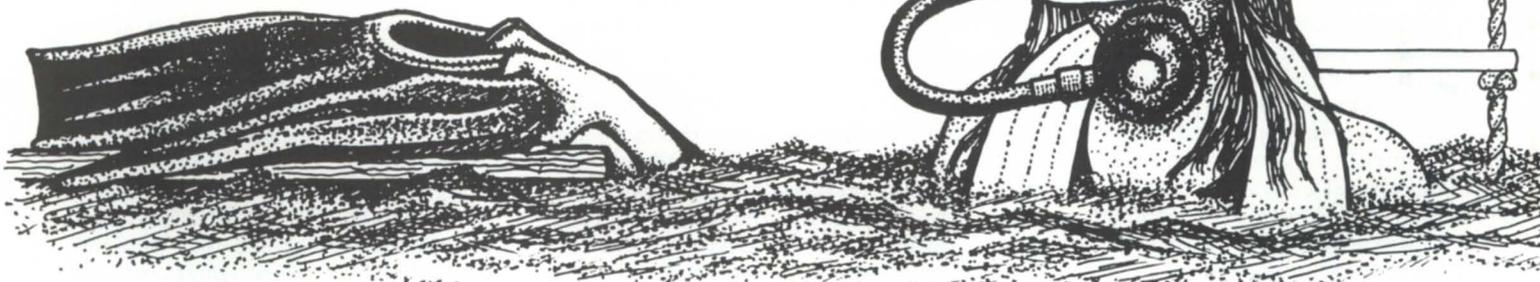
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Early returns

DG's "industry-standards" strategy is in the hands of the voters

April 19, primary election day. Outside, New Yorkers were tuned in to the face-off between Democratic hopefuls Jackson and Dukakis, but within the sedate sanctuary of the Metropolitan Club's library, the crowd was turning its attention to Ron Skates, Ward MacKenzie, and Tom West.

I'm not suggesting the events inside were as significant as those on the street, but the three men from Westboro did have something important to say. They came to New York to explain the product strategy that will guide Data General for the next decade.

The crowd assembled in the dark-paneled library included members of the trade press, investment bankers, and industry analysts, about 75 in number. Their attitudes ranged from nonchalant to skeptical. Most had heard enough announcements of strategic directions to know that what really counts in the computer industry is products that are ready to ship.

Ron Skates spoke first. As DG's senior vice president for Finance and Administration, Skates has spent a lot of time lately explaining why the company is really in much better financial shape than its earnings and stock price would indicate. It's a story worth retelling (see Rene Dominuez's account of it on page 13), but this time, Skates was sticking to his role as master of ceremonies. With Edson de Castro in Bangkok on business, it was his job to warm up the crowd.

"On a scale of 0 to 10, today's announcement is a 10 for Data General." The audience stirred a bit, and Skates continued: DG would have preferred to wait a few months before making this announcement, but that became impractical when Motorola announced its new 88000 reduced instruction set (RISC) microprocessor the day before; DG's involvement in the Motorola announcement had raised a lot of questions that DG couldn't ignore. At this point, DG would only announce its strategy, and would not discuss specific products under development. Furthermore, the company was in a quiet period pending the announcement of quarterly financial results, so Skates wouldn't have any more to say on that subject either.

Motorola had previewed its announcement of the 88000 with multipage ads in newspapers across the country, and DG was prominent among the companies Motorola listed as members of "88open," the consortium established to develop products and standards for the new RISC

chip family. It made sense that DG was going to use the 88000 in some part of its product line. But how? And how big a commitment was it? And how would it affect the current customer base?

These were the questions Ward MacKenzie addressed. Relatively new to Data General, MacKenzie left DEC to take over as director of DG's VAR marketing program. Within months, he was promoted to his current position, vice president for Corporate Marketing. Ironically, the strategy he was going to describe had evolved from discussions that started long before he moved to Westboro. Still, MacKenzie was quite aware of enormous implications the strategy holds for Data General, and he went to considerable effort to reassure current DG customers.

DG intends to produce an entire family of products built around the 88000's reduced instruction set architecture, he explained. In addition, DG and Motorola are working together to develop high-end chips using the 88000 program architecture; Motorola will manufacture the chips and market them worldwide.

That was the first part of the new strategy—a "strategic alliance" with Motorola that will lead to a new product family built around a "scalable" industry-standard microprocessor family. This is a major change from DG's traditional approach, which has been to develop proprietary chips designed to execute enriched proprietary instruction sets.

The second part of DG's new strategy is a logical extension of the first: Unix. If you're going to adopt an industry-standard architecture that was designed with Unix in mind, you better be prepared to embrace Unix. There is no question now: DG is fully committed to Unix as the industry-standard operating system. In fact, DG's stated goal is to become the leading supplier of industry-standard systems.

The third part of DG's new strategy is to take care of existing customers. MacKenzie put it a bit differently: "Our proprietary MV family products are the foundation of our company and the base upon which our success will be built. . . . It will take time and industry-wide investment before industry-standard systems can compete with proprietary systems on the basis of breadth and functionality. . . . We anticipate that the business volume for our proprietary products will increase over the next five years, and the investments which we are currently making will take

this product family well into the 1990s."

The logic behind the new strategy is hard to ignore, and the strategy itself is hardly a surprise. It was no great secret that there has been intense internal debate within DG over the fate of proprietary systems. When DG scrapped AOS/DVS, its distributed operating system, it became clear that the "industry-standards" approach was gaining ground. At that point, the word was that the development budget for operating systems would be split about 50:50 between Unix and AOS/V5.

That brought the debate into the open among users. Although DG was acknowledged to have a solid Unix product, knowledgeable critics pointed out that DG had to pay a performance and development penalty for its Unix, because the MV architecture was designed specifically for AOS/V5 instructions, and was not well suited for Unix. That would make it tough for DG to compete with companies that were pumping out huge quantities of cheap Unix boxes. Besides, the critics added, Unix is primitive, cryptic, and not nearly so portable as its adherents always claim. And where were all the business applications for the Unix market going to come from?

Meanwhile, DG/UX (DG's version of native Unix) has gained adherents among DG users. In some cases, they were only using DG/UX as part of a migration strategy—running their applications on existing hardware while making the conversion to Unix, and preparing to make a jump to whichever vendor could offer the best price/performance when the time comes to replace or upgrade the hardware.

DG's decision wasn't made in a rush, and it wasn't made in ignorance of the facts. Company sources say the internal debate was long and sometimes painful. They add, though, that it resulted in a remarkable unanimity within the company. Recognizing all that is good about AOS/V5 and the MV architecture, DG still had to accept the fact that today's customers have little enthusiasm for proprietary systems. ("They want those MIPS to run on commercial-quality, open, non-proprietary, gun-grey platforms," was the way Tom West put it.) In the long run, there may be room for IBM and DEC to continue in the old proprietary ways, but DG can't afford to ignore the push toward standards.

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That's in the long run. In the short run, the company recognizes all of the current limitations of Unix. It also recognizes—and went to considerable effort to acknowledge—its obligations to its current base of customers.

Tom West, DG's vice president of Product Development, promised a continuing aggressive development plan for MVs.

"The next two generations of MVs are already under development, and we're evolving a more powerful AOS/VS, adding large-system features and support for fault tolerance and transaction processing."

Ward MacKenzie said, "We will also build the bridges that allow customers of our current proprietary products to move

with us into the standards world when and if they choose to do so." MacKenzie didn't provide any details about what the bridges would look like, but Janpieter Scheerder, director of Software Development, hinted that networking between cleaved applications is a promising technique. Asked whether CEO might be ported to Unix, Scheerder said that the functionality of CEO would probably be made available under Unix, whether or not the product was formally ported.

DG says its goal is to build the best industry-standard systems available, and to ensure application portability between its proprietary and standards-based platforms. But what is that new platform going to look like? Tom West provided some broad hints when he said that a company that could offer advantages like these would have an unmatchably strong position in every market DG competes in:

- an open, integrated office environment
- networking and interoperability with IBM systems
- fault tolerance
- symmetric multiprocessors
- support for applications cleaved between workstations and servers
- a strong industry-standard software environment featuring a real-time Unix kernel and the best computer-aided software development tools available
- a broad range of processors (from tens to hundreds of MIPS) with outstanding price/performance based on an industry-standard RISC architecture
- open standard busses
- graphics workstation in the \$5,000 to \$10,000 range.

The first DG products to grow out of DG's new strategy are still about a year in the future, but West said that the choice of the Motorola 88000 family will take DG a long way toward these goals. In the first place, the 88000 is a highly integrated commodity micro from a leading semiconductor manufacturer. Second, its program architecture is scalable, and Motorola is cooperating fully as DG works to design high-performance ECL versions of the 88000. Finally, it has the sophistication of a second-generation RISC micro. It has its own cache and memory management units on chip, and offers the system-level hooks to support features like fault tolerance and multiprocessor operation.

Like the election that was going on outside, you don't know who wins until the votes are counted. The strategy sounded reasonable—certainly the audience inside was willing to accept it. But only time will tell.—G.F. Δ

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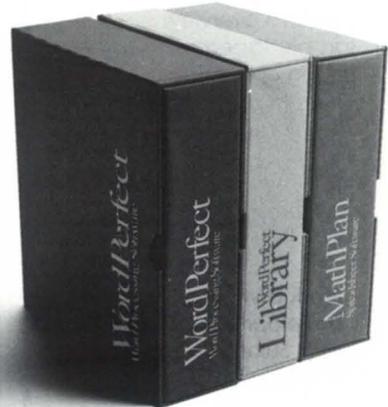
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LETTERS



It is always with great interest that I read *Focus*, especially "System Manager's Log," "AOS/[VS] Tricks," and "Discoveries." But the January 1988 issue contained a few typos. In the last paragraph on page 42 of John A. Grant's article on assembly language programming, the name ABC should have been STUPID, and the off-ending statement is I=2.

In the same issue, Jim Siegman presented a few macros for adjusting the element size. But there were two errors in the macros. The third line in SCAN_ELEM.CLI should have read:

```
build/length/elem/type/type=/lnk/type=/dir/type=/
cpd &
```

Note that the order of the switches "/length/elem/type" is very important.

In RESET_ELEM.CLI, delete the switch "/buff=32768" from the copy command.

In the February 1988 issue (page 56, Figure 3), Jim Siegman presented a macro that checks if the Minisam server is running, but the macro should have read:

```
push; prompt pop
delete/2=ignore ?CHECK.[!pid].TMP
create ?CHECK.[!pid].TMP
who/l=?CHECK.[!pid].TMP/2=ignore OP:MLS32
[!une [!size ?CHECK.[!pid].TMP],0]
. . . .
```

Otherwise, the warning message will end up in the temporary file instead of the process-info.

Many CLI commands have a corresponding pseudo-macro, e.g., DIRECTORY and [!DIRECTORY], but some, like WHO, don't. Therefore, I have written a macro, PSEUDO.CLI, that simulates a pseudo-macro by storing in STRING the normal output from a command.

Using this macro, the check can be programmed like this:

```
push; prompt pop
pseudo who OP:MLS32
[!nequal ( ),([!string])]
. . . .
```

comment Macro PSEUDO.CLI returns in STRING the output from %1-%

```
delete/2=ignore UDD:[!username]:?PSEUDO.
[!pid].TMP
%1%/L=:UDD:[!username]:?PSEUDO.[!pid].TMP/
1=ignore/2=ignore %2-%
string/k
string [:UDD:[!username]:?PSEUDO.[!pid].TMP]
delete :UDD[!username]:?PSEUDO.[!pid].TMP
```

Jan B. Andersen

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Following up on the general invitation to members of NADGUG to attend the U.K. users group meeting in London in March, my wife and I much enjoyed the friendly atmosphere and professionalism of this crisply run affair. We heartily recommend it to NADGUG members doing business in the U.K.

As a member of the DG community with a heavy stake in DG's future corporate health, I was disappointed in the keynote presentation made by DG financial executive Ron Skates. He started out well, pointing out something we all know: DG's future relies on the health of its VARs and the support and encouragement it receives from Westboro. I was glad to see that DG has a goal to once again see 70 percent of its income from its VARs.

But having said that, the rest of his presentation was spent reassuring us of the company's solvency and telling us how much money was being spent on the NTT deal. How in Hades is a commitment to phone switch technology going to help out the many VARs at the U.K. DG computers users meeting? Was Herb Osher's sales pitch for Unix the "VAR strategy?"

Apparently, DG is pretending the PC revolution isn't happening. In fact, Mr. Skates stated, "DG [is] not going to participate in the low-end, knock-off market." It reminded me of the ex-GM executives who ignored the Datsuns and Toyotas in their employee parking lots 20 years ago.

I have watched DG be ridden out of one market after another. And now here comes the 386 PC with its enormous price/performance potential threatening what is left of DG's entry-level base. Where is the DG technological cavalry?

While DEC teams up with Apple, DG throws its VARs a Dasher 286 (bare) bone, the Desktop with mini-priced peripherals, and (crash of cymbals) Unix for MVs.

Time is running out. The real PC challenge (OS/2) gets closer with each passing month. It gets harder and harder to sell DG price/performance when the customers are lured by PC technology advertised in the mass media as a commodity. Anyone in Westboro know Compaq's phone number?

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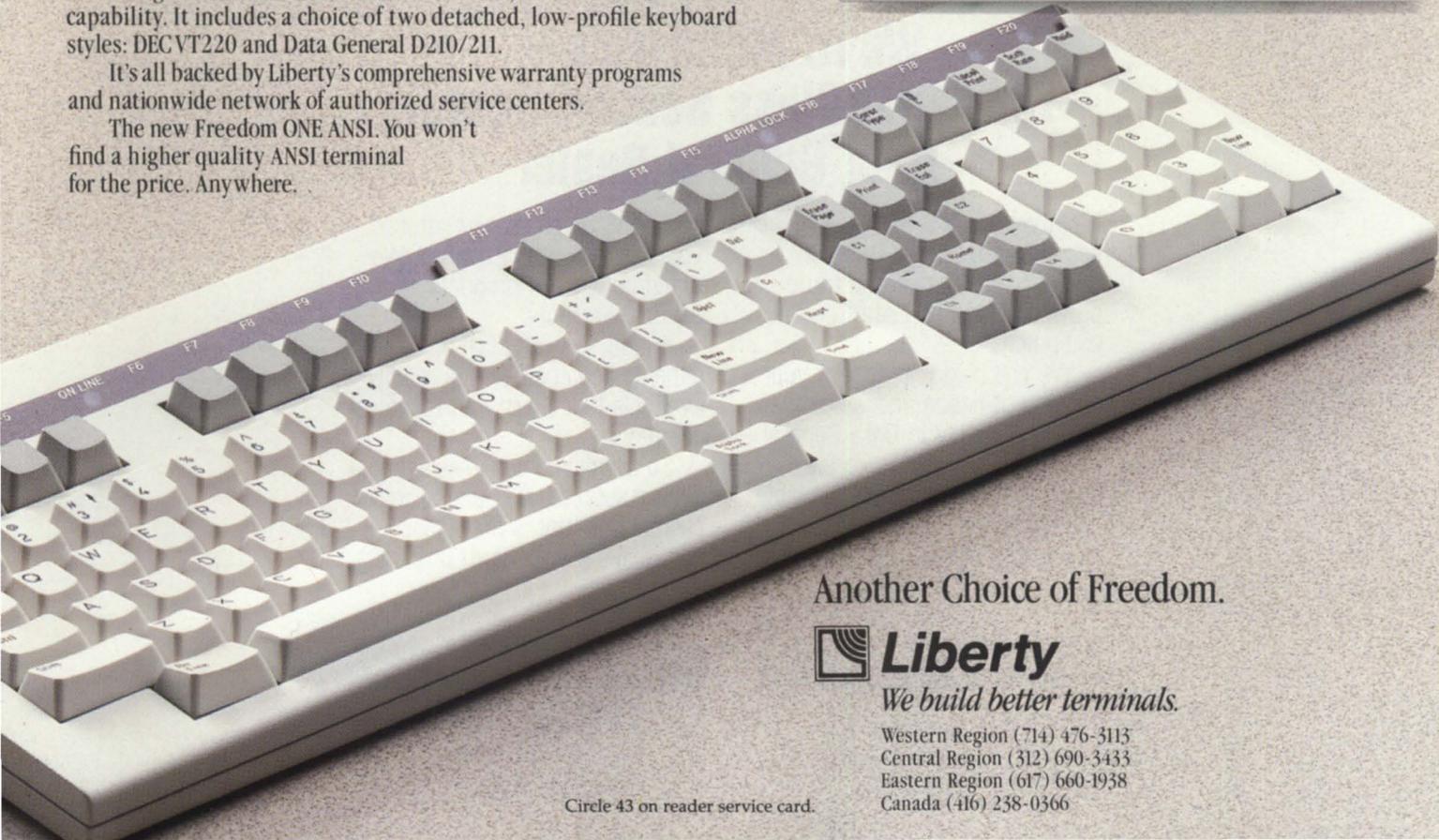
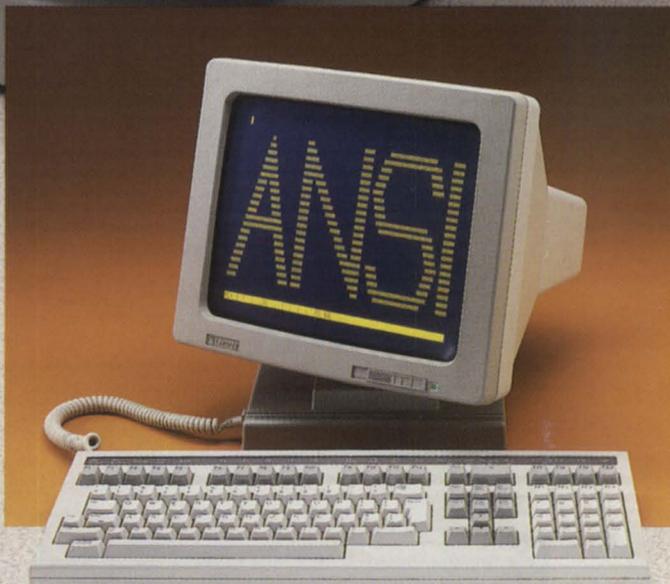
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DG-HAUS closes doors

With the addition of file uploads and downloads on the Rational Data Systems bulletin board (415/924-3652) and the departure of Lynn Lively from Gulf Coast Systems, the Houston Area Data General Users Group (HADGUG) has terminated DG-HAUS, the Houston DG board. The group would like to thank Lynn for his efforts in running the board.

Meanwhile, HADGUG continues to meet regularly. At the April meeting, Randy Berndt, NADGUG librarian, reviewed the current contents of the software library. Attendees that brought a 1,200-foot tape were able to get copies of the library after the meeting, thanks to the use of HADGUG president Jeff Campbell's system.

TEO 3-D SIG meets

The newly formed TEO 3-D SIG held its first official group meeting since the NADGUG conference in Las Vegas on May 3 at the A/E/C 88 convention in Chicago. So far, the group has approximately 22 member sites, with about 20 members from each site.

TEO 3-D is a three-dimensional engineering graphics and data base management platform offered by Data General. For additional information about the group, contact Ken Libby of Macola, Inc. at 614/382-5999.

PADGUG users meet with DG, third-party vendors

Members of the Pittsburgh Area Data General Users Group (PADGUG) held their bimonthly meeting April 6. After a general business meeting to review the minutes and the treasurer's report, two speakers gave presentations to the group of approximately 28 people that attended the afternoon meeting at Blue Cross. Blue Cross, a former IBM user now getting into Data General, supplied refreshments. The meeting lasted about 2 1/2 hours.

Larry McIsaac of Data General Field Engineering talked about options in DG Field Engineering with a slide presenta-

tion. He discussed purchase choices for maintenance to peripherals and third-party supplies. He also discussed response times. Pat Carr of Dataram talked about third-party memory vendors in the DG environment. He had a slide show also. Afterward, an open discussion brought out the suggestion to raffle the free conference registration to the NADGUG conference at PADGUG's June meeting. Members' chances of winning are based on attendance to local meetings. A runner-up will also be selected. The NADGUG conference will be held in Philadelphia in August.

Also tentatively scheduled for the June 1 meeting, a Data General representative will speak about new product releases, a Cognos spokesperson will talk about software offerings from Cognos, and the first users roundtable on problems and solutions will be held.

Meetings are held the first Wednesday of every other month at 4 p.m. Persons interested in attending should contact Chuck Hickenboth at 412/255-7426 or Ken Krugh at 412/826-8200.

RIG/SIG Committee holds second meeting

By the time you read this, but after *Focus* has gone to press, the RIG/SIG Committee will have convened in Austin, Texas, on May 5 and 6. Committee members Paul Duck, chairman; Dave Angulo, western coordinator; and Jan Grossman, eastern coordinator, will discuss plans for membership growth with the staffs from NADGUG and *Focus*. An intern recently hired by the *Focus* staff will help the RIG/SIG Committee organize local interest group meetings and report on them in the magazine.

The results of that meeting will be included in the July issue of *Focus*.

Errata

The April issue of *Focus* incorrectly stated that interested Unix users could log on to the SIG/UX MV/8000 with the username SIG/UX and the password NADGUG. SIG/UX leader John Huddleston tried to change the program to allow for the mistake, but he says the computer won't acknowledge a "/". The correct username is SIG.UX. Δ

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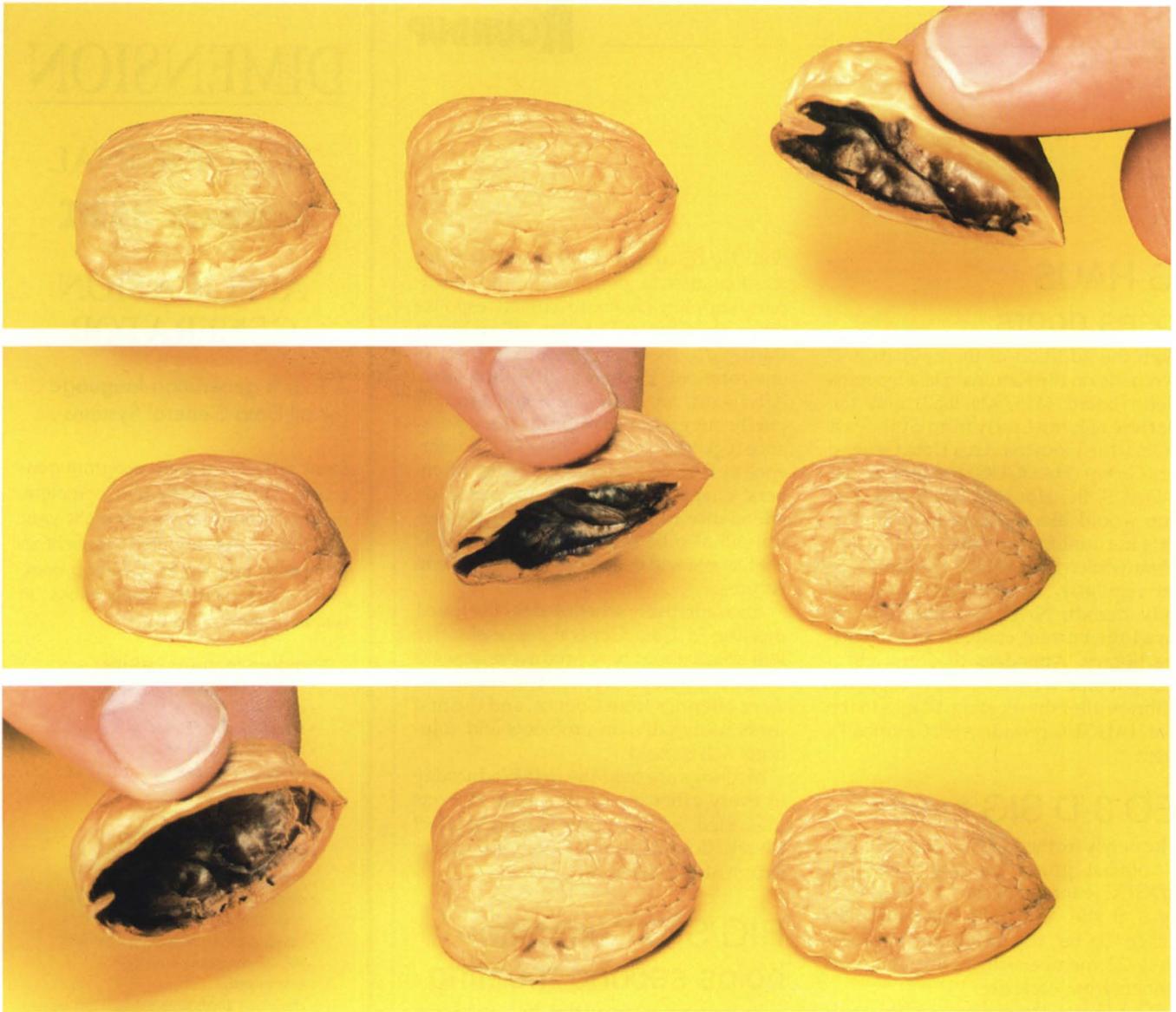
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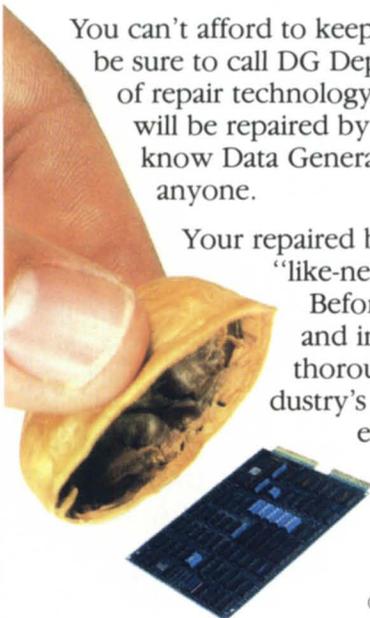
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Allied forces

Executive Advisory Council helps guide Data General's strategic direction

by Rene O. Dominguez
Executive Advisory Council chairperson

NADGUG's newly formed Executive Advisory Council held its first meeting February 8 at the new Data General Executive Briefing Center in Westboro. The purpose of this council is to provide NADGUG with executive experience, and to act as a liaison between NADGUG members and the executive management of Data General. This council doesn't replace the NADGUG officers you elected, but will support their efforts to focus attention on common user issues in a manner that will influence the strategic direction established by Data General executive management.

(Note: if your organization ever needs to be briefed on product directions or specific products, DG's Briefing Center is first class. It can be used to inform executives about the merits and directions of Data General in a collegial atmosphere. If your company has a need for such a presentation, contact your local DG sales representative for more information.)

Our charter to influence Data General's strategic direction is stated as follows.

The Executive Advisory Council will provide, on a formal basis, reasoned input to strategic product planning of Data General in such areas as hardware and software product features relating to functionality, quality, technical capability, pricing, and service—both with reference to Field and Systems Engineering and vertical industry integration. This input will be provided for the benefit of Data General users in such a manner as to have a definitive impact on Data General's strategic product directions.

Our initial meeting was held to establish our charter and goals, as well as to chart a course of action that would allow us to be effective in user issues.

