November 1988

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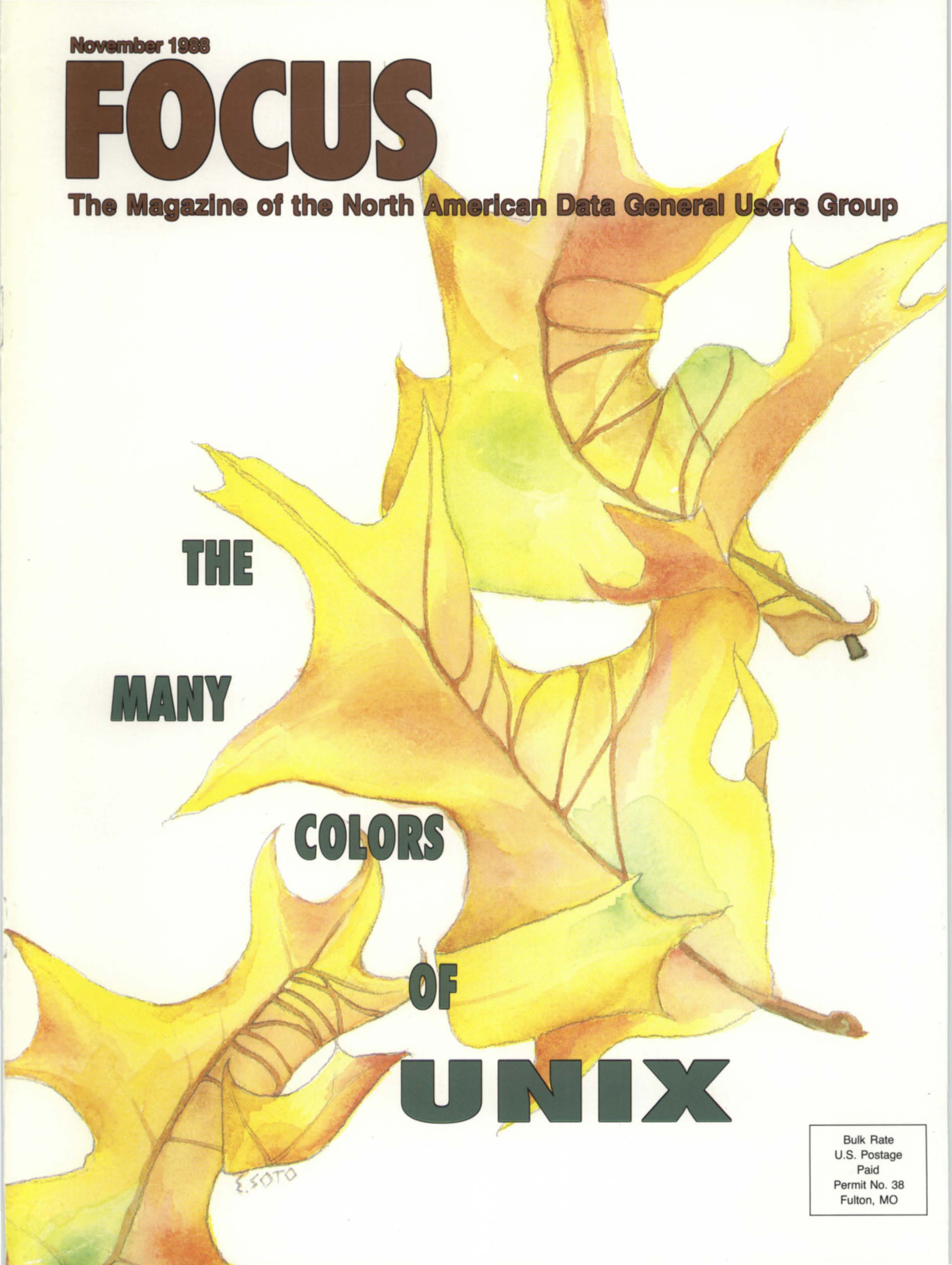
The Magazine of the North American Data General Users Group



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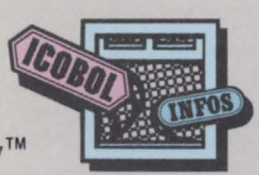

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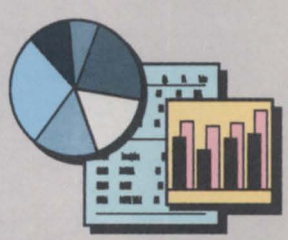

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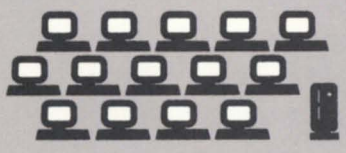

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Cover design by E. Soto.

Focus, the Magazine of the North American Data General Users Group (ISSN 0883-8194) is the official monthly publication of the North American Data General Users Group (NADGUG) in cooperation with Turnkey Publishing. Editorial and business offices are located at Stillhouse Canyon Office Park, 4807 Spicewood Springs Road, Suite 3150, Austin, Texas 78759, phone 512/345-5316. NADGUG headquarters are located at NADGUG, c/o Data General Corporation, 3400 Computer Drive, MS C-228, Westborough, Massachusetts 01580.

Postmaster: Send address changes to Subscription Department, Turnkey Publishing, Stillhouse Canyon Office Park, 4807 Spicewood Springs Road, Suite 3150, Austin, Texas 78759.

Focus Magazine is distributed to members of the North American Data General Users Group. Membership fees: Individual members–$30 per year, installation members–$100 per year. For all memberships outside North America, add $50 to defray costs of mailing. For information on NADGUG membership, call 508/898-4067. Address all other correspondence to *Focus* Magazine, c/o Turnkey Publishing, Stillhouse Canyon Office Park, 4807 Spicewood Springs Road, Suite 3150, Austin, Texas 78759.

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Hold onto your hat

NADGUG's growing with gale forces

by Donald W. Clark
NADGUG president

I can't think of a better way to begin my first letter to the NADGUG membership than this: Hello!

I especially want to welcome those of you who are new to the organization. Judging by the crowds at the conference just finished in Philadelphia, there are quite a few of you. It was easily the biggest conference we've ever had.

I'm still not sure what got me elected as NADGUG's president, but you can forget all the jokes about being out of the room when the Nominating Committee met. NADGUG has an unusual way of filling its officer posts: nobody ever votes for a president. Instead, we elect a vice president, who then becomes president the following year.

That means I had a whole year to think about it while I was vice president. I saw how hard my predecessors worked in this position, and I suppose I could have backed out. Since I'm not usually a glutton for punishment, I have to ask myself why I didn't?

There could be a lot of answers, but it all boils down to this: I believe in the organization. I've been coming to our annual conferences and Executive Board meetings ever since 1983, when we met in Toronto. At that time, I was just getting started with our DG system, and the regional interest group in my area was proving to be a big help. The national organization was a good way to meet a lot more people with similar interests, and the best place to get the inside information that would help me with my job.

Getting through the Executive Board meetings wasn't always a lot of fun—sometimes the discussions put out a lot more heat than light—but we always knew that we were working together on something that was worth doing for all of us. That may be more true than ever now.

During the years I've been working with NADGUG, I've seen four of your presidents putting a lot of the pieces together that have finally brought us to where we are today. Each of the conferences I've been to has surpassed the one before it in size, activities, and value for the people who came. During that time, NADGUG has doubled in size, and is no longer in danger of falling apart if somebody turns their back. On the contrary, with so many of the pieces in place, NADGUG is about to enter what I think will be a phase of explosive growth.

Two of the pieces slipped into place at the conference we just came back from. One of them was incorporation. When we were unincorporated, NADGUG couldn't make a contract unless the officers signed on the dotted line and accepted personal responsibility. Obviously, that had been keeping some of our members from getting involved. Besides that, we were getting too big and too active to leave our leaders exposed to that kind of risk.

The other piece was deciding to take on the responsibility of having our own staff to handle membership and RIG/SIG development. For as long as I can remember, Data General has been providing NADGUG with almost everything we need: office space, computers, personnel, supplies. We couldn't have gotten this far without their help, but it was time for us to start shouldering a bigger share of the responsibility. After all, it's an organization of users, for users, and by users.

Our growing autonomy doesn't mean that we expect to be absolutely independent of DG. Both sides have too much to gain by our continuing interdependence. Knowing that we want to continue a close relationship, and not wanting to stretch NADGUG's resources too thin, we've been building our own staff very gradually. We started with an experimental position for a half-time co-op student to provide support help for the RIGs and SIGs. That turned out to be so successful that we will continue it, and we'll also add another part-time position to manage updates to our membership data base. In the future, if funds permit and needs warrant it, we will consider adding other staff positions.

In the meantime, I think you can expect a lot of growth and excitement in the areas that we've already gotten under way. It should be an exciting year—hold onto your hat. Δ

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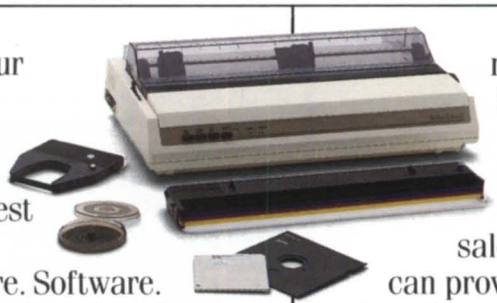

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Sympathy for the spin doctors

Does the PR person have socially redeeming value?

Whether or not the campaign debates between George Bush and Michael Dukakis cast any light on the fitness of the presidential candidates, they at least provide an indicator of how the candidates and the media view the voting public. They pitch to us what they think we like. Given the sophistication of their polling techniques, they're probably right about us—and it's not a very flattering view.

H.L. Mencken once said that nobody ever went broke underestimating the intelligence of the American public. The noted columnist and curmudgeon wrote in the first half of this century, so the media's jaundiced view of the public isn't new.

Of course, Mencken also had something to say about the media: "All successful newspapers are ceaselessly querulous and bellicose. They never defend anyone or anything if they can help it; if the job is forced upon them, they tackle it by denouncing someone or something else."

Ouch! Score a direct hit for Mencken. I set out to defend the role of public relations specialists, but I couldn't do it until I warmed up by denouncing the candidates, the public, and the media.

What brought this all to mind was the fatuous way that television network news anchors dealt with the candidates' "spin doctors" after the debate. Eager to get back to the Olympics, NBC's Tom Brokaw smugly noted that the PR types were working hard to shape how the media would perceive and report on the debates. The other networks' anchors introduced the candidates representatives as "spin doctors" but then allowed them to talk at length about why they thought their candidate had won. An interviewer asked a reporter for the *New York Times* whether the spin doctors would be able to shape the final story. He answered that newspeople used to throw spinners out of the press room, because they interfered with the work; now they allow them to stay but don't pay much attention.

The media people were disdainful of the PR people, but clearly depended on them more than they cared to admit. It's a strange relationship. Reporters depend on PR people to arrange interviews, get quotes and background information, and point out fresh angles that might otherwise go unnoticed—yet they resent and mistrust them for trying to shape a story. The PR people's livelihood depends on persuading reporters to pay attention to a story and give it a wider audience—yet they don't trust the reporters to get it right.

The same is true—perhaps even truer—for the computer press. PR specialists don't trust reporters, thinking with some justification that the majority of them haven't a clue what they're writing about. And the writers don't trust the PR people, thinking—again with some justification—that most PR people couldn't spot a good story if it slapped them in the face.

Consider all of that a backdrop for the announcement that hit *Focus*' mailbox last week. It was an invitation to join Edson D. de Castro "and other Data General senior executives on Monday, October 3, in New York City for a most important product, technology and strategic announcement." The invitation promises "one of the most important public statements in our 20-year history. We will significantly extend the competitive status of a Data General product portfolio that has fueled our growth since 1980. Embodied within this announcement is a technology direction I feel will set our pace and lead the industry into the turn of the century."

You have to ignore the hyperbole; it's just a necessary part of the PR person's art. If you cut through the hype, there are enough hints to let you conclude that DG is adding new members to its MV family—probably the rumored MV/40000. Moreover, there's some kind of new twist to these products—perhaps an answer to the VAX cluster concept. In other words, it's probably worth covering.

Despite the nice things I almost said about PR people, I have to say that the timing of this announcement is terrible for *Focus*. The November issue goes to the printer on September 29. To get any coverage of the new products in this issue, we will have to hold page 6 open and fill it just before the plates go on the press. There's also the matter of a Sunday flight to NYC and a return flight late Monday night. That's a lot of trouble. You'll have to judge for yourself whether the coverage is worth it. If it isn't, you can count on this: my next comments about the PR profession won't be so kind.—G.F. Δ

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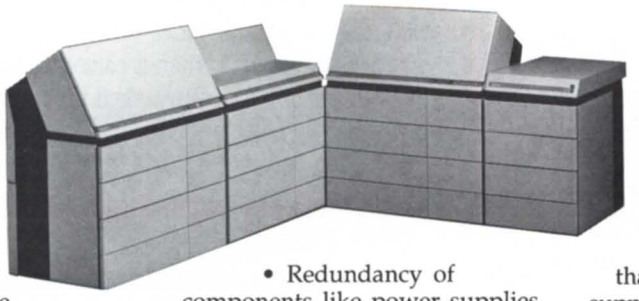
Riddles of the Sphinx



As Sophocles told the story, a hideous beast called the Sphinx was ravaging the city of Corinth. The only way for Oedipus to save his city was to solve the Sphinx' riddle.

A hideous beast probably wasn't what DG had in mind when they tagged their latest product with the code name "Sphinx." It's a good place to start talking about the new product, though. When DG unveiled its Sphinx project to a roomful of reporters and analysts at New York's Plaza hotel on October 3, it didn't just take the wraps off a new generation of hardware. It also offered clues to several riddles that had been troubling users.

Riddle #1: Is DG serious about its pledge to add aggressive new products to its proprietary MV series at the same time it moves into the industry-standard Unix market? Based on the Sphinx announcement, the answer is an unqualified yes.

DG President Edson D. de Castro introduced the new products as the fourth generation in a family that started in 1980 with "Eagle," the MV/8000. Since then, there have followed the MV/10000, MV/20000, and now the MV/40000. With each generation, the goal has been to offer twice the performance of the previous machine at less than twice the price.

That strategy continues with the Sphinx. Actually, Sphinx comes in two versions—a "plain" single-processor machine that uses the traditional MV internal I/O architecture and handles about 14 million instructions per second, and the MV/40000 HA, which supports up to four symmetric multiprocessors and boasts execution speeds of up to 50 MIPS. Both versions share a slanted cabinet that looks something like a hotel ice machine, but is designed for cooling efficiency and ease of service.

The "HA" stands for high availability, which according to product manager Ron Lloyd translates to well over 99 percent uptime. For target applications like transaction processing, "99 percent isn't nearly good enough," Lloyd said. Some of the features contributing to reliability are:

- Instruction retry, a feature not available with any other superminicomputer. When a transient error causes an instruction to fail, the system automatically rolls back to an earlier state and tries again.
- Redundancy of components like power supplies, cooling units, and battery backup.
- The Independent Diagnostic Processor (IDP), which runs on-line diagnostics on key components without interrupting operations, and enables replacement of components without shutting the system down.

The MV/40000 HA can be configured with one, two, three, or four processors (models 1, 2, 3, and 4). MIPS ratings are 14, 27, 41, and 54, respectively.

While acknowledging all the difficulties inherent in using benchmark data to compare machines, Tom West, DG's vice president for product development, nonetheless dared to compare the MV/40000s to DEC's top-end machines. Using six different benchmark tests, West pointed to a consistent pattern with the MV/40000s delivering about twice the performance of the comparable VAX 8810 models—with very substantial price advantages.

The "plain" MV/40000 supports up to 128 MB of memory, and I/O bandwidth of 37 MB per second. The MV/40000 HA supports up to 256 MB of memory, and 60-MB-per-second I/O bandwidth. Both have a 50 nanosecond cycle time.

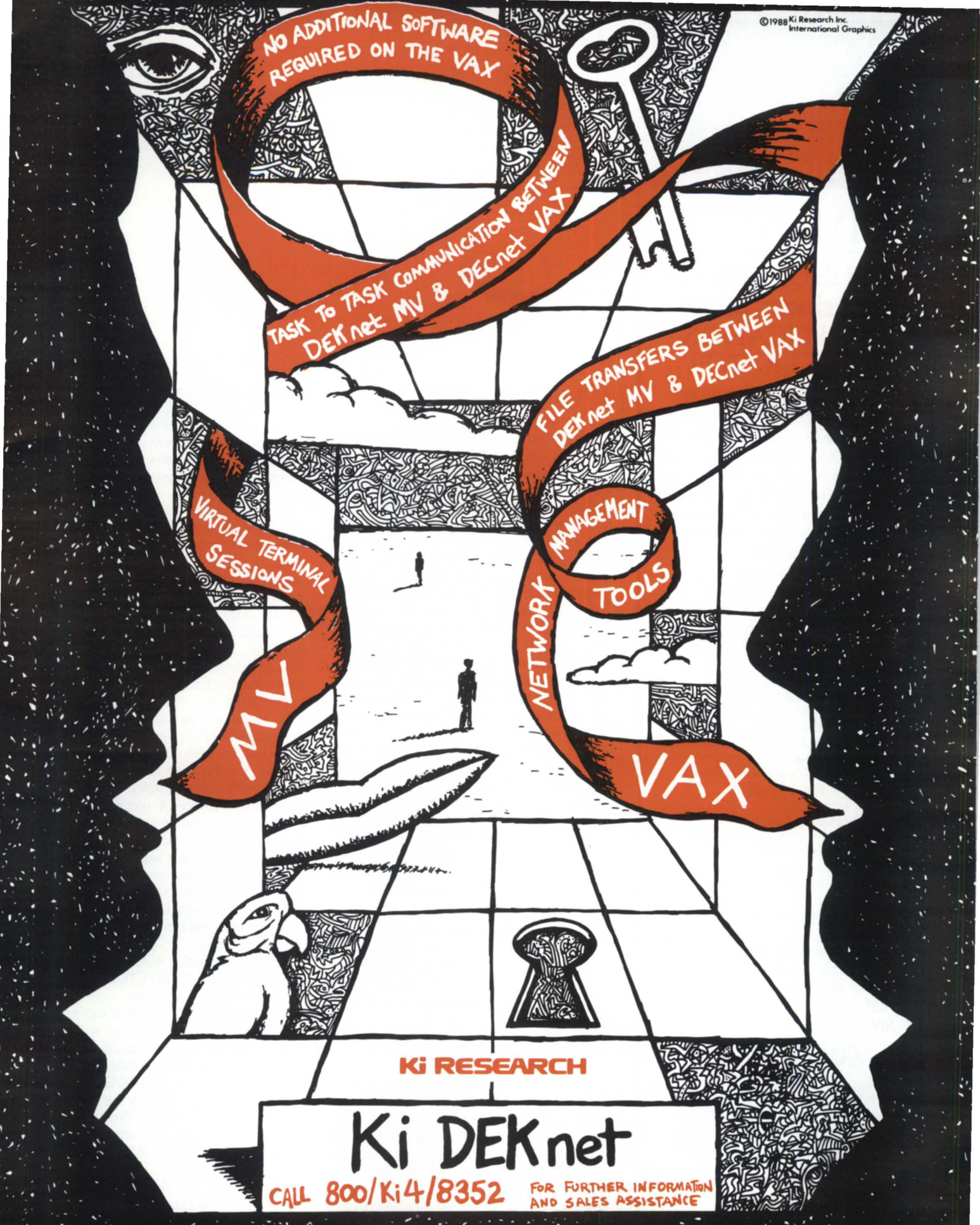
Riddle #2: How will DG answer the challenge of DEC's VAX Cluster? The other piece of hardware DG introduced is the MRC, for Message-based Reliable Channel. Topologically, the MRC looks like a VAX Cluster, but it does more. Offering an I/O bandwidth of 400 MB per second, the MRC is intended to serve as an I/O subsystem for groups of MV systems. While reporters and analysts looked on, an operator first simulated a failure of a system controller, then the addition of a disk drive, while the approximately 70 terminals on the audience's tables continued operating. The MRC's modular design and fault-tolerant capabilities could allow a network of MV systems (including earlier generations) to continue running despite failures of individual systems or peripherals attached to the MRC.

Riddle #3: How will the unbundling and separate pricing of AOS/VS and AOS/VS II affect current customers? This is a complicated topic that can't be covered adequately in the space available this month. For the time being, perhaps it's enough to know that AOS/VS and VS II are now distinct supported products, and that the operating system is now sold separately from the hardware. (Hardware prices are somewhat lower now, so the total system cost remains about the same.) In addition, current users of AOS/VS who want to upgrade to AOS/VS II can get a 70 percent discount. *Focus* will address this topic in considerable detail next month.

Riddle #4: Will this be enough to lift DG from the doldrums of the past three years and reestablish the company as a leader in the minicomputer field? Perhaps. The Sphinx announcement puts DG back in front with the best performance and fastest processors in the minicomputer market. Moreover, the prices quoted on the machines are aggressively low. To the extent that the market pays attention to price/performance, that should help establish DG's leadership credentials.

It didn't hurt DG's position to be able to point to $30 million worth of orders for the new systems on the day they were announced. Several of the buyers were present to talk with reporters about their reasons for selecting DG. The largest was STNA, the Technical Service Department of France's air traffic control organization, which will install $20 million worth of MV/40000s over the next several years. This will move DG into the leading spot as a supplier of air traffic control systems outside the United States.

Raymond Fortune, senior vice president of Worldwide Sales and Marketing, said the new products would significantly improve DG's revenues. While acknowledging that sales of the MV/20000 had failed to meet the company's expectations, he argued that the price and performance of the MV/40000 would be hard for the market to ignore. He said customers will see the new products as a clear indicator that the company intends to extend the MV line and give current customers someplace to go when they outgrow their current systems.—G.F. Δ



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LETTERS

Engine troubles

We are using an MV/4000 with 4 MB of memory and three 277 MB removable disk packs. One of these is a CDC drive model 9766 on a 3400 model controller from SI at port 67. The other two are DG drives model 6122 on a Vulcan model controller from DG at port 27.