Some of the goals we established include:

- to establish a vehicle for feedback to and

from Data General and the user group for communicating DG strategic issues

- to identify and quantify the strategic issues critical to Data General users and communicate the same to Data General's executive management
- to gain active involvement of Data General senior management in the efforts of the Executive Advisory Council
- to devise a mechanism to evaluate the effectiveness of the Executive Advisory Council's impact on identified strategic issues.
- to organize a periodic and effective means of interfacing with DG Corporate Marketing so that Data General receives timely input to their strategic product decisions
- to advise the NADGUG Executive Board on issues the council believes are important to the growth and development of NADGUG.

The meeting successfully accomplished the above and, more importantly, allowed us to exchange ideas with two Data General executives, Ron Skates, Data General's senior vice president of Finance and Administration, and Ward MacKenzie, Data General's vice president of Corporate Marketing.

The meeting with Ron Skates was both informative and pleasant. Skates first addressed the issues of Data General's financial performance. Although Data General posted a \$127.1 million loss on revenues of \$1.274 billion last year, Skates said that most of the loss stemmed from Data General's major reorganization of facilities, a one-time charge that was very costly. The reduction of manufacturing capacity, also quite costly, still leaves DG with sufficient capacity to resume their growth on a highly favorable trend.

DG continues to invest in research and development, as evidenced by the increase in budgeted expenditures planned for 1988 following a \$159 million expenditure in 1987. The fruits of this research will be enjoyed in the next few years through new products and the expansion of the joint venture with Nippon Telephone and Telegraph.

Skates also informed us of some accounting changes made in 1987. The two most significant changes involve DG's depreciation policy regarding in-house computer equipment and the capitalization and amortization of development

expenses for software. Data General has been extremely conservative in both of these areas. If Data General had been utilizing the accounting practices of some of the large computer manufacturers, recent operating results would have been more favorable. Although Data General is changing its accounting policy in a few areas where it has been overly conservative, DG will remain, for accounting purposes, among the most conservative companies in the industry.

**The council
has requested
another meeting with
DG's senior
management
in May or June**

Addressing the issue of mergers and acquisitions, Skates said DG is not contemplating a merger with another computer manufacturer at this time, although it will continue to review the acquisitions of other companies.

Price/performance and sales are the two areas that DG continues to stress, as exemplified by the recent recommitment to the value-added resellers and a continued development of the end-user marketplace.

December quarter results put Data General ahead of the plan with an improvement in orders—the continuation of which would mean DG would be profitable this fiscal year.

The meeting with Ward MacKenzie was likewise pleasant and informative. He pointed out that the consolidation of marketing functions under Corporate Marketing would allow Data General to improve its marketing focus. Key components of this focus include directing engineering toward future products, maintaining a strategic view of competition and technology, marketing on a proactive instead of a reactive basis, and identifying the changing needs of customers. This

focus is directed toward making Data General a marketing-oriented, technically superb company. According to MacKenzie, Tom West will now be responsible for product development, and Colin Crook will be responsible for communications products.

MacKenzie is very interested in establishing a two-way flow of information

with regard to product requirements. Reiterating Skates's comments, he said Data General's strategic plans will focus on becoming a general computer system supplier to end-users and VARs with world-class systems products. He is also looking for customers' key "hot buttons" for both good and bad items within the DG product line.

The council has requested another meeting with DG's senior management in May or June to secure involvement of DG management in the efforts of the council. In the meantime, we need your help and support. A NADGUG questionnaire will be arriving at your office shortly. Complete it and mail it back as soon as possible. If there are issues that you believe are very critical, please drop me a line or call one of the council members listed below.

Remember that the more successful Data General becomes, the better our decision was to use DG products, and the better the solutions will be for our companies. When Data General wins, we win.

This council can help to realize some of these goals. To date, the Executive Advisory Council has made some recommendations to the NADGUG Executive Board regarding NADGUG. The council has requested a session at the NADGUG conference where key identified issues will be discussed in a forum composed of Executive Advisory Council members and DG executive management. This forum will be presented in a general session at Conference 88 in Philadelphia in August. Also, the results of our survey will be used in our future discussions with Data General management.

The Executive Advisory Council members are:

George Allen
National Safety Council
312/527-4800

Ken Anderson
Vantage Software
212/302-7711

Don Brungard
American National Can
312/399-3122

Rick Chapman
Humana
502/580-1000

Orin Crosley
Reserve National Insurance
405/848-7931

Rene Dominguez
Deutsche Credit Corp.
312/948-1810

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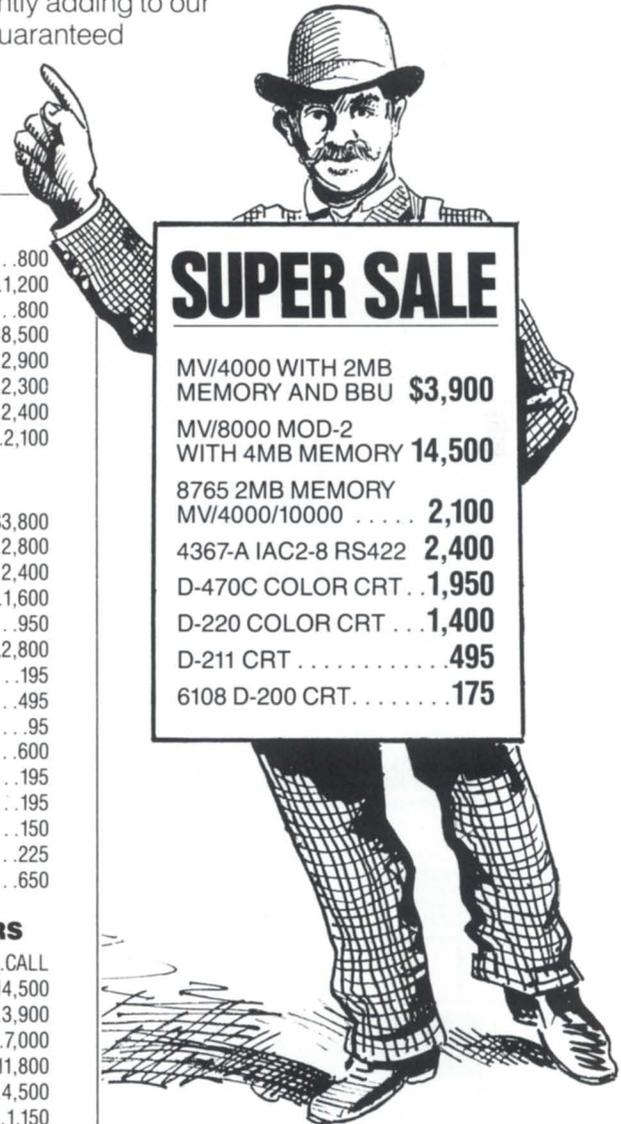
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Service, support, and satisfaction

DG has an array of offerings

by David Ramsdell
Special to Focus

While some vendors give their field engineers profit goals to meet, the goal at Data General branch offices is to maximize system up time and customer satisfaction. "At the branch office, the main focus is keeping customers satisfied," said Gerry Cromwell, director for Field Engineering's eastern United States area. "Our field engineers don't have goals related to revenue. It's strictly customer satisfaction."

"The service marketplace is increasingly competitive," said Norm Hodge, Data General Field Engineering's director of marketing and sales support, "and we realize that to do the job right today, we have to do more than just fix a computer. We have to be the best. We have to offer the variety of service and support solutions that today's customers demand."

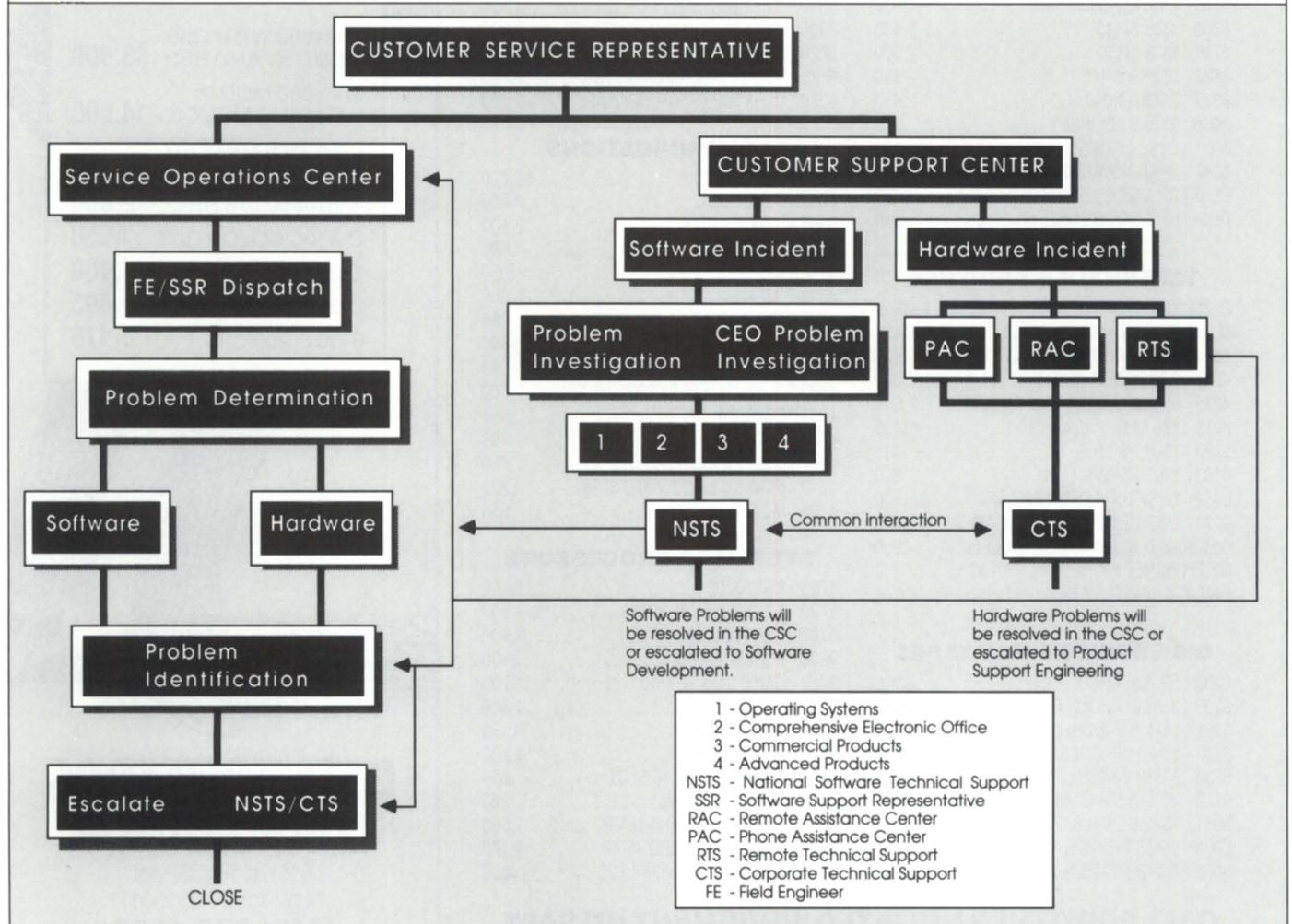
To accomplish this, Data General Field Engineering combines several elements—each of them critical to providing support to a spectrum of users throughout the world. In North America, it all comes together in two areas: at the nearly 280 field office locations, from which the field engineer (FE) travels to a facility with tools, parts, and expertise, and at the Customer Support Center (CSC) outside

of Atlanta.

"We have grown into a very effective remote service delivery center," said CSC director Tom Rizk. "We're providing total support for our Data General customers, no matter what the issue may be. You need to dial only one number from anywhere in North America, 1-800/DG-HELPS, 24 hours a day, 365 days a year, to get full system support through our service operations center."

That call will connect you with a customer service representative, who will either dispatch an FE immediately or route you to the appropriate hardware or software group. If your problem isn't solved within an hour, an FE is on the way. The center's people typically handle about 35,000 customer situations per month.

Figure 1: CSC call flow



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Figure 1 shows the call flow at the Customer Support Center.

Hardware support

Back to your call. If it's a hardware matter, it's routed to one of the center's major hardware groups.

The first group, the Phone Assistance Center (PAC), provides support for customers and Data General FEs who have questions about smaller systems, including the Desktop, DG/One, Dasher/One, and Dasher/286 systems. Phone assistance engineer Bobby Arnold said, "One of PAC's major goals is to fix the problem over the phone. That's important for our on-site contract customers, because it keeps down time to a minimum."

The Remote Assistance Center (RAC) offers remote support for all Eclipse MV systems, as well as field engineering support on all products. This may be done either on the phone or through remote diagnostics. Thirty percent of all RAC calls are resolved this way.

Many customers are using Co-resident Diagnostics, a program that installs diagnostic software on the operating system disks of most MV processors. "We can

diagnose potential problems fast, reducing customer down time due to system repair or problem resolution," said Jerry Johnson, RAC engineer.

Other groups, like Remote Technical Support, back up FEs with high-level hardware expertise on all Data General products. Corporate Technical Support includes the center's most specialized hardware engineers, who are available not only to advise and assist DG's hardware support specialists and FEs, but to go on site to resolve stubborn problems.

"Since we are the manufacturer, a unique part of our support escalation process is our flexibility. In the rare cases when we have to, we can take an issue all the way back to the group that built or even designed the system," said Hodge.

Software support

Let's say that your call involves a software matter. In that case, it's routed to one of the center's Software Support Groups.

First, problem investigation specialists or CEO (Comprehensive Electronic Office) specialists provide first-level technical support. These specialists conduct software problem diagnosis and search

data bases and other resources for problem resolutions. If they don't find an answer, they escalate the call to a software product specialist.

National Software Technical Support (NSTS) includes the center's most highly specialized engineers, who advise and assist the other software specialists. National software coordinator Joe Zacharia said, "NST is most often the last stop in problem resolution for especially tough issues. If a problem is escalated to our level, and we can't resolve it remotely, we'll go to the customer's site." Sometimes referred to as the "gurus" of software engineering support, they also help develop workarounds that alleviate problems until they can be fixed in a new revision.

The Software Problem Management Department was developed to increase the speed and efficiency of Software Trouble Reports (STRs). This group resolves as many STRs as possible, then forwards the remainder to the company's research and development departments.

Size is strength

Given the great size and applications

Some companies prefer to use third-party maintenance

by Kevin Greeley • Special to Focus

Having utilized the services of both third-party and manufacturer maintenance, my vote has to be for third-party service. At first, I was apprehensive to sign with a third-party organization. The major reasons for my fear centered on spare parts inventory, technical abilities, down time, and response time.

The ability of an organization to stock an inventory of spares to maintain my system is very important. I felt that only the manufacturer had the capability of carrying such inventories. However, I have found that my service organization has always been able to deliver any parts that have failed on my system. This equipment has always been in equal or better condition than the original equipment.

The individual who is responsible for maintaining my system is just as important as the company. When I call to have my system fixed, I want a person I can trust and who is knowledgeable. When a technician from a major manufacturer arrives, that person always runs diagnostics and then calls back to the office to talk

with the "know all" tech. With the third-party service vendor that I use, Xyrтин Xolutions, the technicians can take care of any problem without contacting their office for assistance. When my service call is placed, the company analyzes the situation and dispatches a technician who has the ability to resolve it.

One of the most crucial items of concern is down time. As a large paint manufacturer, our system is used for order entry, shipping, accounting, and many other functions. We cannot afford any down time. From the moment my call is placed, I want to feel assured that the service company is preparing to resolve my problem. It's important that they show interest in my problem, even if it occurs late in the day. Some company technicians are clock watchers. If it nears their deadline time, and the system is still down, they won't continue to work unless you pay for overtime. In most cases, my third-party vendor stays until my system is fixed, without worrying about additional charges.

Response time is an equally important aspect of service. On this point, there isn't

a lot of difference among service companies. Each contract states the time the technician should show up. A severe problem should be handled before the minor calls. Third parties seem to evaluate each call, prioritize the severity, and act accordingly.

There are also cost advantages in choosing third-party maintenance. Most third-party companies have discount structures off of the manufacturer's price. This has saved my company, Cardinal Paint, a great deal of money. Most third-party companies will maintain mixed hardware, while this was a problem for me with the manufacturer. I had to have multiple service companies to maintain my system. When my system would go down, I constantly ran into support problems. Usually they blamed the system failure on a part they did not service.

I prefer a maintenance company that deals with me as a person and that is concerned about my system operating. Δ

Kevin Greeley is data processing manager for Cardinal Paint.

range of its customer base, along with the geographic range of its marketplace, Data General Field Engineering must bring many strengths to bear on an enormous variety of customer needs.

For instance, the company's On-call Hardware Services provides an unlimited on-site repair service, Field Change Order installations, and a four-hour response goal for field engineers. On-call custom-

ers can also opt for services such as extended coverage, resident field engineers, critical response service, and Co-resident Diagnostics.

On the software side, there's Support Plus, with a baseline service that includes telephone and on-site support, automatic distribution of documentation, and microcode updates, as well as access to the software and hardware information avail-

able on Data General's On-line Information Service. Options include the help line, a telephone support product for PC-based products, and off-site performance analysis, which provides audits of an AOS/VS MV's system performance complete with recommendations.

Other services include traditional time and materials service, depot maintenance service, and a variety of special support

A new Pharaoh

by Bill Hoermann
and Bruce Pardee
Special to Focus

The next time your Data General field engineer is on site, you're likely to see a Pharaoh come along as well. No, your FE won't be lugging around an Egyptian mummy case. It will be Data General's new intelligent service tool, the Pharaoh.

Pharaoh is an all-in-one tool designed to support Data General's current and future products. The system, which was officially unveiled to DG's service force in April, is based upon the DG/One model 2T EL personal computer. To form an integral package, an expansion chassis designed by Data General has been added, housing a series of interface cards and a power supply.

The unit delivers portability and functionality that can be customized to meet the individual needs of field engineers and their customers. Pharaoh replaces many of the tools that once had to be transported to the site, such as oscilloscopes, volt meters, terminal testers, and continuity testers. In addition, the system provides access to on-line data bases that provide the field engineer with up-to-date technical information, allowing better and faster problem resolution.

Fred Cochrane, vice president of Engineering Services within Data General's Worldwide Field Engineering, said, "We've made major investments in technology, such as remote diagnostics at our Customer Support Center. Now with Pharaoh, we've taken another big step, putting even more powerful tools in the hands of our field force on site."

Some of the functions Pharaoh provides include a peripheral device tester, signal

processor, diagnostic load device, terminal emulation software, and remote support software.

The peripheral device tester will come into play whenever a Data General printer or terminal needs service, said Paul Bielski, Data General's director of Service Technology in Engineering Services.

The signal processor replaces many of the items a field engineer once had to carry in a tool kit, such as the oscilloscope, frequency counter, and digital multimeter. With this, field engineers can calibrate and adjust devices more easily, said Bielski.

With the diagnostic load device, field engineers can load diagnostics directly onto certain I/O buses utilized on Data General products, and the emulation software lets field engineers use the DG/One as a terminal for connection to a customer's asynchronous communication port.

Field engineers will also benefit from the expertise of support engineers at the Customer Support Center through the use of Pharaoh's remote support software.

The system also eliminates a lot of on-site phone calls and paperwork by providing on-line dispatch and call closure ability. A built-in barcode reader will help provide more accurate service call data.

"We designed the system to be flexible," said Bielski. "When new requirements arise, we can add to the functionality."

According to Cochrane, much of Pharaoh's strength is in its software, which includes MS-DOS as its operating system, communications software to allow access to a wide range of data bases, and the

ability to use many applications packages.

Such access, Cochrane said, makes the unit an impressive administrative and information tool. Field engineers will use the system to access several product information data bases, such as DG's On-line Information System (OIS) and the Symptom/Fault/Fix system, which provides the latest problem resolution information available.

In the past, it would have been impossible for a field engineer to carry all the documentation that might be needed at any one site. And there was often the chance that certain information would be outdated. That is no longer true.

Pharaoh eliminates much of the field engineer's paper handling. "Using the data bases, the field engineer can access Field Alert Bulletins, weekly software newsletters, patches, diagnostic trouble and documentation summary reports, Field Change Order (FCO) abstracts, and product support plans, just to name a few," said Cochrane. They are all up-to-date, and they're all easily accessible.

"We predict that our field engineers' efficiency on site will go even higher because of Pharaoh," Cochrane said. "It enhances our overall support capabilities and sets a new standard for service technology." △

Bill Hoermann is the manager of Technical Information Services, and Bruce Pardee is technical writing supervisor within Data General's Worldwide Field Engineering in Milford, MA.

options for users of the DG/One, Dasher/One, and Dasher/286 systems. More information on these products is available from Field Engineering's telemarketing representatives at 1-800/325-3065 (inside Massachusetts, 1-800/952-4300).

With such offerings in place, the engine that drives response time on customer calls is Data General's escalation process.

This ensures that if the initial efforts to restore a system are taking too long, then added expertise, such as field support specialists and Corporate Technical Support, can be brought in promptly to assist the field engineer, making sure that the system is up as soon as possible.

Another company strength is training. One type is computer-aided instruction

(CAI), such as Project Discovery, with standalone workstations in all key locations and branches. FEs and other support people can use its videodisks in an interactive touch-screen mode to maintain their training on products and technologies. In problem simulations, the viewer's progress depends on the answers they give in response to the questions posed by the video.

A major training component is the company's training center located at a former college campus in Woodstock, Connecticut. It has all the features of a first-rate educational institution: qualified instructors, laboratories, hardware and software, communications systems, and simulation capabilities. Each year, FEs and support specialists from around the world receive continuing instruction on this campus.

The tools must be first rate also. For example, there are two new tools in Data General's toolbox: System/Fault/Fix data base (SFF) and Pharaoh. SFF stores a huge range of global, technical, and problem documentation, easily accessible to FEs and Customer Support Center staff. The format helps them identify and resolve problems and get a system up and going faster. The second, Pharaoh, is a portable all-in-one diagnostic unit carried by Data General FEs. This new tool replaces many of the tools an FE once had to carry, and most important, it can be customized to service specific needs (see page 19).

FEs and customers are also backed by the latest technology in spare parts and systems repair at the Product Distribution and Repair Center located in Fountain, Colorado. If you combine the center's large inventory of spare parts with the smaller inventories of individual field offices, which are stocked through Fountain, you would have nearly \$150 million worth of about 17,000 types of parts. Those parts are tested and repaired using technology such as the sophisticated automatic test equipment used to examine the printed circuit boards swapped through Field Engineering calls.

"Every board we take out of the field is assumed to be bad. We don't repair them on site; we swap them for new ones and send them to the repair center. This gets customers back in business faster. When we repair them, all the logic on the boards is exercised, not just the problem spot. That way, we know that the board is completely right," said Hodge.

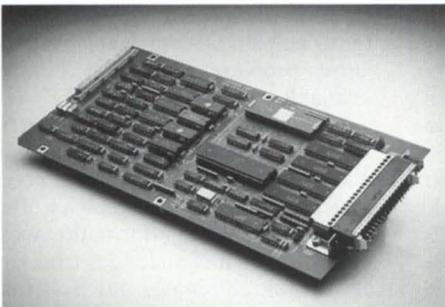
Depot maintenance service from Fountain is used by customers who do their own repairs. One of those services, spare

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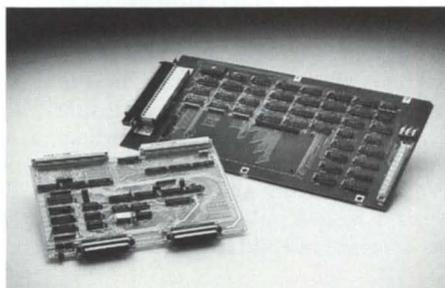
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Get immediate access to the growing world of VME-based products with the IS-3200, a high-performance interface that directly connects your Data General computer to an external VME chassis. Key features:

- Maximum transfer rate of 10 Mbytes per second
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- Jumper selectable interrupt levels
- Jumper selectable VME support logic

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Circle 36 on reader service card.

mail, offers a choice of turnaround times on parts repair or exchange, from overnight exchange to three-week exchange or repair.

This all leads to customer satisfaction. If there's a single dominant motivator among the people at Field Engineering, this seems to be it. Sometimes it takes the form of letters. Alan Tan, operations manager at Dry Color Manufacturers' Association in Virginia, wrote that a New Year's Eve "nightmare" involving a hard disk was solved due to the "hard work, the attention, the promptness, and courtesy" of the field engineers and CSC staff.

Programmer Peter Chin and data processing technician Dot O'Connor of the California Energy Commission wrote about "the excellent service" they received during their conversion to an Eclipse MV/10000. The field engineer "was here for 12 hours, and we got the hardware up and running without any major problems."

Satisfaction shows up in other ways, too. For example, last year, customers rated Field Engineering's overall hardware service an 8.7 on a 0-to-10 scale, while field engineers' communications effectiveness was rated at 9.2.

What's new

Data General frequently releases new support options, as it detects new customer needs. For example, Data Assurance, through an agreement with Data General, offers hot site/disaster recovery services. DG/hot site offers customers an alternate electronic data processing facility in the event their system is rendered inoperable.

In another move, DG has expanded its On-call Support Services to include additional, select, non-DG hardware products that are integrated into Data General computers. In a related service, Data General now offers comprehensive network systems support services to help plan, design, install, and maintain an integrated, multivendor computer network. Your maintenance contract provides total system support for a DG/PC*I network. For example, the company supports IBM's family of personal computers, along with popular peripherals and options cards, within a DG/PC*I environment.

What's ahead

Systems are changing rapidly along with service and support needs. Field Engineering's director of New Business Development, Colin Cowie, said, "Needs will change. Field Engineering sits alongside Data General's corporate marketing, prod-

uct, and planning groups, and we are involved in discussions about where we are going and the directions our business will take. The marketplace is demanding more integrated, comprehensive, one-stop service packages.

"It doesn't stop at fixing something when it's broken. Customers want to see a wide range of account management pro-

grams that allow them to say, 'Yes, I want your solution to my business problems, and I want you to take care of all the elements that surround the delivery of that solution.'" △

David Ramsdell is a free-lance writer based in West Boylston, MA.

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Circle 37 on reader service card.

Third-party service and support

Where can you go for help these days?

To help you answer this question, Focus compiled the following list of vendors who offer third-party service for DG computers.