Things were going fine (relatively) until I attempted to install AOS/VS 7.0 and above. I can do so successfully from the DG drive on the DG controller at either port 27 or 67. However, if I install the system on the CDC drive and its SI controller from either 27 or 67, the SYSBOOT hangs (although the installation, etc., goes through perfectly). A 354 MB Winchester on a Spectra controller at another installation does fine with AOS/VS rev 7.0 and above. We have tried every trick to no avail. DG at Singapore told us they "do not know anything" about CDC drives on DG computers with SI controllers yet. But the whole show would go through if I used rev 6.06 SYSBOOT. The documentation for rev 7.0 specifically prohibits this, so I had to ^C^B. Please suggest some solutions other than change of H/W.

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Off the mark!

Attendees' expectations were sorely misled at the recent NADGUG 88 Conference. "ICOBOL in the Age of Micros" was billed as a *management* seminar that would "discuss the present and future abilities of ICOBOL to assist in the integration and expansion of the DG/PC interaction." Instead, attendees found themselves an audience to Gerry Manning's ICHOST sales presentation.

Since no time was extended for a question-and-answer period . . . I [want to] correct some of the false assumptions and statements made about Wild Hare's products.

In a responsible discussion of expanding the capabilities of ICOBOL, any fair commercial product comparison should include the pertinent goals, design philosophies, and characteristics of each product. Unfortunately, Mr. Manning chose only one criteria—speed—and emphasized his own product's faster runtime. . . . Equally significant user interests of portability, range of product features, support considerations, extended capabilities, etc., were never addressed.

In addition, the relative performance programs benchmarked in his handouts were not run with current versions of our Choice! products. In fact, no version details were listed. . . . Choice! was rewritten in assembler for the PC computer series to increase its operating speed. This would have substantially affected the information presented at the seminar.

Mr. Manning also overlooked the main point of Wild Hare's Choice! product line. Choice! was designed to provide ICOBOL portability to the broadest range of computers possible, . . . including PC/MS-DOS, PC networks, Unix, Xenix, VAX/VMS, IBM AIX, CTIX, CTOS, MCS, and other proprietary systems. . . .

I found the commitment of this conference to provide the DG user with valuable, accurate product information seriously lacking in this instance. I hope that in the future *Focus* and NADGUG will extend equal opportunity for collaborative vendors to discuss their products' role in expanding the world of DG's number one language, ICOBOL.

Bruce Ray, president
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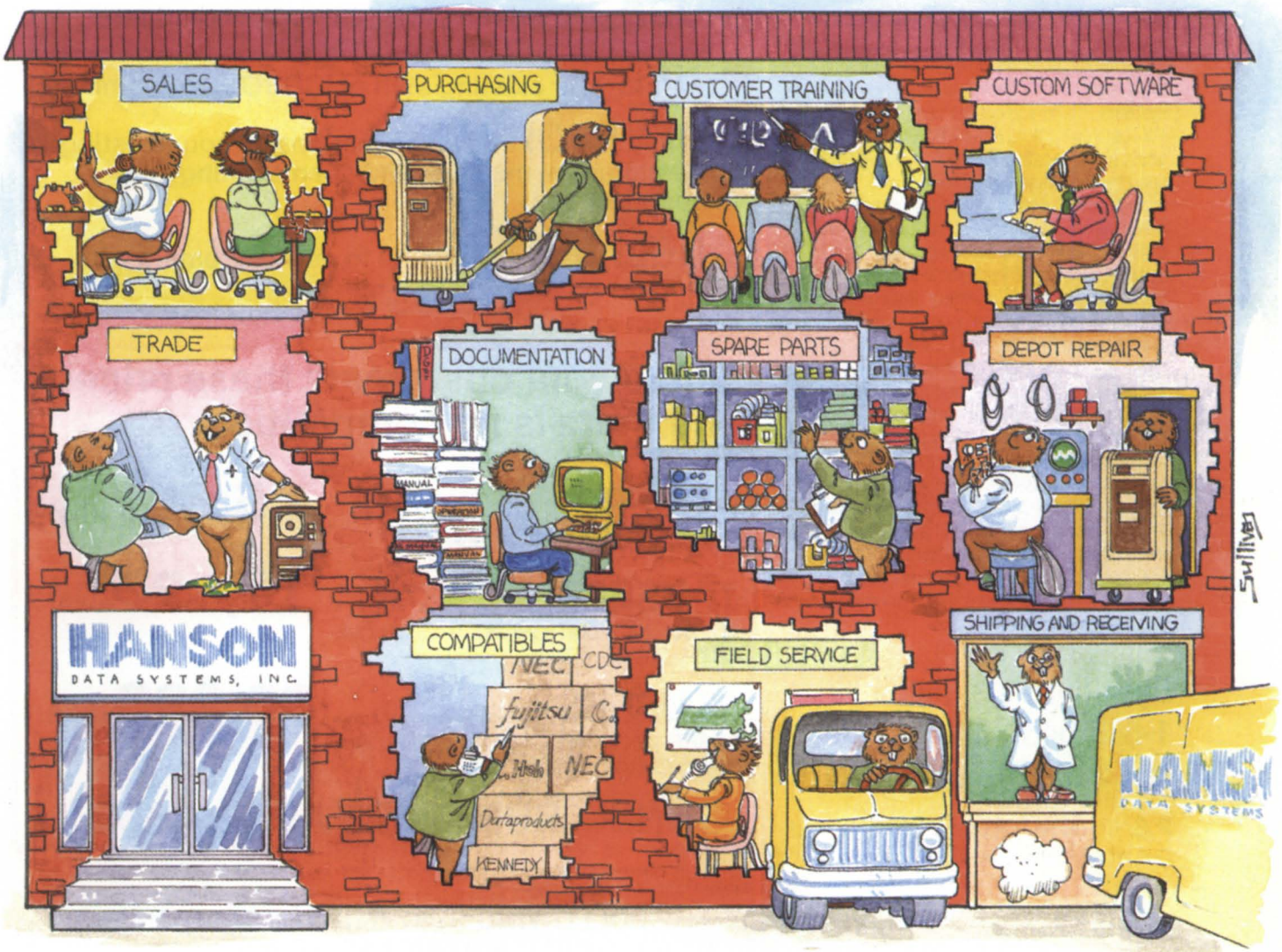

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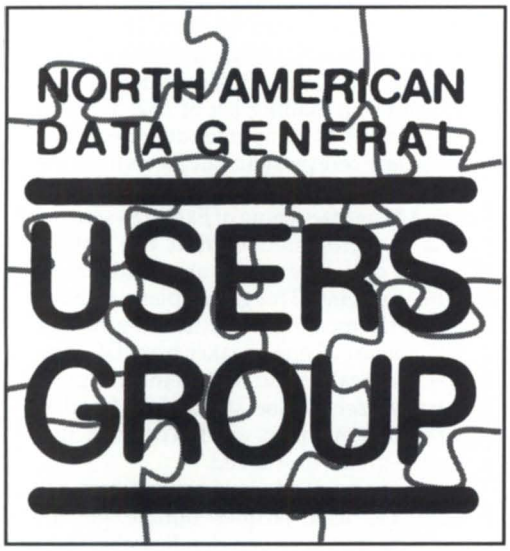
News from NADGUG and its affiliates



Conference 88 put the last pieces of the puzzle in place

by Cathlene Gentry
RIG/SIG coordinator

Conference 88 was indeed a place "Where Great Ideas Begin," especially where regional and special interest groups were concerned. As RIG/SIG coordinator, I attended the Executive Board meeting, along with the NADGUG officers, committee chairpersons, and the representatives of most of the regional and special interest groups. The RIG/SIG Committee was represented by Paul Duck, RIG/SIG chairperson; Jan Grossman, RIG/SIG vice chair for the eastern U.S.; and myself. Each of us reported on our activities and the status of the RIG/SIG program. Three groups applied for recognition at the meeting. Recognized were the Tri-State Area Data General Users Group (TADGUG), representing Delaware, New Jersey, and Pennsylvania; the Cleveland group (NO DG BS, which stands for Northern Ohio DG Business and Scientific RIG); and the Music and Recording Industry Special Interest Group.

The RIG/SIG luncheon, held the first day of the conference, was open to all the RIG/SIG chairpersons. Most groups were represented, but unfortunately, some weren't. These groups should send a report to the RIG/SIG Committee. The chairpersons in attendance were treated to lunch and then asked to give their reports. I got to hear firsthand how all of the groups were doing. It seemed to help the chairpersons to exchange ideas with other group leaders. Several good suggestions for the RIG/SIG program came out of this luncheon, and from people gathered at the NADGUG booth. One idea is for group chairpersons to share newsletters with each other. Another topic of discussion was having member software available to the groups, startups as well as existing ones.

Another recommendation is for older, more established groups to get new people involved by doing a mailing to all the users in the area with the names coming from the most current source available. I requested that each of the groups keep my name on their mailing lists, send me newsletters, and keep me informed of meeting dates and times.

Attending the board meeting, RIG/SIG luncheon, and the conference itself proved to be the last piece in the puzzle of what NADGUG really is and who the people really are. And the people really are great!

■

The conference was a beginning place for three groups. The Tri-State Area Data General Users Group had their first organizational meeting Monday afternoon, and met again on Wednesday for a lunch meeting. The group elected officers and voted on and accepted their bylaws. The officers are Lee Locke, president; Ken Atlee, vice president; James Linville, treasurer; and Ann Malley, secretary. Interested DG users in the tri-state area should attend the meeting or contact Lee Locke at the Philadelphia Corporation for Aging, 111 N. Broad Street, Philadelphia, Pennsylvania 19107, 215/496-0528.

The SM BASIC special interest group also had their first meeting at the conference. Paul Duck, RIG/SIG chairperson, started the meeting by explaining how a special interest group benefits users, and how NADGUG can help these groups. After the group elected officers, Ken Smith, the new president, took over the meeting. There were about 20 interested individuals present. The group accepted bylaws and set up a Publications Committee to publish a quarterly newsletter. If you want more information on this newly formed group, contact either Ken Smith or Rich Iceman, both of McGean Rohco, 2910 Harvard Avenue, Cleveland, Ohio 97209, 216/441-4900.

WPSIG, the new Wordperfect special interest group, also had its first meeting at the conference. Its aims are to provide a forum for users of Wordperfect products and to exchange information with Data General and Wordperfect Corporation about all of its products regardless of the hardware they run on.

At its first meeting on September 1, 1988, bylaws were adopted, annual dues of $5 were collected, and a slate of officers was elected. They are Gary Lindner, president/treasurer; Richard Rocuant, vice president; and Mort Kahl, secretary. Anyone interested in joining should contact Gary Lindner at Colonial Parking, 2145 K Street, N.W., Washington, D.C. 20037, 202/965-5800.

■

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Attend the next bimonthly meeting of ***ADGUG*** *to be held in late November. Contact Randy Smith at Lakeshore Hospital, 3800 Ridgeway Dr., Birmingham, AL 35209,* ***205/868-2404****, for details.*

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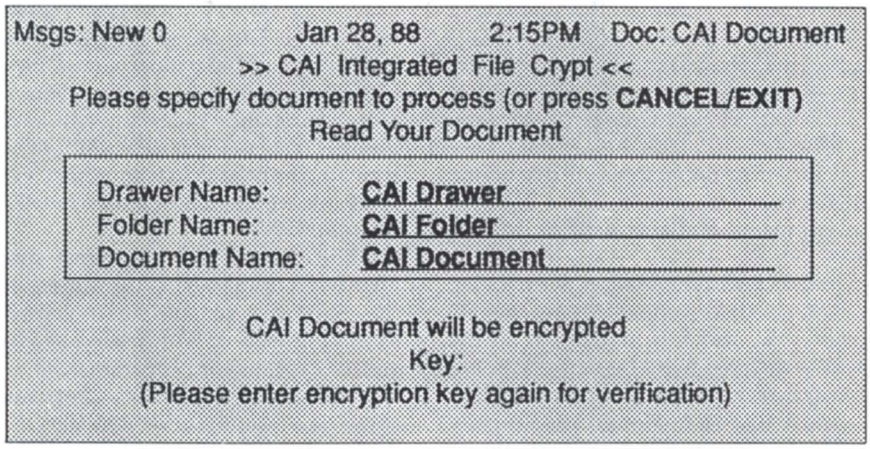

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Although the conference was sponsored by the North American Data General Users Group, several other countries were represented. Among these were the U.K., Sweden, France, and Belgium.

Joel Moisse attended the conference in order to get ideas for the users group he is attempting to start in Belgium. The group, known as BUDG (Belgium Users of Data General), held their first meeting on June 21. Out of a mailing list of 252, 50 users from about 30 companies attended. Two speakers were present; Luc Steels from the University of Ghent gave a presentation titled "The Deepening of Expert Systems," and a representative from the Arthur Young company spoke about advanced office systems. The group plans to have quarterly meetings. The meeting format will consist of one speaker from DG, one special speaker, and one member reporting on a user site. Joel stressed the fact that all of their members will have to be active for the group to succeed.

The group started when Joel and another DG user, Jacques Tamine, got together with Stany van den Bassche, their Data General representative. They sent out surveys to test the interest in the area. The mailings for this group tend to be more difficult, because they have to contend with members who speak three different languages: French, Dutch, and English. The surveys uncovered the need for special interest groups under the bigger user group. Four SIGs where decided on, the Office Automation SIG, the Communications SIG, the Operating Systems SIG, and the Fourth-Generation Language SIG. They are expecting each SIG to have fewer than 15 members and to work without a budget.

BUDG has several goals. For the short term, they want to have the maximum number of members attending each meeting. They also want to have active SIG groups. Selecting topics that aren't too technical is a challenge for the Executive Board when planning the meetings. Eventually the group wants to be independent from Data General. They would also like to see an informal European users group form among countries such as Sweden, Germany, France, and the U.K.

NADGUG's Conference 88 offered many lessons to Joel about starting a group. He was impressed with our RIGs and SIGs that send out newsletters, because he believes a newsletter is the best way to get information out to members, especially since BUDG will only be meeting quarterly. He also learned that although it's important to have key people in positions who will work and be active, it's better to

have them change positions on an annual basis in order to get as many users as possible into leadership roles.

After sitting in on the NADGUG Executive Board meeting, Joel said he learned that it is better not to have too large an Executive Board. He thought having a smaller group of people making the decisions would have saved time. He said the main difference between the Belgium group and the North American group is the absence of any VAR activity. Their group is comprised of users who buy DG computers directly from Data General.

When I talked to Joel, it was only his third day in America. He and his wife had gotten a chance to visit some of the historical sites in Philadelphia and enjoyed hearing the explanation of the country's history. After the conference, they had plans to visit Florida, specifically Disney World.

Joel said he enjoyed the conference and the sessions that he attended. He was happy with the things he learned from NADGUG, and said that although his group would probably never get as big, he hoped it could eventually offer as much to its members.

■

The RIG/SIG Committee changed faces at the conference. The new RIG/SIG chairperson is Charlene Kirian of Intercon Associates, 716/244-1250. The vice chairs are Steve Kern of Werner & Pfleiderer, 201/327-6300, for the eastern region, and Leryl Cash, 503/631-2605, for the western region. Anyone wanting more information or answers to questions about RIGs and SIGs should contact one of these people.

Many thanks to our past leaders, Paul Duck and Jan Grossman!

■

The Central New York Regional Interest Group will have its next meeting on November 17 in Albany. Speaking at the meeting will be Brian Johnson of B.J. Inc. He will speak on system tuning and performance monitoring. He is also donating a copy of his :SYSMGR performance monitor to be raffled off at the meeting.

The chairperson for the group, Joanne Terry, is now MIS system manager for Pomco, 2425 James Street, Syracuse, New York 13206. For more information on the meeeting or the group, call Joanne at 315/432-1966 or Bruce Blander at 518/438-4571. Δ

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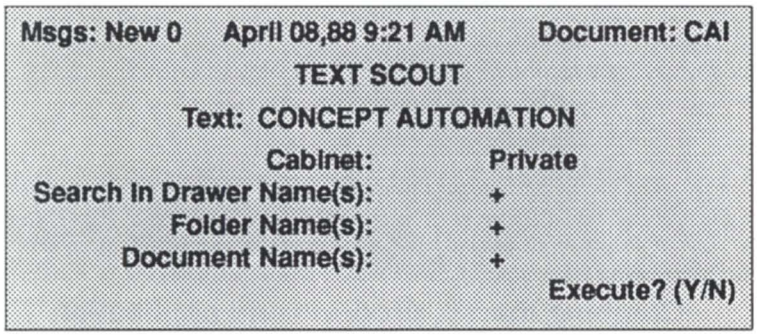

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ERP, an AOS/VS process termination program

by Perrie Bruce
CODGUG member

"Oh #$!@, I was in a hurry to get to the CODGUG meeting, and I forgot to log off!" The unattended connected terminal is one of those daily security headaches for system managers. Take heart! There is a public–domain program that will zap those PIDs attached to terminals used by virtual users.

ERP is a process termination program written in Fortran 77 by NASA on an MV/10000 to warn the user and then terminate the process after a threshold of inactivity has been reached. PIDs 1, 2, and 3, and all OP processes are immune to ERP to avoid any embarrassing terminations. A VIP file can specify which virtuous users are to be spared ERP's wrath. The number of warnings and the time between warnings can be varied.

Manville R&D has used ERP successfully under AOS/VS rev 6 and 7 for more than a year. We modified ERP to terminate processes after three 15-minute periods after work hours. After an initial shock, our user community has learned to peacefully coexist with ERP.

ERP is described in detail in NASA TM-86535, "A Process Activity Monitor for AOS/VS," which is available through the National Technical Information Service (NTIS). F77 source for ERP is available through Perrie Bruce, Manville R&D, 303/978-5325. We did not implement PIDACT, a process activity display program also described in the memorandum. Δ

Special invitation

by Tom Rizk
Special to Focus

As director of Data General's Customer Support Center, I invite all regional interest group and special interest group members to hold their next user group meeting in Atlanta. As shown by the Democratic National Convention, Atlanta has outstanding convention and conference facilities, including fine hotels, restaurants, tourist attractions, and nighttime entertainment. During your stay in Atlanta, I would like you to visit the Cus-

tomer Support Center in which Data General will sponsor a formal tour of our facility.

Included in the tour will be a slide presentation of the organizational structure and an overview of our software and hardware customer support strategies. Customers will then visit the Service Operation Center, where all customer service calls are routed to either an internal support group or dispatched to field personnel. Presentations will be given by each of the software and hardware remote service support groups.

The first groups to be visited will be the Problem Investigation Groups, which provide the first level of software support. Demonstrations of the Symptom Fault Fix System and call-handling procedures will be presented. Next, a tour of the Software Product Specialist groups, which include Operating Systems Support, Applications Software Support, Language and Data Base Support, and Advanced Products Support groups, will take place. Each of the preceding groups contain our most senior software support personnel.

Presentations from the hardware support groups will include the Phone Assistance Center, which provides remote support for customers and DG FEs who have questions about smaller DG systems; the Remote Assistance Center, which offers support for all Eclipse MV systems; and the Remote Technical Support group, which backs FEs with high-level hardware expertise on all DG hardware products. National Systems Support, which consists of Data General's most specialized hardware and software engineers, will end the tour of the groups with a brief description of their roles and responsibilities. To finish the tour, Data General invites you to an open question-and-answer session with Customer Support Center managers.

I urge all RIG/SIG leaders to consider scheduling Atlanta for their next user group meeting and to take advantage of Data General's offer to tour the Customer Support Center. Data General believes that the outcome of these meetings would be mutually beneficial. Such meetings would enhance your understanding of the remote service support structure that Data General presently offers. Furthermore, these meetings can help shape future service offerings by educating Data General in regional interest groups and special interest groups' present and future service needs.

Feel free to contact Doug Tomlinson at 1-800/DG-HELPS for more information or for answers to any of your questions. Δ

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Of programmers and users

Telling them apart isn't always as easy as you think

by Michael E. Marotta
Special to Focus

Every software house has its own set of horror stories about the incredibly stupid things users have done. Users reformat the hard drive. Users reboot in the middle of file operations. Users press the wrong keys, because they don't read the prompts, menus, or manuals. And so on.

True though these stories may be, they miss an important fact: we are all users.

In the earliest days of computing, programmers held advanced degrees in mathematics. Only a mathematician could be comfortable with binary, octal, and hexadecimal arithmetic. At the beginning of the cybernetic age, all programming was done in binary, often by flipping toggle switches on the front panel of the computer.

Some genius developed a way to create decks of cards or streamers of tape that contained base-8 codes. These octal instructions were much easier to use than long strings of zeros and ones. Then someone invented the first assembler. This made it possible for mathematically illiterate programmers to punch up mnemonic phrases like ADD AX, DL.

In Tracy Kidder's *The Soul of a New Machine*, we get to see Data General develop a 32-bit computer. Among the people who were responsible were a handful of wizards who got the machine to the point where Data General's programmers could write an operating system for it. These wizards called themselves "microkids," because they programmed in binary strings 75 bits long: they wrote microcode. Of the thousands of programmers working today, few could do this.

Programmers may argue that users don't really care about computers, they just want to post journals and calculate stresses. In fact, most programmers don't care about interrupt vectors and clock cycles, they just want to write loops and open files.

Furthermore, programmers generally know nothing about computer hardware. Octal latches and Schmitt hex triggers are beyond them. Most programmers couldn't solder a chip to a board, to say nothing of designing the masks for photoengraving silicon wafers. Few of the programmers who sneer at users could write an operating system, manufacture a chip, or even create a full-screen text editor.

If COBOL and BASIC are computer programming languages, then so are Lotus and dBase. The secretary who uses a word processor is programming a computer to generate text in a predefined way. There is no essential difference between picking items from a menu and using a turbo language with its programmer-friendly windows with helps and traces.

Imagine a world where every time a programmer wrote a routine that left a file open, a tally was posted on a large billboard overlooking Town Square. It would be humbling, to say the least.

The geniuses who gave us COBOL and Wordperfect were kind enough to include manuals that list errors. This makes it easy for users to identify undefined variables, division by zero, unopened files, invalid operands, or even footnotes and headers with too many lines.

The purpose of computing is to expand our abilities. You can avoid tedious arithmetic by knowing Fortran or Lotus. Anyone who uses a computer is a programmer. All programmers use the systems that were designed by other, more intelligent, people.

The only real distinction is between people who care about what goes on inside the system and those who do not. If you care to read, learn, and experiment, you deserve the title "Power User." Most self-proclaimed programmers are actually Power Users of BASIC or assembler or whatever.

Some users develop systems for other users. Those who develop applications software are called programmers—but only relative to the people who *use* the system that was created. If you develop a set of macros for the spreadsheet users in your office, you are a spreadsheet macro programmer.