ADH Computer Services

2721 Loganrita Ave.
Arcadia, CA 91006
818/574-6958
Contact: Al Oliveira
Services: on-site and depot services
Hardware: Eclipse lines
Peripherals: all types
Service area: southern California only

A/S/K Associates

P.O. Box 824
Lawrence, KS 66044
913/841-8194
Contact: Frank Ruth
Services: software repair only
Service area: nationwide

Accounting Systems Computer Support Services

6701 Aberdeen Street, #9
Lubbock, TX 79424
806/794-1655
Contact: Mike Redeker
Services: on-site and depot services
Hardware: no CPUs
Peripherals: terminals, printers, disk drives, tape drives, and communications equipment
Service area: West Texas and eastern New Mexico

CCI Uptime

5306 S. Bannock St., Unit 5
Littleton, CO 80120
303/798-2911
Contact: James Swails
Services: on-site and depot services
Hardware: all DG equipment except MV/2000s
Peripherals: any that have to do with DG equipment
Service area: Colorado

Catalina Computers

1001 W. Arbor Vitae St.
Inglewood, CA 90301
213/215-0641
Contact: Jim McInnis
Services: depot repair
Hardware: none
Peripherals: boards only
Service area: nationwide

Comp-Rite International

11490 W. Sample Rd.
Coral Springs, FL 33065
305/753-2800
Contact: Erick Von Lippke
Services: on-site (within a 100-mile radius) and depot services. Four-hour turnaround during normal working hours, and 24-hour, on-call extended coverage
Hardware: Novas, Eclipses, and DG-compatibles
Peripherals: tape drives, printers, and disk drives
Service area: 100-mile radius

Compuplan International

400 Center Park Blvd., Suite 100 B
DeSoto, TX 75115
214/228-0188
Contact: JoAnn Gentile
Services: on-site, depot, and time and materials services. Standard coverage—8 a.m. to 5 p.m. Extended coverage—24-hours
Hardware: 16- and 32-bit DG machines up to and including MV/10000
Peripherals: all DG and third-party peripherals
Service area: Chicago, Dallas/Ft. Worth, and Houston

Computer Engineering

3922 Vero Rd.
Baltimore, MD 21227
301/247-5244
Contacts: Mike Collins and Paul Keys
Services: on-site, depot, and field engineer services
Hardware: full line up to MV/15000s. Standard coverage—four-hour turnaround during working hours, 8:30 a.m. to 5 p.m. Extended on-call coverage—24 hours, seven days a week
Peripherals: everything but modems
Service area: five offices—Baltimore; Washington, D.C.; Pittsburgh; Cambridge, Maryland; and Moorestown, New Jersey

Computer Field Services

6 Federal St.
Danvers, MA 01923
617/777-8730
Contact: Dan Cronin and Sharon Ezell
Services: on-site, depot, and refurbishment services. Standard contract—four-hour response time during working hours
Hardware: Novas, Eclipses, Desktops, and MV/4000s and up
Peripherals: printers, terminals, and disk drives
Service area: on-site—New England area; depot—nationwide

Computer Maintenance Corp.

405 Murray Hill Pkwy.
E. Rutherford, NJ 07073
201/896-0707
Contacts: Robert Weber and Bill Cirone
Services: on-site and depot services. They have a factory.
Hardware: Novas, Desktops, MV series, and DG clones (Point 4, Digidyne, Bitronix)
Peripherals: full computer system service
Service area: minis—from Maine to Virginia; micros—nationwide

Computer Products & Repair (CPR)

641 E. Walnut
Carson, CA 90746
213/538-1900
Contact: Yolanda Parker
Services: on-site and depot services
Hardware: full computer system service
Peripherals: full computer system service
Service area: depot service—nationwide; on-site—California only. The number for service is 213/538-4600.

Computer Repairman

838 Sparta St.
P.O. Box 2777
West Lafayette, IN 47906
317/497-2616
Contact: Dave Koehler
Services: on-site and depot services. On-site contracts include quarterly PMs and four-hour response time during normal working hours.
Hardware: Novas, micro Novas, Eclipses, and Desktops. No MVs
Peripherals: terminals, disk drives, tape drives, and communications
Service area: nationwide depot service and local on-site service

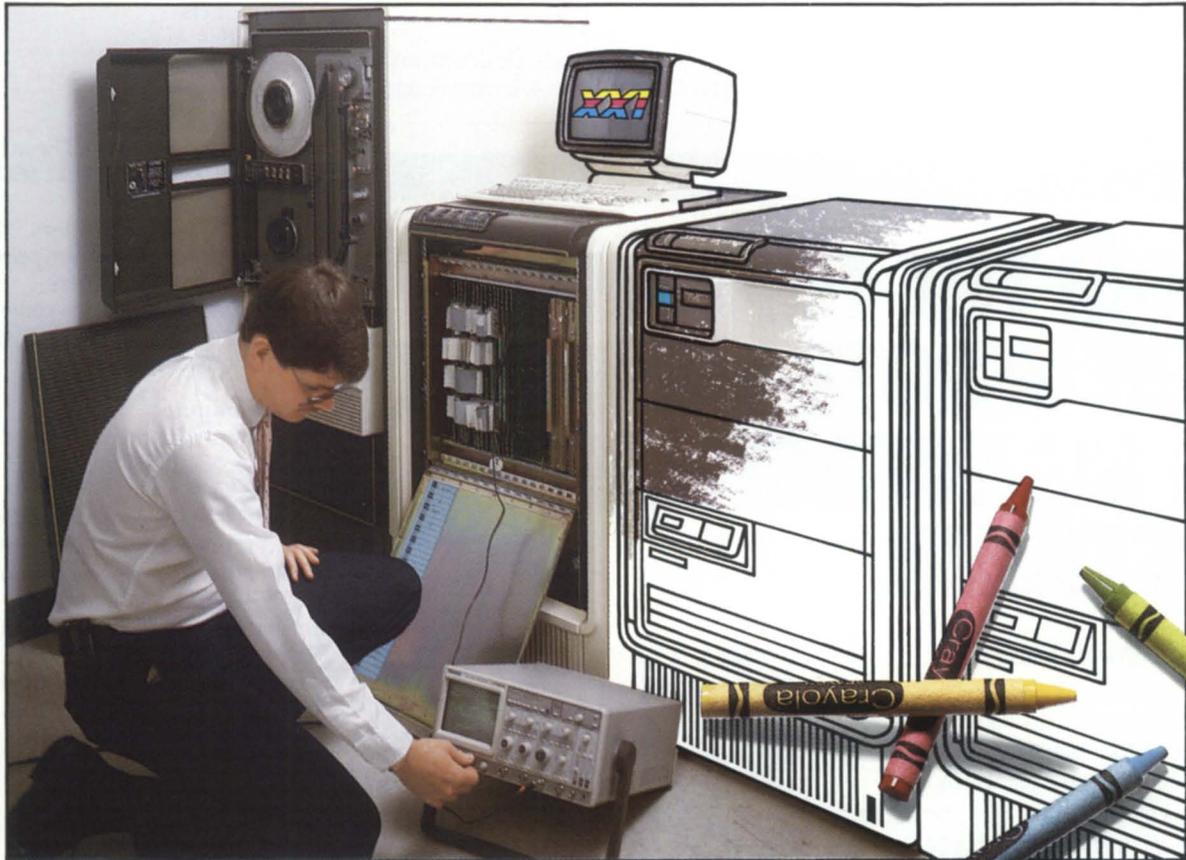
Computer Technology

1442 W. Collins Ave., Suite B
Orange, CA 92667
714/538-2344
Contact: Karen Gurol
Services: depot repair for their boards only. 24-hour hot line services comes with purchase (800/999-5459). Free temporary replacement board within 24 hours while repairing the customer's board.
Service area: nationwide

Concept Automation

1319 Moran Rd.
Sterling, VA 22170
703/450-6000
Contact: Bill Tabb
Services: on-site service
Hardware: all types
Peripherals: all types

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Service area: Washington, D.C., metropolitan area and Oklahoma City, where they have a branch office. They contract all other nationwide service calls out to Data General. Service numbers to call are 703/450-6486 in Virginia and 800/368-5004 outside Virginia.

Data Entry
114 Live Oaks Blvd.

Casselberry, FL 32707
305/339-5062
Contact: Jim Walton
Services: on-site and depot services, including full parts and labor, four-hour response time, and 800 number for dispatching purposes
Hardware: Novas, Eclipses, Desktops, and DG clones (Ampex, Point 4, Bytronix, and

Digidyne). No MVs
Peripherals: almost all DG peripherals, including third-party printers
Service area: Four service centers cover all of Florida.

Dataproducts
9601 Lurline Ave.
Chatsworth, CA 91311
818/887-8409

Contact: Jon Gilchrist
Services: depot repair. The number for service is 818/888-8844 ext. 950, 7 a.m. to 5 p.m., Pacific time.

Peripherals: DG printers that they manufacture for DG—drum printers, band printers, and laser printers
Service area: Two service centers, one in New Hampshire and one in California, offer nationwide service.

Delta Computec
18 Corporate Circle
Syracuse, NY 13057
716/458-2560

Contacts: Joe David and Ken David
Services: on-site and depot services. The number to call for service 24 hours a day is 800/234-2202.

Hardware: entire DG product line
Peripherals: entire DG product line
Service area: nationwide through their Atlanta service center. On-site repair in Texas, the Gulf Coast area, and the Northeast

Digital Computer Service
624 Krona Dr., Suite 195
Plano, TX 75074
214/422-1864

Contact: Mary Allen
Services: depot repair only. 8:30 a.m. to 5 p.m., central time, Monday through Friday
Hardware: Novas and most Eclipses
Peripherals: most DG peripherals
Service area: United States and Canada

Digital Data Systems
1551 NW 65th Ave.
Ft. Lauderdale, FL 33313
305/792-3290

Contact: Jack Gallagher
Services: depot repair. Turnaround time is 10 working days.

Hardware: Novas and Eclipses
Peripherals: memory, power supply, and any add-on memory boards
Service area: nationwide

Essex Computer Service
263 Cox St.
Roselle, NJ 07203
201/245-8300

Contacts: Greg Deo and Bob Remmert
Services: on-site and depot services. Mail-

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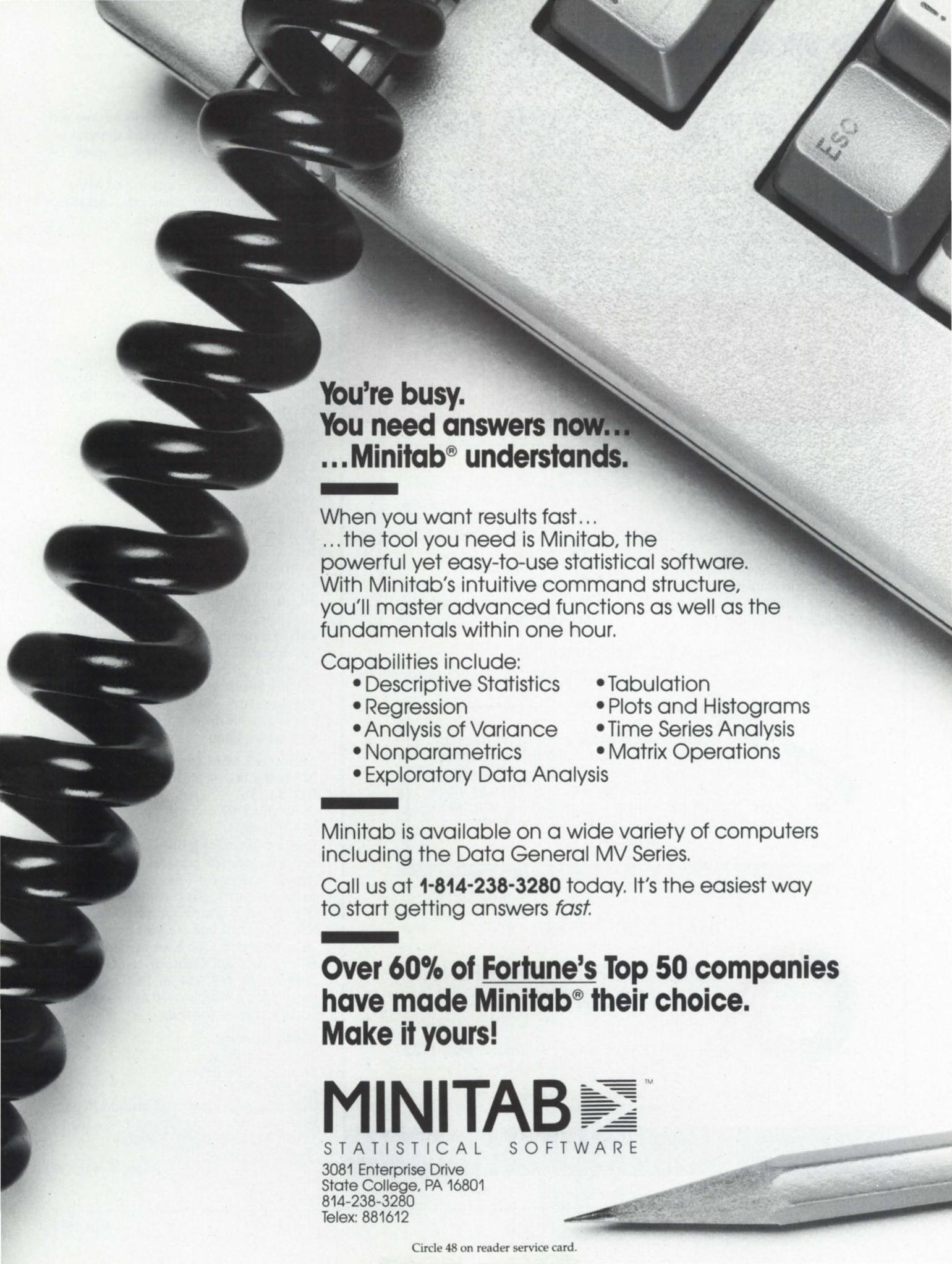
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in services can issue you contract to obligate turnaround time. Extended coverage offers seven days a week, 24 hours, four-hour response.

Hardware: from Novas to MV series (MV/2000 to MV/10000)

Peripherals: all DG peripherals, standard add-ons, including Fujitsu, Dataproducts, Printronix, and Centronix

Service area: Delaware, New Jersey, New York, eastern Pennsylvania, and southern Connecticut

Grumman Systems Support

90 Crossways Park West
Woodbury, NY 11797
516/682-5367

Contacts: Bob Denecke, Mitch Portnoy, and Richard Rosello

Services: on-site (50 branch locations) and depot (three depots). Hours depend on contract, up to seven days a week, 24 hours a day.

Hardware: Novas, Eclipses, and MVs
Peripherals: all the standards, including PCs, printers, disk drives, tapes, and memory boards

Service area: nationwide

Hanson Data Systems

60 Brigham St.
Marlboro, MA 01752
617/481-3901

Contact: Howard Hanson

Services: on-site and depot services. 24-hour service contracts. 8 a.m. to 5:30 p.m., Monday through Friday, eastern time

Hardware: all DG hardware

Peripherals: all DG peripherals

Service area: New England area

Logical Solutions Company

1 Pope Rd.
Windham, ME 04062
207/892-7536

Contact: Walter Veinotte

Services: on-site with full parts and labor
Average four-hour response time. Mixed environments

Hardware: Novas, Eclipses, and Desktops
Peripherals: terminals, printers, and third-party equipment

Service area: Maine to southern Virginia with two offices and several remote FE centers. Subcontract for West Coast area—Washington; Oregon; San Diego; Honolulu; Norfolk, Virginia; Dallas; and Columbus, Ohio

McIntyre's Mini-computer Sales Group

575 E. Big Beaver Rd.
P.O. Box 516
Troy, MI 48099
313/524-4900

Contact: Veronica Johnstone

Services: on-site services in Michigan, depot services for others, and time and materials work. Basic contract 9 a.m. to 5 p.m. with four-hour response time. Extended coverage—seven days a week, 24 hours a day, four-hour turnaround

Hardware: full DG line up to MV/10000s
Peripherals: full line of DG and third-party peripherals, as well as memory

Service area: worldwide

Media Concepts

562 Lincoln Blvd.
Middlesex, NJ 08846
201/560-8584

Contacts: John Tiano and Bridgid Regan

Services: depot repair only. 8 a.m. to 5 p.m., Monday through Friday

Hardware: none

(cont'd on pg. 78)

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Commitment or conversion?

RDOS users have a dilemma. It's time to decide

by Al Takach Hill
Special to Focus

Ever since its early years, Data General has been claiming upward compatibility as one of the main advantages of its line of minicomputers. However, this compatibility has only been stressed at the hardware level. Certainly instruction compatibility is important to solving growth and expansion problems of DG's older client base, but no one has seriously addressed the compatibility of upgrading from one operating system to another. During the past several years, I have listened to rumors and read articles about RDOS on an MV, multiple-ground RDOS, RDOS agents, and the like. In almost every issue of *Focus* or *DG Review*, there is a complaint or an article about clients who wish to leave the RDOS system for something that gets more support from Data General.

The MV/7800 CPU was supposed to allow S/140 and Nova 4 clients to upgrade their current hardware to the MV series with some degree of cost-effectiveness. Whether or not this was a reality, I cannot say. Data General's RDOS Agent was supposed to provide a migration path for those customers who wanted to abandon their old Nova and Eclipse hardware with RDOS to finally arrive at AOS/VS on an MV. But I haven't heard any testimonials for this approach either.

I do have some thoughts on the problem, however. If the customer's application is in a higher level language, then the customer should spend time either with existing personnel or a consultant to convert to the same higher level language under AOS/VS. The major concern here is the runtime calls, particularly from Fortran IV and Fortran V, that access various RDOS system and task calls that aren't available on the AOS/VS system. These

should be looked at on an as-needed basis.

A second concern, although much more obscure, is the number of concurrent tasks that AOS/VS will run per program. This may require the client to split an application into two or more programs on the MV, or maybe even to consider using AOS/RT32 as the runtime environment. Still, there are a number of reasonable Fortran and COBOL programmers who can handle the job of conversion of these higher level languages with few or no problems. Data General publishes a guide to Data General's Fortrans that could aid in such a conversion. COBOL and COBOL/INFOS users shouldn't have much difficulty. Business BASIC and Extended BASIC users will follow the same route. RDOS Algol and DG/L users should find conversion to AOS/VS DG/L, or even AOS/VS C, a reasonably easy task. ICOBOL is ICOBOL across the DG product line.

But suppose the client's application, in its higher level language, uses assembler subroutines. Now the problem is more complex because of the limited availability of programmers who know assembler (both RDOS and AOS/[VS]) and the differences in the system and task calls of the two operating systems. Generally speaking, applications written in higher level languages use a proportionally smaller number of assembler language subroutines. Again, these assembler modules could be converted to equivalent AOS/[VS] modules and the higher level language application simply recompiled.

The advantages of conversion are obvious. A client has many years of investment in an application. Many applications are homegrown, and very few have adequate documentation. The client's personnel all know the application and would probably be averse to a complete rewrite or new application because of the learning curve. Many applications suit a specific need that cannot be easily replaced by off-the-shelf software. Rewriting the application is not usually an option, because producing an application that could run on a PC or compatible or a small DG MV system could cost many times more

than the hardware itself.

All but one of these problems can be addressed by careful analysis and the procurement of a competent consultant. Suppose the client's application is written entirely in assembler, is highly overlaid, uses extended memory, has its own device drivers, uses a large amount of system and task calls from RDOS, has poor to nonexistent documentation, uses more than 32 tasks, defines user clocks, and is real-time-oriented? This is the type of problem that deserves special attention.

Some people advocate the use of a multiple-ground RDOS system. However, many clients probably would like to abandon the confines of the RDOS system and move up to a system that will support the existing application and provide access to the full software line available under the AOS/VS system, such as CEO, Xodiac, SNA, F77, Ada, C, Unix, and the range of productivity tools. AOS/VS also allows expansion beyond the 64 KB limits of the RDOS system—in addition to long-term support from DG.

Others advocate using the RDOS Agent. Again, the user would probably like to escape from the RDOS system and any emulation to arrive at a solution outside of the RDOS environment.

In the 10 or more years that I have been dealing with DG equipment, and the last 3 years of analysis of RDOS versus AOS/VS, I have found a solution to the assembler problem mentioned above. Of the 133 RDOS system and task calls, I have written more than 122 routines to convert the RDOS call to its AOS/VS equivalent. The degree of compatibility between the RDOS Mac and AOS/VS MASM 16 allows the assembly of RDOS assembler programs with little or no required change to the source. The 16-bit Nova and Eclipse instructions, with few exceptions, are identical. The only real problem is the RDOS system and task calls. If these were available, the client's application could run without any modification.

Consider that many applications are designed using a front-end to various system- or application-specific features.

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The front-end is used because the underlying code, with a specific and documented interface, may change without affecting the calling program. By writing more than 122 of the RDOS calls to call the equivalent AOS/VS routines, I am providing this type of front-end. But I am using AOS/VS MASM 16. This means that the application once assembled and linked will be a 16-bit program under AOS/VS and still bound by the 64 KB limits of such a program. This boundary is only on the face

Whenever an application is so tightly wired to the operating system, a penalty must be paid

value. The newly converted program may have new code added that will make use of the ring structure of AOS/VS for large data tables and subroutines. The front-end routines actually use inner rings for management of many of the RDOS to AOS/VS procedures, thus allowing the client more available space in a ring 7, 16-bit program. By using the available user rings, the program could be increased to more than 1.5 GB of logical address space.

The newly converted application can also mix RDOS and AOS[VS] system and task calls in the 16-bit program, provided sufficient space exists. Shared and unshared overlays are able to be supported. By using the multiprogramming features of AOS/VS, extensive stack management, and an in-depth knowledge of AOS/VS internals, the front-end routines are able to provide significant RDOS functionality.

Now the client can execute the application under AOS/VS and, if necessary, add new code or modify existing code to take advantage of the AOS/VS architecture. Now if clients want to convert to a full 32-bit application, they can take time to analyze the problem without being rushed.

In the past three years, I have closely analyzed more than 500,000 lines of RDOS and AOS[VS] assembler source. While most of the analysis came purely from the system and task call point of view, a reasonable portion of this time was spent in performance analysis. The decision to

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build all required temporaries and packets on the stack was a good one. By design, the programming had to be reentrant, position-independent, and movable to create an environment that is small, sharable, and able to promote execution speed.

While most RDOS assembler sources can be ported to the AOS/VS system using these methods, there will undoubtedly be some source modules wired into the RDOS system. Unwiring these types of routines can cause discomfort to the person performing the conversion. This type of wiring is usually the result of trying to extract as much power and resources from the RDOS system as possible. Whenever an application is so tightly wired to the operating system, a penalty must be paid.

Previously, I mentioned multiple-ground RDOS. Using the above-defined architecture, the client will have multiple-ground RDOS capability equal to the maximum number of user processes allowed and available on the AOS/VS system. On some MVs, this could possibly be into the thousands, although this is not probable. The RDOS client would no longer be bound to a foreground-background operation. The client would also be able to take full advantage of all devices available on the AOS/VS system, as well as a more sophisticated file system. New disk architectures available only under AOS/VS, coupled with the MV series of equipment, can provide a small, compact, quiet hardware environment with seemingly unlimited disk space, asynchronous lines, and features beyond what the client currently has under RDOS.

A discussion of what the client could have under AOS/VS would be an article by itself, so I will conclude by encouraging RDOS clients and system developers to take a closer look at porting their application to the AOS/VS or AOS/RT32 environments. Although RDOS is a system that can stand on its own merits, it isn't one that will allow clients to continue through the next several years. While Data General doesn't seem to want to make a solid statement about the future of RDOS, and while maintenance of the old Eclipse and Nova hardware only keeps rising in cost, the client can, at reasonable cost, step into a more comfortable environment and plan for the future. Δ

Al Takach Hill is president of Hill Computer Consultants, Inc. He has written the System Call Translator (SCT), as well as other products. He may be reached at 703/471-4104.

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Nice choice

Wordperfect rev 4.2 is praiseworthy, despite a few quibbles

by Harvey Shreiber
Special to Focus

Up until now, people in the DG community could choose between two very good office automation software packages. With recently released versions of both CEO and Wordperfect, the choice is now between two packages that are better than before—and it doesn't even have to come down to a choice any more, now that it's possible to integrate the two.

The convergence of Wordperfect with CEO would have seemed unlikely a few years ago. CEO was always presented as an integrated office environment, with word processing being only one component. Wordperfect, on the other hand, earned its reputation strictly as a nimble, powerful word processor. However, since the market for these products demands both performance and functionality, it makes sense that DG and Wordperfect would each strive to match what the other offered.

Wordperfect Corporation's approach has been to surround its word processor with a family of products—initially called "Library" but since renamed "Office"—to provide electronic mail, calendar and scheduling, phone messages, spreadsheet, and a simple, flexible menu interface to move between them. The result is a very good word processor and a promising, but still somewhat rough, office automation environment.

CEO's feature-rich menus and filing system are more sophisticated and better integrated than Wordperfect's product family, but CEO word processing doesn't match the features or performance that shrink-wrapped PC word processors have led users to expect. CEO users who want a better word processor now have two alternatives. They can buy either DG's CEOwrite or Wordperfect; both can be integrated with the CEO environment. (Actually developed by Microsoft, CEOwrite is seen as a replacement for CEO Word Processing; it is the only DG product that will offer micro-oriented features

like integration of text and graphics.)

With rev 4.2, the Wordperfect word processor offers a few major new features, and a long list of enhancements. The focus of development efforts at Wordperfect Corporation is shifting, however, as the company's fortunes have risen in the PC market. Although the DG market was Wordperfect's birthplace, the vast majority of its sales now comes from the PC market—and since the micro arena is so competitive, PC Wordperfect now leads the way for new enhancements. To see what the next release of DG Wordperfect will bring, just take a good look at what PC Wordperfect offers in rev 5.

This shifting development emphasis raises the question of whether future releases of DG Wordperfect will continue the product's tradition of power and performance. At least for rev 4.2, the answer is yes.

When the update tape arrived, my first step was to check the grapevine to see what others were saying about the new rev. I didn't find anybody who had installed it yet, but one friend did say he had heard it was a little bit rough. The installation notes looked straightforward, and I was curious enough that I decided to proceed. Installation was easy, and the only necessary change was a small modification to the clean-up file for our alternate print queue. There were a few rough edges, but they were very small in comparison to the new functionality. I'll raise them briefly, and then move on to the good stuff.

Quibble #1: The default left margin is at column 10, but the display on the screen always starts at column 0. To see how your document will look on the page, you have to "preview" it from the print menu.

Quibble #2: The column counter on the screen's status line doesn't get updated as you type. You have to be editing to get an accurate cursor position number.

Quibble #3: Using the cursor controls to move up or down through your document causes the cursor to move unpredictably—sometimes it jumps all the way to the left or right margin, but in no discernable pattern.

Quibble #4: Some of the features listed in the *Update Guide* don't work as described. For example, the HOME-DEL combination, which is supposed to delete

characters between the cursor and the beginning of the word, doesn't work at all.

Quibble #5: Sometimes when inserting text in the middle of a line, characters temporarily disappear until the next time the screen gets refreshed.

These annoyances are pretty easy to overlook when you compare them to new features like these:

• **Thesaurus**—Called directly from a function key, the thesaurus is both convenient and swift. The top of the screen shows the current four lines of your document. The word at the cursor position automatically becomes the subject of the search, and the system displays a list of synonyms and antonyms grouped by parts of speech and nuance. It's easy to follow a chain of associations until you find the right word—and when you do find it, Wordperfect will automatically substitute it for the word you started from.

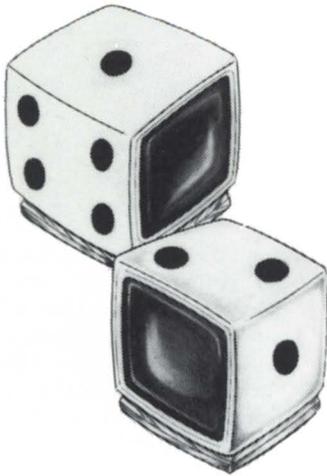
• **Filing**—The "list files" function key is much more user friendly in rev 4.2. As before, it will give you a list of files in the working directory, and menu selections let you retrieve, copy, delete, rename, or inspect the files. There are new options to search the documents for a character string, and to mark a group of documents to delete or move. Best of all, the system keeps you from obliterating a directory and all its contents if you forget to specify the complete target pathname for a file you want to copy. (This happened with unsettling frequency to novice users of the old Wordperfect.)

• **Reveal codes**—You now get two windows, one showing your normal screen display, and the other showing the "hidden" codes. This makes it much easier to find and fix codes that may be messing up your display.

• **Speller**—It seems to run just a shade faster than before. There's also a new option that does a word count on a document in a matter of seconds, which is very handy for people like me who are limited to 1,000 words for an article.

That's just a peek at the new features. There are many more, including a document summary, line drawing capability, improved math and column features, a sort option to the merge function, and as many as 10 active documents. They all seem to work, and I'd love to tell you about them, but I just passed 1,047 words. Δ

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Sneak preview

Big changes in rev 3.0 of CEO.

Part II of III

by Paul Duck
Special to Focus

This is the second in a three-part series describing the extensive changes in the latest revision of CEO. Last month's installment included an overview of the changes, and this month's article continues from where Paul ran out of space last month.

Survey management

Several menus, including the inbox, drawer, folder, and document survey menus, now offer an option called survey management. This is an extended version of the former option to reformat or print survey menus. On most menus where survey management is available, you can now file, print, sort, or reformat the menu. On a few menus, like the remote alias menu, you can only file or print the survey.

When you sort or reformat a menu, the survey management option also lets you choose whether you want the change to be temporary (for this session only, until you exit this menu) or permanent. Because you can now make permanent changes straight from the survey management menu, you can no longer make permanent reformatting changes through your personal profile menus (option 3 on the utility functions menu).

What follows is a description of each option on the survey management menu.

1. File—If you choose option 1, you can file a copy of the survey menu in a CEO filing drawer and folder. You can specify in your personal filing profile whether you want to file surveys as document type CWT (CEOwrite) or WRD (CEO Word Processing). Then, whenever you file a survey, the CEO system will file it as the type you specified. If you want, at the time you file the survey, you can override the document type specified in your filing profile. You fill out a define document

summary menu for each survey that you file. To override the document type that appears automatically, enter a new type at the "document type:" prompt.

2. Print—Choose option 2 if you want to print a copy of this menu. If your survey is wider than the maximum number of characters per line supported by the printer you are using, you can choose to either wrap or truncate the lines of the survey. Wrapping continues the extra-wide lines on the next line of the paper, and truncating stops printing a line when the printer

The shred option destroys your document so that it is no longer accessible or restorable (sources say that this was implemented for Fawn and Ollie).

reaches its maximum line width. CEO will print surveys of up to 132 columns wide.

3. Sort—Option 3 allows you to change the order of certain items on the survey menu. If the CEO system is able to change the order of a menu item, the sort menu displays that item as a valid sort key. For instance, sort keys for the inbox menu include postmark, certified, sender, subject, and new.

The sort menu prompts you for the number of a primary sort key and, if you want to use one, a secondary sort key. The primary sort key is the key that the CEO system sorts by first. Then, if the system encounters any duplicates when sorting

with the primary key, it will resolve them by sorting with the secondary key. Suppose you wanted to sort your inbox using sender as the primary key and postmark as the secondary key. Then, if you have more than one message from sender Les Smith, the CEO system will sort your messages from Les Smith using the secondary key—postmark.

The sort menu asks whether you want to sort items in ascending or descending order. For example, if you sort the messages in your inbox by sender in ascending order, messages from senders whose names start with the letter A will appear first.

The sort menu also asks whether you want this change to be temporary or permanent. If you make the change permanent, then every time you enter this survey menu, items will appear in the new sort format you specified.

4. Reformat—Option 4 allows you to reorder the columns, add columns to or remove them from the menu, and tailor their headings and widths. When you choose option 4 from the survey management menu, you see the reformat menu. The reformat menu offers five options.

a. Add a column—If you decide to add a column, the CEO system will display a list of columns available to add. A column with the label "In use" will indicate which columns are already on display in this menu. For instance, in addition to what normally appears on the inbox menu, you can display columns for things like confidential, delivery time, and filed.

The add a column menu prompts you for the column name and width (in characters) of any new column you choose to display. You can accept the standard answers that appear, or type a new column name and width. Note that if you specify a width narrower than what is necessary to show the entire contents of the column, CEO will truncate its display of that column's contents.

b. Edit column to display—If you choose option 2 from the reformat menu, you can change the column name and width of the column you specify.

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| January 28, 1988 | Current Inbox | 9:16:29 |
| Date | Sender | Summary |
| 1) 15-Jan-88 | Sue | Meeting on Thursday |
| 2) 20-Jan-88 | John | PIPELINE information |
| Choose one: (1. Switch to outbox, 2. File Mail, 3) Examine, 4. Delete) | | 1 |

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c. **Remove column from display**—This option allows you to remove any column that you no longer want to see on the menu you are working with.

d. **Reorder columns**—Option 4 allows you to change the order in which the columns appear on your menu.

e. **Done**—When you are completely done specifying format changes, choose option 5 to see the results of your changes. As with the sort function of the survey management option, you can specify whether you want the change to be temporary or permanent.

You can reach the survey management menu and functions from the following menus:

- drawers
- folders
- documents
- inbox
- inbox wastebasket
- mailing lists
- queue history
- queue information
- remote alias (file or print only)
- user directory (file, print, or reformat only)
- user profiles (file or print only)
- wastebasket
- keywords
- personal aliases
- filing conflicts.

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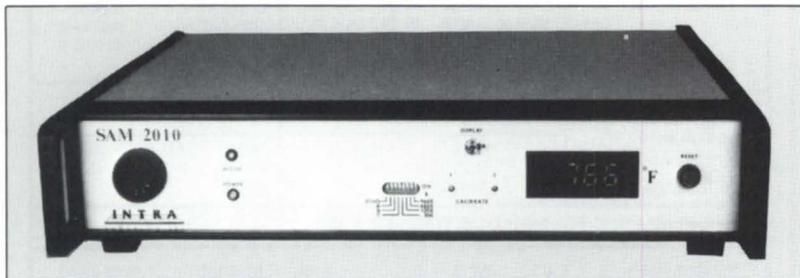


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to your previous position or move around further in the survey by pressing the NEXT SCREEN or PREVIOUS SCREEN function keys, or the GO TO function key in conjunction with the up-arrow or down-arrow key.

If you press the FIND function key repeatedly, the system remembers and will automatically supply the last character string you typed. To search for the string again, press NEWLINE without typing anything. To search for a new string, type over the existing characters and press NEWLINE.

The remaining sections of this document list changes you'll encounter within specific menus. They are divided under major headings by main menu option. Option 2 (edit document) and option 3 (view a document) do not appear because they do not change in revision 3.0.

Print document

Revision 3.0 allows you to print to a pass-through printer—one that is directly connected to your terminal. At the prompt for printer name on the print document or printing specifications menu, specify the name of your pass-through printer, as defined by your CEO manager.

If you want to offset the left margin by a certain measure when printing CEO-write documents, you now have a choice of specifying the measurement in inches or centimeters. The option is available as part of the language profile menu. Depending on what you choose, the CEO system will prompt you for "left margin offset (in inches):" or "left margin offset (in centimeters)."

Filing

In your filing profile, you can now specify whether you want to display archived drawers, folders, or documents in the survey menus for drawers, folders, and documents. If you choose to display archived items, then you will probably want to add a column to the survey menu, indicating whether each item has been archived. Using survey management, you can specify that you want to add the archived column to the drawer, folder, or document survey menus.

The CEO system can keep track of the last folder you used in each filing drawer and the last document you worked with in each folder. It supplies that name automatically the next time you use the filing menu. This makes it easier to get to folders or documents that you work with repeatedly. Prior to rev 3.0, the CEO system was capable of remembering only the last folder

and document you worked with in the last drawer you used.

The folders menu now offers an option for mailing a folder, as described earlier in the section on mail that appeared in the May issue. Choose option 9 to mail a folder from the folders menu.

The wastebasket has a new shred option, which works the same way as the shred option of the new inbox wastebasket. If you don't want a deleted document to remain in your wastebasket, you can shred it (option 5 on the wastebasket menu). This destroys your document so that it is no longer accessible or restorable (sources say that this was implemented for Fawn and Ollie).

When you import a file from an operating system directory, the import menu now allows you to specify any document type for storing the file in the CEO filing system. After the prompt "file is stored as type:" the system displays the current file type in the AOS/VS directory structure. At the next prompt, "file will be imported and stored as type;" you can accept the current type, which is displayed automatically, or you can enter another valid CEO document type. To see a list of valid types, press the INDEX function key. If you specify a different type from the type the document is stored as, the system will convert the file as it imports it.

Note that you can change the document type displayed in the "file is stored as type" field, because the operating system labels some unusual file types as type TXT or UDF, even if in reality they are dissimilar to TXT or UDF files. Such files may be unconverted PC files created with Multi-mate, Wordstar, Wordperfect, or similar software, and transferred from a PC. Or they can be files that you exported from CEO in PC format. They have control codes and special instructions that are unusable in the operating system or in CEO. The document conversion software needs to know exactly what format the file is in before you import it into CEO so that it can either retain those special instructions and codes or convert it to a new format. When you import a file from the operating system directory into CEO, and you know it is one of these non-TXT types, you must change the TXT that appears in the "file is stored as type:" field to the true document type if you want to retain its original format. If you don't know the valid three-character CEO code for your document type, press the INDEX function key.

When you export a CEO Word Processing document (type WRD) and convert it to an AOS file, rev 3.0 offers the option of

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saving certain printing specifications that the software would normally strip out in the conversion process. Previously, if you exported a document and converted it to an AOS file and then printed it, certain features that existed in CEO Word Processing would no longer be present. Now, you can preserve printing specifications regarding the following features, as you define them in the printing specifications menu:

- justify the right margin
- print and save headers and footers
- set footnote characteristics
- print line numbers
- print index
- print user notes
- hyphenate
- merge with previously merged list document.

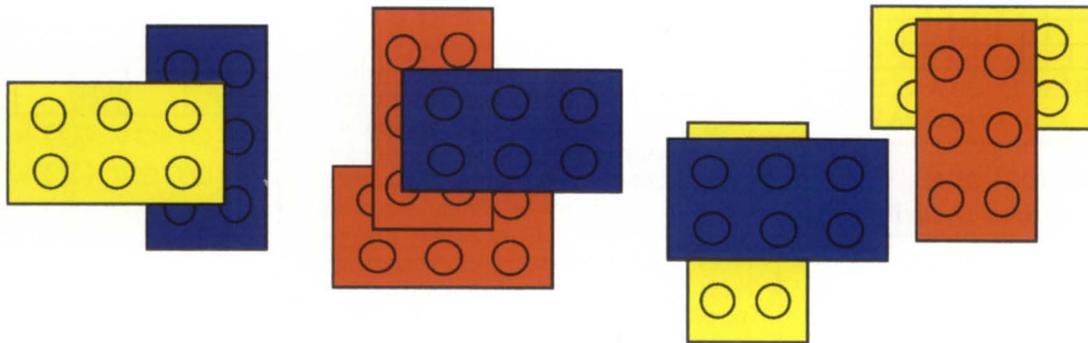
As with importing, you also have greater flexibility regarding the document types you can export. The menu shows the current document type as it is stored in the CEO filing system, then prompts you for a type to export and store it as in the operating system directory. To see a list of valid types, press the INDEX function key.

The inventory option no longer exists on the other printing activity menu; it has become option 9 on the filing functions menu. With rev 3.0, the CEO system now creates the inventory while you wait and displays it on your screen. (Note that if you request a large inventory, such as an inventory of all your drawers, it may take a while for CEO to format and display the inventory.) You can use the NEXT SCREEN and PREVIOUS SCREEN function keys or the up-arrow and down-arrow keys to scroll through the inventory survey on your screen. The display includes the names of documents, their document types, their AOS/VS pathnames, and the number of bytes of storage space they use.

The inventory survey menu offers two options: (1) done and (2) survey management. If you are done viewing the survey and do not want to do anything else, choose option 1. If you choose option 2, you will go to the survey management menu, from which you can file, print, or reformat the inventory.

Next month, I will discuss new calendar features, utilities, CEOwrite, and other changes. Δ

Paul Duck is the chairman of NADGUG's RIG/SIG Committee and a CEO guru for Orbi Inc., a vendor of MRP II-based manufacturing systems. Contact Paul c/o Orbi Inc., 14390 Carlson Circle, Tampa, FL 33626; 813/855-2615.



Building blocks

High-level language techniques for the assembly language programmer

by Tom Gutnick
Special to Focus

ing year, the use of assembly language gets harder to justify. I've done a lot of digging into the code generated by some of Data General's 32-bit compilers, and I've found that the generated code tends to be very tight. And if you specify optimization, the compiler will generate code that even the best assembly language programmers may have a tough time beating. In addition, many managers now

The debate continues: assembly language or high-level languages? With each pass-

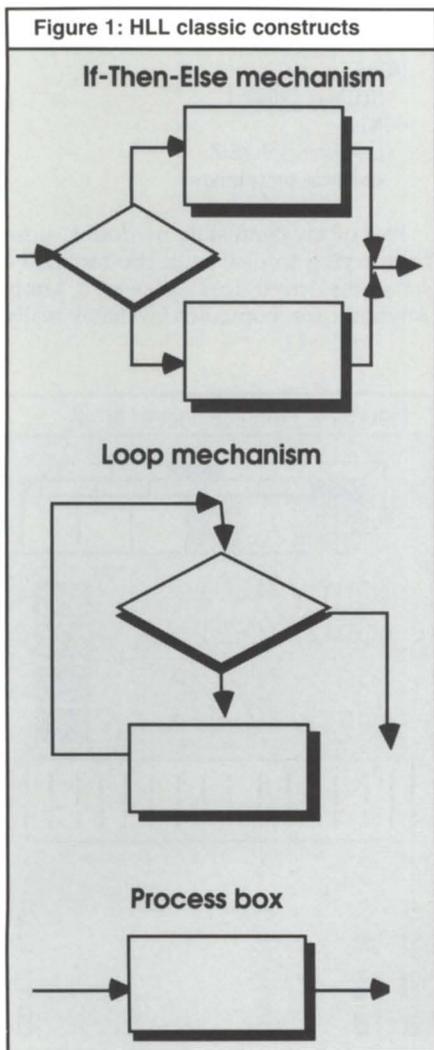


Figure 2: IF-THEN-ELSE MACROS

```

1.          .TITLE   MACROS           ; Macros for If-Then-Else
2.          .PUSH    .NOLOC
3.          .NOLOC   1                 ; Suppress listing of macro source
4.
5.          .MACRO   EQI               ; Immediate value equal to accumulator
6.          WSEQI   ^1, ^2             ; ---->
7.          %
8.
9.          .MACRO   IF
10.         **.IFE    .MCALL            ; Initialize counter
11.         **CNTX=  0                 ; used for generating labels
12.         **.ELSE
13.         **CNTX=  CNTX+1            ; Increment counter
14.         **.ENDC
15.
16.         **CNT=   CNTX
17.         **^2    ^1, ^3
18.         **WBR   $F\CNT             ; ---->
19.         **.PUSH CNT                ; ----> "True" code path. . .
20.         %
21.
22.
23.         .MACRO   ELSE
24.         **CNT=   .TOP
25.         **WBR   $E\CNT             ; ---->
26.         **$F\CNT: ; ----> "False" code path. . .
27.         %
28.
29.         .MACRO   ENDIF
30.         **CNT=   .POP
31.         **$E\CNT: ; ----> End of IF statement
32.         %
33.         .END

```

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FOCUS ON: HLL TECHNIQUES

feel that programmer efficiency is more important than program efficiency.

Nevertheless, there are times when assembler is still best, times when you need to be able to directly manipulate accumulators and other registers, for example; there are times when you don't need the flexibility of general-purpose runtime routines, but you do need to save every possible processor cycle. This is why *Focus* is printing John Grant's five-part introduction to assembly language programming, and it's why I'm here this month.

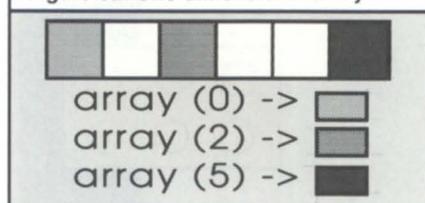
When coding in assembler, you're working at a very basic level—load an accumulator, increment a memory location, push something onto the stack. It's much more involved than writing in Fortran or Pascal. But Data General's macro assemblers are sophisticated programs in their own right, and you can put them to work to save yourself some effort. Through judicious use of MASM, you can actually implement certain high-level language (HLL) techniques within assembly language programs. These techniques give you the structured programming constructs and the data constructs that characterize the higher level programming languages. (The techniques described here are, in general, equally applicable to AOS and AOS/VS.)

I gave a three-hour seminar on this subject at the NADGUG Conference 86 in Orlando, and even in that time, I couldn't cover the entire subject. Certainly this article can't make you an expert on the subject, but it can give you some ideas that may improve the quality of your assembler programming.

Working in an HLL, you have several "classic" constructs available (see Figure 1): a process box (a chunk of code that gets executed sequentially), a binary-decision mechanism (IF-THEN-ELSE), and a generalized loop mechanism (DO-WHILE, DO-UNTIL, PERFORM).

Working in Eclipse assembler, we don't have these nice mechanisms: all we've got are some jump and skip instructions. Using the jumps and skips properly always drives me bonkers when writing conditional code in assembler. Do I want to skip the next instruction on a zero result or a nonzero result? I never could keep it straight, and I probably wasted a couple minutes figuring it out again for each condition in my program. Let's take a not-too-farfetched example. If accumulator 0 is set to -1, you want to set a block size to 2,048; otherwise, you want to set it to 8,192. Here's how it is coded:

Figure 3a: One-dimensional array



16-bit version

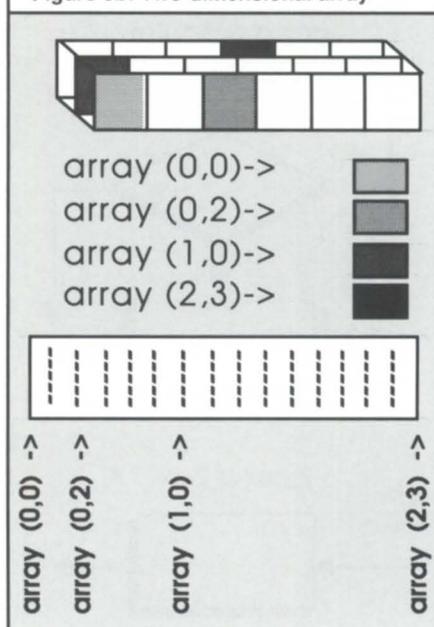
```
COM# 0,0,SNR
JMP DEFLT
LDA 1,-8192.
JMP CONT1
DEFLT:
LDA 1,-2048.
CONT1:
STA 1,BLKSIZ
<continue processing>
```

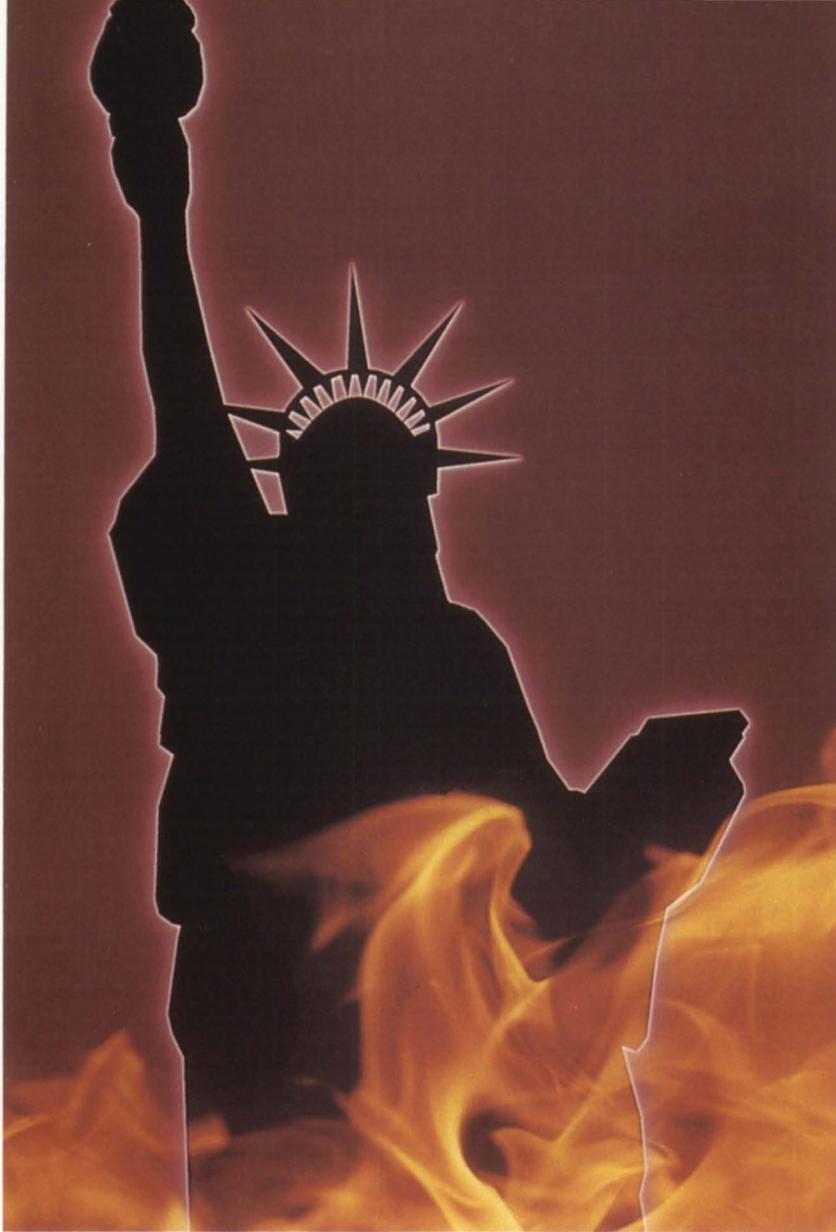
32-bit version

```
WSNEI -1,0
WBR DEFLT
NLDAI 8192.,1
WBR CONT1
DEFLT:
NLDAI 2048.,1
CONT1:
LWSTA 1,BLKSIZ
<continue processing>
```

Part of my confusion, no doubt, arose from trying to deal with the fact that I sometimes need to skip over a jump. Anybody for hopscotch? What I really

Figure 3b: Two-dimensional array





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wanted to be able to do was to write code something like this:

```
32-bit version
IF      -1 EQI 0
  NLDAI 2048.,1
ELSE
  NLDAI  8192.,1
ENDIF
LWSTA  1,BLKSIZ
```

Have you ever wondered why the assembler is called MASM.PR and not ASM.PR? The "M" means that we can write macros—sort of like CLI macros, complete with argument expansion, conditional assembly of code, and more. Figure 2 shows a series of macros to provide the IF-THEN-ELSE capability I wished for. Here's a brief explanation of what it all means.

- Lines 10-16 initialize and maintain a counter used for generating unique labels. If you didn't do this, you could only use this macro once within a program.

- Line 17 provides the comparison/skip instruction that you would have to write yourself if the assembler weren't doing it for you. The substitution for argument 2 is another macro, which defines the specific test. (In the example above, this line would evaluate to WSEQI -1,0. The macro EQI is shown in lines 5-7.)

- Line 19 pushes the current value of your counter on the stack (this is a stack used at assembly time, not at runtime)—this allows you to have nested IF statements. Lines 24 and 30 get the counter from the stack.

- Lines 18 and 25 are the same branch instructions that you would have to figure out for yourself if the assembler weren't doing it for you.

- Lines 26 and 31 generate the labels that are expected by the branch statements.

- Lines 18, 20, 25, 26, and 31 are what actually get generated by the assembler—everything else is just overhead to make the thing work.

There are a couple of constraints with these macros. First, you must always have an ELSE somewhere between the IF and the ENDIF, although no code need be supplied for the ELSE case. (There are other ways of writing IF-THEN-ELSE macros that eliminate this constraint—one method involves diddling with MASM's location counter.) Second, because of the macros' use of the stack, you have to be sure that your code doesn't do any .PUSHing or .POPping that might confuse the macros. (In other words, if you modify the stack after invoking any of

Figure 4: Calculating array offsets

Given:
 $A [i_1, i_2, \dots, i_k]$
 is a k -dimensional array
 with elements of c words each
 for $0 \leq i_1 \leq d_1, \dots, 0 \leq i_k \leq d_k$

$$\text{Location } (A [i_1, i_2, \dots, i_k]) = \text{Location } (A [0, 0, \dots, 0])$$

$$+ c (d_2 + 1) \dots (d_k + 1) i_1$$

$$+ \dots + c (d_k + 1) i_{k-1} + c i_k$$

$$= \text{Location } (A [0, 0, \dots, 0]) + \sum_{r=1}^k a_r i_r$$

where $a_r = c \prod_{s=1}^{r-1} (d_s + 1)$

Source: Donald E. Knuth, *The Art of Computer Programming: Fundamental Algorithms*

these macros, you had better restore the stack before invoking the next of these macros.)

Now, of course, you'll probably also want macros called EQ (checks if two accumulators are equal), NE, NEI, GE, GT, LE, EQZ (equals zero), etc. And now that I've shown you how, it should only take you a few minutes to write them. With just a bit more thought and ingenuity, you can probably also come up with similar macros to provide DO-WHILE loops and maybe even CASE constructs.

You can insert these macros at the beginning of any assembler source file, but a better approach is to keep them in a separate source file. Then, your command line to assemble will look something like:

```
X MASM MACROS/S MYPROG (AOS)
X MASM MACROS/PASS1 MYPROG (AOS/VS)
```

Or you can get even fancier and install your macros in the assembler's permanent symbol table (which is a file that tells the assembler the mnemonics for the instructions, along with the macros needed

for doing AOS or AOS/VS system calls):

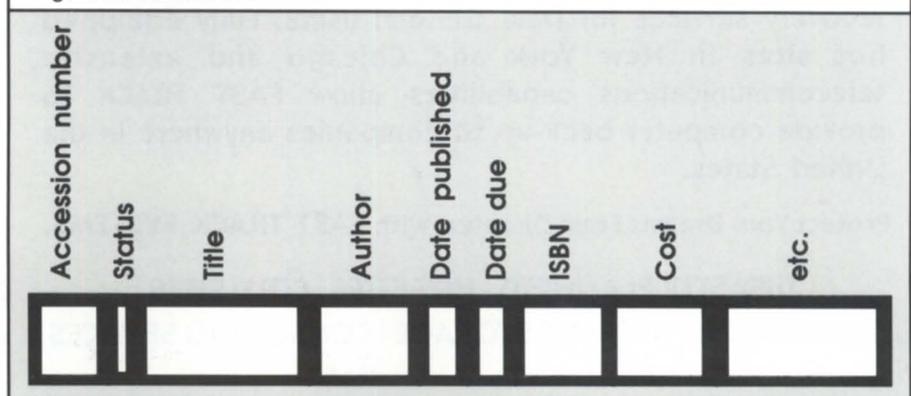
```
X MASM/S PARU SYSID <your-macros> (AOS)
X MASM/MAKEPS EBID ECID SKIPS PARU.32
  PARU_LONG SYSID.32 <your-macros>
                                     (AOS/VS)
```

The advantage of adding your macros to the permanent symbol table is that you don't have to include anything extra in your source file or on your command line when you assemble your program. (The only problem I've found with using these macros is that if I'm working on somebody else's system where these macros aren't available, I still waste a couple minutes every time I have to code a condition!)