If someone challenges your right to call yourself a programmer, ask that person which computer systems they use and which ones they created. Δ

Michael E. Marotta is a systems analyst with a decade of experience on Data General and other equipment. He specializes in creating user manuals.

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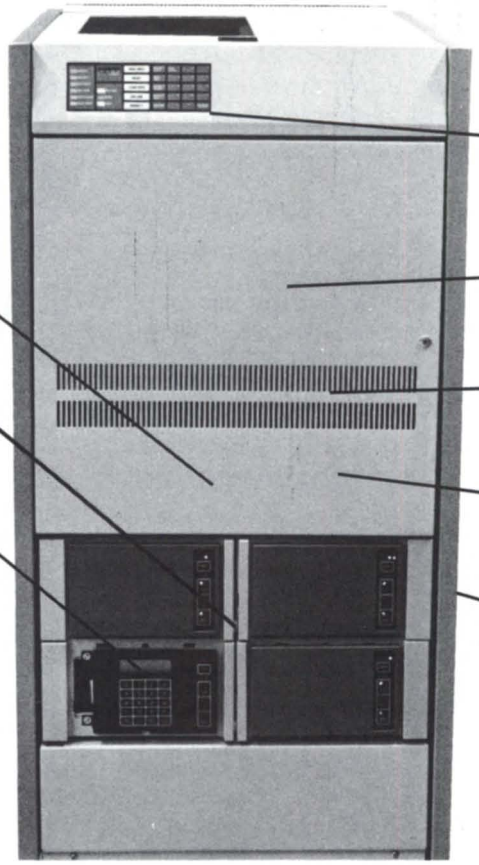

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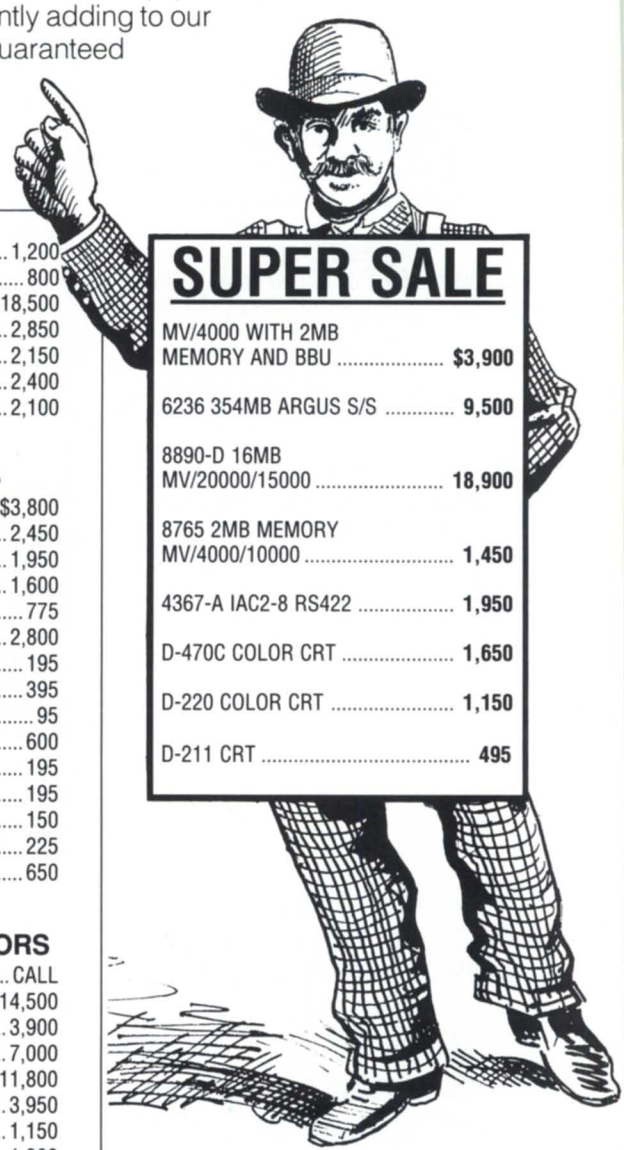

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SUPER MATRIX

Men of silicon or men of steel?

by Joe Cannata
Special to Focus

With a little creativity, patience, and time, you can turn the daily routine of working in CLI into an upstart affair with your D450/D460/D462. Each of these terminals has the ability to download any user-defined character sets, and you can utilize this feature to make a custom CLI prefix—or even make your own fancy character set. It's easy to generate the effect.

Let's demonstrate the idea with a custom prefix macro, as shown in Figure 1. Invoking this macro will produce a Superman "S" as the CLI prefix, as shown in Figure 2. This example may even have a useful purpose: you can give this to users who want to be "superusers," but without the superuser privileges.

The concept of the macro is to redraw the prefix, not as ") " but as two lines of two characters (D, E, F, and G were chosen arbitrarily), one on top of another. That will give us a large enough matrix of dots to create the superman graphic. The next step is to replace the letters with custom dot patterns.

Figure 1: Creating the Superman prefix

```
1 PREFIX   [!ASC 236]FS20[!ASC 212]DE[!ASC 212]FG[!ASC 236]FS01
2 WRITE    [!ASC 236]FS20
3 WRITE    [!ASC 227 236]FR[!ASC 104]@@@@@@@@@@@@@@@@@C_D_I_SX
4 WRITE    [!ASC 227 236]FR[!ASC 105]@@@@@@@@@@@@@@@@_P^X_TAB
5 WRITE    [!ASC 227 236]FR[!ASC 106]KXE_BOA@@V@K@F@B@A@@@@@@
6 WRITE    [!ASC 227 236]FR[!ASC 107]@D\H^PO@N@\@H@P@@@@@@@@@
```

If we issued the CLI command line:

```
)PREFIX DE[!ASC 212]FG
```

it would create the same result with just the letters D, E, F, and G, instead of the user-defined characters. In order to achieve the results of Figure 2, we need to use the custom character-set feature to reprogram or redraw the four characters D, E, F, and G. Instead of the letter D appearing, we will get the upper left-hand portion of the Superman S, and so on for the E, F, and G. So those letters aren't permanently altered in any text on the screen, we turn on the custom character set, draw the prefix, and turn off the custom character set. That's what the first line of the macro does.

We type the PREFIX CLI command and then issue an [!ASC 236]FS20 to let the terminal know that we have chosen user-defined character-set code 20. (The 20 is somewhat arbitrary as well—you have 30 possible definable character sets to choose from.) Note that there is no space between the [!ASC 236] and the FS20, and the FS *must be in capital letters*.

Next, the macro issues an [!ASC 212] (which is a newline), draws D and E together, sends another newline, draws F and G together, and then signals the terminal to turn off the custom character set and restore the default (with the [!ASC 236]FS01).

The second line of the macro begins our custom character definition. The pseudo-macro invokes character set 20. Lines 3 to 6 declare the dot-matrix replacements for the standard letters. The [!ASC 227 236] does a ^W cursor position, and issues the FR to signal the start of the definition for the character [!ASC 104], which is the letter D. The 24 characters that appear afterward represent the new dot pattern for D, which will become the upper left-hand portion of Figure 2. At this point, you will need to know how to lay out the dot patterns.

Figure 3 is the 10-by-12 dot matrix that is used by the D450/D460/D462 for each character. The standard character set works with 7 by 9 of this matrix. We will use the whole area to allow our

Figure 2: Superman S

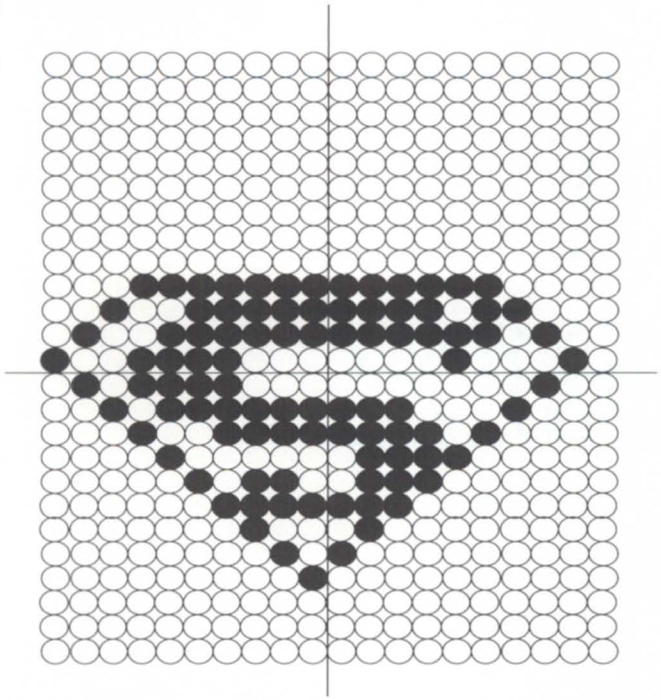
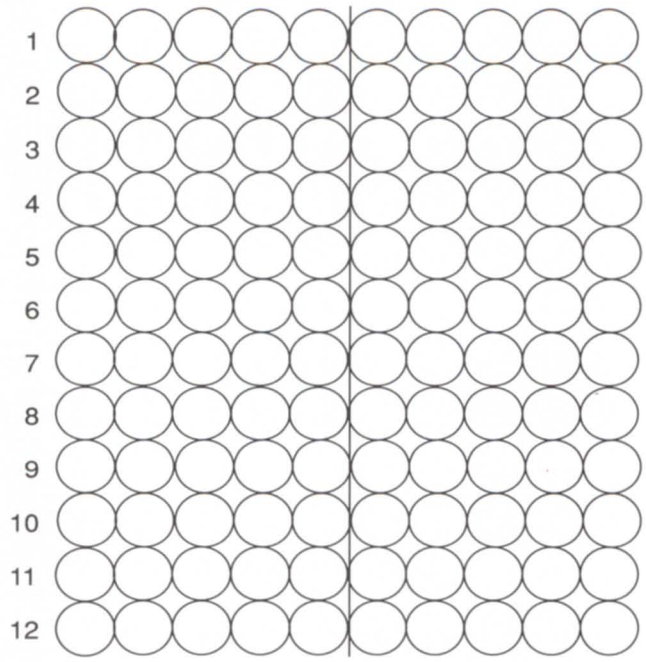


Figure 3: Terminal's dot matrix



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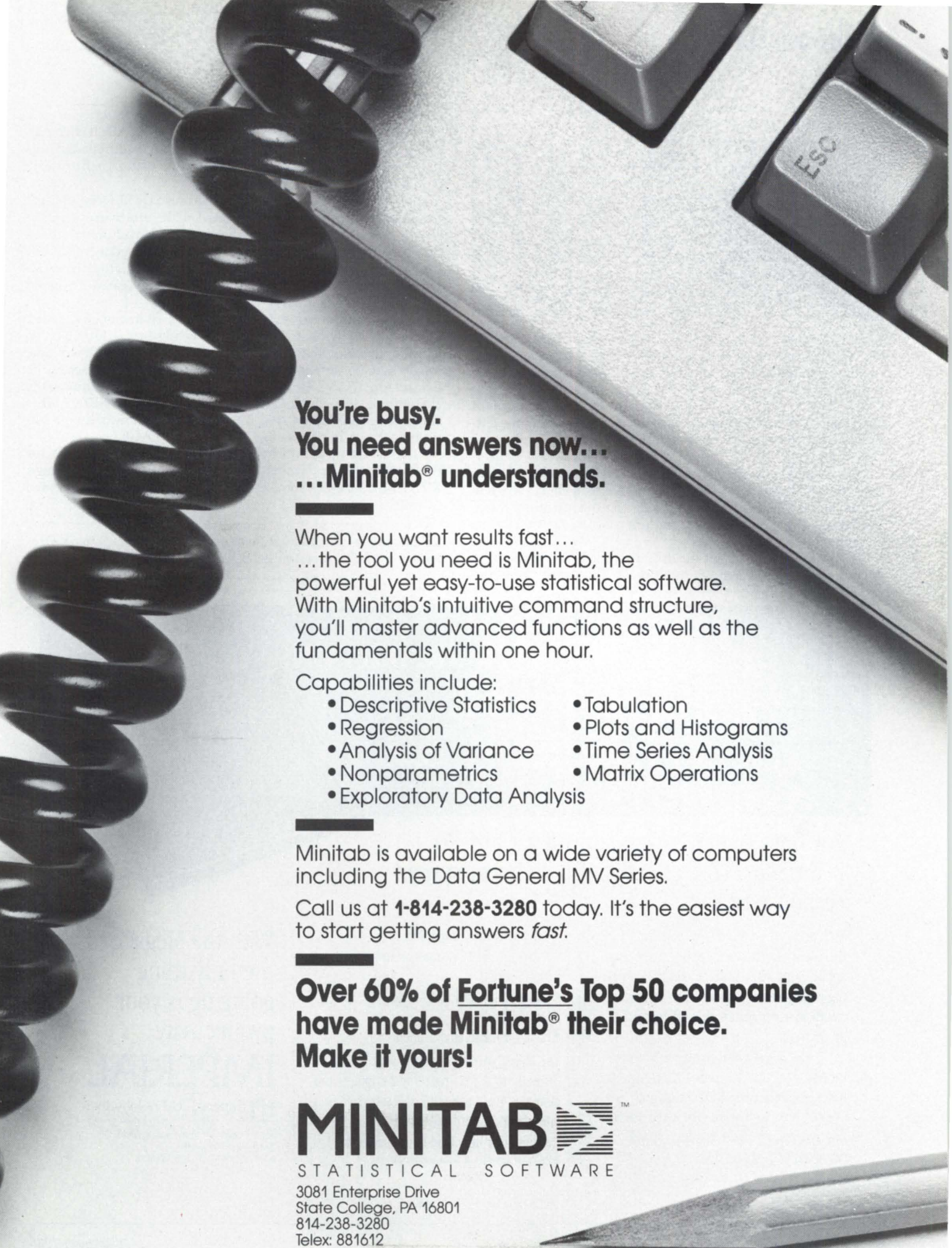

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Figure 4: Binary–to–ASCII conversion chart

00000	@	01000	H	10000	P	11000	X
00001	A	01001	I	10001	Q	11001	Y
00010	B	01010	J	10010	R	11010	Z
00111	C	01011	K	10011	S	11011	{
00100	D	01100	L	10100	T	11100	\
00101	E	01101	M	10101	U	11101	}
00110	F	01110	N	10110	V	11110	^
00111	G	01111	O	10111	W	11111	_

custom characters to touch without interruption. The matrix is divided into two equal halves, and each row is numbered. The customization of each character requires you to declare it one row at a time, starting with the left half of row 1, followed by the right half of row 1, left half of row 2, and so on. The string of 24 characters in each of the lines 3 to 6 of the macro represent the left-right, row-by-row binary representations of the dot patterns for D, E, F, and G.

To understand how the characters @ and H can produce the dot patterns 00000 and 01000, look at the conversion chart shown in Figure 4. Zero means the pixel is off; one means illuminated. Therefore, any possible 5-bit pattern of on or off can be accommodated.

This means you can design any dot pattern you like. You simply lay out a character matrix, as in Figure 3, and draw. When the drawing is complete, you just compare your dot patterns for each character with the table to get the corresponding ASCII character string. There must be 24 declarations for each custom character, as in lines 3 to 6, so you will simply define the custom prefix row by row, letter by letter.

Keep in mind, this whole process requires a D450, D460, or D462 terminal. It will not work as well on a D470C, which uses an 8-by-10 dot matrix. Also, you aren't limited to a 2-by-2 prefix. I have designed them as four characters in a row, or used a 2 by 3. The limit is your own creativity. One point to consider is that the prefix when it's actually drawn on the screen will be elongated compared to the way it looks in your original drawing.

If you have time, you can create a full 94-character custom set. We have a few that have come from several sources, like Hebrew, Cyrillic, reversed letters, cursive, LED, and others. It will take longer, and to invoke it, you must not include the reset to the default font ([!ASC 236]FS01) in your macro. To cancel any of the custom sets once invoked, create a macro called RESET.CLI that simply does a WRITE [!ASC 236 106 101]. This macro does a soft terminal reset, like pressing CMD+ERASE PAGE.

For more terminal information, consult your user's manual for the corresponding terminal. The manuals are available through *TIPS*. You may make some other discoveries about your terminal as well. Δ

Joe Cannata can be reached at Data General Educational Services, 7927 Jones Branch Dr., McLean, VA 22102; 703/827-9666.

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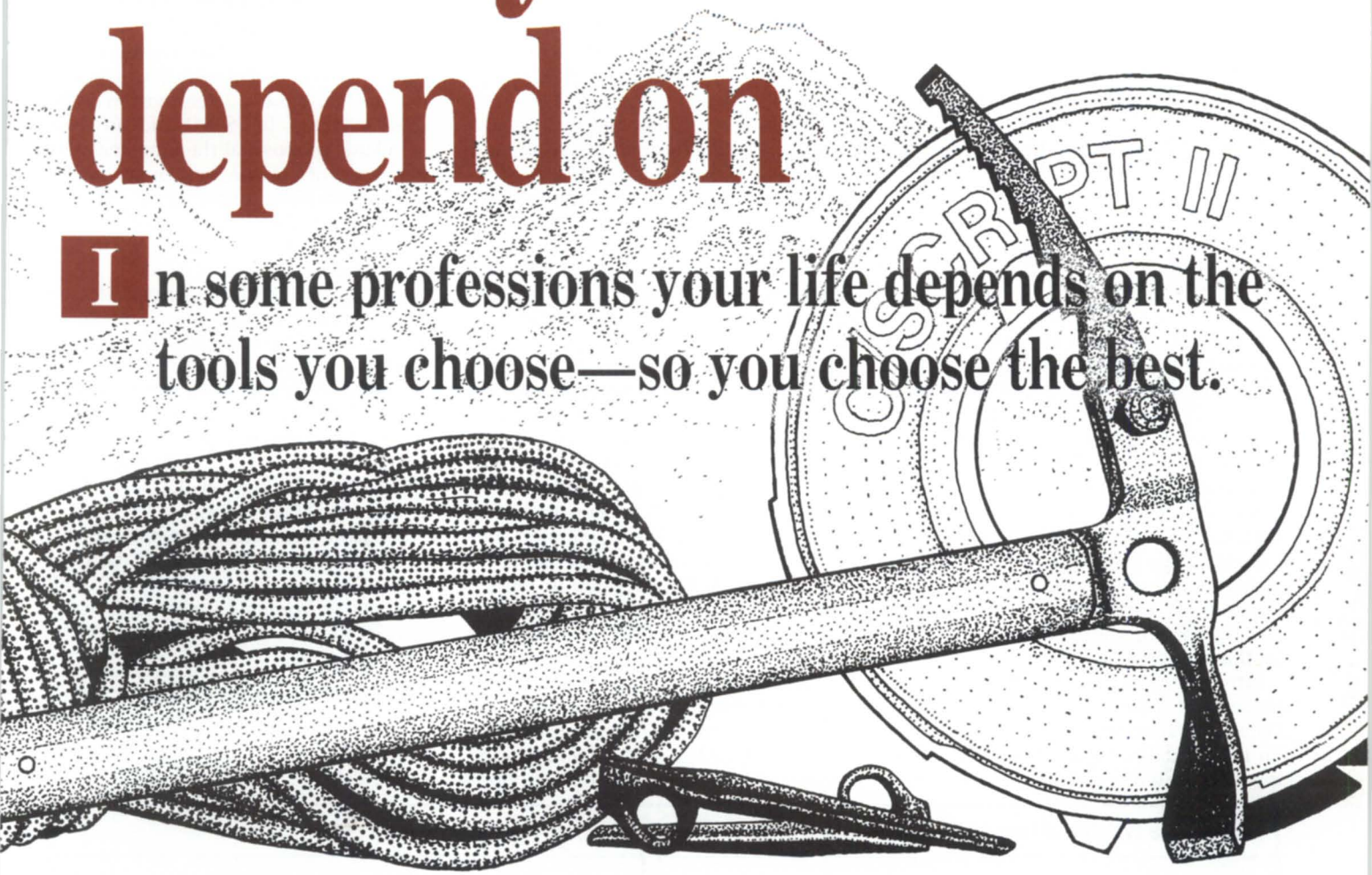

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Time lines

The history of Unix development shows Data General pursuing two paths

by John Huddleston
Special to Focus

Now that Unix has become a major product in the Data General community, DG users are asking a lot of questions about it. What is Unix? What applications run under Unix? Is there a word processing system for Unix? Is there a desktop publishing system for it?

Not all of these questions can get definitive answers right now, because Data General keeps a tight lip about products until they are announced, but DG has an applications consultant, Donna Boyce (919/248-5804), who can assist you if your local reps cannot.

In the meantime, it may be instructive to review a bit of the history of Unix and how Data General fits into this time line, based on release dates. Figure 1 demonstrates this progression in the form of a time line.

Let's start with the origins. AT&T developed Multics in combination with MIT and GE back in 1969. The inspiration for Multics came from an experimental operating system and file system designed by Ken Thompson, Dennis Ritchie, and others on a DEC PDP-7. In 1970, it was renamed Unix and ported to a PDP-11 in exchange for a commitment to develop a word processing system. It was up and running in 1971. At this point, the system had an assembler and some simple utility programs.

In 1973, V4, Version 4, was rewritten in C. Subsequent versions had reliability problems, but V7, Version 7, was formally released by Bell Labs in the spring of 1978. In 1979, Ken Thompson spent a year of sabbatical at the University of California at Berkeley. V7 was reworked at the Computer Science Department and released as 4.1BSD, Berkeley System Distribution Version 4.1, in October 1980.

In 1981, AT&T developed SIII, AT&T System III, and in 1982, AT&T released SIII for the PDP-11 and VAX computers, but did not include many of the enhancements of the 4.1BSD system. In 1983, a Unix users group, "/usr/group," formulated a draft standard (UDS 83) in an attempt to unify the two systems, but a second BSD release, 4.2BSD, in July 1983 widened the gap between the AT&T and BSD versions. In turn, AT&T announced SV.1, AT&T System V Version 1, which included a major expansion of C library support, new tools, and some Berkeley utilities such as "termcap" and "vi." In December 1983, Data General released SIII for its MV series machines running under AOS/VS. This system is known as MV/UX.