So much for the block structuring constructs. Let's talk about data. HLL programmers have several nice data constructs at their disposal: data records or structures, arrays or tables, and queues or linked lists. It turns out that these are not difficult to implement in assembler.

HLLs allow us to create an array of data that contains multiple occurrences of some

Figure 5a: Record structures



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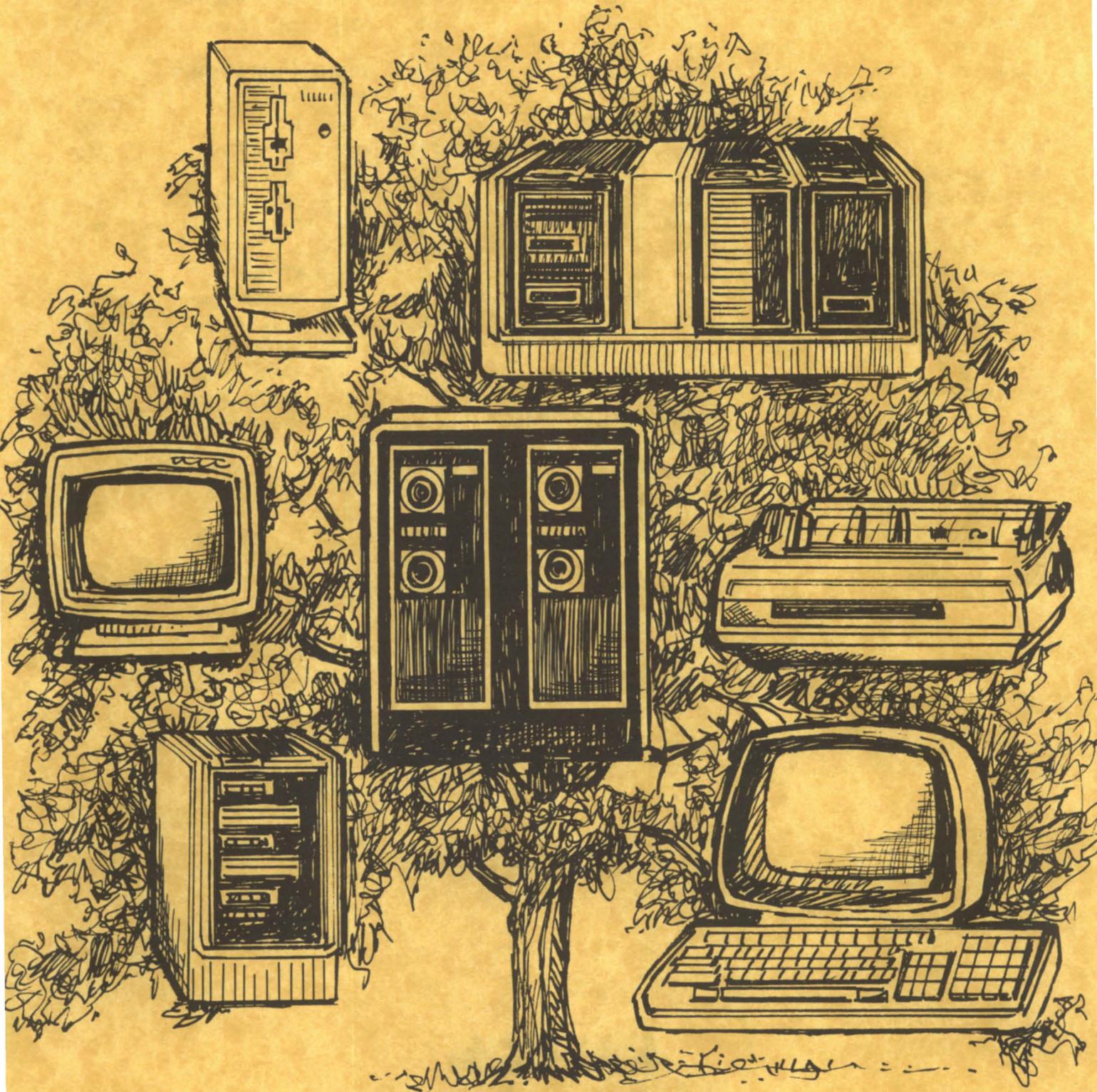
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data item. By using subscripts, we can refer to specific elements in the array. (See Figure 3a.) We can have a two-dimensional array, which we can visualize as a table containing rows, each of which contains several columns of data. Many languages allow us to specify three or more dimensions.

But today's general-purpose computers don't have n-dimensional memory. All this data is stored in linear, consecutive memory locations (see Figure 3b); the compilers and the runtime code do a lot of work to translate your subscript into an

offset from the starting location of that data array. By writing a little subroutine, you can accomplish the same thing in assembler.

For a one-dimensional array, it's very easy:

OFFSET = <size of data item> * <element #>

where the size is in 16-bit words, and the element number is the desired subscript, assuming that your subscripts start at 0. (The C language starts its subscripts at 0, COBOL starts at 1, and Fortran gives you

a choice.)

Here's a code fragment to load the address of an element of an array into an accumulator:

```
SIZE= 4 ;      Each entry 4 words long
SUBSCRIPT: .-
DATA:        .BLK MAXENTRIES * SIZE
```

```
NLDAI  SIZE,0
LWLDA  2,SUBSCRIPT
WMUL   0,2 ; Gives the offset
LLEF   3,DATA,2
```

Obviously, it gets more complicated when you go to more dimensions. Figure 4 gives the algorithm for calculating the offset for an array of any dimension.

Data records or structures are very handy. Fortran programmers don't do these much because EQUIVALENCEing is unwieldy, but COBOL and C programmers, among others, can't live without structures. Figure 5a shows a record layout for a library circulation record. Figure 5b shows how a COBOL programmer might declare the data.

Figure 5b: Declared data

| | | |
|----|---------------------|----------------|
| 01 | Circulation-Record. | |
| 02 | Accession-number | PIC 9(9) COMP. |
| 02 | Status | PIC 9(4) COMP. |
| 02 | Title | PIC X(40). |
| 02 | Author | PIC X(30). |
| 02 | Date-Published | PIC 9(9) COMP. |
| 02 | Date-Due | PIC 9(9) COMP. |
| 02 | ISBN | PIC 9(9) COMP. |
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| MV4 & MV10 4 MB | |
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Figure 5c: Assembler declarations

| Parametric Definition of Data Record | | |
|---|--------------------|-----------------------------|
| ; Offsets in data record | | |
| ACCNUM= | 0 | ; Accession number |
| STATUS= | ACCNUM+2 | ; Status bits |
| TITLE= | STATUS+1 | ; Title |
| AUTHOR= | TITLE+(TITLEN/2) | ; Author |
| DTPUBL= | AUTHOR+(AUTHLEN/2) | ; Date of publication |
| DTDUE= | DTPUBL+2 | ; Date due |
| ISBN= | DTDUE+2 | ; Standard book number |
| COST= | ISBN+2 | ; Replacement cost |
| RECLEN= | COST+2 | ; Size of record (in words) |
| ; Field length (bytes) for character fields | | |
| TITLEN= | 40. | ; Byte length of title |
| AUTHLEN= | 30. | ; Byte length of author |
| ; Bit positions in Status word | | |
| SREF= | 0 | ; 1 = Reference section |
| SRES= | SREF+1 | ; 1 = On reserve |
| SOVD= | SRES+1 | ; 1 = Overdue |
| SOVDN= | SOVD+1 | ; 1 = Overdue notice sent |
| ; Bit masks for Status | | |
| REFERENCE= | 1B(SREF) | |
| RESERVE= | 1B(SRES) | |
| OVERDUE= | 1B(SOVD) | |
| OVDNOTICE= | 1B(SOVDN) | |

Wouldn't you like to be able to do the same in assembler? Actually, if you've done any AOS or AOS/VS systems programming in assembler, you've been doing just that when you've been referencing packet offsets. Figure 5c shows the assembler declarations for the same record structure. If the parameter definitions are used in more than one module, again, you can include a separate parameter file on the first assembly pass, or build it into your permanent symbol table.

Although coding in assembler is likely to be a bit tedious, you can let the assembler do some of that work for you. The end result will be code that is quicker to write and easier to maintain. What could be better than that? Δ

Tom Gutnick is the systems engineering consultant for Data General's mid-Atlantic region, where he specializes in AOS/VS performance and security issues. He can be reached at 703/827-9600. The information contained in this article represents the opinion of the author and is not the representation, warranty, or promise of Data General.

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Notes from abroad

U.K. users group's AOS[VS] panel raised interesting ideas—and a few hackles

:ROOM_WITH_A_VIEW

I'm sitting in Siena, a little town just outside of Florence, Italy. Tomorrow, I'll take a flight from Rome back to San Francisco, after a week spent in London holding a seminar and attending the U.K. DG users group annual conference, and a week spent in Italy indulging in a bit of R & R. That's good, because I'm itching to get my fingers onto a keyboard connected to a real computer instead of this DG/One. Actually, the DG/One is OK; it's this little toy operating system called MS-DOS that's the real pain. It makes me wonder if there's any truth to the speculation I once heard that RDOS would have had a decent shot at becoming the standard operating system for PCs had it not been for DG's licensing policy.

One of the first things I notice whenever I get across the pond is a sense of déjà vu. It's tempting to say that the reason for it is that the computer industry in the U.K. and Europe is behind North America by some number of years, but then I always notice a few little things that belie this opinion. For instance, the TV monitors in the airports are more likely to be color than monochrome over there, and Europe seems to have made far more progress in implementing ISDN than we have in North America.

In any event, it's refreshing for an old dog like me to find that a substantial number of attendees at the U.K. DGUG conference were significantly more technically oriented than their counterparts in North America.

:UKDGUG:PERSPECTIVE

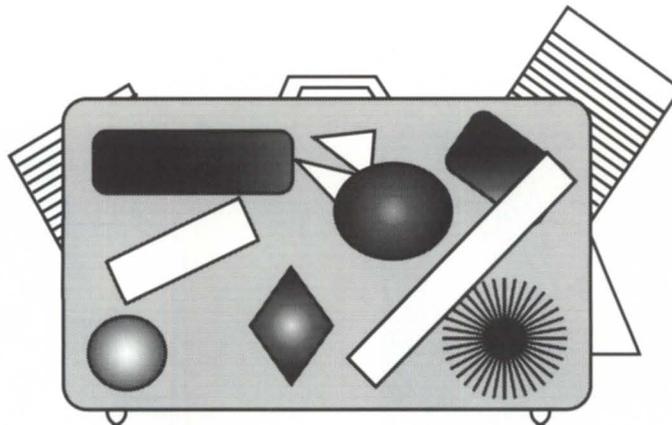
To put the U.K. conference in perspec-

tive, consider this: the U.K. alone accounted for about 7 percent of DG's world-wide sales last year, and it's growing at a much faster rate than the U.S. market. At the end of this year, the U.K. is expected to account for nearly 10 percent of DG's sales.

At last year's NADGUG conference in Lost Wages, Nevada, there were about 900 attendees. At the U.K. DGUG conference, there were more than 150 attendees. That means that the U.K. turnout was much higher than one would have predicted from its market share. Hmmm.

:UKDGUG:AOS_PANEL

I was fortunate to be invited to chair the



AOS[VS] panel discussion at the U.K. meeting, and I promised to write up my notes in a future column. The session was short (75 minutes), so the range of topics didn't vary as much as the NADGUG version of the panel, but it should provide an interesting insight into what's on the minds of the AOS[VS] users in the U.K.

One of the main things you'll notice is a trend similar to that noted in my columns on the the AOS[VS] system managers roundtable the last few years; there is little discussion about the basic capabilities of the operating system itself. AOS/VS seems to have emerged from puberty quite nicely.

OK, enough of the philosophizing and

on with the specific issues raised.

:MATURE_VERSION_SUPPORT

A question came up about what form Mature Version Support for AOS/VS would take, specifically if users could expect bugs to be fixed, or if the emphasis would be on workarounds.

For those of you like myself who have never heard of Mature Version Support (MVS), let me fill you in. MVS is apparently the brainchild of the DG/U.K. customer service organization and is specific to the U.K. at this point.

The idea is to offer ongoing support for older revisions of AOS/VS (6.09 in this case) for those customers with static applications who find it impossible to stay with the current versions of AOS/VS due to the significant increase in resources required, notably memory.

As some of you may remember, I attended the U.K. DGUG conference last year after encountering the increased memory requirements of AOS/VS 7.5x. I had anticipated that the conference would be a preview of the unrest that I suspected was going to arise at Conference 88 as a result of the increased memory requirements of AOS/VS 7.5x. To my surprise, I discovered that concern about the issue was not as widespread as I thought it would be, although

there was more concern in the U.K. than there was in North America. I'm pretty sure that the reason for this was that the U.K. is more OEM/VAR-oriented than the North American market, and a couple of VARs had just shipped a lot of 2 MB MV/2000s when 7.5x hit the streets.

Anyhow, MVS is a response by DG U.K. to the memory problem for users who (1) don't need any of the new features, (2) can't afford to upgrade their configuration for whatever reason, and (3) still feel the need for ongoing support.

The general consensus from the DG panel members was that MVS would be primarily concerned with maintaining a

data base of known problems with AOS/VS 6.xx and the associated dependent products, including access to the information available in Atlanta. Any fixes would most likely take the form of workarounds, unless the patch required to fix the problem was relatively easy to generate and of a manageable size.

:GOTCHAS:UCODE

An attendee questioned whether it was necessary to reload the microcode after Field Service ran diagnostics, and if so, why this wasn't documented more clearly. He cited an instance where his system behaved strangely for weeks after a visit by Field Service, and reloading the microcode cured the problem.

My understanding is that some of the diagnostics play games with the current microcode, and that reloading it after diagnostics are completed is generally done either by the engineer involved or by the system manager as part of the reboot. Also, powering the system down and back

up prior to rebooting fixes the problem, because it forces the microcode to be reloaded from the system disk. After think-

**Moral:
Reload your microcode after
diagnostics until further notice.**

ing about all this, it occurred to me that I had never seen any of this documented either; I had assumed that it was general knowledge.

The panelists from DG agreed with my understanding, but none of us could cite chapter and verse to back up our "understandings," so I guess there does need to be something in the documentation on this issue.

Moral: Reload your microcode after diagnostics until further notice.

:BASIC

At this point, one of the attendees

brought up the subject of BASIC. During a presentation that I gave the previous day of the conference, I characterized BASIC as a "sleazy language" when discussing how to optimize the system calls and disk I/O of application software. Rather than deal with this here, I'll push this issue onto the stack and pop it off in another column.

:DEALS:MEMORY?

An attendee asked if there would be any deals on memory this year like there were last year when AOS/VS 7.5x hit the streets. Answer from DG panelists: no.

For those of you who didn't hear about the memory deal last year, DG decided not to publicize it widely in North America and disclosed it only to the squeakiest wheels.

:WHEN:REV8?

A request for speculation on when AOS/VS rev 8 would hit the streets was greeted by the following comment from the assembled DG panelists: beta test is ostensi-



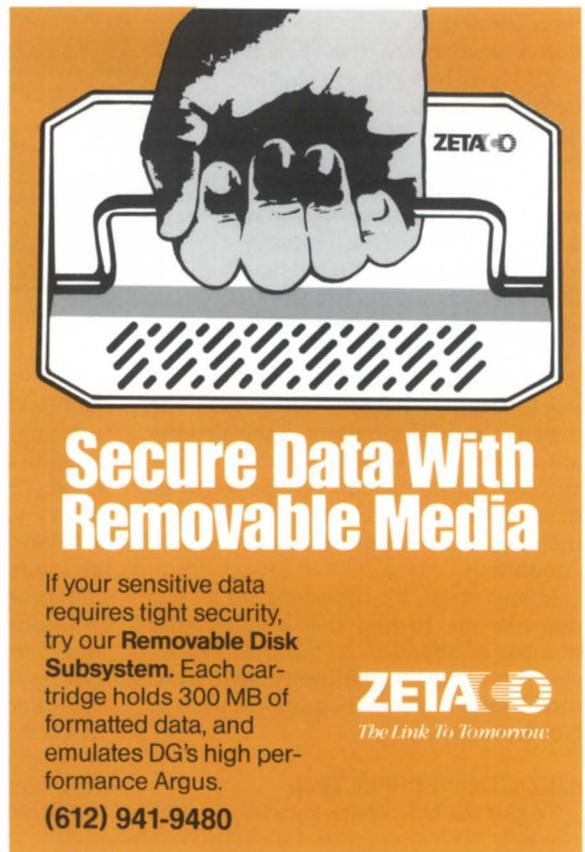
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bly scheduled for April (history by the time you read this) with shipment sometime around September.

Does it strike anybody else as interesting that major new releases of AOS/VS always occur just after the annual NADGUG conference? Hmmmm.

:NET:DUMP

Some interest was expressed in allowing DUMPs to labeled tape across the network (i.e., XTS). This strikes me as akin to filling your car with gas through a soda straw, but perhaps it's not so bad given the speed of the MV/2000 cartridge tape compared to a LAN.

I couldn't think of any reason why the facility shouldn't be possible from a technical point of view, and neither could the DG panel members, so maybe it's just a case of writing an STR similar to the one that resulted in us being able to print across the net.

A show of hands revealed that nearly 20 percent of the attendees were interested in this feature. That's pretty high.

:BAD_NEWS:OLD_MV8

An attendee mentioned the rumor that the old style MV/8000s with IOPs wouldn't be supported under AOS/VS rev 8. DG panelists indicated that the rumor is true.

Some discussion followed on whether a deal should be put together to ease the upgrade for these users, either in the form of changing processors or replacing IOPs with IACs, but no concrete results were reached.

I'm generally in favor of eventually

A sympathetic deal on an upgrade would be in DG's best interest, given the small number of IOP-based MV8000s still in use

decommitting from old hardware after a reasonable period of time. Otherwise, new capability is inevitably stifled in an attempt to support the old equipment. That's easy to say for things like 605X series terminals, but a bit more difficult for entire processors like the old MV/8000s.

Taking into consideration that the old IOP-based MV/8000s appear to be a fruitless limb on the MV architecture tree, a sympathetic deal on an upgrade would be in DG's best interest, given the small number of IOP-based MV/8000s still in use by users interested in staying current.

:MINISAM_TO_DBAM

An inquiry was made as to whether there was a utility that could convert ICOBOL ISAM files to INFOS DBAM files.

Short of writing a program to do it (later revs of ICOBOL support assembly language subroutines that could be used for INFOS calls), there doesn't appear to be such a facility available off the shelf.

:REV8:CONVERSION

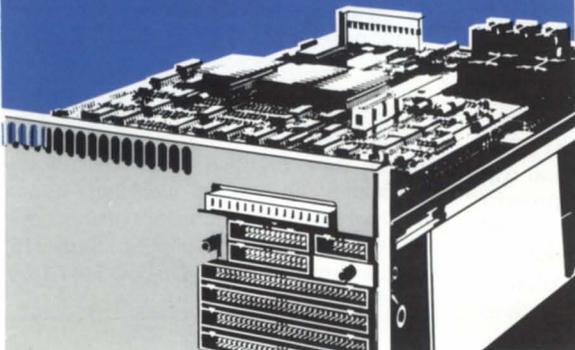
Several attendees were interested in the performance penalties imposed by the new file system on AOS/VS rev 8. The general consensus of the DG panelists seemed to be that creating a file would take a bit longer and that reading/writing would be

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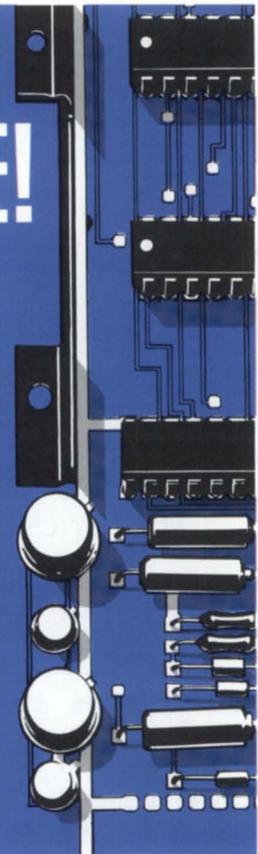
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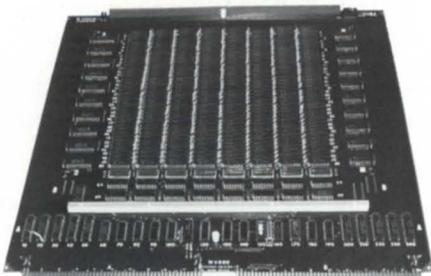
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about the same as rev 7.5x. They also pointed out that the goal for the new file system was a performance penalty of no more than 5 percent in exchange for the improved functionality (e.g., no more forced FIXUPs after an abnormal shutdown).

I pointed out two things: the manual for the conversion process is already available (093-538), and the DG colloquium scheduled in London on March 28 would probably be the best source of detailed information on the new features.

One MV/2000 user asked about the possibility of loaner tape drives for use during the conversion. Seems reasonable to me. I suspect that if DG came up with a published fee for this, there would be quite a few takers. I also suspect that quite a few MV/2000 users would elect to purchase the tape drive after the conversion was complete.

Also, in response to a comment about the inordinate amount of time required to back up a 120 MB disk using the MV/2000 cartridge drive, a DG panelist mentioned the impending arrival of a presumably faster (130 MB?) cartridge for the MV/2000.

:DISKS:DUAL_PORTED

One attendee inquired as to the dual-porting considerations under the new file system. The consensus of the panelists was that the same facilities would be available in rev 8. Somebody asked whether it might be possible for simultaneous access by both CPUs now that rev 8 supports multiple LDUs within a physical disk. Nobody knew the answer, but I suspect the answer is no. If such a capability was added, there would have been some fanfare about it before now. Seems like it should be easier to do on rev 8 than previously, so maybe it's in the cards for a future rev. I have fond memories of RDOS dual-ported disks.

:PASSWORD_CONTROL

This issue also surfaced in Lost Wages. The general consensus was that DG's PCS product offering lacks a few critical features. For example, it does not prevent users from picking the same password that they've used previously. I'm not intimately familiar with PCS, but I plan to obtain a manual as soon as I get back to

San Francisco. Since a show of hands showed that almost 20 percent of the attendees were interested in improved password control, I smell a third-party product possibility.

The goal for the new file system was a performance penalty of no more than 5 percent in exchange for the improved functionality

:PC*I

One attendee questioned the availability of host load information for PC*I-based systems, specifically for planning purposes. None of the panelists had much to offer, and I haven't seen much myself in the way of host loading statistics for PC*I-based systems, so I guess we'll have to wait until something becomes available.

:UKDGUG:EOF

That's about it for the panel discussion. Thanks go out to the DG personnel who volunteered to serve on the panel, and thanks also to the two representatives of the user community who served on the panel. And finally, a special thanks to the U.K. DGUG for inviting me.

:STOP_PRESS

AOS/VS 7.60 arrived last week, and there's good news and bad news. The good news is that the problem of runaway mux ports appears to have been solved! Hooray! The bad news is that LOAD_II/DUMP_II is still as flaky as ever. Back to CLI's DUMP/LOAD again.

:WHET

As in appetite, not stones. Next month, I'm going to disclose the breakthrough results of a recent XLPT/PMGR debugging episode that finally explains the mystery of why all of our third-party serial printers occasionally print an extra blank page or blank line. Δ

Copyright © 1988 by B.J. Inc. All rights reserved. Brian Johnson is the president of B.J. Inc., a San Francisco-based consultancy specializing in system auditing, system management, and performance analysis. He can be reached at 109 Minna St., Suite 215, San Francisco, CA 94105; 415/550-1444, telex 296544.

Help yourself

A help desk can alleviate users' problems

In a previous article (*Focus*, August 1987, page 28), I wrote about the support Data General offers CEO users through the Atlanta Customer Support Center. This time, I would like to discuss the support you can get and give in your own installation.

Most sites refer to their support center as a help desk. This help desk can be anything from a one-person operation to an entire staff of people offering assistance to end-users. Whichever is the case, the following guidelines should help you to run a successful operation.

First, a help desk must be available to CEO users 100 percent of the normal working hours. It serves as a central point for handling questions about usage of the product and also addresses problems and concerns with the system. The help desk should serve as the interface between end-users and the Data General support center. It is neither practical nor efficient to have end-users calling the support center with questions that could be handled internally.

There are several functions that should be designated as help desk responsibilities. They include the following:

- answering basic questions
- routing problems to the appropriate resource
- setting and maintaining CEO standards and procedures
- keeping a log of all calls
- setting realistic expectations of CEO users
- publishing a CEO bulletin or newsletter
- documenting CEO enhancement requests
- identifying/confirming problems
- resolving first-level problems.

Some initial steps can make access to the help desk easier. By setting up the help desk as a user on the system, messages can be sent directly to the help desk without identifying a specific individual. Users should be encouraged to use CEO messages to contact the help desk rather than calling on the telephone. However, for this to be effective, a terminal that is always available to accept new messages must be maintained as a help desk terminal. You can go one step further by having users create a command that automatically sends a message to the help desk asking for assistance.

If such as system isn't available, the telephone is the next alternative. I've found that when the system isn't available, the

phone will ring off the hook with the same user questions about the same problems. To alleviate answering repetitive questions about system availability, an answering device with an appropriate message is the best solution. For example, a tape with the message that a particular system is temporarily down, but measures to correct the situation are already under way, will let callers know that you are aware of the problem and have taken steps to correct the situation. This will free you to help where needed.

Another tape can be created to take an overflow of calls, or a temporary absence of help desk staff. If you are a small operation, and only one person is available to answer questions, it is reassuring to a user to know that someone will receive the message even if the appointed person isn't available at the time of the call. Users get frustrated if their calls go unanswered. It's bad enough to have a question or problem, but to ask for help and find that no one is there is sometimes the last straw.

It's important that the help desk staff has a positive attitude. You should be selling the system at all times. I've yet to talk to anyone that doesn't like CEO as a product; however, when problems arise, it's easy for users to become disenchanted.

A log of all incoming calls/messages should be kept by help desk staff. This serves not only as a record, but also as a reference to a recurring problem. It can point out an area where users needed additional training. It will also show patterns of slowdowns on the system.

With any call or message that comes in, a mandatory follow-up procedure should be established. Reassure users that something is being done about the reported concern by checking back with them to see that the problem has been resolved, or let them know what is being done to resolve it.

The help desk staff should also keep records of any calls made to the Atlanta Customer Support Center. Just as you are the focal point for help at your site, the CSC is the focal point for you. They have their own records of calls, but keep a record for your own use to relay that information back to your users.

Another duty of the help desk could be keeping information up-to-date in the public cabinet. Establish a procedure to file information of general interest to the user community. This could also serve as the location of an internal bulletin or

newsletter. Information that you have gathered from some messages or calls can be passed along to all users to save you from answering similar questions from other users.

Testing new revisions is a time-consuming but important activity of the help desk. If you find special problems before users start using the new revision, you can begin addressing the problems and get a jump on users' questions.

All the hints and suggestions within this article won't be any use without proper staffing of the help desk. This is the most critical part of all. This position can be very stressful. Seldom do you get calls from users telling you how well the system is running and how they appreciate everything you're doing to help them. More likely, the calls are from users that have deadlines to meet.

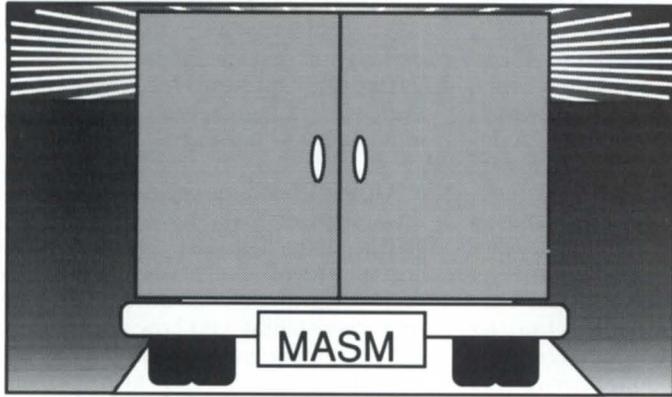
The help desk position requires someone who not only knows more than anyone else about the CEO product, but who also can identify with user needs and be compassionate of their concerns. It may not seem important that they cannot get their printer to work right now, but to them, it may mean their job to get something out today! Members of a help desk staff have to learn to deal with the frustration and anger that accompany many of the calls and messages that are reported. There is little gratitude for people in this position, except the gratification of helping someone overcome a problem.

No one should be in the help desk position for a full eight hours a day, or be in the position for more than one year at a time. This may seem odd, but after talking with several users that serve in this capacity, they all agree that it is not an unreasonable concern. After a year of dealing with user complaints and problems, help desk staffers tend to lose the congeniality and compassion necessary to do a good job. However, if responsibilities of this position are shared with another person(s), objectivity can be maintained.

Keeping some of these thoughts in mind, if you are lucky enough to have a help desk staff, why don't you give them an encouraging word, or better yet, give them a raise! Believe me, they deserve it! Δ

Charlene A. Kirian is account executive for Intercon Associates, 1580 Winston Rd. S., Rochester, NY 14618; 716/244-1250.

The end of a long haul



Part V of V. VS/ECS calling sequence

In this final article of the series, I will deal with the VS/ECS calling sequence and will show how to write assembly language subroutines that you can call from a high-level language. All numeric values will be in decimal (base 10).

The MV wide stack

The stack is simply a block of reusable memory that is described by four values: a lower and upper limit of memory and two dynamic reference marks, the stack pointer (SP) and frame pointer (FP). While there are several types of push and pop stack operations, we can ignore most of them in this discussion of calling assembly language routines from a high-level language (HLL). In the usual scheme of things, the stack is set up and dynamically managed by the HLL, and all you have to know is how to access the values on the stack. This will be described later.

Arguments must match in NUMBER, TYPE, and PRECISION. I know you've heard that before, but now you're going to find out why. The first item needs no clarification; later, however, we will see that it is possible to circumvent this restriction if the subroutine is coded in assembly language.

Why is the TYPE of the variables so important? Well, obviously, a mismatch between a REAL*4 and INTEGER*4 will result in garbage, but of more importance is the difference between CHARACTER and non-CHARACTER variables. Assume that the bytes of physical memory are numbered 0, 1, 2, etc. CHARACTER variables may have any length from 1 to 32,767 and can be aligned on any byte, odd or even. For this reason, they are accessed by their byte addresses. On the other hand, non-CHARACTER variables (REAL, INTEGER, LOGICAL) are always stored on an even-numbered byte and are accessed by their 16-bit word addresses (in the Data General world anyway; DEC uses byte addresses for *all* variables). As an example, an INTEGER*4 variable occupying bytes 4 to 7 has a word address of 2, while a CHARACTER*3 entity occupying bytes 4 to 6 has a byte address of 4. As you can see, byte addresses are essentially word addresses times two, and that's where the problems start. If you pass

a byte or word address to a subroutine that expects the other kind of address, it will either try to access a variable that is twice as far away or half as far away but in the wrong direction. These mismatches often result in "hardware protection violation: inward address reference" errors.

The PRECISION of the argument is also important. There are two basic modes of operation of MV memory load/store instructions: NARROW (16-bit) and WIDE (32-bit). For example, LNLDA and LNSTA are for 16-bit entities, and LWLDA and LWSTA are for 32-bit entities.

Similar instruction pairs exist for 32-bit (REAL*4) and 64-bit (REAL*8) floating-point values. Assuming the word/byte address is correct, if a 16-bit value is passed to a subroutine that thinks it is getting a 32-bit value, it will grab 32 bits of memory, which includes the 16-bit value, plus 16 bits of the next memory location (garbage). The first 16 bits will be in the wrong part of the accumulator, and the lower 16 bits will be garbage.

In summary, the TYPE of the argument determines *where* (in memory) the subroutine will look for the argument, and the PRECISION of the argument determines *how much* of that memory location is referenced.

The VS/ECS calling sequence and the stack

The Virtual System/External Calling Sequence (VS/ECS) is described in chapter 6 of the *Fortran 77 Environment Manual* (93-

Figure 1: F77 code

```

REAL*4 SCALE
CHARACTER*80 TITLE

(a) CALL FOO(SCALE)
    XPEF SCALE ;push word address of SCALE
    LCALL FOO,0,1 ;call FOO (1 argument pushed)

(b) CALL FOO(TITLE)
    XPEF ????? ;push the length of TITLE
    XPEFB TITLE*2 ;push byte address of TITLE
    LCALL FOO,0,2 ;call FOO (2 arguments pushed)

(c) CALL FOO(SCALE,TITLE)
    XPEF ????? ;push the length of TITLE
    XPSH 0,0 ;push a dummy placeholder
    XPEFB TITLE*2 ;push byte address of TITLE
    XPEF SCALE ;push word address of SCALE
    LCALL FOO,0,4 ;call FOO (4 arguments pushed)

(d) CALL FOO(TITLE,SCALE)
    XPEF ????? ;push the length of TITLE
    XPEF SCALE ;push word address of SCALE
    XPEFB TITLE*2 ;push byte address of TITLE
    LCALL FOO,0,3 ;call FOO (3 arguments pushed)
    
```

288-1). You will probably find it discussed in all of the other HLL manuals as well.

Briefly, when a procedure is called, the following happens.

1. The 32-bit addresses of the arguments (if any) are pushed on the wide stack in reverse order. CHARACTER arguments have byte addresses; all others have word addresses.

2. An LCALL instruction is generated to call the subroutine.

3. The subroutine should do a WSAVR or WSAVS instruction to save the accumulators on the stack and allocate space for the subroutine's local variables. At the end, WRTN is used to return to the calling program.

To implement the VS/ECS calling sequence, three basic instructions are used to push the arguments onto the stack:

XPEF—push the word address of a variable

XPEFB—push the byte address of a variable

XPSH—push the contents of an accumulator.

In addition, the LCALL instruction is used to call or invoke the subroutine. It accepts two arguments: the first is unimportant here, and the second is a count of the number of arguments pushed on the stack. (Note that this will be different than the number of arguments coded if any of the arguments are CHARACTER). LCALL puts the process status register (PSR) and argument count (NARG) on the stack, as will be shown later.

VS/ECS examples

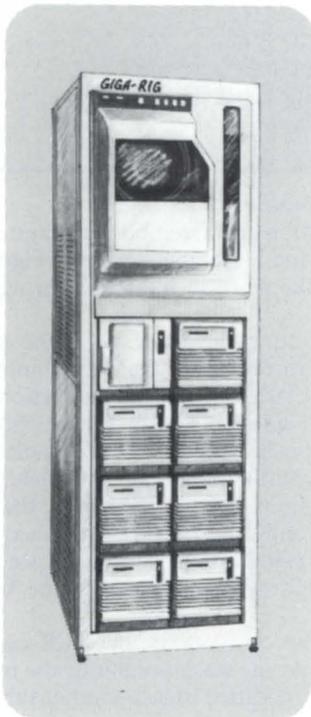
Figure 1 shows the code generated by the Fortran 77 compiler to implement the VS/ECS calling sequence for simple subroutine calls. Compare examples (a) and (b). What is that extra thing that is pushed on the stack before the byte address of TITLE is pushed?

Data General calls that a dope vector, and it appears to be the address of a table of information that describes the CHARACTER entity, specifically the length (that's how the LEN function knows the length). I've already explained how a mismatch in byte and word addresses can put your program in the weeds. Well, if that isn't enough, here is another pitfall. If argument "i" of an F77 subroutine is declared CHARACTER, the F77 subroutine will assume that the corresponding dope vector will be found at location "2*i" on the stack. If you have called the subroutine with a non-CHARACTER variable, then your program will probably crash and burn when it accesses the undefined memory location.

Now compare examples (c) and (d) of Figure 1: the CHARACTER variable is the last argument in (c) and the first argument in (d). The order of the arguments in (c) requires that a dummy dope vector be pushed on the stack between the dope vector for argument 2 and the address of argument 2. The dummy dope vector isn't needed in example (d), because a placeholder is not necessary (the arguments are accessed relative to the frame pointer that points to the "other" end of the argument list).

Does VS/ECS allow any HLL to call subroutines written in any other language? Well, yes and no. F77, Pascal, and PL/1 generate identical VS/ECS code, but C must be explicitly coded with "&" prefixes on the arguments to generate "call by reference" code. Even that isn't enough, because C doesn't push dope vectors for CHARACTER arguments on the stack, which an F77 subroutine would expect to find. Last, but not least, COBOL (always in its own grimy little world) generates and expects only byte addresses. It's hardly worth the effort to try to match up COBOL with any other high-level language, unless the arguments are all

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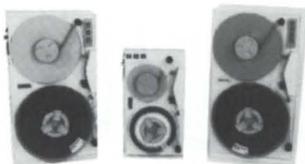
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AOS[VS] TRICKS

CHARACTER. The intent of this article, however, is to show you how to call assembly language subroutines from high-level languages. Keeping this in mind, let's move on to the assembly language subroutine and see how to retrieve the subroutine arguments from the stack.

Figure 2: Fortran and assembly code

```
PROGRAM TEST                .TITLE TEST
INTEGER*2 IA                XPEF IC
INTEGER*4 IB,IC             XPEF IB
...                          XPEF IA
CALL FOO(IA,IB,IC)         LCALL FOO,0,3
...                          ...
END                          .END

SUBROUTINE FOO(IA,IB,IC) .TITLE FOO
INTEGER*2 IA                .NREL 1
INTEGER*4 IB,IC             .ENT FOO
IX=+2
IY=+4
FOO: WSAVS 4
IX = IA + IB                XNLDA 0,@ARG1,3
                              XWLDA 1,@ARG2,3
                              WADD 0,1
                              XWSTA 1,IX,3

IY = IA - IB                XNLDA 0,@ARG1,3
                              XWLDA 1,@ARG2,3
                              WSUB 1,0
                              XWSTA 0,IY,3

IC = IX * IY                XWLDA 0,IX,3
                              XWLDA 1,IY,3
                              WMUL 0,1
                              XWSTA 1,@ARG3,3

RETURN                      WRTN
END                          .END
```

The assembly language subroutine

Figure 2 shows both the Fortran and assembly language code for a simple subroutine FOO and its calling sequence. Figure 3 illustrates the changes that take place in the stack during the calling process.

When the HLL calls a subroutine, the addresses of the arguments are pushed on the stack, incrementing the stack pointer by two (words) for each argument. After the LCALL instruction has executed, the stack looks like Figure 3b. The first instruction in subroutine FOO (WSAVS 4) pushes (saves) the accumulators, sets the frame pointer to the current stack pointer, and pushes the stack pointer up four more locations to reserve room for the two 32-bit temporary variables (IX and IY). The stack now looks like Figure 3c. After the WRTN instruction executes, the stack is restored to its original state (Figure 3a), thus ensuring the reusability of that part of memory.

While in the subroutine, the contents of the stack can be referenced by offsets from either the stack pointer or the frame pointer. These pointers are not modified unless another subroutine is called. In practice, the FP is used as the reference mark, with negative offsets for the subroutine arguments and positive offsets for local subroutine variables. As you can see from Figure 3c, arguments 1, 2, and 3 are at offsets -12, -14, and -16 from FP

respectively, and the two local variables are at offsets +2 and +4 from the FP. File LANG_RT_PARAMS.SR (look in your LANG_RT directory) contains mnemonics (ARG1-ARG20), which define the offsets of the first 20 arguments from the frame pointer, as well as offsets to other locations on the stack shown in Figure 3c. This makes your assembly language code easier to read. If you use these mnemonics, assemble your code with:

```
) X MASM LANG_RT_PARAMS.SR/PASS1 %1-%
```

Here are a few simple rules that are illustrated by the code in

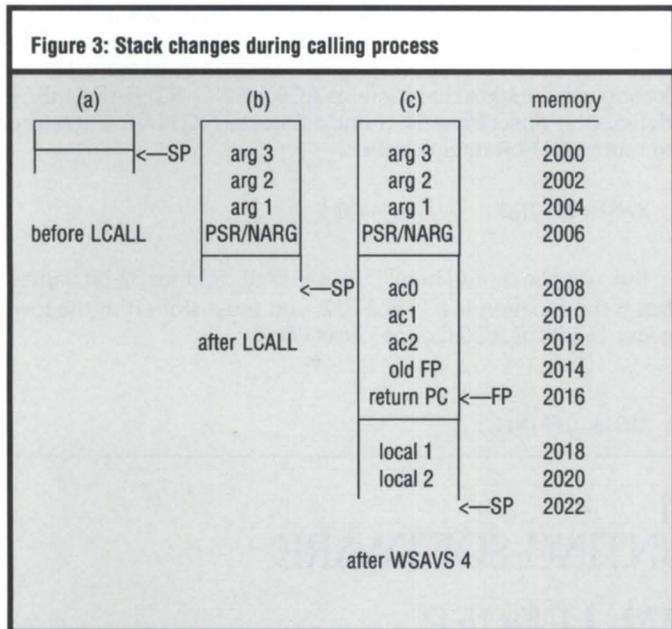


Figure 2.

1. LCALL/WSAVS/WRTNs work as a team; "WSAVS n" must be the first instruction (n = number of 16-bit words required for local stack variables). Use WRTN to return to the calling routine.

2. After executing WSAVS, AC3 will contain the current frame pointer. All arguments are referenced relative to the FP that may be in either AC2 or AC3 (see rule 3). If you destroy the FP in AC2 or AC3, you can always reload it with LDAFP 2 or LDAFP 3.

3. If an argument has been passed to the subroutine with the VS/ECS calling sequence (call by reference), it can be retrieved with:

```
XNLDA A,@offset,F ;for 16-bit values
XWLDA A,@offset,F ;for 32-bit values
```

where "A" is the accumulator (0,1,2,3) in which to put the value, and "offset" is any of ARG0 through ARG20 for arguments 1 through 20. "F" is the accumulator (either 2 or 3) that contains the current frame pointer.

If "call by value" was used to call the subroutine (i.e., from C), the arguments are retrieved with:

```
XNLDA A,offset,F ;for 16-bit values
XWLDA A,offset,F ;for 32-bit values
```

because the actual values are stored on the stack, rather than the addresses.

In both cases, the address "E" on the stack is calculated by

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adding the contents of "F" (AC2 or AC3) and the offset. If the "@" symbol is present, it means to get the value using the address you find at "E." Without the "@," the instruction means to get the value located at address "E."

4. In some cases, you don't want the value itself, but rather the address of the variable (for example, a WBLM block move instruction needs the address of the start of the block). Assuming the subroutine was called with the VS/ECS calling sequence (call by reference), you would retrieve the address with:

```
XWLDA A,offset,F ;get address
```

5. Returning an argument on the stack is the opposite of rule 2:

```
XNSTA A,@offset,F ;16-bit value
XWSTA A,@offset,F ;32-bit value
```

6. In a high-level language, the number of arguments passed to a subroutine must match the number of arguments declared. If the subroutine is written in assembly language, it can have a variable number of arguments, and the subroutine can get the number of arguments from the stack (PSR/NARG in Figure 3). This is fine if all arguments are non-CHARACTER, but the coded number of arguments will differ from the argument count (NARG) if any arguments are CHARACTER (because of the extra dope vectors). If all arguments are CHARACTER, the number of user-coded arguments is NARG/2. In my GET_SWITCHES.SR rou-

tine (September, October, and November 1986 issues of *Focus*), the number of coded arguments is always guaranteed to be (NARG+1)/2, because the second to last argument is always non-CHARACTER, and the last argument is always CHARACTER, thus always guaranteeing NARG-1 dope vectors on the stack.

Function subroutines

The VS/ECS calling sequence requires that non-CHARACTER function results be returned in AC0 (FPAC0 for REAL*4 or REAL*8). The calling routine expects to find the function result in AC0. For REAL functions, simply load FPAC0 with the result before returning with WRTN. For INTEGER or LOGICAL, you must load AC0 with the result, but since WRTN restores AC0-AC2 from the stack (pushed by WSAVS), you must store it in the location on the stack that contains AC0. LANG_RT_PARAMS.SR defines this offset from the frame pointer as FRTN=-8. Therefore, to return a 32-bit integer value:

```
XWSTA 0,FRTN,3 ;note: no '@'!
```

But wait; be careful here! Offset -8 is all right for 32-bit values, but if the function is INTEGER*2, you must store it in the low-order 16 bits of AC0 (i.e., at offset -7):

```
XNSTA 0,FRTN+1,3
```

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Tricks

1. If you are passing CHARACTER arguments to an assembly language routine, how does it know how long the CHARACTER string is? Although Fortran 77 and other compilers push extra dope vectors, DG reserves the right to change them, so it isn't recommended that you try to use them. Instead, you should explicitly code an extra argument that is the length of the CHARACTER variable:

```
CHARACTER*80 TITLE
CALL FOO(TITLE,LEN(TITLE))
```

You can also terminate your CHARACTER strings with a NUL <0> character. Then you can use WCST to determine the length of the string. Here's an interesting exercise for you. Compile the following with F77/CODE/L=X:

```
CHARACTER*80 TITLE
I=INDEX(TITLE,"<0>")
END
```

Don't use /OPT=FULL, or it will optimize it out of existence. The resulting code is tricky and illustrates the WCST instruction very well.

2. Since most of the compilers push byte addresses for CHARACTER variables and word addresses for non-CHARACTER variables, can you write an assembly language routine that can be

called with either type of argument? Of course. Just use pointers (addresses) of the arguments and pass the pointer, not the argument itself. Pointers are more elegant in newer languages like C and Pascal, but you can accomplish the same thing with BYTEADDR and WORDADDR in Fortran 77:

```
CHARACTER*80 CTITLE
INTEGER*4 ITITLE(20)
CALL FOO(BYTEADDR(CTITLE),80)
CALL FOO(BYTEADDR(ITITLE),80)
```

Subroutine FOO is coded to retrieve the byte address of the variable from argument 1 and the number of bytes to process from argument 2. This technique is also illustrated by the EBCDIC_TO_ASCII assembly language subroutine presented in the June 1987 issue of *Focus*.

3. If a subroutine has an integer argument, it is impossible to call it from COBOL (COBOL generates byte addresses for everything, even COMPUTATIONAL). Non-CHARACTER arguments must be converted to CHARACTER first. Happy MASMinG! Δ

John A. Grant is a geophysicist with the Geological Survey of Canada, where he manages the Exploration Geophysics Subdivision's MV/4000. He may be contacted at 601 Booth St., Room 591, Ottawa, Ontario K1A 0E8; 613/992-1082.

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The micro wave

This column will keep up with the momentum of PC integration

Welcome to "The Workstation," a new *Focus* column about PC integration. For as long as I can keep this up, "The Workstation" will present a forum for any subjects related to the use and abuse of personal computers in conjunction with Data General minicomputers.

I want to start by putting my prejudices on the table. First, my company (Rational Data Systems) is a vendor of PC-integration products and services, and that has a lot to do with my qualifications to write this column. I think RDS knows more about PC integration in the DG environment than anyone else: we invented it. We've been doing it for a long time, and our LAN software is licensed for more networks, more MVs, and more workstations than any other on the market. Knowing where I'm coming from, you'd be wise to remind yourself occasionally that I am selling something.

In this column, I'll be dabbling in almost anything of interest to DG users, but in reality, my daily, personal efforts are spent on the most important aspects (commercially) of PC integration. Every month, I get a call from a sincere Macintosh user (is there any other kind?), pleading for a way to connect a Mac to an MV via Apple Talk. I wish I could help; I like my Mac too. But it's a blue world out there. We just can't afford to develop software for a machine that covers less than 10 percent of our market.

This brings up another point that will disturb many of you. I call it the Emperor's New Operating System syndrome. I also get an occasional call from an RDOS or 16-bit AOS user who is upset that our software doesn't run in those environments. If you're running RDOS, you are probably getting a lot of computer power for your dollar, right? You're carefully watching your nickels and dimes, and you are probably running a lean-and-mean business. Am I close? But you aren't spending enough money. You are simply too poor

or too smart to upgrade to AOS/VS. If an MV with the oodles of memory it now takes to run AOS/VS, CEO, and so on, is too expensive, then so is most of the third-party software.

In any case, the lack of virtual memory and state-of-the-art compiler and debugger technology makes software development on a 16-bit operating system far too expensive. We could never afford to develop a product like PC/VS under RDOS or AOS, for example. It reminds me of the Emperor's New Clothes, because nobody is willing to say what everyone already knows: there isn't enough profit in the market for RDOS or AOS system-level products.

In future columns, I will certainly discuss Macintoshes, RDOS, and AOS, but don't expect to see very much of it.

Now that I got that stuff out of the way, let's get into the more positive aspects of this endeavor. This month, I simply want to set the stage for what's to come. In each future column, I will examine one specific aspect of PC integration. For starters, let's divide PC integration into four levels. Each level represents a more sophisticated degree of integration. I'll describe each level and present examples of each.

1. Terminal emulation represents the chronologically first level of PC integration. It's also the simplest to understand. When people started using PCs in addition to terminals, it became apparent that something was wrong. Users with an already crowded desk had not one but two keyboards and displays, and back then, both were expensive. You can only look at one display at a time, and you can only type on one keyboard at a time. The solution to the desk space problem was to load software into the PC to allow the PC to emulate a Data General terminal. There are many good emulators on the market today, such as Emu, Softerm, and Popterm.

2. File transfer is the second level of PC integration. BLAST is the best known of the simple, asynchronous-based file transfer utilities that allow you to move text and binary files back and forth between a PC and a DG minicomputer across direct or modem lines.

3. Local area networks (LANs) are the next big step to tie PCs and DG minis together at a higher speed. The first use was for high-speed file transfers, but soon, more tightly coupled environments emerged. PC/VS supports notification and remote CLI commands in addition to high-speed file transfer. DG's PC*I combined with RDS's Netlink provides these same services in addition to MS-Net-compatible file service.

4. Distributed processing is the most recent stage of PC integration. At this level, an application is split into two pieces: part of it runs on the PC, and the rest runs on the minicomputer. Data General calls this a "cleaved" application, but I think "distributed" is a more commonly understood term.

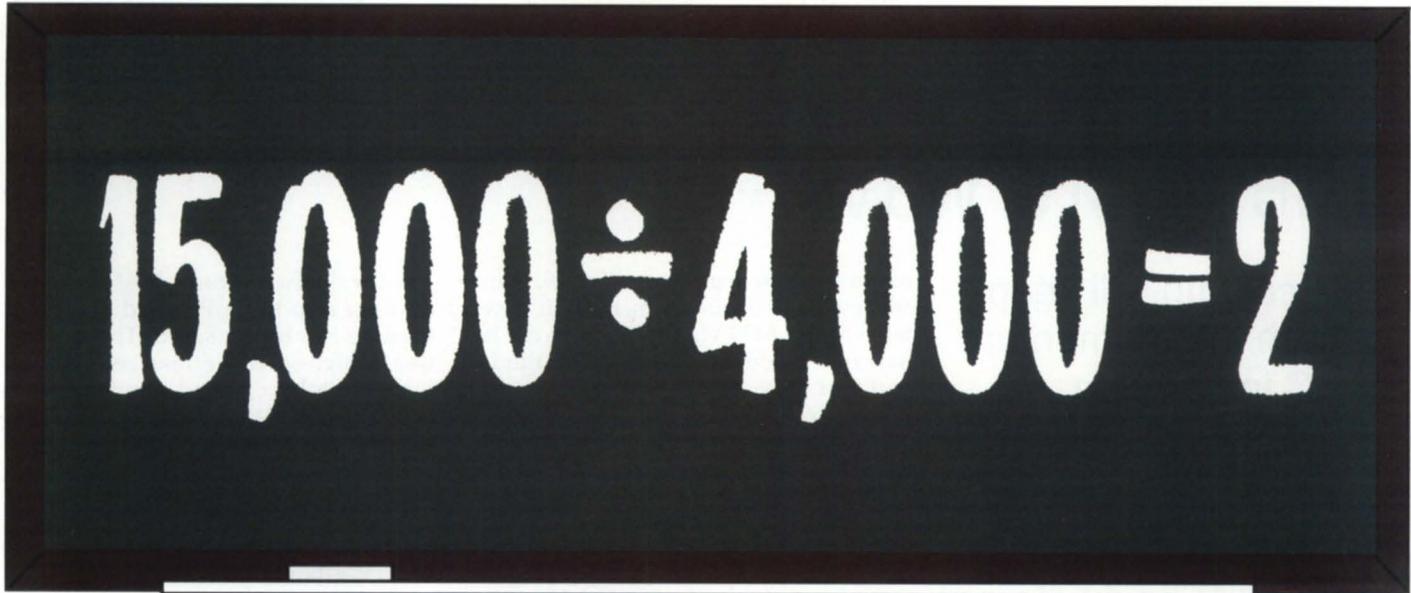
RDS's PC/Mail is a good example of a distributed application. By moving the CEO mail functions from the CEO control program into the PC, PC/Mail offers a better user interface and performance than that obtained using CEO via a terminal or terminal emulator.

That's a quick overview of the levels of PC integration. In the months to come, I'll look into topics such as Ethernet versus StarLAN, how to pick a terminal emulator, and a comparison of PC-only networks (3Com, Novell, etc.) and mini-based LANs.

To get things rolling, I am helping to start a new NADGUG special interest group, the PCI SIG. This SIG will be concerned with any issues related to the use of microcomputers in conjunction with Data General minicomputers. We'll deal with IBM PCs, clones, Macintoshes, LANs, terminal emulators, etc.

We have already established a PCI SIG section on the RDS/NADGUG bulletin board. If you haven't already done so, I urge you to call the board and get to know it. It's free (except for the phone call). We now have two lines that run at 300 to 9600 baud. Call 415/924-3652, 24 hours a day, seven days a week. Δ

Doug Kaye is the president of Rational Data Systems, 5725 Paradise Dr., Corte Madera, CA 94925; 415/924-0840.



Is this new math, or is something wrong?

We got our first MV/15000 (model 8) for one of our clients a few weeks ago, and I took the opportunity to run my Sieve benchmarks (described in my November 1987 column) on it. The Sieve is a CPU-bound program intended to test the relative speed of arithmetic of various languages. I got some unexpected results that don't agree with the published benchmarks and ratings of the processors. I found it so interesting that I ran a number of compute-bound benchmarks in several languages.