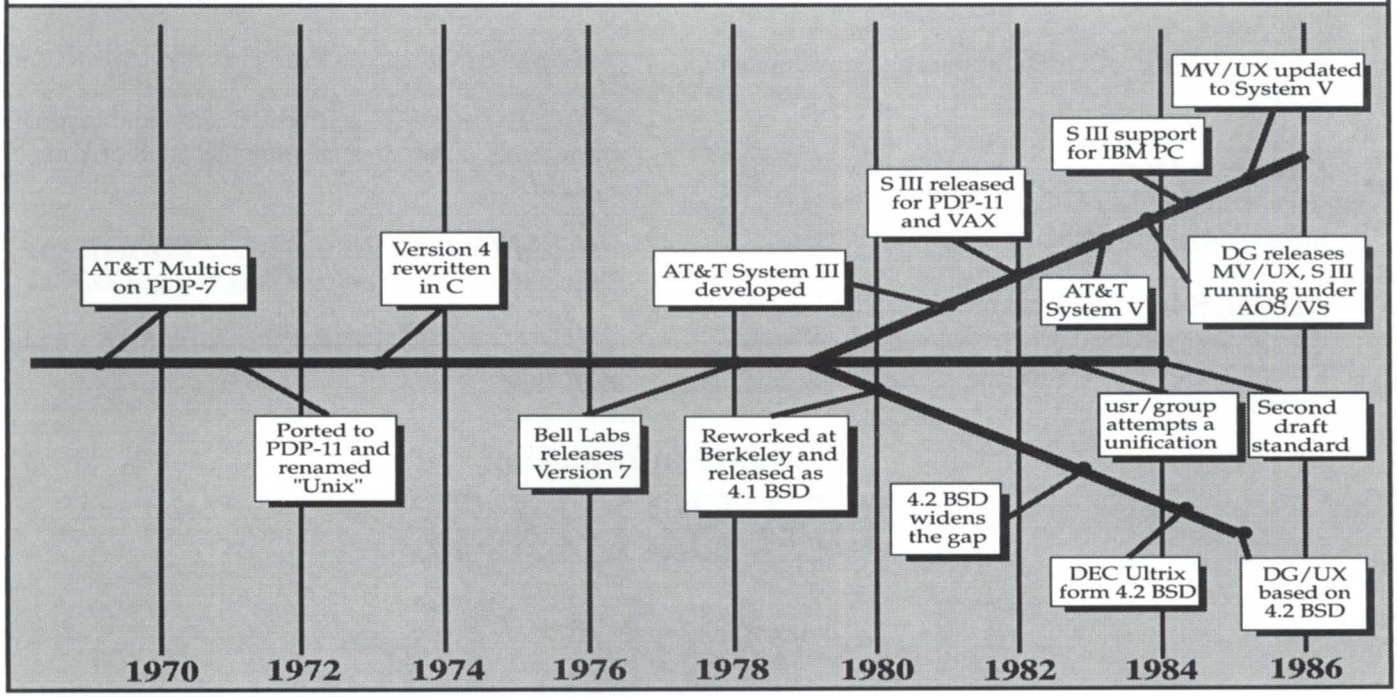
In January 1984, AT&T released SV.2, AT&T System V Release 2, which was closer in design to a later revision of the draft standard (UDS 84) and an IEEE standards proposal at the time. Industry awareness of Unix was heightened as IBM announced SIII support for its personal computers and DEC announced Ultrix, a 4.2BSD derivative, for the VAX in this same month.

In February 1985, Data General released SV.2, running as the kernel operating system (DG/UX) to a limited number of test sites. In June 1985, SV.2 DG/UX was released. In August 1985, Data General released MV/UX SV.1 running under AOS/VS. In April 1986, Data General released MV/UX SV.2. Data General is presently working on DG/UX SV.3, released by AT&T in 1985.

For more detailed information on this subject, see "The Evolution of the Unix Time-Sharing System," *AT&T Bell Laboratories Technical Journal*, vol. 63, no. 8, part 2 (October 1984), pages 1577-1593, by Dennis Ritchie. Δ

John Huddleston, leader of NADGUG's SIG/UX, can be reached at the USDA Soil Conservation Service, 511 NW Broadway, Portland, OR 97209; 503/221-2843.

Figure 1: The evolution of Unix



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Overcoming Unix *anxieties*

DG/UX rev 4 makes DG's industry-standard operating system more understandable

by Steve Carlson
Special to Focus

/unix/poltergeist

Picture a small child with long, blonde hair staring into a Data General terminal. She slowly turns her head and says in an eerie voice, "DG/UX is heeeerre." This may be every AOS/VS system manager's worst nightmare. Quick, run to the tape room and hide. VS users would rather deal with a system disk crash, a Data General salesperson, or even an old Nova. Anything but Unix.

What is Unix? For most AOS/VS users, DG/UX is a big unknown. Lately, however, the topic has been getting more airtime among Data General users. The excitement produced by the anticipated processing speed of the 88000 technology has caused many users to start looking at Unix. If you are going to "keep up with the Joneses," you are going to have to take a look at the industry-standard operating system. Let's look at this demon from the eyes of an AOS/VS user. Since Data General has just released a new revision of DG/UX, I will use it to investigate Unix here. But first, let's brush up on some history.

/unix/defined

Unix has a few more gray hairs than AOS/VS. It was first developed on a Digital Equipment Corporation PDP-7 in 1969. It was written by scientists Dennis Ritchie and Ken Thompson, who needed a set of tools to help them with their projects. Ritchie later converted Unix to C on a PDP-11, which makes it the son of one of the first multiuser operating systems, "Multics," developed inside the test tubes of Bell Labs. Expanded to be used internally by the Computing Science Research group at Bell Laboratories, the focus of this operating system was to provide a platform for software development and to produce documentation.

From its root at Bell, Unix has followed many different directions. AT&T generously provided licenses for Unix source code to universities for modest fees, and the operating system became widely available in 1975. Its popularity increased greatly when college students were trained on Unix. The University of Berkeley made significant additions to Unix, and the BSD (Berkeley System Distribution) enhancements are rooted in this history.

Data General has been licensing a native Unix since 1984. The company's newest offering follows AT&T's System V Release 3, which includes many BSD 4.2 extensions. DG/UX rev 4 is compliant with the System V Interface Definition (SVID).

DG/UX has gotten its share of bad press in the past. Some critics said the original version was released just so the gang at Westboro could say they had native Unix. In addition, DG also had to endure other gripes that are usually leveled at Unix in general, like it's hard to use, slow, and unreliable. I'm going to look at these accusations and compare Unix to our friend AOS/VS.

/unix/hard_to_use

For most, the major drawback about Unix is that it is not user-friendly—a point that is hard to argue against. Depending on which flavor of Unix you're using (AT&T System V, Microsoft Xenix, or Berkeley BSD), there are from 200 to 450 commands. Apply the different options and the number of possible commands gets into the thousands. When you start piping one command to another, there are more than a million possible programs you can create. All of these commands overwhelm many first-time users.

Another source of difficulty comes from the fact that the concepts are powerful and unfamiliar to the average AOS/VS user. You'll find it a lot easier if you don't think of Unix as something you have to work against, but rather as a tool that can make your work easier, with hundreds of flexible commands at your fingertips.

Recognizing these criticisms of Unix, the developers of rev 4 of DG/UX have tried to make it a little easier to live with. One new, easy-to-use feature is called "editread," an original DG/UX library that can be built into almost any program that reads input from a terminal line. It gives the user the option of reviewing a history of the commands that were used earlier, and even to call back, edit, and reissue individual commands from the history. With the .editreadrc file, you can define your control characters to look like those of CLI.

Being a systems engineer, I feel the most exciting, new ease-of-use feature in rev 4 is SYSADM. It consists of a systems administration menu package that contains a hierarchical arrangement of interactive screens that lead the system manager through administrative tasks. It makes installing the operating system very easy. It leads you through the installation, from setting up disks to configuring a line printer (see Figure 1). Throughout SYSADM, on-line help is available. It also provides hand-holding for the installation of TCP/IP, C, and LANG_RT. SYSADM asks for the information it needs

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is a four-letter word

by Bruce Ray
Special to Focus

Unix. Say that magic word in any company today, and you will get a variety of responses. Computer technoids' eyes glass over with megalomaniacal thoughts of raw power, while whispered mantras of pipes, filters, forks, greps, and awks float from their cubicles. At the other end of the building, corporate managers are relieved to finally find *the* computer software standard for all of their corporate computers. Software project leaders shake their heads, wishing for a standard for the standard. And somewhere out there are the end-users who will have to use the operating system itself. Their thoughts may be best left unsaid.

Familiarity breeds resentment

I can sympathize with all of these people. I have used most of the popular operating systems (as well as a few lesser known systems), and have formed a few very strong biases. Although theoretically many of these systems share common features, each one has its own personality and quirks. However, no system but Unix has quite the same frustratingly primitive access to such a wide range of powerful features. Until now, this may not have bothered you, but since most vendors, including Data General, have vowed undying support for Unix, soon *you* may be dealing with many of the eccentricities of Unix.

Case sensitivity

Unix commands are case sensitive. I'll let you discover the joy of this yourself.

Cryptic commands

No usable Unix system I've worked with has gotten around the lack of consistency for commands and arguments. It only took me five years to get used to this, and I still have to look up most of the command-line syntax in the documentation. This leads me to the next problem.

Documentation

We lost three programmers to nervous breakdowns caused by using Unix documentation. The original multiple-volume documentation provided with Unix years ago was a working definition of "user-unfriendly." You had to know the answer to find the correct question. One programmer got lost using an index entry that ambiguously referred to a nonexistent manual volume. Another one overheated during an infinite indirect footnote reference. But this was before companies such as Howard Sams, Que Corporation, Prentice-Hall, McGraw Hill, and others tapped the corporate insurance preventive-medicine market by writing usable Unix documentation.

File/directory access

RDOS users typically find the primitive Unix file access privilege concept an annoyance that gets in the way more often than not. AOS users find the Unix privilege implementation rather primitive, especially when compared with AOS ACL features.

Raw devices

I initially found the difference between devices and raw devices was used inconsistently in many system commands. Some commands that should have required only raw device names actually took both; other commands that I thought should take regular names required the raw ones. Fortunately, most end-users will not have to deal with this.

Cumbersome system management

Unix system management used to be "the exceptions are the rules." Through the years, there have been many attempts at civilizing the system administration. Most use a visual shell menu technique to present common system functions to an operator. I have not found one with the right combination of power, speed, and lack of restrictions. Besides, real power users don't need "pretty shells," do they?

In spite of these criticisms, the user demand for Unix continues to grow. However, its features and benefits come at a price, though some of these problems will improve with maturity. The story of Unix is a common one: it's worse than some but better than others (such as Hewlett-Packard's MPE). But that's another story. Δ

Bruce Ray is the president of Wild Hare Computer Systems, a software development company that uses Unix, among other operating systems. He can be reached at P.O. Box 3581, Boulder, CO 80307; 303/442-0324.

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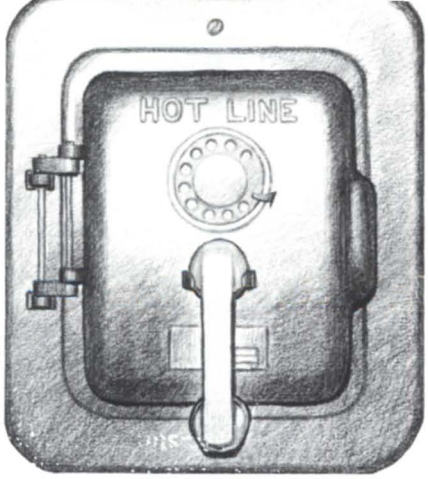

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to edit the necessary files to configure TCP/IP. You should not have to worry about the /etc/rc (the Unix version of UP.CLI) file.

unix/dg/ux/unreliable

The Achilles' heel for Unix has been its filing system, with problems ranging from inflexibility to corruptibility. Actually, its directory structure is similar to AOS/VS: both use a hierarchical filing system; you only need to replace " : " with " / " and they look the same. My pathname, :UDD:STEVE, looks like /usr/steve in DG/UX. Other directory comparisons are :UTIL as /bin and :PER as /dev.

Figure 1: SYSADM main menu

1	diskmgmt	Enter the Diskman program
2	sysmgmt	System management menu
3	fsmgmt	File system management
4	fileinfo	File information menu
5	ttymgmt	Tty management menu
6	lpmmgmt	Line printer management
7	usermgmt	User management menu
8	uucpmgmt	Uucp management menu
9	softwaremgmt	Software management menu
10	networkmgmt	Network management menu

The king of the Unix filing system is called the superblock. The superblock contains disk information, such as the number of inodes in the file system and free list information. It's an index into the rest of the file system. The mount command, which is similar to the AOS/VS INIT command, reads the superblock into memory. In the past, I have found the superblock easy to break. This corruption factor, along with the complicated procedures for initializing the filing system, left a bad taste in my mouth whenever I said Unix. The disk system in DG/UX is now easier to install, more flexible, and more reliable with the replication of the system data base.

The filing system for the new release of DG/UX could be the most substantial change to rev 4. DG/UX now uses "diskmgmt" to manage the disk system. Does that sound familiar? If it doesn't, this will: to go from rev 3 to 4 of DG/UX, you need to dump all your files off and reload. I'm not talking about AOS/VS rev 8. In the previous revision of DG/UX, you were burdened with setting up your disks in slices. As an old AOS/VS user, this was one of the most frustrating things about Unix. If your CPD ran out of space, you would have to rebuild the entire disk and increase the number of slices for your CPD.

Now DG/UX takes advantage of logical disks. The new revision uses logical disks like physical disks, much as AOS/VS does. You are no longer constrained to a filing system associated with eight fixed sections of a physical disk, and the limitation to one physical disk. With rev 4, you can organize logical disks that are composed of up to eight pieces. A physical disk can be broken up into 32 pieces. The creator has a lot of flexibility in how large or small to make each piece. This is all accomplished with diskmgmt.

The kernel in rev 4 has been rebuilt. Its design has been changed to be more modular. This will make it more maintainable. Now it's only necessary to change a module, not the entire code. This should increase the speed of getting to your STRs.

unix/slow

Saying Unix is slow is like saying water is a poor cleanser. Water is a good cleanser if you use it to wash mud off your hands, but a poor cleanser to clean your hands if you just changed the ribbon on your line printer. The same is true with Unix. It is great with many scientific applications, but unsatisfactory in a real-time environment.

I haven't had time to run any benchmarks on DG/UX, and I'm not sure it would have helped anyway. You've got to get behind a shell and take it for a test drive with your own favorite application. I've heard of some system calls running faster on DG/UX than on AOS/VS. DG/UX rev 4 has developed scheduling algorithms to make more efficient use of CPU cycles. With this new release, more important processes are given higher priority.

If more CPU power is what you're looking for, Data General has also added support for symmetric multiprocessing, and now DG/UX can run on an Eclipse MV/20000 model II. There is also support for multiple IOCs.

/unix/dg/ux/cli

Imagine having two different CLIs to select from. With DG/UX, you have the choice of using two very different shells. A shell is the Unix equivalent of CLI; it's your interface to the operating system. With DG/UX, you can use the Bourne shell, which is from AT&T, or the C shell, from Berkeley. They include macro facilities (scripts), string variables, program execution commands, file-handling commands, and the characteristics commands. For the CLI user, these can be powerful and fast, but at times, they can be a cryptic interface. These shells do not always follow a standard syntax.

In general, programmers love the Unix shells. If you don't believe me, try to take it away from them after they've used it a few months. Shells provide a powerful environment from which to operate. For example, to check for a specific process or user on the system (i.e., who is in CLI), here's a C shell (csh) script called "whose.x":

```
if ($#argv == 0) then
    echo 'No argument supplied'
else
    ps -f | grep $argv[1]
endif
```

A shell that is becoming more and more popular is the Korn shell. It combines features found in both the Bourne shell and the C shell, but is currently only available in AT&T releases. I'm sure that when AT&T releases it, DG will implement it into DG/UX.

/unix/just_the_facts_mam

Now it's time to leave this make-believe kernel and come back to AOS/VS. If you have AOS/VS soup for lunch every day, Unix is going to be hard to swallow. It was an operating system developed by engineers. A programmer needing a utility to perform a specific function simply wrote it and threw it in with the others. This is why when you want to place a file on Memorex (tape), you can select from tar, cpio, dd, dump, and mtjcpio. Take your pick. Unix can be confusing at times.

For a small system, however, Unix is one of the most powerful operating systems you can use. Its strengths are in software development and text processing. Even though Unix isn't for everyone, it will fit well with some of Data General's markets: selling to value-added resellers, for example. It's an excellent base for turnkey solutions. It also follows Data General's corporate strategy of following industry standards.

Now may be the time to look at Unix. Rev 4 offers some features that make it easier for the novice to get started: filing system, editread, and SYSADM. Data General has many new manuals to get you started. One manual that has been in high demand is *Porting Software to DG/UX Systems* (model number 093-701036-00). The number of third-party applications that run on DG/UX has grown exponentially during the past year. This may be a good time to beat the crowd. Δ

Steve Carlson is a systems engineer for Data General in Dallas.

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FAST BREAK

Superstructured skeleton code for report break logic

by George Burns
Special to Focus

In my last article (published in the April 1988 issue of *Focus*), I offered a technique for creating screens using DG COBOL. Even though it was quite structured, it did use GOTOs and had a very soft flow. The skeleton code that accompanies this article is almost the exact opposite. It uses the theories of structure without GOTOs to such an extreme that it could be a textbook example of classically structured code.

Thanks go to Olin Hazen of Denver, who many years ago presented the seed of this method, and kudos also to Keith Wickham of Idaho Falls, who took my GOTO version and purified it.

One of the things everyone learns to do in school is to write reports with subtotals and break logic. However, almost no one refines this into a flexible concept. Part of the problem is the point of view. Most people think that breaks happen *after* a change has occurred in the data. It is extremely useful to rethink this into *after* and *before* sets.

Note the following report structure:

```
TOP of REPORT
    BEGIN Division
        BEGIN SalesArea
            BEGIN ProductGroup
                DETAIL print
            END ProductGroup
        END SalesArea
    END Division
Grand Totals
```

Note that each break group has a TOP or BEGIN section and an END or AFTER set. This pure form is useful—but hard to code. That is what this article is about. The STD_BREAK code can be used almost like entering specific routines into a 4GL, with the logic problems already taken care of.

STD_BREAK makes it easy to add and subtract break levels, make nifty twists of top and bottom page printing, assure that a page break never happens in the middle of something important, and more.

Before getting to the specifics, I need to digress a bit on the program logic theory. All programming code can be divided into two general categories: control logic and DO-IT code. Good programmers are aware of the difference, and utilize it in their code. You probably use this concept but may not have made such a direct point of exploiting it. Let me explain.

Control code is the stuff that runs the program flow. It makes records come and go at the right time. It consists of loops, performs, GOTOs, IF-THENs, etc. You will find that programs contain very little important control code. What there is, however, will make or break the program. The moral is to make your control code small, concise, and solid as a rock. If you do, the rest will fall into place!

DO-IT code, as it implies, does the busywork of the program: data division, data definitions, MOVES, A = B, PRINT, math, etc. If the control code is right and this is wrong, it is usually easy to see and fix. It is also easy to add and change DO-IT code.

Getting back to the program, STD_BREAK is nearly all control code. All you need to know is what DO-IT stuff to do where. Note the following rules:

BEGIN logic
- refers to the record just read (i.e., the one that caused the break)
- headings and titles
- top of page/top of group
- clear totals for that level
- move that level KEY to PREV—KEY for break control.

END logic
- refers to prior accumulated data (i.e., totals, PREV— stuff)
- totals
- accumulate to next higher total buckets.

Look at the skeleton code in Figure 1. Empty paragraphs signify the begin and end of each break group. All you need to do to use this code is the following:

1. Write, borrow, or steal some code to extract the desired data.
2. Sort it.
3. Insert this code after the sort.
4. Edit in the DO-IT code for begin and end blocks.
5. Edit in your detail DO-IT code.

For a professional touch, search and replace all of BEGIN-LEVEL-1 with BEGIN-COMPANY, BEGIN-LEVEL-2 with BEGIN-DIVISION, etc. Sometimes a simple comment at the beginning of the code that defines the levels is sufficient.

You will not have to concern yourself with first or last records, and you'll only have to place the top-of-page routine at the right place to make a foolproof program.

You will find it trivial to add and remove break levels, so trivial, in fact, that really powerful reporting with user-controlled optional breaks is viable. You will also find that it's easy to stir around within a break level. Here are some other things that you can do:
- totals-only options (do the break but don't print)
- user-controlled alternate data for breaks at a level
- complete break levels that are optional
- break levels that are used for different things, depending on the kind of records coming from the sort
- break levels that invert or trade for another twist on an existing report.

If you're interested in finding out how to do any of these things with STD_BREAK, give me a call. If there's enough interest, perhaps I'll expand on how to do them in a user-controlled manner.

I didn't say much about the code itself because part of its simplicity is its obvious nature. It can be obtained on the NADGUG library tape, or better yet, you could type

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Listed above are NADGUG's current special interest groups. If you are interested in making the connection with one of these groups, or if you have an interest that needs a group, please contact NADGUG's RIG/SIG coordinator, Cathlene Gentry, at 512/345-5316 for further information.