Figure 1:
BASIC loop for CPU-bound program

```

0010 REM BTEST
0020 LET BTIME=SYS(0)
0030 LET MX=6000 \ X=0
0040 DIM A[MX],A$(1)
0050 FOR J=1 TO 5
0060   FOR I=1 TO MX
0070     LET A[I]=[I]
0080     LET A[I]=!*A[I]
0090     LET A[I]=SQR[I]
0100     LET A$=CHR$(I)
0110     LET X=X + 1
0120   NEXT I
0130 NEXT J
0140 LET ETIME=SYS(0)
0150 PRINT "BEGIN->";BTIME
0160 PRINT "ETIME->";ETIME
0180 PRINT "X   ->";X
0190 GOTO 10
    
```

Before discussing the tests, let's cover the background. The MV/4000 used in the test had 4 MB and no floating point. The MV/15000 model 8 had 8 MB. Both systems were running AOS/VS rev 7.57. The languages used were COBOL rev 3.40, ICOBOL 1.40, B32 version 7.032, and BBASIC version 4.10. The Sieve program was the same one I used in my column last November. The standard version was as published in *Byte* magazine; the "optimized" version is optimized for ICOBOL

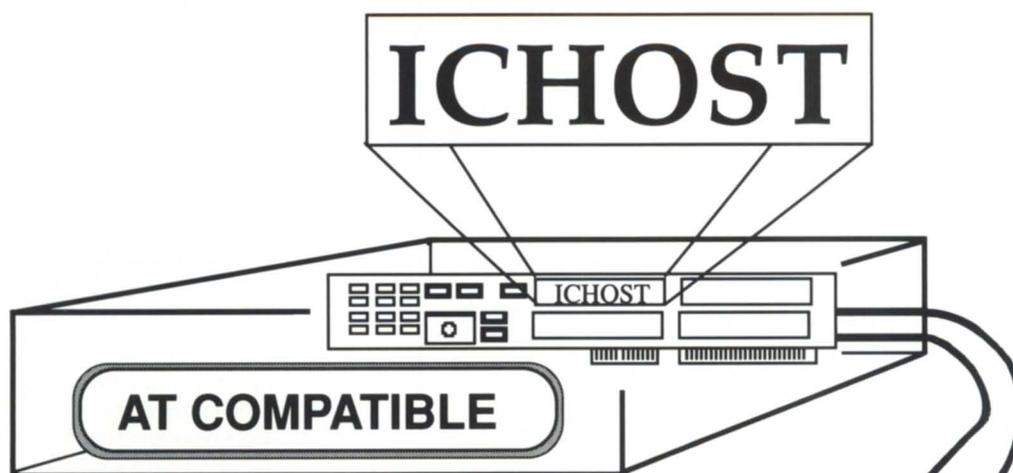
performance—which, interestingly enough, is slower under 32-bit COBOL than the standard unoptimized version. The BASIC program involved was a short program (see Figure 1) that looped 25,000 times on some arithmetic.

The MIPS and Whetstone ratings (see Figure 2) are from various pieces of Data General literature. If you take them literally, they predict that the MV/15000 CPU should have about four times the speed or throughput of the MV/4000 CPU.

Figure 2: Sieve benchmark timings

| | MV/4000 | MV/15000 | MV/15000 | approx ratio |
|------------------------|---------|-----------|-----------|--------------|
| microcode | 10 | 3 | 4 | |
| AOS/VS | 7.57 | 7.57 | 7.57 | |
| MIPS | .6 | 2.4 | | 1:4 |
| Single KWhets | 702 | 2879 | | 1:4.1 |
| Double KWhets | 546 | 2568 | | 1:4.7 |
| Sieve (std. 32-bit) | 21 secs | 12.5 secs | 12.5 secs | 1:1.6 |
| Sieve (opt. 32-bit) | 33 secs | 17 secs | 17 secs | 1:1.9 |
| Sieve (std. ICOBOL) | 87 secs | 49.7 secs | 49.5 secs | 1:1.8 |
| Sieve (opt. ICOBOL) | 46 secs | 30.4 secs | 30.3 secs | 1:1.5 |
| BBASIC loop | 80 secs | 47 secs | 49 secs | 1:1.7 |
| B32 loop | 26 secs | 12.5 secs | 13 secs | 1:2.0 |

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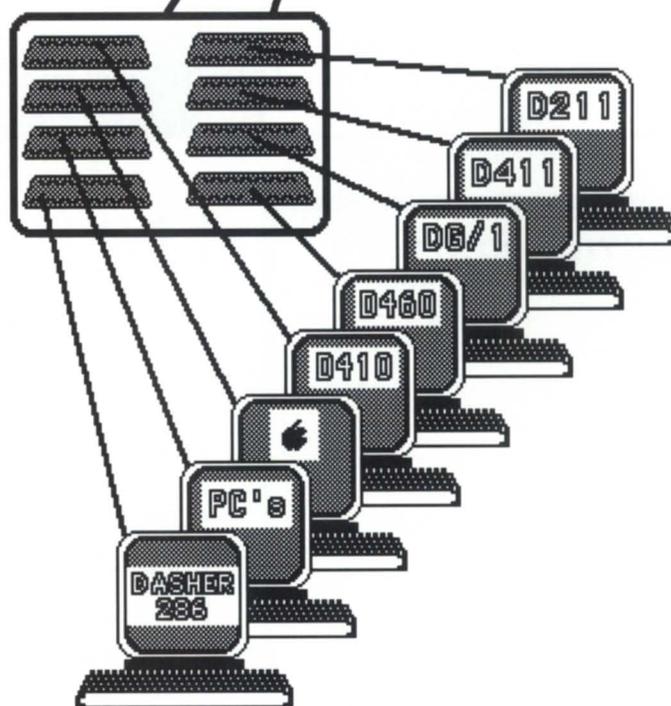


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Since the Sieve program reports the starting and ending times of the loop, there was no I/O of any type to interfere with the timings. The only other outside influence on either system was the PIT. Both systems have their PIT clocks set at 10 Hz, so both should have had the same degree of system overhead. Both systems were running only a couple of servers (INFOS, MLS32, and RLS32), and the benchmarks were run from a single terminal with all other consoles logged off (but not disabled). The BBASIC server does use a little overhead, but like the PIT, it was minimal enough that it did not contribute noticeably to the timings.

None of the benchmarks in any of the four languages ran more than twice as fast on the MV/15000, barely half of what was expected. I haven't determined why there is that much of a discrepancy. I can only speculate that high-level languages in general must compile down into one-word instructions (I know COBOL does), which in turn appears to be a fairly direct counterpart to the 16-bit instruction set, and that perhaps the MV/4000 executes the C/350-compatible instructions better in relation to the MV/15000 than those that require two or three words. I found it interesting that an MV/15000 only doubled the CPU performance from the MV/4000. Therefore, to those of you considering an MV/4000 to MV/15000 model 8 upgrade, watch out! Apparently, the upgrade may not give you as much throughput as you think, especially if your applications are CPU-bound.

Important note: None of the tests were aimed at disk speed. The I/O bandwidth is significantly higher on the MV/15000, and that may be more than enough for a disk-bound application to achieve a fourfold improvement. If time permits, we will run some tests on that for a future column.

Just for the heck of it, we also ran the ICOBOL version of the Sieve benchmark on the Wyse 286 using the IC MS-DOS product from Data General. A single terminal produced ICOBOL Sieve execution times of 53.2 seconds for the standard and 25.5 seconds for the optimized program. Note that those times for a CPU-bound program are just slightly behind those of the MV/15000! We also tried it using the Envyr co-processor board from Egan Systems in the same Wyse system. Timings for the master terminal running ICHOST version 2.00 were 28.8 seconds for the standard and 19.4 for the optimized. Timings for a single "slave" (running on the Envyr board) were 48.4 seconds for the standard and 32.4 seconds for the opti-

mized. As a final test, we tried running the master and slave terminals together to check the amount of interference between the two processors. The times were nearly identical for both the master and the slave, indicating that there was virtually no interaction required between the two processors.

I'll leave it up to you to draw whatever conclusions you desire. No matter what you decide, the MV/15000 is still the faster of the lot, though it doesn't stand quite as far out in front as I expected.

CEO rev 3.0 and Systems Engineering

Data General made a presentation to the members of CADGUG (Chicago Area DG Users Group) about their Systems Engineering rev-up service for CEO rev 3.0. I found this a very interesting topic with a new twist to the way Data General is conducting business.

Let me start by reviewing the way DG used to do business (from my point of view). When a new release of software came out, DG sent tapes to everybody with any type of software support. Then everybody tried to load it. Those without phone support had to use whatever avenues were available if they encountered a problem. This usually meant users groups, friendly SEs, or more often than not, lots and lots of midnight oil. If you had phone support, you would call Atlanta only to be told that this was the first they had heard of that problem. Then you would wait a few days for an answer and sometimes even a solution and explanation. Move the clock ahead a few years, and you only had to wait a couple hours for an answer that usually included a solution and an explanation.

Then last year, they offered a class for system managers on the changes to the operating system in rev 6 and 7 of AOS/VS. Now, I admit it seems pretty cheap to charge someone for training on new features, but that wasn't the point. The information was all there in the documentation if you cared to read it. The class allows you to do in-depth study and get hands-on experience with some of the features before using your system as the test site. Certainly the hands-on experience would make the class worthwhile, especially if you have as good an instructor as Jerry Auge. He'll let you in on every possible trick and technique that anybody has brought to his attention.

Turn the clock ahead to 1988, and you'll find a number of offerings from Educational Services to teach you what you might want to know about rev 3.0. Many system

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managers will find these courses and seminars to be the best thing they have ever attended, others will see it in a less favorable light, and still others will complain that DG shouldn't charge for something that their maintenance is supposed to cover. Each to their own opinion, but I must agree with the latter group that if the courses become an excuse to pass off less-than-excellent documentation, then we will be the victims of a rip-off. Past experience, however, leads me to believe this will not be the case.

The class allows you to do in-depth study and get hands-on experience with some of the features before using your system as the test site

Anyway, enough of the flashbacks and ramblings. What has happened that I find unique is that the local systems engineers have organized a three-part offering available to all interested parties for a price. Although it is in line with the services they've offered in the past, this is the first case I can recall where they have actually put something concrete together to market rather than the usual technical support services. This offering was outlined at a recent CADGUG meeting in which CEO rev 3.0 enhancements were presented and discussed.

The first part of the offering is a half-day classroom seminar that will cover in detail the software and hardware requirements and the installation issues. In this class, they would cover conversion utilities, planning an installation schedule, how to prepare for the install, and to some extent, how to actually do it.

The second part includes a half-day of SE time at the customer's site, where individual needs will be addressed. During this time, the site installation will be looked at in depth for problems or situations that may be affected. For example, a major change in the way letter-quality printers are controlled might affect the office oper-

ating procedures.

The third part would be of interest to those sites that include networked MV systems. This half-day session of on-site assistance and planning covers the Name Server Agent functions, installation, and operations on a network of MV machines.

This three-part series has been designed and is being marketed by the local group

of systems engineers in Chicago and, as far as I know, is a unique program within DG. I have mixed feelings about this type of program. It seems that in-depth consulting to help with planning and installation issues before the install is a service that many companies will find invaluable. I also like the idea that I don't have to support this out of software subscription

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—Patricia Powell

Goodman & Goodman — MV/20000

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dollars if I choose not to attend or use the service. I am disappointed that this isn't offered nationwide, because it seems that there is a lot to be gained. I am also a little worried that this program may be so successful that DG may reduce the services covered by the standard support agreements, either because so many attend the class or because they want to encourage

attendance.

Overall, though, I feel that if we use this service as needed but don't let DG slack off in other areas (documentation and release notes), this will be a long-term benefit both to users and DG. I welcome the idea of having the opportunity to obtain detailed assistance in planning for installation from the SE staff. Although I may

know my site inside and out, someone who has seen dozens of sites and helped in as many installations should certainly be able to give me a few good ideas. So I guess all I can do now is use those services I choose and see what happens.

We have a winner

In the March issue, I challenged readers to write a macro demonstrating how to handle a tax table file with a CLI macro. The winning contribution was from Al Drillick of Track Data Corporation, who added one more feature.

He built the table into a macro that calls itself recursively. His complete macro is reproduced in Figure 3. Looks like Al wins the grand prize of \$25 and a year's supply of IRS 1040 forms (but I won't say which year).



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Figure 3: Winning macro

```
TAX.CLI (Married tables only)

[!equal,%0%,]
tax/1 %1% &
    90000 24590 385 &
    45000 8840 350 &
    28000 4080 280 &
    3000 330 150 &
    0 0 110

[!else]
[!ult,%1%,%2%]
tax/1 %1% %5-%
[!else]
var1 %3%
var2 [!usub,%1%,%2%]
var2 [!umul,[!var2],%4%]
var2 [!uadd,[!var2],500]
var2 [!udiv,[!var2],1000]
var1 [!uadd,[!var1],[!var2]]
write Tax on %1% is [!var1].

[!end]
[!end]
```

And now to the mailbag

Ask and ye shall receive. It works with the mailbag too. A mere three days after I sent the last article to the publisher, a Quick Connect card came in. That's what I call response! Unfortunately, although the timing was incredible, only two more followed (one of which I am saving until next month), and the mailbag was quickly empty again.

Curt Prescott of Edrei Communications asked, "Can you use MV/4000 memory in other MV computers? If so, which ones?"

**Although I may know my site inside and out,
someone who has seen dozens of sites
and helped in as many installations
should certainly be able
to give me a few good ideas**

Also, can you use the Argus disk drive on any MV other than the 4000?" The answers are "yes" and "yes". I consulted my favorite hardware guru for some details, and he informed me the MV/4000 memory (model 8756 for the 2 MB board) can be used in not only the MV/4000 family, but also the MV/10000, MV/8000 II, and S/280 series.

The Argus disk drives (or any of the peripherals on any full-size MV) can be used throughout the MV series. The only

MV class machines that cannot utilize the full range of all peripherals are those of the DC series, including the MV/1400, MV/2000 DC, MV/4000 DC, and MV/7800 DC.

However, it should be noted that support for the Gemini and Phoenix drives (10 MB over 10, and 5 MB over 5) will be dropped in rev 8 of AOS/VS. I don't know anyone still using those on MV machines, although there must certainly be a few out there.

James Murray of Bernard, Overton, and

Russell wrote asking how to use the printer pass-through on the D4xx series terminals. The answer is rather simple, but nearly impossible to find if you don't have a copy of the terminal users guide around. Before sending the data to be printed, send the octal codes 036, 106, and 140 down the lines. To turn it off at the end of the job, send 036, 106, and 141 to reset it back to screen-only.

Epilogue cum laude

We recently received AOS/VS rev 7.60. There seems to be quite a bit of new hardware supported and a number of small fixes. However, DG also included a number of warnings about what is coming in rev 8. I would like to commend this action. I hope that it is the beginning of a new trend. Δ

Jim Siegman is a contributing editor to Focus, chairman of the NADGUG audit committee, and treasurer of the Chicago Area Data General Users Group. Send comments or questions to Datamark Corp., 3700 W. Devon, Suite E, Lincolnwood, IL 60659; 312/673-1700.

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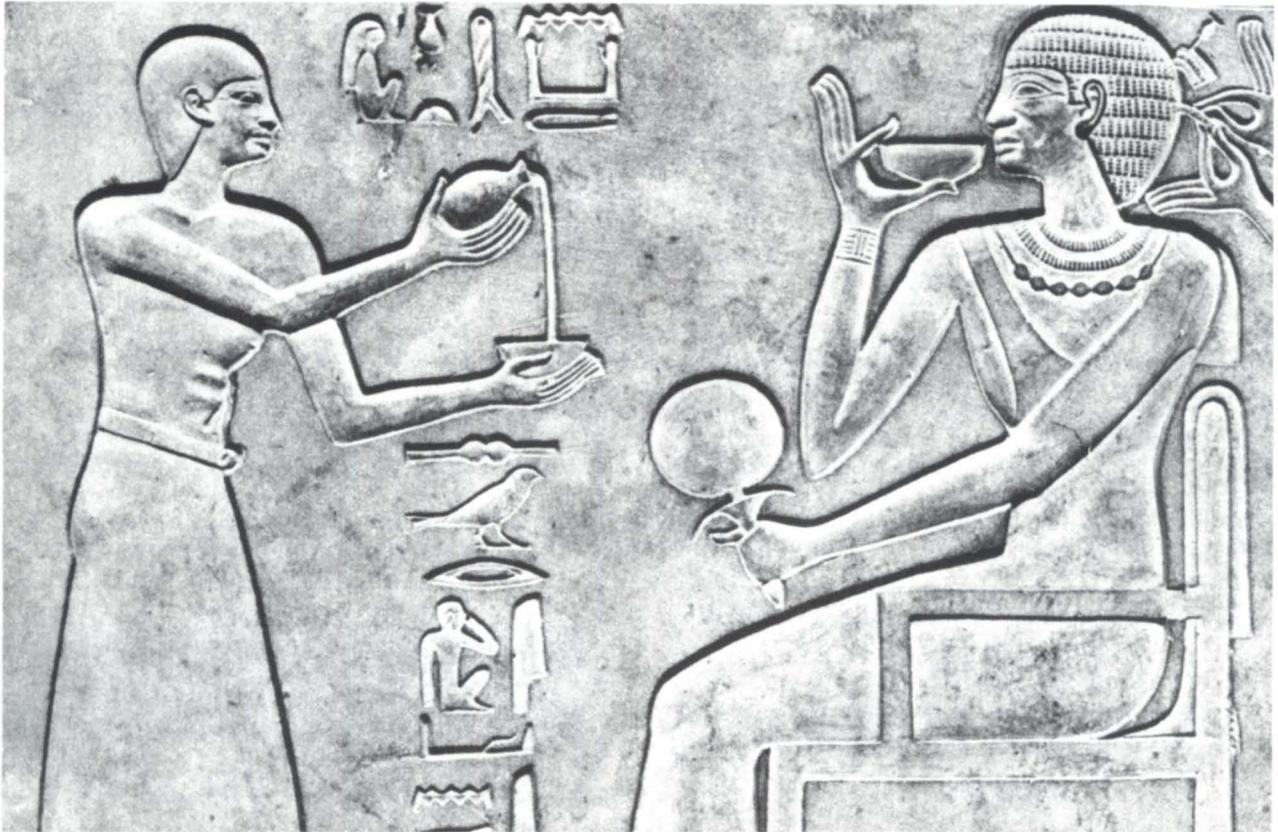
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by Bobbie Pressman
OASIS president

I recently approached the *Focus* editorial staff with an idea for an additional column on CEO. I wanted to get readers involved with determining subjects for my articles—like a “Dear Abby” approach. I hope to give you an ongoing forum to ask questions, look for resolutions to your problems, or share new ideas of interest to CEO sites. You’ve been asking for more articles on CEO, and now you’ve done it; you’re stuck with me.

My name is Roberta Pressman, but my friends call me Bobbie. I’m the president

Writing a wrong

Does DG’s pricing policy for CEOwrite jeopardize the customer base?

of the Office Automation Special Interest Subcommittee of NADGUG (OASIS), training and office systems manager for Deutsche Credit Corporation in Deerfield, Illinois, and president of a new part-time CEO consulting business called RJP Automation Consulting.

Through OASIS workshops and NADGUG conferences, I’ve met many

representatives of CEO sites around the world. I’ve heard common questions, problems, and suggestions from many CEO sites. This has been a tremendous opportunity for learning. At Deutsche Credit, I have managed the CEO system since a beta test version was installed in 1982. Managing the system, I have gained extensive knowledge of CEO.

For this kickoff column, I decided to address Data General’s pricing of the AOS/VS CEOwrite package for existing CEO sites.

Until the end of October 1987, including the CEO Roundtable at the NADGUG conference, Data General personnel told us that AOS/VS CEOwrite would be included at no additional charge in the 3.0 upgrade to CEO. We were told CEO Word Processing would no longer be enhanced, but would continue to be supported, and would only be revised to fix system problems. We were also told that CEOwrite would be the word processing choice in the future.

Then during rev 3.0 upgrade classes, DG trainers told attendees that CEOwrite

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The prices printed in MIS Week weren't even close to being nominal; phenomenal was more like it

was a separate package that could be purchased for a nominal fee. They were unable to tell us what "nominal" meant, but some guessed a few hundred dollars. At this same time, however, some DG support people continued to tell their customers that there would be no extra charge for mainframe CEOwrite.

Then Data General dropped a bomb. In the January 18, 1988, edition of *MIS Week*, I was surprised by the following:

"Initially created for microcomputers, AOS/VS CEOwrite is available as an optional purchase with rev 3.0, and is priced from \$600 to \$10,000, depending on the Data General computer used."

No mention of pricing had ever been

discussed except for a nominal fee. The prices printed in *MIS Week* weren't even close to being nominal; phenomenal was more like it.

Because DG had promoted CEOwrite as the word processing package of the future and would not be improving CEO Word Processing, DG is placing its current customers in a no-choice situation.

Since the upgrades, changes, and enhancements that OASIS has been asking for during the last three years are only available in CEOwrite, I consider the AOS/VS version of CEOwrite as an upgrade to CEO Word Processing, not a separate package. I'm sure many CEO sites have been basing proposals, expansion plans,

and reports to executives on the information received from DG staff. Unfortunately, none of us knew the truth until the article was published.

At the Florida OASIS workshop, Bob Tway, Data General vice president of eastern operations, told the attendees to contact their individual DG salespersons regarding CEOwrite pricing.

I strongly urge you to write to me telling me your opinions and/or your company's opinion regarding the Data General pricing of AOS/VS CEOwrite. Even though I have heard about some price negotiations, we must provide concrete evidence to Data General on its current customers' opinions regarding CEOwrite pricing. Data General needs to know what impact their decisions have on their customer base. I want to hear from you regarding this issue and/or any other CEO or OA subject you would like to see covered. Δ

Bobbie Pressman is the president of OASIS and the manager of training and office systems at Deutsche Credit Corp. She can be reached at 312/948-7272.

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AOSKERM

This is an AOS version of KERMIT written in Fortran. Uses 487 blocks.

DBCHECK

This program checks the open status of an INFOS file and examines the checkpointing status of a file. Uses 230 blocks.

DUMpload

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

FTNCVT

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

Games

Games is a collection from various places. Enjoy. Uses 19,293 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. Uses 416 blocks.

JAG_UTIL

JAG_UTIL consists of several programs: Filecount, Userspace, Scan, and Laminate. John Grant has reserved some rights on his stuff, so check the documentation for their specifics. Uses 1,501 blocks.

KERMIT

KERMIT is a file transfer protocol developed at Columbia University. Uses

9,328 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. Uses 438 blocks.

Macbook

Macbook is a collection of macros from the Colorado users group. Uses 342 blocks.

QHelp

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

SWITCHES

SWITCHES is the GET.SWITCHES routine from John Grant. Uses 1,297 blocks.

TEX

TEX (Terminal Emulator with XMODEM) is a terminal emulation program written by David Down. He has made some changes to his contribution recently. TEX is being distributed as shareware. Uses 426 blocks.

VT100KER

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

Xfer

Xfer is a tape conversion utility. Δ

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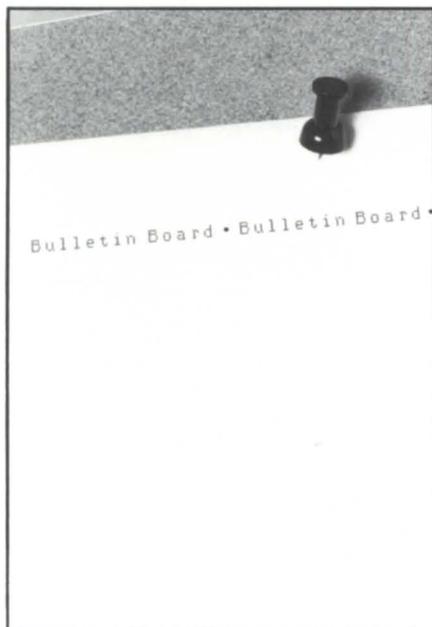
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Bits and bytes from the bulletin board



Volunteers needed

From: Brian Johnson

I need some volunteers to provide off-peak, dial-up access to their MVs for the purpose of testing the :SYSMGR benchmark suite. No special privileges are required for the account. I especially need access to MV/7800s of all flavors and MV/15000s of all three flavors, including with/without hardware floating-point units. If you're interested, please give me a call at 415/550-1444.

*PC*I

From: Doug Kaye

To: David Down

David, how would you like a D410 emulator with a Procomm-compatible script facility, file transfer, remote printing, remote virtual disks, remote CLI-command execution, CEO mail notification, and more? Popterm/410 (our product) does the first part, and a new, yet-to-be-announced product (PC/Remote) does the rest? Interested?

From: Jeff Campbell

To: David Down

The only one that I know of that offers D46x emulation is CEO connection. Unfortunately, the only file Xfer protocol that goes with it is BLAST. The D460 emulator on CEO Connection doesn't completely emulate a D460, but it appears to work OK for our needs.

From: David Down

To: Doug Kaye

Sounds pretty good. How about D460 graphics? We're going to be implementing DG/PC*I on some of the PCs, but the others will still be serial. Is the PC/Remote an Ethernet product, or can you use it on serial lines?

From: David Down

To: Jeff Campbell

Does CEO Connection require CEO on the DG, and will it work on PC clones?

From: Doug Kaye

To: David Down

PC/Remote is for serial/asynch. It does everything that PC/VS and Netlink do, but slower. PC/Remote also supports PC/Mail. D460 emulation should be ready in

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about three months.

From: Doug Kaye
To: David Down

Yes, CEO Connection (a DG product) requires CEO. It will run on clones. PC/Remote (our soon-to-be-announced product) does not require CEO and also runs on clones.

From: Mike Shumway
To: Doug Kaye

Sounds good, Doug. But here's the million dollar question: Does it run resident on the PC, and if so, as many do, does it use up half of the available memory in the PC?

From: Doug Kaye
To: David Down

Mike, David, et al. We don't yet have any printed information on PC/Remote. We're expecting to announce and ship it in April. Yes, there is some code resident. I'll check with the developers and find out how much. I imagine it's less than 30 KB, though, for all the bells and whistles. The optional pieces (Popterm/410 and PC/Mail) can be loaded resident or transient. Of course, the basic mechanisms that do virtual disk, remote printing, etc. must be resident. More information will follow as it becomes available.

From: Ron Ralston
To: Doug Kaye

CEO Connection (model 30952) provides D460 emulation except for compressed mode. Horizontal scrolling is supported. AOS/VS CEO Connection (model 30953) is required on the host end for file transfers. AOS/VS CEO Connection communicates with the document conversion programs in CEO if you want to use CEO Word Processing or other software on the transferred file.

From: Jeff Campbell
To: David Down

CEO Connection only requires something on the DG side if you are going to do file transfers. If so, then you need the MV tape of CEO Connection. It has a particular version of BLAST on it. Other than that, I don't think you have to have anything else on the DG side. There are several patches that change the way CEO Connection sees keyboards (12 function key and such). I would think it would work on a clone, but DG will only guarantee that it will work on a 100 percent compatible machine. (I got one I'll sell you, cheap!) There are some things the

D460 emulator will not duplicate, but I'm not sure of what they are. Maybe some of the gurus on this BBS know.

From: David Down
To: Doug Kaye

I'll bet there would be plenty of interest if you could offer Mac support on PC*I. Can you encourage it?

From: David Down
To: Mark Weber

I'll second the vote for [PC*I] Mac support. We've been getting a bunch of Macs in, and it sure would be nice to network them with the other PCs when we install PC*I this spring.

From: Doug Kaye

The text 'COUNT ON HBI' is rendered in a green, seven-segment digital font. The word 'COUNT' is on the top line, and 'ON HBI' is on the bottom line. The 'O' in 'ON' is a solid circle, while the other characters are formed by segments.

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To: David Down

Not much I can do about Mac support (we're not doing it here at RDS), but I suggest you have your DG sales rep get in touch with DG Product Marketing. Get a message through to Joe Clabby in Westboro.

From: Mark Weber

To: David Down

You may be ahead of the game, David, if you are getting PC*I. Theoretically, you should be able to use TOPS on Mac and PC and use the PC as a gateway to the DG. I am using TOPS to network Macs and PCs. This works well, but I'm not getting PC*I, since I am getting more into Macs than PCs. Something like PC*I for Macs would

be wonderful.

From: David Down

To: Mark Weber

TOPS may be able to coexist with PC*I on Ethernet, but I'm not sure that the PC could function as a gateway without special software for it.

From: Doug Kaye

To: David Down

PC*I (or our alternative, PC/VS) can provide services to the PC. These services are transparently extended to the Mac as follows: If the PC has redirected a drive (say, N:) to the MV, then that drive looks like a physical PC drive. TOPS presents an icon to the Mac that represents the PC's N: drive. Theoretically, this is fine. However, beware of potential interrupt timing problems between TOPS and PC*I. This has tested OK with PC/VS.

On the other hand, consider that other non-redirected services do not get extended to the Mac. For example, although the PC can emulate a terminal, that service cannot pass through TOPS. Likewise, mail notification, remote CLI, etc. only make it as far as the gateway PC. These functions require the execution of MS-DOS commands (among other things) that simply cannot be done on the Mac.

From: Mark Weber

To: David Down

At this point, I would be satisfied with using an MV as a file server for the Mac.

From: Doug Kaye

To: All

We would like to find *good* beta test sites for our newest product, PC/Remote. This product operates via asynch connection (direct or modem) and provides the following functionality:

- file transfer
- remote printing
- virtual disk service
- CEO and Wordperfect mail notifications
- remote CLI command execution
- terminal emulation (via Popterm/410)
- distributed electronic mail (via PC/Mail).

We are looking for five or six good sites that are willing to accept a product in its final phases of testing and development and for which the documentation is not yet complete.

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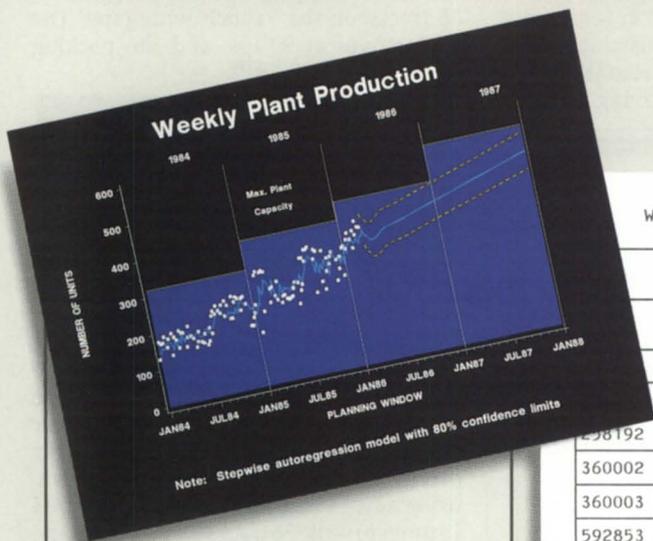

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Production Rate

| Rate | Lots Tested | Lowest | Highest | Mean | Percent |
|------|-------------|--------|---------|------|---------|
| 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 |

Megatape announces new backup drives and subsystems

Duarte, CA—Two new backup drives and subsystems have been introduced by Megatape Corporation. One is a high-capacity, high-performance drive using

the Megatape standard cartridge, and the other is a high-capacity drive using an 8 mm cartridge. Both are available in subsystems for use with Data General, DEC, Apollo, Sun, and other computers.

The MT-1500 provides a formatted capacity of 1.2 GB and a sustained data transfer rate of 764 KB per second. It can work on large systems having several

disks. It has a four-channel head that simultaneously writes four tracks of data to attain the transfer rate. Each channel is provided with 128 KB of cache buffer, and the head is stepped nine times to generate 36 tracks on the 1/2-inch wide tape. The tape moves at 90 ips, and the packing density is 26,600 FRPI.



A medium-performance version of the MT-1500 will also be available to provide a 382 KB-per-second sustained transfer rate and the same 1.2 GB capacity. This drive will write two tracks simultaneously using a two-channel head that is stepped 18 times to write 36 tracks on the Megatape standard cartridge. Tape speed and packing density are the same as the high-performance version.

The 8 mm GT-88 cartridge drive provides a capacity of 2.0 GB and writes data in the Exabyte format. The sustained data transfer rate is 246 KB per second. It has an eight-inch form factor and is available for tabletop or rack mounting. A 110/220 volt universal power supply is provided within each unit.

The MT-1500 is designed for mounting in a standard 19-inch rack and occupies 8 3/4-inches of rack space.

The MT-1500 high-performance drive is priced at \$19,500, and the medium-performance version is \$16,500 in single-unit quantities. Subsystems including drive, controller, cartridge, mounting hardware, FCC cabling, and installation are priced at \$26,900 and \$23,900, respectively.

The GT-88 drive with 1.25 MB of cache and a Pertec interface costs \$7,950 in single-unit quantities. Subsystems using the GT-88 are available from \$6,950 to \$8,950.

Megatape Corp., 1041 Hamilton Rd., P.O. Box 317, Duarte, CA 90101-0317; 818/357-9921. Δ

Circle 79 on reader service card.

RDS links PCs to MVs

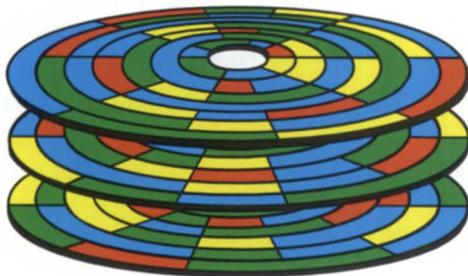
Corte Madera, CA—Rational Data Systems has announced PC/Remote, a software package for linking IBM PCs and compatibles to Data General MV computers via asynchronous technology.

PC/Remote provides the same function-

REORGANIZE DISKS IN PLACE,

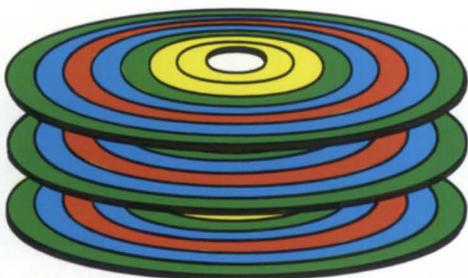
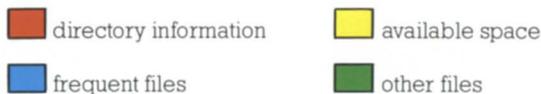
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DISK_PAK is a trademark of EAGLE Software, Inc.



Circle 29 on reader service card.

ality as the RDS existing LAN-based products, PC/VS and Netlink, but using modems or direct connections instead of local area network hardware.

PC/Remote provides the following facilities:

- virtual disk service
- remote printing
- file transfer
- remote CLI command execution
- CEO and Wordperfect mail notification
- a remote IPC interface for OEMs and VARs.

In addition, PC/Remote includes Popterm/410, Rational Data Systems' D410 terminal emulator (normally \$150) at no extra charge. This allows the user to easily switch back and forth between emulation and PC/Remote over a single asynchronous connection.

PC/Remote also supports PC/Mail, RDS's PC-based electronic mail software that is fully compatible with CEO mail. All log-on functions (including modem dialing, etc.) are controlled by PC/Remote script files. These scripts can be customized by nontechnical users for their unique environments. The script file language is based on the command language of Procomm, a PC-based communications program.

PC/Remote software resides on both the MV computer (\$800 to \$4,400, depending on CPU class) and on the IBM PC or compatible computer (\$195). The price includes Popterm/410. Another option includes PC/Remote, Popterm/410, and PC/Mail for \$295.

Rational Data Systems offers an unconditional, 30-day, money-back trial period to qualified purchasers of PC/Remote.

Rational Data Systems, 5725 Paradise Dr., Corte Madera, CA 94904; 415/924-0840. Δ

Circle 80 on reader service card.

SCIP announces add-on memory for DG MV/7800 processors

Beverly Hills, CA—System Controllers and Interface Products (SCIP) has started delivery of an add-on memory board that is compatible with the Data General expansion memories for the 32-bit MV/7800 and MV/7800 XP processors.

The MV780 memory uses high-speed CMOS 1 Mb DRAM technology. Less power is consumed by the MV780, so more +5 volts can be allocated for other uses. The MV780 memory incorporates only conventionally packaged ICs and memory chips. No surface-mount parts

are used, thereby allowing currently equipped depot repair facilities ease of repair and upgrade. Maintenance features located on the MV780 board edge consist of a deselect switch that removes the add-on memory from the system in order to eliminate uncertainty about a system problem source, plus two LEDs that indicate power on and memory selected.

The MV780 is offered in 2 MB increments, from 2 MB through 10 MB with delivery from stock to 30 days. The MV780 offers a lifetime warranty with no maintenance cost. A risk-free evaluation period is available.

SCIP, 449 S. Beverly Dr., Beverly Hills, CA 90212; 213/282-8700. Δ

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FOCUS ON: SERVICE AND SUPPORT

(from pg. 26)

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1010 Stewart Dr.

Sunnyvale, CA 94086

408/733-4400

Contact: Jane McGowan

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Hardware: all types of DG hardware

Peripherals: all types of DG peripherals

Service area: United States, Canada,

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West Linn, OR 97068

503/656-9971

Contact: David Moyle

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Hardware: none

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Hardware: Novas and Eclipses up to the

S/140s. No MVs

Service area: New York City-New Jersey

metropolitan area and New York state

NE Computer Repair Specialist

30 Brandeis Ln.

Plymouth, MA 02360

617/759-9356

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nications

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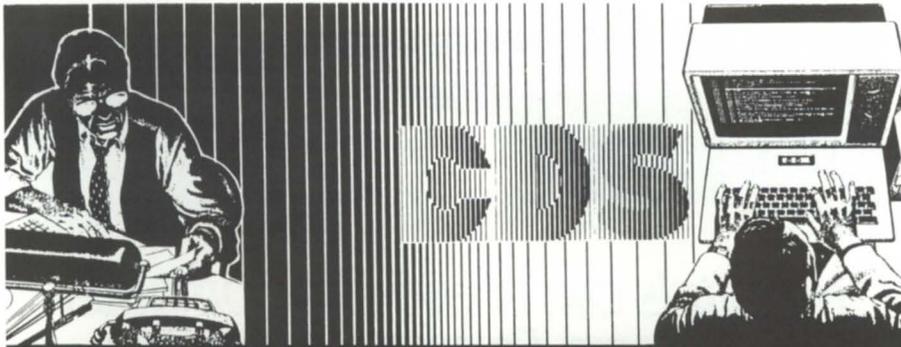
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Peripherals: entire line of peripherals
Service area: California, Arizona, and Oregon

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Hardware: all DG hardware
Peripherals: all DG peripherals
Service area: nationwide

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Gaithersburg, MD 20879
800/922-9620

Contacts: Bob Guilliams and Bob Montgomery

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Hardware: Novas, Eclipses, and MVs, except the MV/20000

Peripherals: all DG peripherals
Service area: 22 states

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14600 Goldenwest, A101
Westminster, CA 92683
714/895-2229

Contacts: Alan Barkshire, Jim Samuelson, and Toni Steinhoff

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Hardware: Novas, Eclipses, Desktops, MV/4000s, MV/8000s, and MV/10000s

Peripherals: printers, disk drives, tape drives, and CRTs

Service area: California only

Xyrtin Xolutions

3322 Industry Dr.
Long Beach, CA 90806
213/597-2317

Contacts: Karen Flynn and Brian Neal

Services: on-site and depot services. Cov-

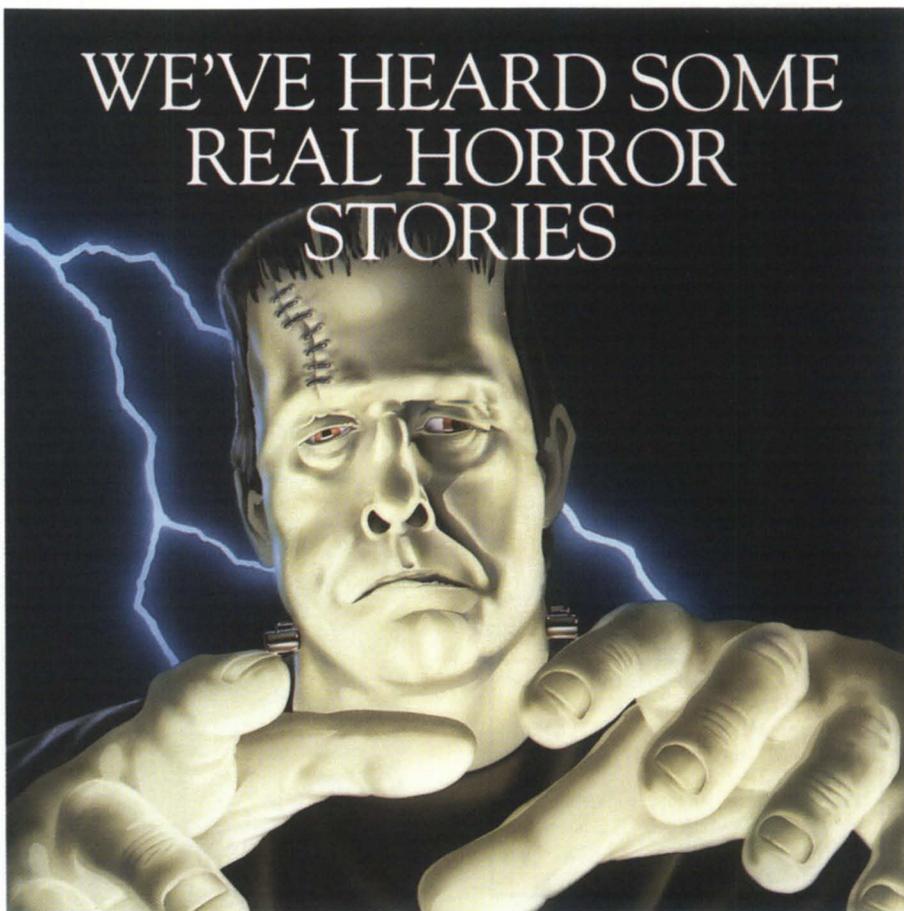
ers multivendor environments, extended hours, and on-site field engineers.

Hardware: micro Novas, micro Eclipses, Eclipses, Desktops, and MV series

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Greg Farman or Carolyn Kelly (please send product announcement to the address listed below)
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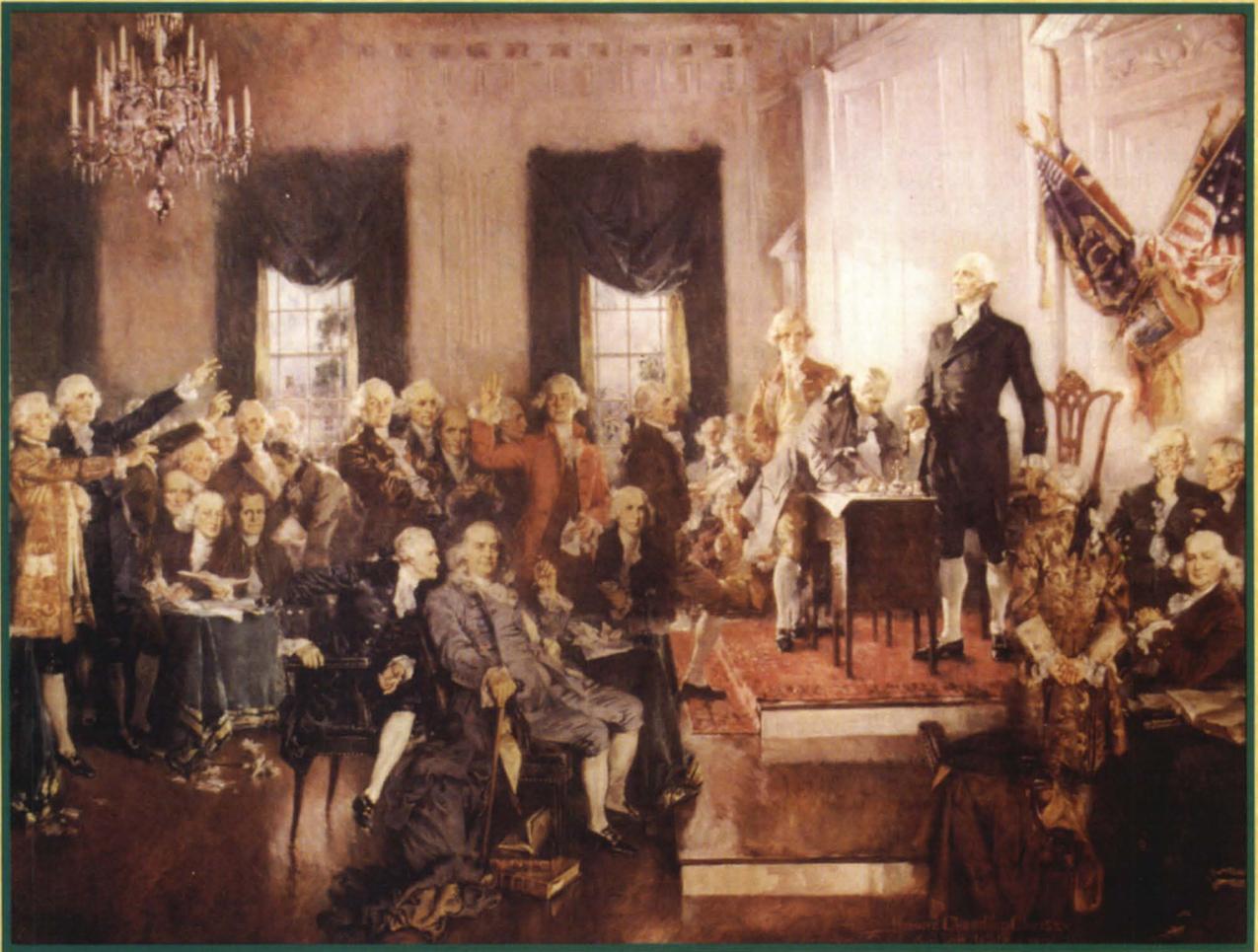
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Because it's time. That was reason enough for the people who worked out the details of Bitnet, the worldwide network of academic and scientific computer systems. Dr. Richard Kouzes described Bitnet in the December 1986 issue, but *Focus* continues to receive questions, and we hope to include another article in the near future. In the meantime, anyone interested in Bitnet for DG can contact Romayne Bernitt, UREP, 333 Whitmore Lab, Pennsylvania State University, University Park, Pennsylvania 16802 (814/865-9505). UREP (Unix RSCS Emulation Program) is a communication package using the Bitnet network. It has been ported to AOS/VSand is available for approximately \$850.

Data Safe Corporation has established a data center in Atlanta that currently has an MV/10000. Based in South Carolina, Data Safe provides contingency planning and backup computer services for Data General sites. Seven companies are currently supported by the data center in Atlanta.

Grumman Systems Support Corporation of Woodbury, New York, has established a repair depot in Gaithersburg, Maryland. The new depot will service PCs, tape drives, printers, and other small units, as well as provide printed circuit board validation, repair, and on-line quality assurance checkout.

Data General and the Online Computer Library Center (OCLC) have signed a new three-year contract estimated to exceed \$20 million for DG Eclipse MV computer systems and upgrades. OCLC's library automation software operates on the full line of DG 16- and 32-bit minicomputers. Their LS/2000 System is a turnkey local library automation system, including an on-line search catalog, circulation, file, bibliographic, administrative, and serials control.

An old friend to Data General, Allen-Bradley, has entered an agreement for DG/One model 2Ts that could reach \$20 million during a four-year period. The contract will result in a new Allen-Bradley programming terminal product, the 1784-T45 portable terminal, based on the DG/One. First shipments have already begun.

According to Terry Bennett, director of Manufacturing Industries Marketing at Data General, "Data General will produce a 'private branded' version of the DG/One model 2T to be used as a program-

ming terminal for Allen-Bradley programmable logic controllers. The T45 will contain special interface boards developed and manufactured by Allen-Bradley, and it will bear the Allen-Bradley name and logo."

You'll know them by their tans. Data General rewarded more than 300 of its top sales representatives by sending them to St. Thomas to attend the 16th Million Dollar Club for three days of meetings and workshops.

The Club provided members with information about Data General product and business strategies to help them sell DG computers. DG president Edson de Castro and other executives sacrificed some time to make it down for the event.

Compuplan International recently purchased its major competitor in the Dallas area. The acquired firm, NPA Systems of Texas, was a third-party maintenance company servicing Data General and compatible peripherals. The acquisition will enable Compuplan to service the entire 16-bit line and most of the 32-bit line of computers, up to and including the MV/10000s in the Dallas area. Compuplan had been servicing the 32-bit line of DG systems through its affiliated office in Chicago.

Plans have been finalized for "The DG Networks Colloquium" to be presented by Data General Educational Services in Costa Mesa, California, June 20 to 22. Members of the development team responsible for creating DG's networking products will attend the three-day colloquium to address the following topics:

- DG/PC*I enhancements and directions
- network management
- ISO communications
- terminal services
- IBM-compatible networks
- X.400.

To pre-register, call Educational Services at 617/366-2900. The cost is \$1,495.

The only "fully commercial" connection between public and private networks was on display in Chicago the latter part of March at Interface 88 when Data General's DG/X.400 electronic messaging service was connected to the Telemail 400 global messaging service. DG/X.400 is fully integrated with DG's CEO office automation software. With DG/X.400 systems, CEO users can send messages and docu-

ments to users on other X.400 systems, even if those systems are from different vendors.

Drumming up DRAMs (dynamic random access memory chips) has become a concern to computer companies as shortages are causing some slowdown in production. According to Jim Craig, corporate semiconductor purchasing manager, Data General has been keeping the shortage in check. So far, DG has been able to get all the 256 KB and 1 MB DRAMs necessary to continue production on schedule.

As a precautionary measure, "We have stepped up our communication with senior-level people at the companies that produce DRAMs. We have been successful thus far because we have longstanding relationships with our vendors," Craig said.

A gathering of eagles, Grey Eagles, that is. More than 200 of them met recently for their annual get-together as the unofficial alumni of Data General. Membership of this group of ex-DG employees is around 500, and represents numerous computer companies. Guests of honor were DG founders Edson de Castro, Herb Richman, Dick Sogge, and Henry Burkhardt III. Sogge and Burkhardt are no longer with Data General.

Service & Training, Inc. has been awarded a contract by the Kaiser Foundation Health Plan of the Mid-Atlantic States for remedial and preventive maintenance on the Data General computer systems at its major facility in Washington, D.C. Kaiser is an HMO.

The facility supports six satellite offices with the systems, made up of five DG computers, including MV/6000 and MV/10000 models, plus associated tape and disk drives. In addition to contract maintenance, Service & Training will install communications cabling and provide rewiring for the systems.

The Compucare Company and Sysgen Recovery have entered a joint agreement to offer contingency planning and hot site services to hospitals utilizing Data General computer systems. Compucare, which provides DG-based information systems for the health care industry, and Sysgen consultants will join forces to develop hospital-specific, custom disaster recovery plans. Δ

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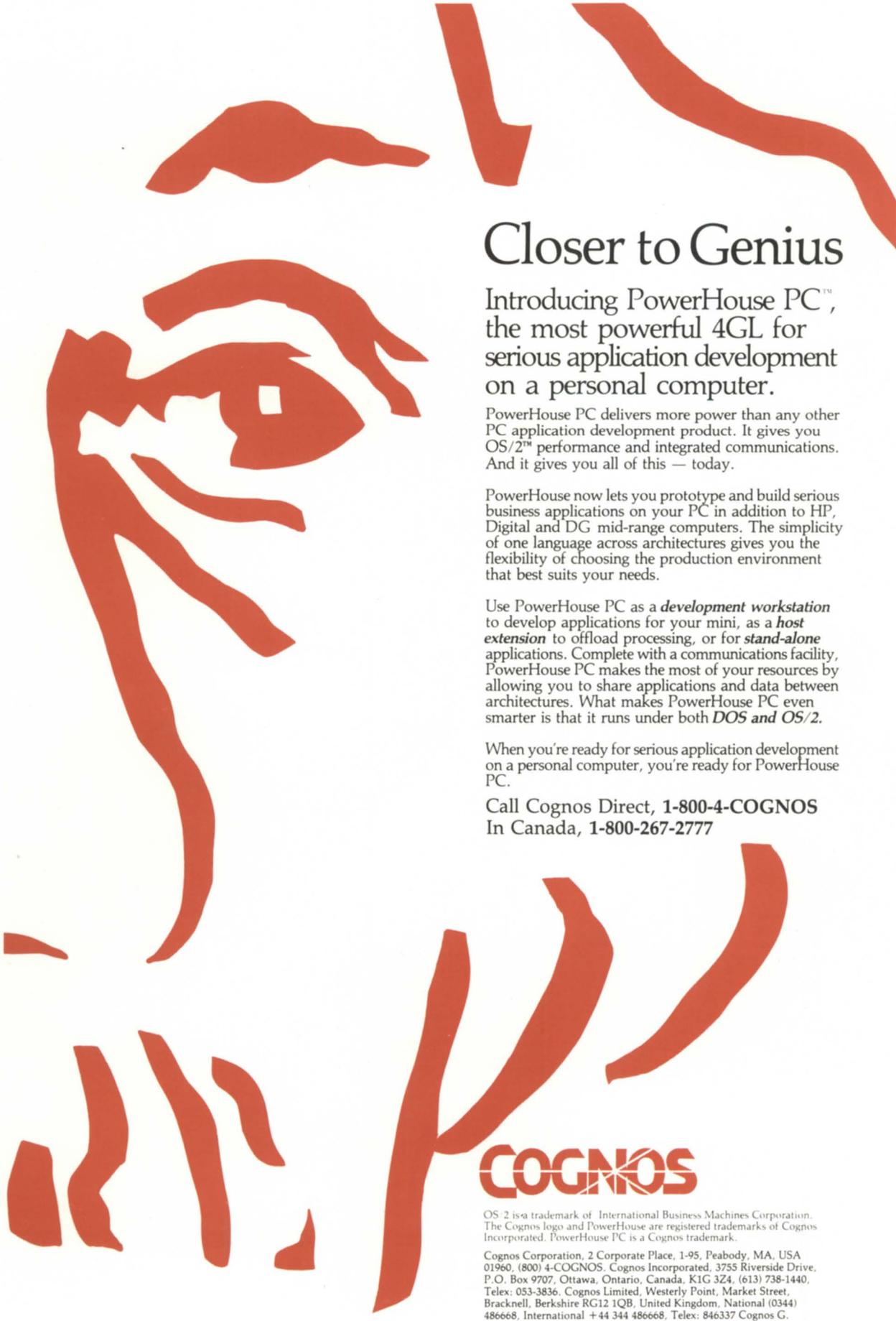
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