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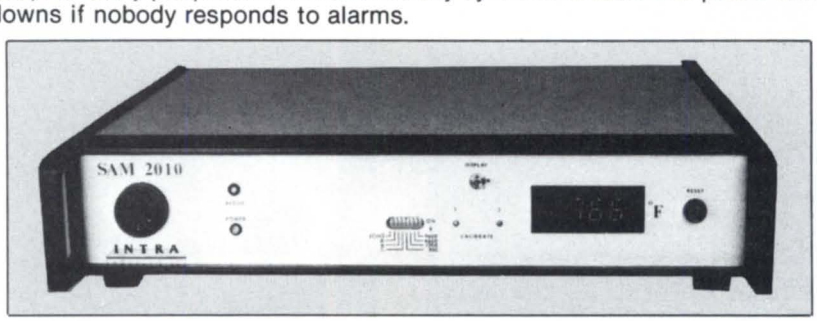

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Figure 1: STD_BREAK

```
********** STD_BREAK *********
* *
* * BY GEORGE BURNS
* *
* * GENERAL BREAK LOGIC FOR HIERARCHICAL
* * REPORT
* *
* * PERFORM 010-CREATE-REPORT UNTIL
* * SORT-EOF
* *

010-CREATE-REPORT.
   PERFORM 015-RETURN-SORT-REC.
   IF FIRST-SORT AND NOT SORT-EOF
       PERFORM 030-BEGIN-LEVEL-1
       PERFORM 035-BEGIN-LEVEL-2
       PERFORM 040-BEGIN-LEVEL-3
       PERFORM 045-BEGIN-LEVEL-4
       PERFORM 050-BEGIN-LEVEL-5.
   IF NOT FIRST-SORT AND SORT-EOF
       PERFORM 055-END-LEVEL-5
       PERFORM 060-END-LEVEL-4
       PERFORM 065-END-LEVEL-3
       PERFORM 070-END-LEVEL-2
       PERFORM 075-END-LEVEL-1.
   IF NOT SORT-EOF
       IF LINE-CNT GREATER THAN MAX-LINE
           PERFORM 025-PAGE-OVERFLOW.
   IF NOT SORT-EOF
       IF SORT-KEY NOT EQUAL PREV-KEY
           PERFORM 020-TOTAL-BREAKS.
   IF NOT SORT-EOF
       PERFORM 080-DETAIL-ROUTINE.
   MOVE 'N' TO FIRST-SORT-SW.

015-RETURN-SORT-REC.
   RETURN SORT-FILE RECORD
       AT END
           MOVE 'Y' TO SORT-EOF-SW.

020-TOTAL-BREAKS.
   IF SORT-KEY-1 NOT EQUAL PREV-KEY-1
       PERFORM 055-END-LEVEL-5
       PERFORM 060-END-LEVEL-4
       PERFORM 065-END-LEVEL-3
       PERFORM 070-END-LEVEL-2
       PERFORM 075-END-LEVEL-1
       PERFORM 030-BEGIN-LEVEL-1
       PERFORM 035-BEGIN-LEVEL-2
       PERFORM 040-BEGIN-LEVEL-3
       PERFORM 045-BEGIN-LEVEL-4
       PERFORM 050-BEGIN-LEVEL-5.

   IF SORT-KEY-2 NOT EQUAL PREV-KEY-2
       PERFORM 055-END-LEVEL-5
       PERFORM 060-END-LEVEL-4
       PERFORM 065-END-LEVEL-3
       PERFORM 070-END-LEVEL-2
       PERFORM 035-BEGIN-LEVEL-2
       PERFORM 040-BEGIN-LEVEL-3
       PERFORM 045-BEGIN-LEVEL-4
       PERFORM 050-BEGIN-LEVEL-5.
* * *
* * * CHECK FOR PAGE FULL IN MIDDLE OF ALL
* * * BREAKS BELOW THE ONE THAT STARTS
* * * A NEW PAGE
* * *
   IF SORT-KEY-3 NOT EQUAL PREV-KEY-3
       PERFORM 055-END-LEVEL-5
       PERFORM 060-END-LEVEL-4
       PERFORM 065-END-LEVEL-3.
   IF SORT-KEY-3 NOT EQUAL PREV-KEY-3
       IF LINE-CNT GREATER THAN MAX-LINE
           PERFORM 026-PRINT-PAGE
                   HEADINGS.
   IF SORT-KEY-3 NOT EQUAL PREV-KEY-3
       PERFORM 040-BEGIN-LEVEL-3
       PERFORM 045-BEGIN-LEVEL-4
       PERFORM 050-BEGIN-LEVEL-5.

   IF SORT-KEY-4 NOT EQUAL PREV-KEY-4
       PERFORM 055-END-LEVEL-5
       PERFORM 060-END-LEVEL-4.
   IF SORT-KEY-4 NOT EQUAL PREV-KEY-4
       IF LINE-CNT GREATER THAN MAX-LINE
           PERFORM 026-PRINT-PAGE-
                   HEADINGS.
   IF SORT-KEY-4 NOT EQUAL PREV-KEY-4
       PERFORM 045-BEGIN-LEVEL-4
       PERFORM 050-BEGIN-LEVEL-5.

   IF SORT-KEY-5 NOT EQUAL PREV-KEY-5
       PERFORM 055-END-LEVEL-5.
   IF SORT-KEY-5 NOT EQUAL PREV-KEY-5
       IF LINE-CNT GREATER THAN MAX-LINE
           PERFORM 026-PRINT-PAGE-
                   HEADINGS.
   IF SORT-KEY-5 NOT EQUAL PREV-KEY-5.
       PERFORM 050-BEGIN-LEVEL-5.

**************************

025-PAGE-OVERFLOW.
   PERFORM 026-PRINT-PAGE-HEADINGS.
* * * ADD ANY ADDITIONAL TITLE LINES HERE
* * *
   MOVE 'CONTINUED' TO TITLE-XX.
   MOVE TITLE-## TO PRINT-REC.
   MOVE # TO LINE-CONTROL.
   PERFORM 091-WRITE-PRINT-LINE.
* * *

026-PRINT-PAGE-HEADINGS.
   ADD 1 TO PAGE-CNT.
   MOVE PAGE-CNT TO TITLE-LINE.
   MOVE TITLE-1 TO PRINT-REC.
   PERFORM 090-WRITE-TOP-LINE.
   MOVE TITLE-2 TO PRINT-REC.
   MOVE # TO LINE-CONTROL.
   PERFORM 091-WRITE-PRINT-LINE.
```

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```
********* BEGINNING ROUTINES *****

030-BEGIN-LEVEL-1.
   MOVE CURRENT-XX TO TITLE-XX.
   MOVE ZERO TO TOTAL-1.
   MOVE SORT-KEY-1 TO PREV-KEY-1.

035-BEGIN-LEVEL-2.
***
*** PLACE ACTUAL PRINT PAGE HEADING IN
*** BEGIN OF LEVEL THAT ALWAYS GETS A
*** TOP OF PAGE BEGINS ABOVE THAT WILL
*** AUTOMATICALLY GET THEM. BEGINS
*** ABOVE SHOULD "FILL" THEIR HEADING
*** DATA INTO WS.
***
   PERFORM 026-PRINT-PAGE-HEADINGS.
***
   MOVE CURRENT-XX TO TITLE-XX.
   MOVE # TO LINE-CONTROL.
   PERFORM 091-WRITE-PRINT-LINE.
   MOVE ZERO TOTAL-2.
   MOVE SORT-KEY-2 TO PREV-KEY-2.

040-BEGIN-LEVEL-3.
   MOVE CURRENT-XX TO TITLE-XX.
   MOVE # TO LINE-CONTROL.
   PERFORM 091-WRITE-PRINT-LINE.
   MOVE ZERO TOTAL-3.
   MOVE SORT-KEY-3 TO PREV-KEY-3.

045-BEGIN-LEVEL-4.
   MOVE CURRENT-XX TO TITLE-XX.
   MOVE # TO LINE-CONTROL.
   PERFORM 091-WRITE-PRINT-LINE.
   MOVE ZERO TOTAL-4.
   MOVE SORT-KEY-4 TO PREV-KEY-4.

050-BEGIN-LEVEL-5.
   MOVE CURRENT-XX TO TITLE-XX.
   MOVE # TO LINE-CONTROL.
   PERFORM 091-WRITE-PRINT-LINE.
   MOVE ZERO TOTAL-5.
   MOVE SORT-KEY-5 TO PREV-KEY-5.

********* ENDING ROUTINES *******

055-END-LEVEL-5.
   MOVE PREV-XX TO TOTAL-LINE-XX.
   MOVE TOTAL-5 TO TOTAL-LINE-XX.
   MOVE # TO LINE-CONTROL.
   PERFORM 091-WRITE-PRINT-LINE.
   ADD TOTAL-5 TO TOTAL-4.

060-END-LEVEL-4.
   MOVE PREV-XX TO TOTAL-LINE-XX.
   MOVE TOTAL-4 TO TOTAL-LINE-XX.
   MOVE # TO LINE-CONTROL.
   PERFORM 091-WRITE-PRINT-LINE.
```

```
   ADD TOTAL-4 TO TOTAL-3.

065-END-LEVEL-3.
   MOVE PREV-XX TO TOTAL-LINE-XX.
   MOVE TOTAL-3 TO TOTAL-LINE-XX.
   MOVE # TO LINE-CONTROL.
   PERFORM 091-WRITE-PRINT-LINE.
   ADD TOTAL-3 TO TOTAL-2.

070-END-LEVEL-2.
   MOVE PREV-XX TO TOTAL-LINE-XX.
   MOVE TOTAL-2 TO TOTAL-LINE-XX.
   MOVE # TO LINE-CONTROL.
   PERFORM 091-WRITE-PRINT-LINE.
   ADD TOTAL-2 TO TOTAL-1.

075-END-LEVEL-1.
   MOVE PREV-XX TO TOTAL-LINE-XX.
   MOVE TOTAL-1 TO TOTAL-LINE-XX.
   MOVE # TO  LINE-CONTROL.
   PERFORM 091-WRITE-PRINT-LINE.

* * * * * * * * * DETAIL ROUTINE * * * * * * * * *

080-DETAIL-ROUTINE.
   MOVE CURRENT-XX TO DETAIL-XX.
   MOVE # TO LINE-CONTROL.
   PERFORM 091-WRITE-PRINT-LINE.
   ADD CURRENT-XX TO TOTAL-5.

* * * * * * * * * PRINT ROUTINES * * * * * * * * *

090-WRITE-TOP-LINE.
   WRITE PRINT-REC
       AFTER ADVANCING PAGE.
   MOVE 1 TO LINE-CNT.

091-WRITE-PRINT-LINE.
   WRITE PRINT-REC
       AFTER ADVANCING LINE-CONTROL.
   ADD LINE-CONTROL TO LINE-CNT.
   MOVE 1 TO LINE-CONTROL.
```

it in to get familiar with it and make your own comments. You might say that you don't need five levels very often, but it's easier to delete code than to add it. You could, of course, have STD_BREAK5, STD_BREAK4, etc., in your skeleton code library.

As an analyst, the availability of near-4GL flexibility without any limits can open many doors for quick, powerful reports. The structure can be easily ported into anything from BASIC to C, but the mind-set of looking at a report structure this way is the key to understanding and writing complex reports. Δ

George Burns is the data processing manager for Rogers Brothers Seed Co., P.O. Box 4727, Boise, ID 83711-0727.

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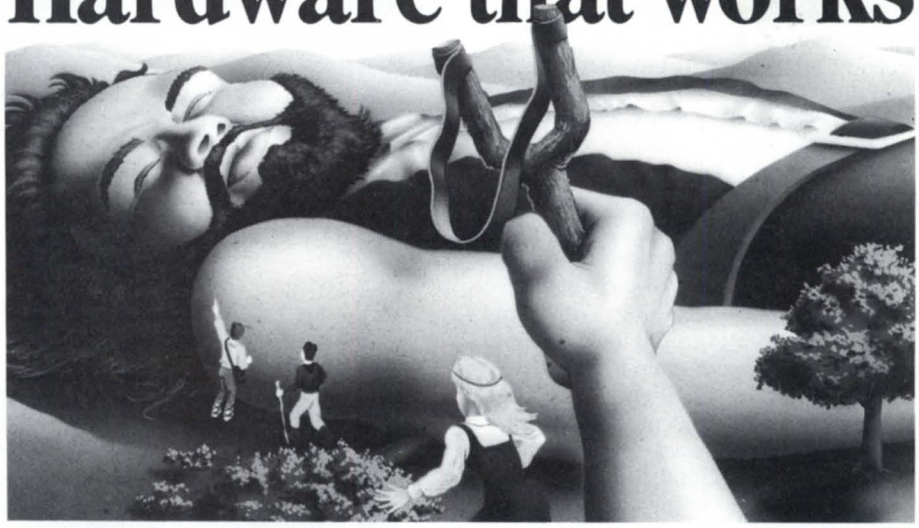

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Conference 88 scrapbook

Or "How I Spent My Summer Vacation"

Detractors had warned that August in Philadelphia would be hot, muggy, and thoroughly unpleasant. Perhaps it was, but the people attending the NADGUG conference from August 28 to September 1 didn't seem to notice.

Few attendees actually spent much time outside the hotel, so the weather didn't make much difference—except for Tuesday's field trip to see the Phillies and Giants play baseball. Fortunately, Monday's storms cleared off long before the game, and Tuesday was a beautiful night at Veteran's Stadium.

As usual, a lot of time went into taking care of business for NADGUG. The Executive Board met all day Sunday before the conference, but the general business meeting just *seemed* to last that long. At least three members were glad they came, though, because they walked away with big prizes after the drawing.

The NADGUG staff and Meetings Committee scheduled a day-and-a-half worth of activities for every day of the conference. With as many as six sessions for every time slice, it would have been impossible to do everything. With many activities revolving around food, it would have been dangerous even to try.

The final count of attendees reached 1,238, nearly a 40 percent gain over last year's total. The crowd was especially noticeable in the exhibit hall, which was packed both with people and new products.

"Where Great Ideas Begin" turned out to be a swan song for NADGUG coordinator Barbara Hoogasian. Even before the conference convened, Barbara knew she would soon step into a marketing position with Data General. Her many NADGUG friends hated to see her go, but they consoled themselves to know that Debra Bedrosian was there to take her place. Goodbye to Barbara, hello to Debra, and thanks to you both. Δ

Charlene Kirian, Bobbie Pressman, and Wes Thomas watch the Philadelphia Phillies rout the San Francisco Giants.

Setting up the exhibit area and wiring it for on-line access is a major part of every conference.

The first-timers reception gave new members a chance to meet one another and get a preview of conference activities.

A glimpse of the Executive Board meeting shows its past, present, and future presidents.

ch of the work done at the nference took place during rmal meetings nd around the hibit area and eminar rooms.

Something lost, something gained

Upgrading meant giving up old utilities, but gaining better performance

For a pleasant change, I have too much to write about this time. I've just returned from a great conference in Philadelphia, and our company just installed an MV/8000.

The MV/8000 installation went like clockwork. DG was as helpful as possible, and I'd like to thank Mike Dudzinski from the Cleveland office for his assistance. You've heard of weekend conversions? Well, I came in Tuesday morning, and the system was up by Wednesday morning. Of course, this was preceded by a couple of weeks of DUMPing off files.

Caveat #1 to RDOS users: If you are keeping history tapes in anything except DUMP format, and you want those files on your MV, it's going to take a *lot* of time to get them over there!

Our controller told me that for IRS reasons he needed the last three years of monthly backups transferred to the MV. I, of course, keep the monthly backups in FDUMP format, since RDOS DUMP can't handle multivolume tapes. The procedure thus becomes:

- load FDUMPed files onto the S/140
- dump the files onto tape until the DUMP fails
- take the tape over to the MV and RDOS LOAD it
- repeat the DUMP/LOAD about 20 times for each month
- DUMP_II the files off of the MV
- repeat the whole procedure 36 times.

Surely there must be a better way to do this! If AOS/VS only had an RDOS FLOAD program, the whole thing could have been avoided. Even in the worst case—if I had kept the monthly backups in a disk-image form, such as BURST or COPY—the process would have been cut by a factor of 40, and wouldn't have involved the MV at all. If I had been doing an upgrade and hadn't had access to both machines, I would have first had to load up 700 or so tapes. *Not* a very practical solution. Luckily, the good people up in Grumman's Cleveland office lent me a spare Zetaco controller, so I could be running both machines simultaneously. Without their help, I couldn't have gotten the backups over (and I can hear our controller now: "Incompatible backups? Isn't that something IBM would do?").

OK, so I got the files over. The first thing I did was a recompile. Yes, I know that the programs are object-code compatible, but I wanted to be safe, and it didn't take long. The only problem was that about half the programs that print blew up with a "FILE DOES NOT EXIST: PRINTDATE80.WS." It worked fine under RDOS. What happened?

Well, chalk this one up to the programmer. In RDOS, I try to make my copy filenames 10 characters long, but if I forget, no big deal, right? RDOS will simply truncate the name, and as long as it's unique, continue without a hitch. In VS, however, the copy filename is perfectly legal—and doesn't exist. So, no problem, just change the name and recompile. But remember to keep those names to a legal length, just in case *you* ever move to VS.

One of the problems we're having in the conversion is our 6053 terminals (luckily, there are only three of them left). There are certain fields and values in the data records that remain constant 99 percent of the time. But just in case there needs to be a change, I allow our entry people to either type over the field, or hit carriage return and leave it alone. For instance, many of our customers have blanket purchase order numbers that are in the customer file. In order entry, then, I have a screen-section field that looks like this:

```
03 VALUE-ITEM-14 LINE 22 COL 10 USING
     CUSTOMER-BLANKET-PO.
```

and my ACCEPT for this field is like so:

```
IF CUSTOMER-BLANKET-PO IS NOT = SPACES
     DISPLAY VALUE-ITEM-14, ACCEPT VALUE-
          ITEM-14.
```

This works fine under RDOS. In most circumstances, it works fine under AOS/VS. On the 6053 terminals, however, hitting a CR instead of a NEWLINE will wipe out the field completely. I can convert the CR to a LF by bringing the line up with the CHAR/NAS switch, but then the NEWLINE will wipe out the field. Now I understand why 6053s are selling so cheaply! The solution to this one, if you have a sympathetic (and slightly crazy) maintenance company, is to have them hard wire the 6053 so that both keys return a NEWLINE.

The big change in the conversion was the printers. For those of you unfamiliar

Figure 1: SBTEST benchmark results

	Elapsed time (min.)		
	CS/40	S/140	MV/8
Random write 1,000 records	2:52	0:17	0:08
Random read 1,000 records	1:28	0:07	0:05
Sequential write 10,000	5:50	1:08	0:51
Sequential read 10,000	2:47	1:07	0:29
Random read/rewrite 1,000	2:49	0:14	0:06
Sequential read/rewrite 10,000	5:06	2:50	1:11
Call program 100 times	1:33	1:22	0:48
Divide S9(10) comp by S9(5) comp giving S9(5) comp 10,000 times		0:48	0:22
Multiply S9(5) comp by S9(5) comp giving S9(10) comp 10,000 times		0:32	0:15
Add S9(5) comp to S9(10) comp 10,000		0:26	0:10
Move S9(5) comp to S9(5) comp 32,768		0:50	0:21
Move X(50) to X(50) 32,768		0:43	0:04
Null paragraph 327,679 times		0:29	0:09

with RDOS, in RDOS you have two basic choices of what to do with a print file. You may either send it directly to the printer by opening $LPT and writing to it, or you may send the files to disk. If you go to the printer, the file will either print or give you a file access error, in which case you send out a "Printer busy—will you wait?" and try again. If you go to disk, ICOBOL keeps track of the files printed in ICX.LP, and allows you to print them from the main screen using a utility called PASS. This is a full-screen display of which files are waiting to be printed, and enables you to print, delete, print certain pages, etc.

In AOS/VS, EXEC does not like you to open the printer exclusively. So, to avoid a lot of program changes to pause @LPD, restart it, and so on, we've taken to spooling everything. Not an optimum solution for our shop, but one that I can live with until I rewrite some programs.

PASS, on the other hand, was a hard utility to give up. Thanks to Gerry Manning, I didn't have to. Gerry has a program called PRINTMGR that will give you PASS on an MV. Never being one to leave well enough alone, he's expanded it; for instance, instead of one screen with 46 possible printouts (or 23, for you ICOS users), he allows up to 9,999 screens with 30 files each. If you should have a need for more than 300,000 print files on your system, give him a call—I'm sure he'll change it.

PRINTMGR can handle 20 separate queues in nine directories, binary files, templates, viewing files, and other features. All in all, it has made life a whole lot easier for us, and I promise an in-depth review soon.

As long as I'm moaning about lost utilities, I might as well mention Reorg. We have one file each month that needs to be sent to the Rubber Manufacturer's Association on tape in EBCDIC. This is one of the reasons that I justified my original tape drive purchase, and Reorg has been handling the conversion like a trooper. Last month, I got the file ready, then stopped to look in the manual for the right switches to get AOS/VS Reorg to translate to EBCDIC. Nothing was documented. Phone call time!

Yes, Reorg has no translation capability. No, I could not get a good explanation why. Someone suggested that I buy Sort/Merge.

Why? CSSORT handles everything except the EBCDIC conversion, and Reorg *used* to handle that quite nicely. Why would you take functionality out of a program when moving it to AOS/VS? Instead, I wrote a simple program with an ASCII-to-EBCDIC table in it. It's slow (about the speed of ICOS Reorg), but it works, and if anyone out there needs it, I'd be glad to pass it along.

But that's enough complaining. I don't want to give the wrong impression. I *love* this machine. For one thing, it's fast. Really fast. How fast? I've been running the SBTEST benchmark program on every machine that I've had. Some of the results are shown in Figure 1.

Not too shabby—just about twice as fast as the S/140, and immensely faster than the CS/40. These are all running unloaded, on the same (clean) disk drive, and all of the records are 100 bytes long with 10-byte keys.

But, as I said above, that's with one user. How does it perform with everyone pounding away at once? Well, lacking any tools to measure performance, I'll have to

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1-Password:				24-Encrypt password:	Y
2-Profile expire:	12-Jul-89	3-Password life:	90	25-Superuser:	N
4-Initial Program:	CLI.PR			26-Superprocess:	N
5-Initial IPC file:				27-Use IPC:	N
6-Initial directory:				28-Use console:	Y
7-Default user priority:	2	8-Max. queue priority:	0	29-Use batch:	Y
9-Unlimited son processes:	N	10-Max. son processes:	1	30-Use virtual cons.:	N
11-Disk quota (blocks):	500			31-Use modem:	N
BATCH		**NON-BATCH**		32-Change password:	Y
12-Log. addr. space:	-1	18-Log. addr. space:	-1	33-Change priority:	N
13-Min. working set:	-1	19-Min. working set:	-1	34-Change type:	N
14-Max. working set:	-1	20-Max. working set:	-1	35-Change username:	N
15-Def. user local.:	0	21-Def. user local.:	0	36-Access devices:	N
16-Use other local.:	N	22-Use other local.:	N	37-Create w/o block:	N
17-Other locality:		23-Other locality:		38-System Mgr priv.:	N
Time of last logon:	18-Jul-88 08:39			39-Access local device remotely:	N
Last password change:	15-Jul-88			40-Change address space type:	Y
Last profile change:	15-Jul-88			41-Change working set limit:	N

42-Comments:

Edit which field?
"Help line"...

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be subjective on this one: at our peak time (according to B.J.'s :SYSMGR utility), it still feels like I'm the only one at the keyboard. Of course, I don't have everyone hooked up yet, and 12 tubes isn't a lot to be pushing through an MV/8000, but I'll go one step further: even when we're running a couple of heavy batch jobs at once, performance doesn't seem to degrade.

The lack of degradation particularly surprises me, because this was one of the issues raised at the ICOBOL Roundtable at the NADGUG conference. I suppose everything is relative. Compared to what the S/140 did while running batch jobs, this is a breeze!

Next, a word about the back-up utilities. Those of you who have been reading this column for a while know that I am an absolute fanatic about backups, and have been raving for years now about the lack of a reliable, flexible RDOS back-up utility. While contemplating the move to an MV, I've been reading the RDS bulletin board about how DUMP_II performs poorly, and the ongoing controversy about a chargeable upgrade to DUMP_III. So I was more than a little nervous about VS's backups, and was really sweating when I had to reformat and reload my system disk a week after the conversion.

Let me give you a completely biased, utterly subjective view of DUMP_II: I love it. It's the best darn back-up utility I've ever used. It's faster, more flexible, and more reliable than FDUMP—and FDUMP is the *best* back-up utility that RDOS has. I won't even bother comparing it to DUMP or BURST. I may change my mind after a catastrophe or two, but for now, I think you VS people are spoiled rotten.

My word count tells me I'm running out of room for this column, and I haven't even gotten to the conference. It'll have to wait for the next column. Just to whet your appetite, all kinds of good things are happening to ICOBOL—from a 4 GB index to ICOBOL 2.00 under Unix. Details later.

To finish up, for those contemplating a move to an MV, I'd like to mention a serious compatibility problem I ran into during the upgrade. The ICOBOL software is extremely compatible, and most of my hardware will work in the MV. What no one told me is that my *electricity* isn't compatible!

My Eclipse (and the Nova that preceded it) was running on 220 volts. My MV/8000 runs on 220 volts. Unfortunately, the MV needs three-phase power, while the Eclipse can make do with good, old, simple single-phase—something our electrician discovered when he looked at the plug to decide what receptacle we needed. The only place where we use three-phase power in this entire plant is about a half a mile away.

This means that we needed to buy a 220-volt isolation transformer and about 500 feet of 10/4 wire (of which there seems to be none in northern Ohio) and run a line from the substation, at a cost that turns out to be a substantial percentage of the total system cost.

This brings a completely new meaning to the phrase "plug-compatible." In our case, the plugs aren't compatible! Δ

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

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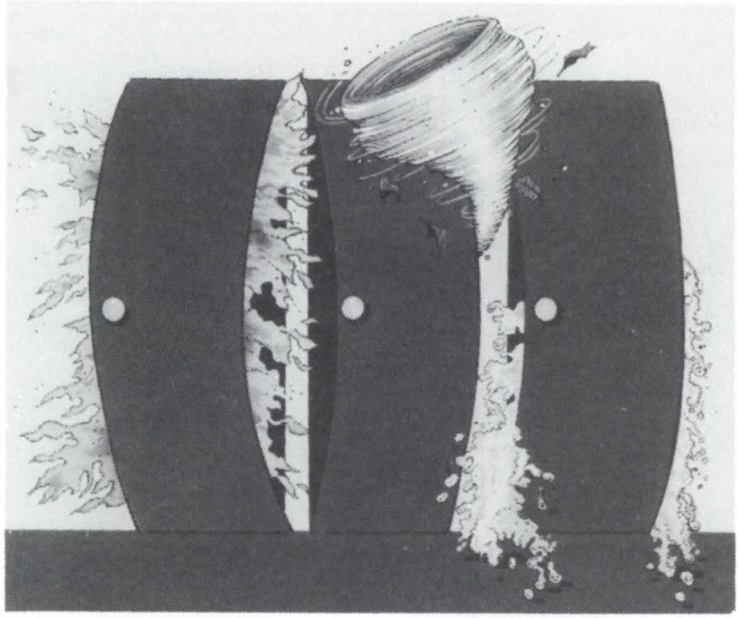

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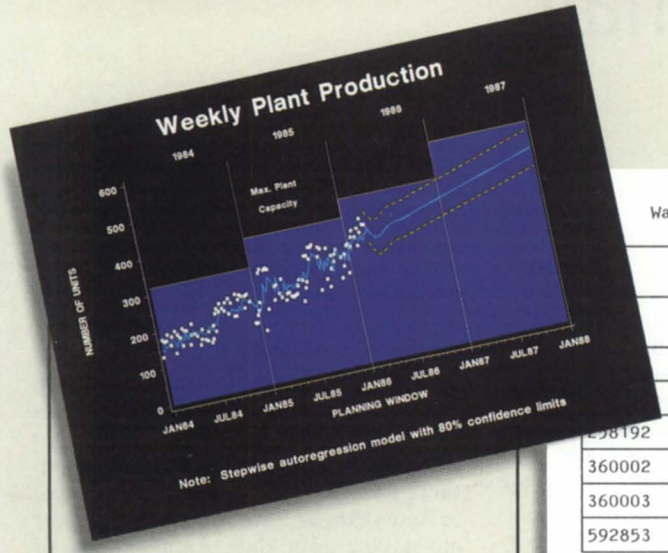

Warehouse Inventory Report - 16JAN87

	Quantity on Hand	Quantity on Order	Projected Reorder Date
	123980	10000	THU, FEB 12, 87
	89450	5000	FRI, FEB 20, 87
298192	20110	1000	MON, MAR 30, 87
360002	8585	0	TUE, FEB 10, 87
360003	15985	500	TUE, FEB 10, 87
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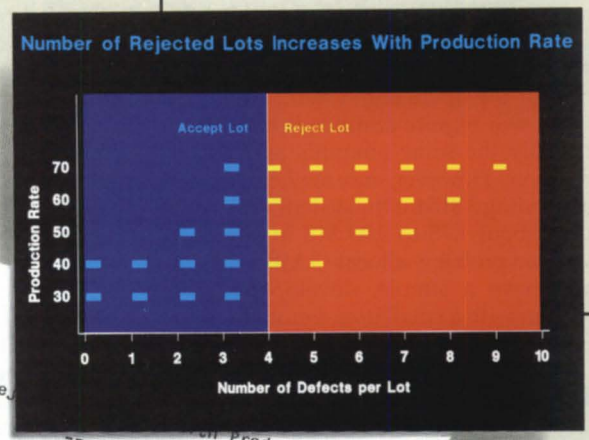

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		Lowest	Highest	Mean	Percent
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Ideas—great and small

Here's to hoping the AOS/VS 2 pricing announcement was just a trial balloon

I went to Philadelphia looking forward to a great NADGUG conference, and we certainly had one. In case you've been on another planet for the past year and hadn't heard, the title of the 1988 conference was "Where Great Ideas Begin." It seems to me that Data General might have taken that thought a little too literally: they had a great idea, and they told the users about it. However, most of the users didn't think it was so great.

As a result, we had a genuine controversial issue with so much debate that it threatened to overshadow anything else of importance offered at the conference. For those of you who missed the fun and excitement, I'll give you a rundown (from my point of view, of course) of what happened. With any luck, the issue will be resolved before this goes to print. I fear, however, that it will become an even hotter topic before we're done.

Unfinished business

Before I get started, I'll provide the answer to a question from last month concerning rev 8 memory requirements. There are none. There is no rev 8 planned at this time. However, the product that replaces rev 8 is quoted as needing 4 MB of memory for the operating system; additional users will require additional memory in roughly the same amounts as previous revisions. However, since rev 7.62 is quoted as needing 3 MB for the system, and it only uses about 1.75 to 2.00 MB in our shop, you can probably allocate 3 MB if, like us, you have a simple, development-only system with a small user count. But what is this talk about no rev 8? Read on.

The Great Idea

Data General's wonderful idea was to freeze the current version of AOS/VS with few or no major enhancements, but to continue support indefinitely. In addition, they said they will introduce a "new" operating system called AOS/VS 2 (which used to be AOS/VS rev 8.00). VS 2 will have lots of new features, and with a completely redesigned and reimplemented directory and file structure (diskworld to you internals folks), it sets the stage for years of enhancements to come. VS users will be able to upgrade to VS 2, but the cost will be more than just the effort of having to dump, reformat, and reload all of your disks, as it would have been with rev 8. Although pricing details weren't available at the conference, I got the impression that big bucks were involved.

In support of the idea

Although I have long since learned I shouldn't count on being able to understand what goes on in either corporate or female minds, that doesn't prevent me from trying to figure out both. However, after sifting through all the facts and opinions presented, there are two major supporting arguments for this plan.

In the past, particularly three and four years ago, one of the hot topics at the DG conferences I attended was the quality of software releases. The joke was that there wasn't any. In the 16-bit world, there was even talk of freezing rev 6.09 of AOS forever and ever, amen. Users were looking for any solution that would give them confidence about new releases of the operating system and various other DG products. Therefore, I conclude that part of this idea was that DG was trying to respond to those users. More on this later.

DG says that this new release cost them a fortune (16 megabucks and 200-plus man-years) to develop and that they can't afford not to charge a large upgrade fee for a large upgrade. All new users would be given the choice of the "old" AOS/VS that is rev-locked at 7.xx or the "new" AOS/VS 2 with all the neat, nifty features they've been working on for two years.

The opposition and objections

There were many points of opposition, but three main ones carry more weight individually than all the rest together.

The first is that of freezing on a release. In an informal poll taken in one of the sessions with approximately 400 attendees, there were only a few (10 or so) users who were not up to at least 7.5x. DG has done a lot to improve the quality of software releases in the last two years. The last system problem that manifested itself at any of my clients' sites was fixed in rev 6.02. Many other users have found that the later releases are far more solid (although still not perfect) than those of three to four years ago. As a result, most users are staying up-to-date. Another show of hands was requested for those people who would never go to VS 2, even if it was free. I believe only four or five people responded to this one. Hence, the overwhelming consensus is that given reliable software, the users want to stay current.

Actually, that is the only non-dollar-oriented point. It basically says to DG that for the most part, the users aren't interested in the plan they are offering, at least not now that they have their act together in the quality assurance department.

The second point concerns all of the other VS software. Scuttlebutt says that some of the features in the next rev of Xodiac require VS 2. It is conceivable that within a year or two, every VS product that DG sells and supports would have to have two versions, one for VS and one for VS 2. The users wanted to know how these products were going to be handled under this plan. DG's response that they hadn't really thought about it implied that they were still working on a practical solution. The same goes for all those patches in the rev 6 and 7 patch files that say "fixed in rev 8." Does that mean that it will never be fixed in VS, since rev 8 was renamed into a new product? Again, the response was that it had not yet been considered but would probably have to be fixed again in 7.7x or later.

The third point concerns all of those faithful people who have been paying software subscription services all of these years. For two years, they've been hearing about the new disk system and how it

would probably be in rev 7. Later, it was rescheduled to rev 8 when the true magnitude of the project became apparent. But responses to STRs, solutions, and patches from Atlanta and development frequently said "fixed in rev 8." Every indication was that rev 8 was just going to be one of many releases through the years to come. Rev 8 was also going to include first-time support for a number of hardware releases, but delays finally gave birth to revs 7.5 and 7.6 to support the new hardware that couldn't wait any longer. Now suddenly, we find out that all of this support we thought we had been paying for is going to cost us significantly more.

My reaction

Observation: It is an interesting concept.

Feeling: I am strongly against it.

Opinion: If pursued, I feel it will fail, or at least cause a lot of bad feelings, resulting in more trouble than it's worth.

The concept is indeed interesting, because it shows that DG was willing to go to great lengths to satisfy their customers. At that fateful conference several years ago, a significant number of people responded to the straw poll that they would consider freezing themselves under a solid rev of software indefinitely. When 15 to 20 percent of your clients are willing to consider this as a solution, you know you have to do something. The irony is that they did. In response to a few other suggestions at that meeting, they did more quality assurance between each release and slowed them down from every month to every two to four months. Although it took a long time to do it, DG has actually responded to many of our requests and desires at that time.

However, DG has made enough progress in improving software quality, many users (myself included) have a lot more faith in the system. Revving up to the latest software is no longer the crapshoot it used to be, and in many shops, it has been demoted to the status of a scheduling problem. Hence, I no longer have any desire to rev-lock myself. Many other users must feel the same way, since at the conference this year, perhaps only 1 or 2 percent of the attendees preferred the rev-lock solution during the straw polls taken at one of the AOS/VS sessions.

Why then am I so against it? Simple. I am satisfied with the products DG has been supplying me. Perhaps not ecstatic, but definitely content. The software has periodic improvements in functionality and can be relied on. Although the hardware requirements have jumped significantly in the last few revisions of certain pack-

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ages, some of it is to be expected considering what is happening. Our systems aren't maxxed out on memory, so this is not a problem to us. I must agree with those users who have reached the memory limit on their systems. DG must provide the new microcode and/or field upgrades needed to support the new software features on those systems as well.

I've also been looking forward to rev 8 with great anticipation. I know that it will mean an awful lot of work to upgrade myself and all of our clients, but the improved reliability of the filing system will make it all worthwhile. Several years ago, (1984 in San Diego, I think), a straw poll was taken in the AOS/VS Roundtable with several hundred attendees in the room. The discussion was the same old problem of time last accessed being updated when DUMP or DUMP_II backed up the file. A number of other old problems related to the directory structure were also under fire.

At this point, one of DG's representatives got up and stated this type of change would require a new directory structure, and he asked for a show of hands who would be willing to completely reformat every disk drive and disk pack they had in use, and reload them all to obtain this functionality. Nearly every hand in the room went up. Nearly every jaw belonging to a DG rep hit the ground. The next comment from DG was that they had no idea we wanted it that bad. Although I don't recall it, Brian Johnson says we were also asked who wanted it enough to pay a nominal upgrade fee to obtain this functionality. Again, the response was overwhelming. This year, B.J. reminded us of that, commenting that he should have been more specific about what "nominal" meant.

Revving up to the latest software is no longer the crapshoot it used to be, and in many shops, it has been demoted to the status of a scheduling problem

However, we won't be able to upgrade if the expense is high. Most of our clients won't pay it. Even if they did, our office copy would still have to come out of overhead, and we are not a big enough company to be able to swallow that size of pill without a lot of pain. Getting our clients to pay a nominal fee of $200 or $300 would not be a major problem. Getting them to pay an upgrade of $5,000 or more would be nearly impossible. They would want to see something significant for it. Unless we kick in another $2,000 for a memory board and maybe even another $5,000 to $10,000 for an additional disk unit, the only thing they will see from the improved software is a noticeably slower response. Although the new disk system is giving them a lot of additional reliability, a lot of it would probably never be noticed by unsophisticated users. Since nearly all of the new features require only a reformat and reload of all the files, it will be virtually transparent to them, so they won't truly appreciate what the release or upgrade really means.

The long and short of it is that if the upgrade expense is high, I cannot do it. Although it's not my decision in the office, it's the same one I would be forced to make in the same circumstances.

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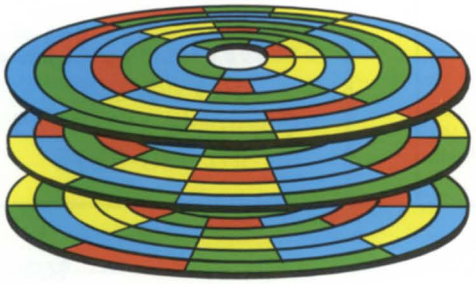

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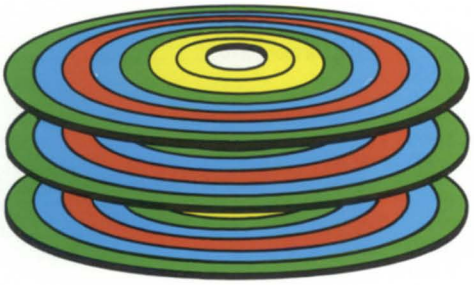
available space
frequent files
other files



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The long-term results

Here's where I look into my crystal ball. The images are not always easy to see, but this is what I imagine happening if the new plan is pursued.

DG will have two product lines to maintain instead of one. This will double the complexity of support and require a significant staff increase or support-level decrease. That is part of the reason they abandoned the AOS/DVS project. It was so similar to AOS/VS they couldn't justify having two parallel operating systems. It's also why they merged ICOS back into RDOS many years ago: it was just plain silly to support two nearly identical systems.

I find it incredible that they are considering a split like this, considering how much it will cost to support. I suspect that part of the reason for the proposed one-time upgrade charge is to raise the money to be able to gear up for higher support costs. In the long run, they would have a larger support staff to maintain, but they must be assuming this would be offset by all the new systems they hope to sell.

However, as a customer who's been around for a few years, what would you do? After years of paying for software support and subscription services without even receiving an update, RPG customers were told they had to buy a new license to be able to get the next release. CEO customers had their rude awakening last year when DG decided they would have to relicense their word processing or rev-lock themselves, since CEO-write was the new word processor. Now DG says they want to do the same to their AOS/VS operating system customers. I think a significant number of customers are going to balk. They'll cancel their software subscription contracts and just wait for the occasional "new product upgrade" every couple years. For support, they have an alternative in the bulletin boards and user groups, which have provided nearly 90 percent of my support in the past anyway.

DG will have two product lines to maintain instead of one. This will double the complexity of support and require a significant staff increase or support-level decrease

One final comment

One of DG's other arguments in support of their great idea is that they are just being competitive. They say the competition is doing it, and they're just doing the same. The reason I use DG is that their products are better than the competition, and they didn't have to resort to marketing voodoo to sell an inferior line. However, if they are going to start using the same tactics on us as the competition, I might as well go buy from the other guys, since nobody ever got fired for choosing the company with the right initials. 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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Everything in its place

A short safari through the author's computer environment

It is now September 5, and I'm going on holiday for a month and a half, which means I have to write my November, December, and January columns all in the next two days. That will leave three or four hours to pack my bags—plenty of time! As you can imagine, these next few articles will be short and simple.

(Editor's note: we'd feel sorry for putting the author under such deadline stress if we didn't know he was going to Africa to climb Kilimanjaro and tour Abu Simbel. Frankly, we're envious.)

Usually I write about programming details and/or tricks, but that takes a lot of time to do, because the code has to be written, tested, and declared bulletproof before I publish it. Since I really am "chief cook and bottle washer" for the computer system here at the Geological Survey of Canada, I thought I'd talk in more general terms about my working environment and the system I have set up for our users.

Most managers and users have their own way of doing things; I'll talk about mine, and you might pick up an idea or two. If you have a different or better way of doing something, why not write it up and send it in? But don't write me: write the editor! There have been several articles on first-hand experiences with CEO, system management, disaster recovery, etc., but not many on the actual working environment. Don't assume that what you have to say is trivial. There are many novices out there who can learn simple things from experienced users and managers.

Here is my working environment (speaking from a programmer's point of view).

One program per directory

Sounds simple, doesn't it? On the other hand, you might be surprised how many directories I see that contain half a dozen programs with no documentation or CLI macros. If the owner is run over by a truck and someone has to modify one of those programs, it will take quite a while to figure it all out. Each program should be entirely contained in a single directory, and each such directory should only contain files related to that program. I can't imagine any reasonable excuse to have a directory named XXX that contains programs YYY and ZZZ.

Directory name

Let's assume that I am going to write a program called FOO (what else?). The first thing I do is create a directory called PROGRAM_FOO.DIR (it can be of type DIR or CPD, but I recommend CPD so that you can use the SPACE command on it). You will notice that I didn't name the directory FOO, FOO.DIR, or SAM. Would you expect to find the sources or documentation for program FOO in a directory called SAM? Of course not! What about the .DIR extension; isn't it a bit redundant, since FILESTATUS/TYPE or FILESTATUS/ASSORTMENT shows that it is a directory? Perhaps, but if you have many directories and files mixed together, you can get a listing of your directories faster with:

```
) FILESTATUS +.DIR
```

than with:

```
) FILESTATUS/TYPE=DIR/TYPE=CPD +
```

since it does not require that the file type be looked up (it's also quicker to enter). Finally, what's wrong with a directory called just plain FOO? Nothing, but I use the PROGRAM_FOO.DIR format because then I can get a listing of all of my directories that contain programs with:

```
) FILESTATUS PROGRAM_+.DIR
```

Without some common prefix (or suffix), it's difficult to distinguish between directory BEER.DIR, which contains program BEER, and BEER.DIR, which contains the data base for your beer can collection.

Getting there (and back)

I also create a little macro for each directory, which allows me to get in and out of the directory with relative ease. For example, I would create macro .FOO.CLI for directory PROGRAM_FOO.DIR:

```
push
directory program_foo.dir
string &
  [!asc,211,211,211,211,211,224]FOO[!asc,225]
prompt string
```

and then a simple .FOO will go into the directory and POP will exit. A more general-purpose variation on this is the FDIR.CLI macro (see "Shortcuts," *Focus*, July 1988).

Directory contents

Now what are you going to put in each program directory in addition to the source files? If you put your main program module and all of the subroutines in one file, then the obvious name for it is FOO.F77 (assuming it is Fortran). That's not always the most efficient arrangement for a program development environment. Redundant compilation can be minimized by creating a separate disk file for each subroutine. This requires separate compilation, but you can easily recompile everything with:

```
) F77/L=F77ERRORS ([!file,+.f77])
```

This won't compile any unnecessary files, because the directory only contains files that are required by this one program (I hope).

Instead of putting *each* subroutine in a separate file, you could also create a separate file for each group of related subroutines. This is similar to the "package" in Ada. This doesn't necessarily result in redundant recompilation if one subroutine is modified, because the chances are good that it affects at least one other subroutine in the package.

If your source code INCLUDEs other files of PARAMETERS or COMMON blocks, then the obvious name for the main INCLUDE file for program FOO would be FOO.IN or FOO.F77.IN. If there are other INCLUDE files, they would have names such as:

```
FOO_COMMON.IN
FOO_IO_STUFF.IN
FOO_FILENAMES.IN
...
```

Finally, you will need a "make" or "build" or "link" macro that will do all of the required compiling and linking to completely rebuild the program from the source files. An obvious name for the macro is MAKE_FOO.CLI or BUILD_FOO.CLI. This macro is essential, since it may contain several critical compile or LINK specifications not contained in the source files. For example, MAKE_FOO.CLI might look like:

```
F77/CCOMPILE=DXY/INTEGER=2/LOGICAL=2/&
OPT=FULL FOO FOO_INIT FOO_TERM
comment–don't compile FOO_XXX with/ &
      OPT=FULL: F77 6.0 bug
F77/CCOMPILE=DXY/INTEGER=2/LOGICAL=2 &
      FOO_XXX
F77LINK/TASKS=3/MTOP=4 &
      FOO FOO_INIT  FOO_TERM FOO_XXX &
      ^PROGRAM_ANOTHER_FOO:YYY &
      TABLE/ALIGN=10
```

Without such a macro, it would be impossible to re-create the program without the author.

Documentation

Several years ago, I scanned a CEO manual that attempted to explain the concept of directories (oh, excuse me, I meant *drawers*) and files and how to use them. I shook my head in sadness when I saw a diagram of a directory structure that had such generic names as SED_FILES, COBOL_FILES, and CEO_FILES. What an absurd view of the world! Files should not be grouped by type or method of creation. If your program has any documentation, it should be in the program directory with the source files, where it belongs. This documentation may be a full-blown manual prepared with CEO (FOO.MANUAL), or a simple user guide created with SED (FOO.USERGUIDE). In addition, there may be notes for the programmers who inherit the program. These could all have .DOC filename extensions, i.e., HOW_TO_MODIFY_MENU.DOC. Other useful filenames are FOO.WARNING or the ubiquitous READ.ME.

Libraries

Suppose you have a group of subroutines that are used in many of your programs. Where do you put them? Instead of putting them in one of the program directories, why not create a separate directory and make a library out of the subroutines (see "It's a Wonderful LFE," *Focus*, September 1987)? This directory should be at the same level as your PROGRAM_+.DIR directories, and an appropriate format of the names is LIBRARY_FOOLIB.DIR. In the library, you not only have all of the source files, but a MAKE macro also:

```
MAKE_FOOLIB.CLI
FOOLIB.LB
```

To access the FOOLIB.LB file, you can make LIBRARY_FOOLIB.DIR part of your SEARCHLIST in your LOGON.CLI macro:

```
SEARCHLIST [!SEARCHLIST] &
      :UDD:GRANT:LIBRARY_FOOLIB.DIR
```

A better choice would be to make it visible only when you LINK each program, i.e., either:

```
F77LINK FOO ^LIBRARY_FOOLIB.DIR:FOOLIB.LB
```

or

```
PUSH; PROMPT POP
SEARCHLIST &
      [!SEARCHLIST] ^LIBRARY_FOOLIB.DIR
F77LINK FOO FOOLIB.LB
POP
```

Δ

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Sleaze, pleas, and DGs

The System Manager's Panel is a big draw at every NADGUG conference. Here's a summary for those who couldn't attend

:YO:SLEAZE

I made at least one major mistake at NADGUG's Conference 88 this year: I depended on two local spies for the preliminary scouting of potential sleazatoriums instead of doing a little first-hand research myself. It won't happen again, I promise.

Rocky's hometown of Philly left a lot to be desired when it came to raw material for the Sleaze Tour. Even an excursion across the Ben Franklin Bridge into New Joisy was a world-class disappointment. I suspect that there's better sleaze to be had within five miles of Heritage U.S.A. than there is in all of Philly and southern N.J. The sleaziest thing I saw in Philly was the statue of Rocky in front of the Spectrum after the baseball game.

I hope this was the calm before the storm. From what I hear, if you can't find sleaze in New Orleans, your sleaze detector needs swapping out.

:AOSVS:8.00

This was not the year to miss the NADGUG annual conference. I can't say much more at this point, except to point out that this conference had more of an effect on DG's view of the AOS/VS user base than any conference since the one three years ago—when most of the attendees surprised DG by agreeing to heroic measures (a disk offload/reload) to solve the long-standing TLA problem.

Perhaps by the time you read this the details will have become public.

:OLD_BUSINESS

Many of the problems I described with XLPT and nonstandard printers in my three-part series on XLPT last summer have been fixed in the new XLPT released with AOS/VS 7.62. However, the new XLPT still has a few obvious teething problems as I'm writing this (Labor Day weekend), and it has introduced a few new problems. The AOS XLPT situation is unchanged. As soon as I figure out the new AOS/VS XLPT situation, I'll do a column on it.

:SYSTEM_MANAGER_PANEL

Rather than do a blow-by-blow of the topics covered as I've done in previous years, I'm just going to review the major ones. Bear in mind that for any show-of-hands percentages, there were about 200 people in attendance.

Also, I reminded everybody at the panel discussion, and I'll point it out again here for the benefit of those who didn't attend: DG accepts Software Trouble Reports (STRs) from anybody. You don't have to have any kind of support contract. You get an acknowledgement by mail, and you get a response by mail once the STR is resolved. You can also check the STR by number on the OIS bulletin board periodically, or call the STR coordinator at 1-800/DG-HELPS to inquire verbally.

> The sleaziest thing I saw in Philly was the statue of Rocky in front of the Spectrum after the baseball game

In summary, if you run into a problem with a piece of software, please send in an STR about it. The most effective way to convince the software development organization that there's a recurring problem with a piece of software is to keep DG up to its neck in STRs on the problem.

In case you're one of those people without dial-out capability on your MV, I'd suggest you climb on the bandwagon as soon as possible, especially now that AOS/VS includes a program that will dial OIS for you and capture the traffic (:UTIL:OIS:OIS_CONNECTION.PR). Just a few minutes ago I used it to call OIS and inquire on the status of an STR that I submitted in July of 1987. It took only a few minutes to find out that the STR is still "under investigation" after more than a year! Now that's handy. (STR no. 129371, if you're curious). And if you don't want to use OIS, you can still call the NADGUG BBS and :SYSMGR BBS.

:DUMP_II.LOAD_II

Problems with DUMP_II/LOAD_II and/or labeled tapes surfaced again this year. A show of hands indicated that at least half of the attendees were suffering from persistent "annoyances," either due to spurious error messages from LOAD_II, problems with the lack of hard-tape error recovery facilities, or with labeled tape sets. A DG panel member indicated that the solution takes the form of using DUMP_2/LOAD_2 instead of DUMP_II/LOAD_II. In other words, kiss DUMP_II/LOAD_II goodbye. Apparently DUMP_2/LOAD_2 is a version of DMS System's famous DBR program that DG purchased, modified slightly, and is distributing as part of AOS/VS 7.62 (see directory :UTIL:NEWFS_MIGRATION on the 7.62 update media). DUMP_2/LOAD_2, with its hard-tape error recovery capability, will replace DUMP_II/LOAD_II, effective with AOS/VS 7.64. Then a very fancy version of DG's DBR will surface as a separate model number (presumably with a separate license) on some later rev of AOS/VS. If you're a bit confused, you're

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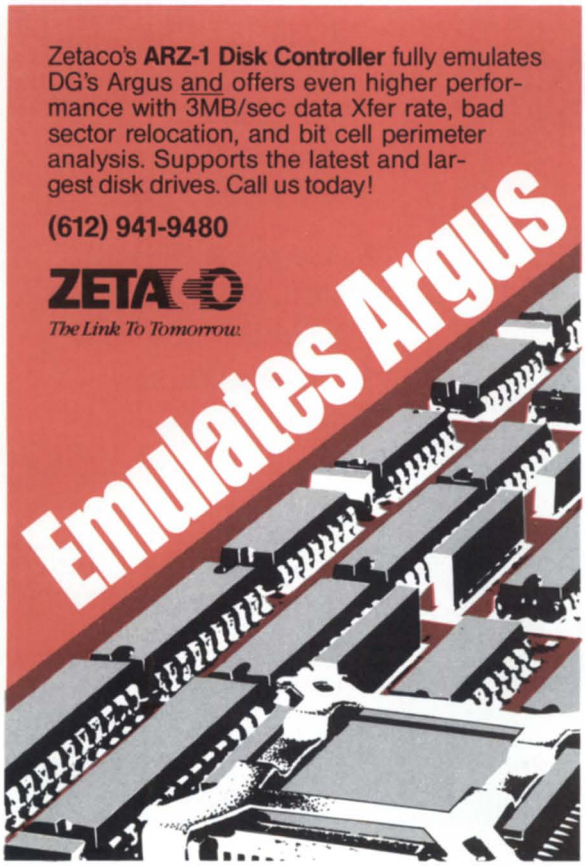

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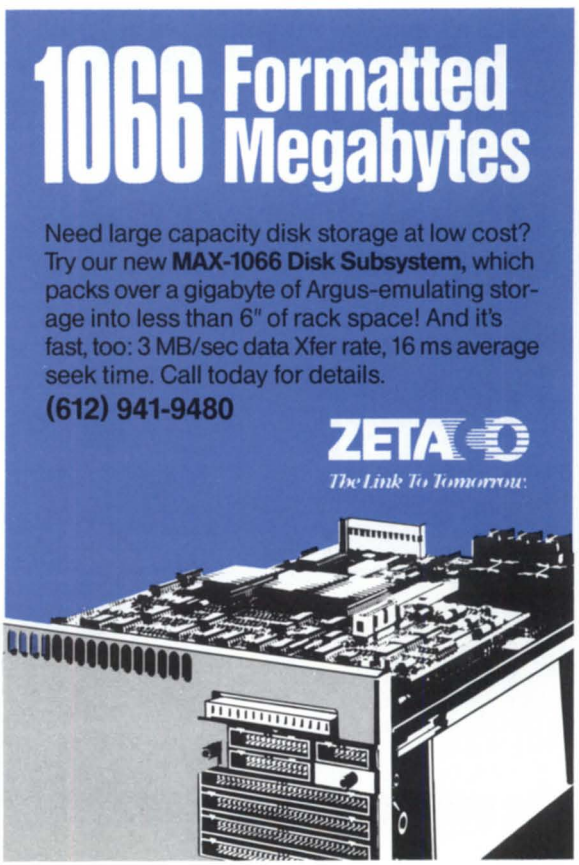

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not alone. It will suffice to say some new back-up/recovery tools are on the way, and that's good news.

:DISK_REPACKING

Someone asked whether software development has a disk repacking utility in the works to solve the problem with recovering contiguous free space to avoid the dreaded "insufficient contiguous blocks" error message. The panel indicated that nothing is on the drawing boards, effectively leaving the field wide open for Eagle Software and DMS's third-party disk repacking utilities.

:LABELED_TAPE

An intermittent problem with IBM tape labeling using DUMP_II surfaced (this may be an Agent problem, not just a DUMP_II problem). Atlanta indicated that the problem was supposed to be fixed in 7.57, but the users said it wasn't. The advice was to reopen the STR.

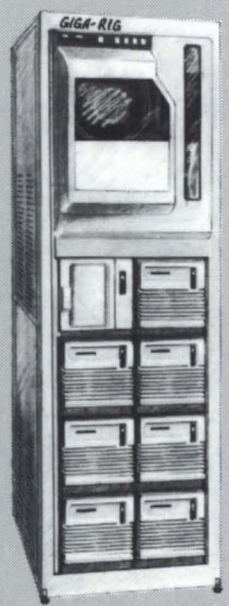
Another problem involving ANSI labels was reported. Apparently the block-size field is set to the block size minus one (a la DG native labels), instead of the block size. The STR response was that this is an implementation limitation. The attendee felt that ANSI labels should mean ANSI labels, not DG's interpretation of how ANSI labels ought to be. DG indicated that the attendee's viewpoint was obviously reasonable and that they would locate and reinvestigate the STR.

> The most effective way to convince the software development organization that there's a recurring problem with a piece of software is to keep DG up to its neck in STRs on the problem

:UPDATE:+UPDATE+.CLI

The UPDATE.CLI macro set came up for the second year in a row. For those of you who haven't noticed, the UPDATE.CLI macro that started shipping with AOS/VS 7.5x consumes roughly the same amount of CPU time as a program to simulate the entire U.S. economy from 1917 to the present (57 CPU minutes on my MV/4000, almost 20 CPU minutes on one attendee's MV/10000). The author of the macro happened to be in the audience and responded that the macro has a lot of work to do and therefore requires a non-trivial amount of CPU time. The attendee who brought up the subject said that he felt the function should be done with a short, script-driven PL/I or Fortran program. I agree. Until that happens, I've put an item on the :SYSMGR BBS this morning that accomplishes the same thing as the UPDATE.CLI macro, but it does it in less than one CPU minute on my MV/4000. I've also sent a copy to the author of UPDATE.CLI. Perhaps it will surface in

for **Nova, Eclipse, and MV Users**



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some future rev of AOS/VS.

Additionally, another attendee brought up the fact that in spite of its complexity and double/triple checking, UPDATE.CLI trashes the file structure when :UTIL is a link to somewhere else. It cost him six hours of rebuilding the disk and updating it using an edited version of the UPDATE.CLI script file. Hmmm.

At this point, I volunteered to put a macro on the :SYSMGR BBS that we use to distribute update files in one-tenth the time that it takes UPDATE.CLI. On the way back to Frisco, I thought this one over and changed my mind. I'd rather keep the pressure on DG to produce a simple update script processing program like one of the other major minicomputer manufacturers has had for years. Their scripts even take care of deleting obsolete files (hint hint, nudge nudge).

:NEW_XLPT.PR

AOS/VS 7.62 includes a new XLPT, which apparently has some teething problems, notably related to EXEC-XLPT communication timing difficulties and the use of binary clean-up files. None of the problems we had were insurmountable, but several were annoying, like the fact that the printer stops in mid-page on the last page printed.

> The attendee felt that ANSI labels should mean ANSI labels, not DG's interpretation of how ANSI labels ought to be

Whoever wrote the new XLPT missed Rule #1: it should work exactly the same as the old version, including quirks and curios, and any new features should be a superset of the old features. The guys who did the new EXEC on 7.5x understood that rule perfectly.

:PASSWORD_CONTROL

There was a request for a password change time stamp in the profile. DG indicates that its PCS product has similar facilities (for an extra cost), and that no plans are in the works for this feature to be included as a standard part of AOS/VS, but that it will be considered. Also, there was a comment from the floor (perhaps from the questioner) that they were getting tired of finding basic items that should be part of the basic system software are only available as extra-cost add-ons.

:PORT_CONTENTION

A facility to force a logoff after a specified period of time (for a variety of reasons) was requested. Answers were to investigate Eagle Software's Terminator product, which is part of their VS Toolbox (I don't know if Terminator is available separately), or a public-domain program

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that was published in a back issue of *Focus ("Watchdog," by Sharon Lindley, Robert McKosky, and John Chapman, in the December 1985 issue–ed.)*. Or you can wait for DG's new Portwatch utility, which will eventually be made available by the SPSD division.

:FILE_DOES_NOT_EXIST

There was some discussion regarding various pieces of software, CEO 3.00 in particular, which abort with "ERROR, FILE DOES NOT EXIST," but don't show the filename that caused the error. The impression I got from the discussion was that many users assume this is an operating system problem. The real problem is that many programmers react to unexpected errors by simply returning to the CLI with the error code, instead of writing the extra logic that it takes to recognize that the error was related to a filename and report both the filename and the error code. There is no fix that can be made to the operating system, or to some individual piece of software like CLI, to get around this problem; it's simply bad programming in the particular application program involved. Other than publishing and enforcing proper programming practices in the software development groups, there's not much else that can be done about this problem.

:OIS

From a show of hands, it was pretty clear that there are some problems with the usability of OIS. A majority of those present appeared to have abandoned it except for when there is no other recourse. I hate to admit it, but I fall into that group. The only thing I can see saving OIS is a redesign to make it easier to navigate and use. Every time I use it, it ends up being an exercise in frustration.

At the conference, DG announced that OIS is free to NADGUG members until Dec 31, 1988. No purchase order or credit card number is required.

Rather than belabor the OIS topic, I'm going to stop here. I hope the apparent problems with the design of OIS were not lost on the DG panel members.

:OIS:AUTO_LOGOFF_V.S._P.O.

Several users who have difficulty with issuing "open" purchase orders for OIS to cover their use in excess of the free hour per month were interested in having an option whereby they would simply be warned as the end of their free hour approached, and then ultimately logged off at the one-hour point. They wouldn't need to deal with purchase orders. This is the way that most PC-based BBS software works. I'm including this suggestion in my umbrella STR on OIS on the behalf of everyone present.

:SHARED_LIBS

For the second year in a row, there was interest in when the shared library facility would be available for the rest of the languages, and when the utility .PRs supplied with AOS/VS would start using the shared library facility.

The general consensus was that all "current" compiled languages that use LANG_RT support shared libraries, and that the utility .PR issue would get handled eventually, but nobody wanted to speculate as to when.

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:DFMTR

For more years than I can count, DFMTR has been a recurring topic at NADGUG conferences. This year was no exception.

For those of you who aren't aware of the problems, there are two: (1) DFMTR scores a block as bad whether the error was a soft one recoverable in one retry (sometimes caused by cosmic rays or noisy circuitry, not bad media) or a hard error that defies correction, (2) DFMTR makes no attempt to copy the data in the newly discovered bad block to the good block in the remap area, and (3) there's no way to find out which file is involved, short of purchasing a third-party software package.

The net result is usually that your main INFOS data base ends up with a block of zeros where there used to be data or index information, and that's fatal to the file contents.

My memory is that early revs of AOS 16-bit DFMTR did attempt to copy the data from the bad block, usually successfully. This "feature" probably got lost during the translation to AOS/VS.

In any event, fixing this problem would require an average programmer to spend less than one hour on the source code, but it still hasn't been resolved. And it appears no resolution is in sight. The DG panel members nodded thoughtfully, and dutifully took notes, just like they've done for the last umpteen years, but no commitment was voiced.

This problem is so serious around our shop that we finally broke down a couple of years ago and wrote a program to deal with it. It displays the bad block number list and lets you indicate which ones it should attempt to salvage and copy to the remap area. It has saved my life more times than I can count. In previous years, I avoided making this program available in order to keep some pressure on DG to fix DFMTR, but I've waited long enough. The program is on the BBS as item AOSVS16: UTILS:BBRESCUE. So there.

:TLA

The age-old file archiving problem reared its ugly head for the *n*th year in a row. It's fixed in the New File System, but only the new DUMP_3 supports the "suppress TLA" option currently. Obviously, MOVE/NO_TLA should be high on the list of other commands that allows overriding the TLA.

:SERIAL_VFUS

A user pointed out that there is currently no way to take advantage of high-speed partial page slewing using the VFU options built into several DG and third-party printers due to lack of support in XLPT. Two problems: some of the VFUs on DG printers are not compatible with Data Products' EVFU (the only VFU that XLPT knows how to deal with), and even printers that are equipped with Data Products-compatible EVFU can't be handled if they are configured on CON ports using serial-parallel converters.

"Sounds like a reasonable request," said a DG panel member.

:NEW_XLPT_PROBLEMS

If the first printer STARTed is not ready, then XLPT doesn't come up for the remaining printers. Also, XLPTs aimed at a pipe-type file don't work, although the restriction seems arbitrary. The idea of aiming it at a pipe was an attempt to allow some filtering of the data before it gets to the printer. Some panel members felt this was a high-overhead way to deal with the

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problem (I agree), but until the EXEC-XLPT interface specs are published (a DG panel member alluded that they might be at some point), it seems that a pipe is the only easy workaround.

:WHY_NOT_BOOT_FROM_OTHER_UNITS?

It used to be possible to boot AOS/VS from a disk unit other than unit zero by booting using zero and responding to the master logical disk question with DPF1 or whatever unit you wanted to boot. This facility seems to have disappeared beginning with the new user-friendly INSTL as of AOS/VS rev 7.5x, although DFMTR still asks "System disk?" for every unit.

The DG panel members and many of the attendees seemed surprised that this facility had gone away (I guess not many ever used it, but I did), and a DG panel member indicated that he would look into it.

:XTS_USING_DIAL_UP_ISC

Xodiac can be instructed to automatically reestablish a broken synchronous connection through an Intelligent Synchronous Controller (ISC). Somebody from the audience said they were having trouble getting this feature to work with rev 5.30.07 of XTS. Sometimes the connection would come back up, sometimes not. Since the problem was only happening once or twice a month, they hadn't been able to reproduce it.

One of the panel members nodded that he knew about the problem and said it was fixed in 5.40.

:XLPT:CLEANUP_FILES

There was some interest in XLPT set-up files as opposed to clean-up files. Unfortunately, the subject of XLPTs was in a state of flux at the time of the panel discussion because of the recent release of a completely rewritten XLPT with AOS/VS 7.62. The DG panel members and the 7.62 users present felt that the new XLPT probably addresses the problem, despite some teething problems and inconsistencies with respect to how the new XLPT works versus the way that the old XLPT did.

:LONG_SEARCHLISTS

There appears to be a lot of interest in searchlists longer than eight directories. There was spontaneous applause when this subject came up. Also applause, albeit less, for more than eight levels of subdirectories.

:MISSING_TOPICS

For the first year in my memory, the subject of auto-baud detect did not come up at either the System Manager's Panel or the AOS/VS Roundtable. What gives? As far as I know, AOS[/VS] shares the distinction of lacking this feature with only one other operating system I know of: MS-DOS. Pretty embarrassing. Δ

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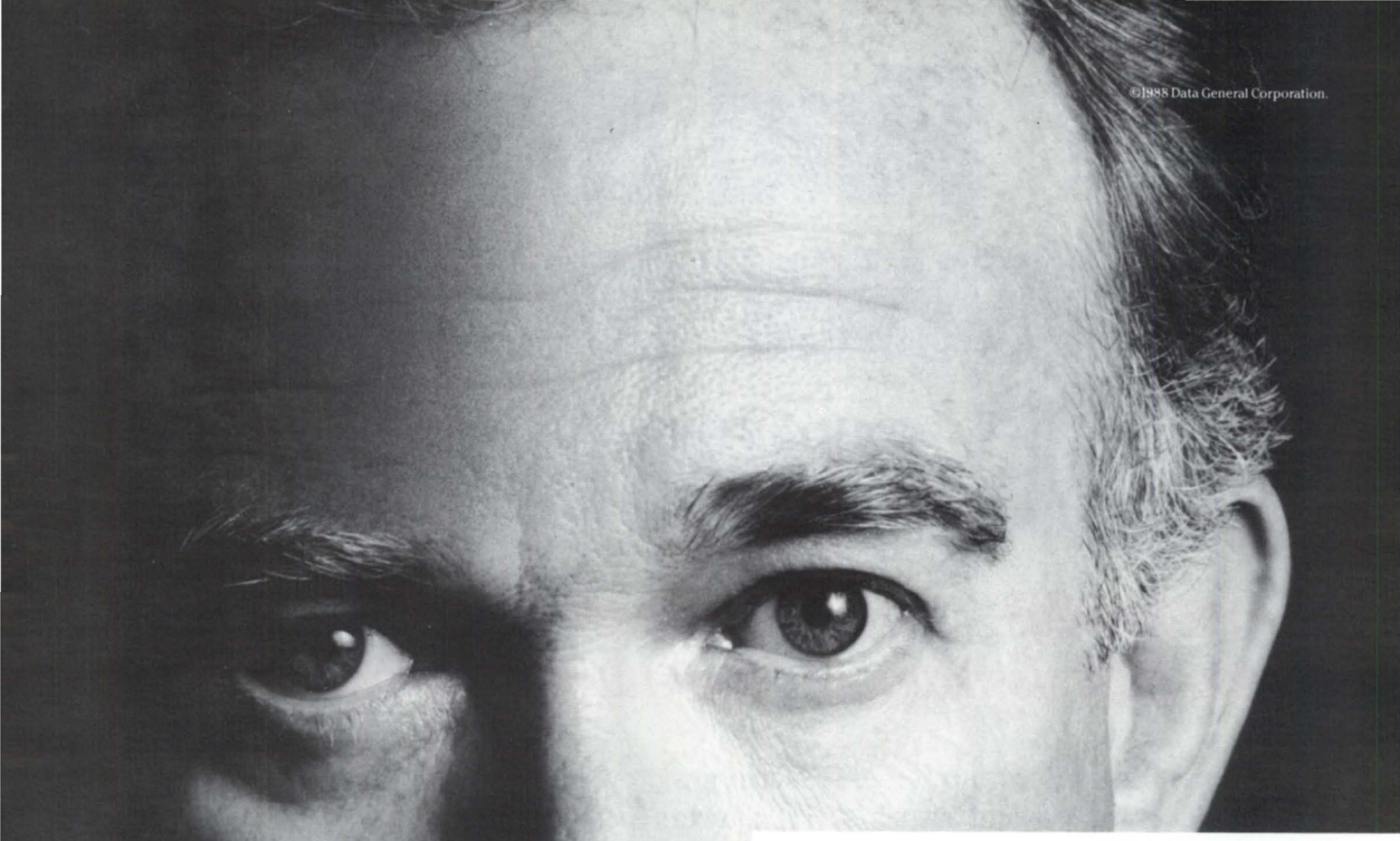

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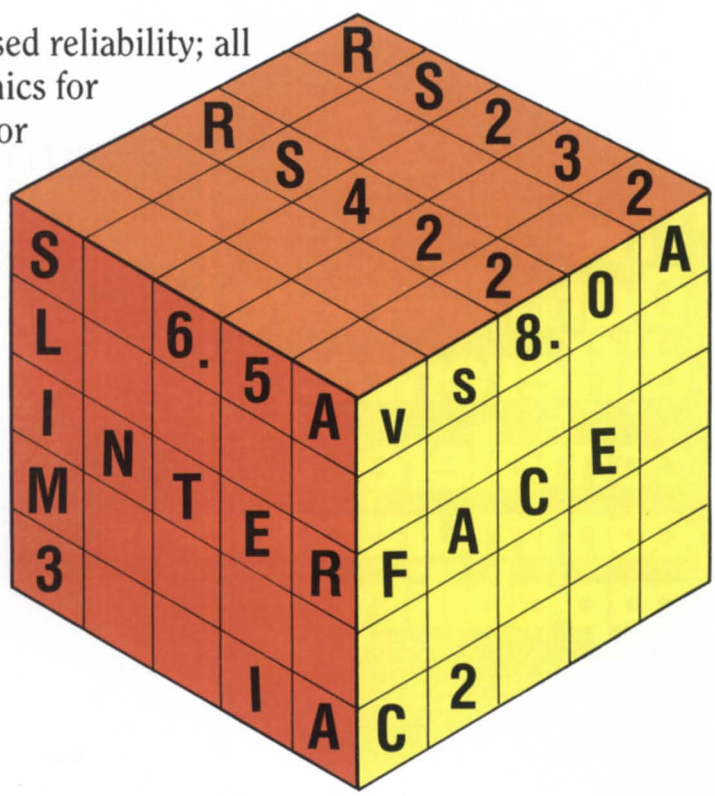

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A LAN tutorial

A close look at local area networks sheds light on communications buzzwords. Part II

Last month, I explained the differences between three of the wiring options available for local area networks: StarLAN, Arcnet, and Token Ring. This month, I'll finish up my discussion of the physical level of the seven-layer network model by describing the advantages and disadvantages of Ethernet and Lattisnet. Next month, I'll move on to an explanation of transport protocols, file servers, and print servers. I hope by the end of this tutorial you will not only understand your LAN better, but also have learned about the many options you have with network software.

Ethernet

Ethernet was invented by Xerox in 1976, after Xerox signed up endorsements from DEC and Intel in order to get it into the marketplace. It is now the most widely used cabling scheme for local area networks.

Operating at a clock rate of 10 mbps, it can handle most LAN tasks. Ethernet is the primary scheme adopted by IEEE for its 802.3 standard.

Ethernet uses coaxial cable in a bus topology. Networks are divided into segments. A segment is one or more pieces of coax connected end to end (no branching) with a terminating resistor at each end. Segments may be built of thick Ethernet cable (with a maximum length of 500 meters per segment) or thin cable (limited to 185 meters per segment). Thin cable is RG-58 and is often referred to as "thinnet" or "cheapernet," reflecting its lower cost.

In addition to its lower cost per foot, RG-58 is easier to install and can be run directly to the back of the workstation, where it can be connected directly to the transceivers that are built into most PC Ethernet controllers.

When using standard, thick Ethernet, a transceiver is attached to the main coaxial bus, and a transceiver cable is run (up to 50 meters) to the controller.

In practice, a mix of thick and thin cables are used for all but the simplest installations, as segments may be connected via $1,500 repeaters with no degradation of performance. Whereas thin cable is excellent for connecting clusters of workstations, the requirement that it extend all the way to each PC and from there to the next, and so on, quickly burns up its maximum 185-meter segment length. Multiple thin segments are typically connected to a thick cable backbone segment.

Although Ethernet cable costs more per foot than the twisted-pair wiring used by other LANs, the total cost is often less. For example, consider that a single Ethernet cable can be run throughout a building, and individual devices or clusters of devices may be simply attached at convenient points along the way. With the twisted-pair wiring schemes used by StarLAN and Token Ring, it is often necessary to have multiple wires along the same path in order to connect to multiple devices.

Ethernet controllers are less expensive than those for the Token Ring because of greater demand and a simpler design, but are more expensive than those for Arcnet.

Data General resells the Ungermann-Bass controller as a DG PLC (Professional LAN Controller, model 4585) at a list price of $825. A little-known fact is that DG/PC*I also supports the 3Com #C501 controller, which is also supported by PC/VS and is available for $495.

Connection pricing, without cabling and installation, is therefore just the price of the controller, assuming built-in transceivers are used:

Controller	$495
Total per connection	$495

If it's not possible to connect a PC directly to a segment of RG-58, a transceiver or Media Access Unit (MAU) and appropriate transceiver cable must be used. MAUs cost between $295 and $350.

Ethernet is the king of LANs as far as software goes, for it supports virtually all software, including Rational Data Systems' PC/VS and Data General's DG/PC*I. Of course, Novell's Netware also runs on Ethernet.

Novell's Netware supports a wide variety of Ethernet controllers, including some that are less expensive than 3Com's. As is the case with all LANs supported by Netware, PC/VS can be used to communicate with an MV computer host. In the case of Ethernet, however, the MV is connected directly to the same LAN used by the PCs; the Novell server does not need to bridge one LAN technology to another.

There are many benefits to using Ethernet:

- **Performance**—At 10 mbps, Ethernet has a greater capacity than all other LANs discussed.
- **Standardization**—Ethernet's widespread use has allowed multiple vendors to enter the hardware market. Competitive pressures continue to lower the prices of Ethernet hardware.
- **Configuration flexibility**—By combining thick and thin cables, fiber-optic links, and twisted-pair schemes such as Lattisnet (see next section), Ethernet can handle complex and large configurations unsuitable for other technologies.
- **Software compatibility**—There are more software options available to Ethernet users than to users of other LANs.
- **A corporate resource**—Ethernets are commonly used for purposes other than PC integration. For example, Data General's new ITC controllers and Term Servers allow an Ethernet to be used for the interconnection of terminals instead of traditional point-to-point RS-232C or RS-422 wiring. Many other applications and vendors can share an Ethernet as well.

However, Ethernet does have its disadvantages:

- **Cost**—Although the cabling costs of Ethernet make it the most expensive of the popular LANs to install, its great popularity and the advent of new chips such as Intel's 82595 will make Ethernet controllers for less than $100 a reality within a few years.
- **Installation**—Coax-based Ethernets must be designed and installed according to exact specifications. If you decide to implement an Ethernet, I strongly recommend that you contact an experienced vendor for assistance in designing your installation.

Lattisnet

Originally known as Astranet, this technology was developed at Xerox Palo Alto Research Center (PARC), and was licensed to a new spin-off company named Synoptics. At the data-link layer, it is identical to, and compatible with, Ethernet. However, unshielded twisted-pair wiring is used instead of coaxial cable at the physical layer, resulting in substantially lower cabling costs.

Similar to StarLAN or Token Ring, Lattisnet uses centralized hubs or concentrators, from which twisted-pair wiring is

run to each computer or workstation. A model 101 concentrator costs $19,300 when configured for 64 devices, its maximum. The model 1010 concentrator can connect up to 24 devices and costs $7,925 in that configuration.

Concentrators may be connected to one another via fiber-optic cable as long as 2,000 meters (6,600 feet). As much as 110 meters (360 feet) may be run from the concentrators to Lattisnet transceivers, which cost $155 each. Coming out the other side of the Lattisnet transceiver is the standard IEEE 802.3 connector that connects to any Ethernet controller via a 50-meter (maximum) transceiver cable.

In other words, Lattisnet is a plug-compatible, end-to-end replacement for Ethernet. In fact, using standard repeaters, you can mix Lattisnet and Ethernet in the same network.

As summarized above, the costs include a transceiver ($155) and a concentrator ($330 per port), in addition to the standard Ethernet controller.

Recently, Synoptics has reduced the Lattisnet technology down to a single chip and has sold that chip to various controller manufacturers (Novell, Western Digital, and Micom/Interlan), who are making boards with built-in transceivers. This has substantially reduced the cost of a Lattisnet installation, as reflected in the following calculations:

Controller with transceiver	$595
Concentrator (per port)	$330
Total per connection	$925

Because Lattisnet really is Ethernet, it can be used with any Ethernet-compatible software, including PC/VS, Netware, and DG/PC*I. When used with the combination of Novell and PC/VS, the on-board transceivers can be used, keeping the price low.

Lattisnet has two advantages:

• **Performance**—Because Lattisnet is identical to Ethernet at the data-link layer, it operates at the same 10 mbps.

• **Ethernet compatible**—All of the controllers and software that operate with standard Ethernet will operate with Lattisnet. It is also simple to build networks that contain both Lattisnet and standard Ethernet.

It also has two disadvantages:

• **High cost**—Because of the required concentrator, Lattisnet typically costs more than Ethernet. However, when the cost of cable installation is factored in, Lattisnet is frequently less expensive.

• **Lack of standardization**—Due to the tremendous advantages of a 10 mbps, twisted-pair LAN, the IEEE 802.3 committee is currently in a stalemate trying to resolve the differences of its members. Originally, the IEEE panel had agreed on the Lattisnet standard offered by Synoptics, Hewlett-Packard, and others, but now the vendors are fighting over voltages, wave forms, and transceiver designs. Other vendors, each with their own approach, include DEC, 3Com, National Semiconductor, and AT&T. In the meantime, don't expect to see an IEEE standard for 10 mbps twisted pair until late in 1988. Δ

Doug Kaye is a partner in Rational Data Systems, 5725 Paradise Dr., Corte Madera, CA 94925; 415/924-0840. This article is an excerpt from the "Rational Data Systems Report on PC Integration." For a free copy, contact Rational Data Systems at 330 N. Brand Blvd., Glendale, CA 91203; 818/507-4235. *Copyright © 1988 Rational Data Systems.*

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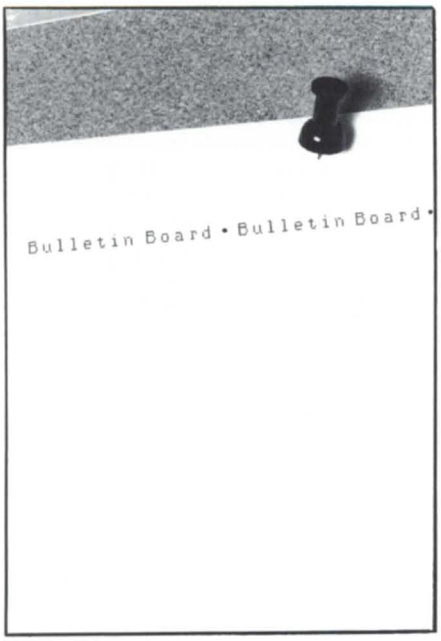
Bits and bytes from the bulletin board



Business BASIC rev 5
From: Joe Carrico

[After upgrading from BB 4.2], we had a problem with some A/P software from Maxon. I think it has to do with their use of STMB 1 and 2. As a workaround until they can get the problem corrected at Maxon, we're running the A/P software under BB 4.20. One other problem we have is printing to remote printers through a Xodiac network. We've had problems with this before and are waiting for some replacement modules from DG to correct the problems. Overall, everything seems to be working fine. Our performance improvements range from 30 percent to 50 percent.

From: Kent Florian

That sounds promising. I'll give it a thorough workout after I get the OK from our software vendor. I'll let you know if I find any problems.

From: Joe Carrico

Just make sure you get all of the replacement modules that are available. We were a beta site and got all updates as soon as they came from the developers. When we first went live with it, we already had two sets of replacement models beyond the official release tape. We've received another one since then, and my local SE, who's worked really closely with us on this one, tells me that there is one more on the way. We've been pleased with the product and all of the support we've received from DG. By the way, we've been using BB since 1979 when we first bought it and two S/130s from TAC. Now we're running it on five MVs worldwide. We've come a long way!

More on DUMP/LOAD
From: Tom Manning

With all the discussion on this BBS re-

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garding DUMPs and LOADs in all their various flavors, i.e., DUMP, DUMP_II, DUMP_III, and DBR DUMP, etc., I have a couple basic questions regarding backing up our production INFOS_II data bases. I'm looking for some suggestions, so feel free!

Currently, early in the morning, after we've completed our nightly batch processing, we bring our "on-line" system up for all the users and commence backups of the data base (approximately 750 MB) using DDUMP/ARCH/DUMPOPEN to labeled tape. This allows us to back up the standard VOLs, while the users utilize the INFOS DVLs. In case of a crash, we DLOAD the ARCHIVE tapes, run IRECOVER/DELETE, and replay the COMLOG tapes. We've had numerous problems with recent revs of INFOS (anything newer than 4.10) corrupting the data base. We suspect space management and/or compressed records or keys are not properly DLOADing, or something similar. Having drawn a complete blank from DG (quote: "Rev 4.20 is solid"), we're going to give DMS a try. Questions: (1) As long as I ensure that no checkpoints are run during the backup, can I still allow the users access to the data base while I back up the standard volumes? (2) In case of a crash, will I be able to DBRLOAD the VOLs and replay the COMLOG, or does DDUMP somehow set a flag on the data base that will cause a mismatch between the data base and the log tape? (3) Are there any other pitfalls to watch out for? Thanks in advance!

From: Wendell Putney

I just spoke with a sales representative at DMS Systems. From the horse's mouth: DUMP_III/LOAD_III is DBR. DG has bought all the rights to the product, including maintenance and support of existing DBR licensees. After September 1 (I believe), you will have to go to DG to obtain this excellent product. License fees are expected to be the same.

DMS is also coming out with a disk optimizer! It will mostly eliminate the need to DUMP/LOAD your disk, but in addition, it is supposed to provide performance improvements beyond reducing file fragmentation. Looks like a rival to Eagle's product. Isn't that special: two good products from two good companies, and neither one of them is DG!

From: Tim Boyer

Speaking of optimizers, have you read about B.J.'s new product? It optimizes on the fly, along with fixing element sizes and lots of other good things. As soon as I can, I'm getting a copy.

UPDATE.CLI

From: Stan Gula

Speaking of Update, I can't believe what a pig it is! I still haven't gotten around to bringing up 7.62, but just yesterday, I had to gen a new 7.60 system. Update only had to apply patches to the SYS.PR (I wouldn't have had to update anything else), but the damned macro took almost five minutes just to get to the point where it started up the patch utility. This was on a totally unloaded MV/8000 model II with tons of memory, and I was the only user on CON2. I tried to unravel the macros to see why it could possibly be so slow, and got tired of it. In the old days (before rev 7), we had a simple macro that would apply all the patches in an update tape really fast and

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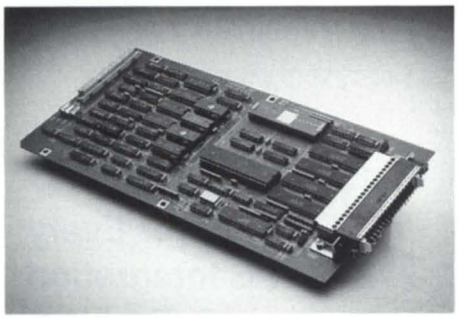

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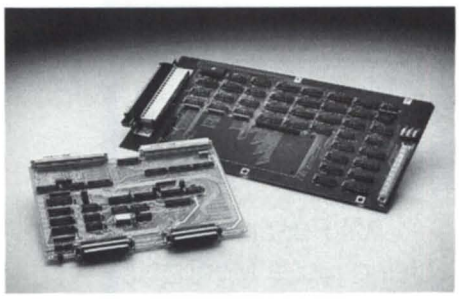

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automated. We used it from rev 4 all the way through the end of rev 6 and never had a problem. Looks like I'm going to have to invest the time to write a new UPDATER.PR or something, so I can nix the Update facility. I remember trying to update to one of the 7.5x versions. Update never completed successfully, and we spent hours trying to back out and restart. Anyone else feel that Update is more trouble than it's worth? Does anyone really like it better than the old ways we used to update?

From: Randy Berndt

Actually, you can cheat and read UPDATE_SCRIPT.CLI. It contains all the steps Update will take. Then do the MOVEs yourself, and then X PATCH/Y/T=system.pr/P=7.60_AOSVS_PAT. That's what I did, and it works quite quickly.

From: Jeff Campbell

You cheated!

Hardware

From: Glenn Diehl

Does anyone know of any quality, reliable products that might help improve the performance of a "stock" MV/8000 model II? We are currently running 8 MB, three 354 MB disks, four IAC 8s, and an Ethernet controller (ILC). Examples of what we're looking for: CPU accelerators, smarter I/O controllers, faster memory, etc. Thanks.

From: Michael Travis

I'm told that the MV/8000 is synchronous, so there's no way to speed it up with faster memory. DG will sell you an FP accelerator, which speeds up double-precision FP (but not single). You can go to 16 MB of memory with third-party memory (e.g., SCIP). There are faster disks, third party and DG (look into the new shadow 8-inch disks from DG).

C programming

From: Doug Rady

When given enough rope, most [people] will hang themselves. C assumes the programmer knows what to do and how to do it right. I get really frustrated at times with PL/I telling me that I can't do something. C pointer flexibility makes up for a lot of the bad things about C. After pimping myself a couple of times with the word/byte pointer thing, I now explicitly cast my pointer assignments. Pointer stuff is usually one of the first things I check when something goes off to the Twilight Zone or just crashes and burns. Becomes habit after a while. SWAT is what really makes C all right under AOS/VS.

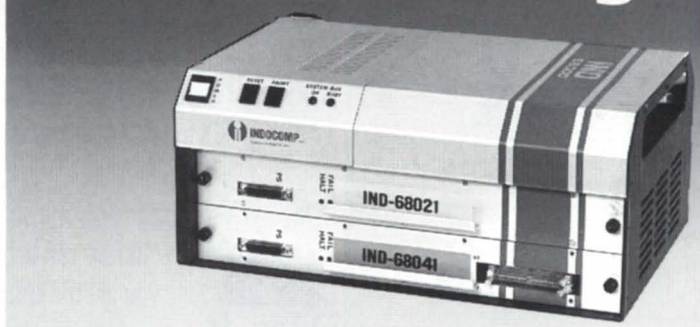
From: Michael Meissner

I always use the quip: "Most languages will allow you to hang yourself given enough rope; C will go out to the hardware store and buy the rope for you." By the way, 4.00 C will support step-points and watch-points in SWAT. Once you've used them, you wonder how you ever got along without them.

From: Doug Rady

Yes, I know! Having used them on PDP-11 and VAX languages, I've missed them! Ever notice that as of late, PL/I seems to be the last language that DG upgrades? No STEP and no shared libraries as yet, although 2.50 is due "soon now." Maybe

Is your computer smart enough?



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then a SELECT won't add 4 KB to a program. Must say that the C standards group has done a good job of not destroying the language—a rarity these days.

From: David Down

It really boils down to C assuming you really know what you're doing and letting you do just about anything you want, unlike Pascal, which assumes you probably don't know what you're doing and puts you on a leash.

From: Dell Setzer

I've always seen C as being like a sports car: it goes fast, lets you do what you want, but watch out for the curves. (Oh, you want me to take this character pointer and cast it into a pointer to function and execute it? No problem, boss!) I'm often reminded of Wiley E. Coyote chasing the roadrunner off a cliff, not realizing that there's nothing below him. His legs look like a windmill, with little puffs of dust still coming from his feet.

From: Tom Scheiderich

I like to think of C as Pascal run wild!

From: Doug Rady

I still have to tell people around here that they have to init auto variables in PL/I or C before they make any assumptions about values. As for people rewriting malloc, they deserve things that can't be posted on this board. Same for people intent on reinventing the wheel by rewriting the standard libraries. It's obvious that some people don't realize that there is more to the world than the box they work on and the O/S they use.

Xmodem for Macintosh

From: Ray Walther

I am attempting to transfer text files from my DG to our Mac II using TEX on the DG and Versaterm on the Mac. When I transfer the file using Xmodem, I get all the data, but the spacing goes haywire. I'm obviously not doing something right (or I'm not holding my mouth right). If anyone can point me in the right direction, it would be appreciated! Thanks.

From: David Down

Did you specify option "k" (and not "i") for TEX to select NEWLINE conversion for the Mac? This will convert NLs to CRs as used on the Mac.

From: Ray Walther

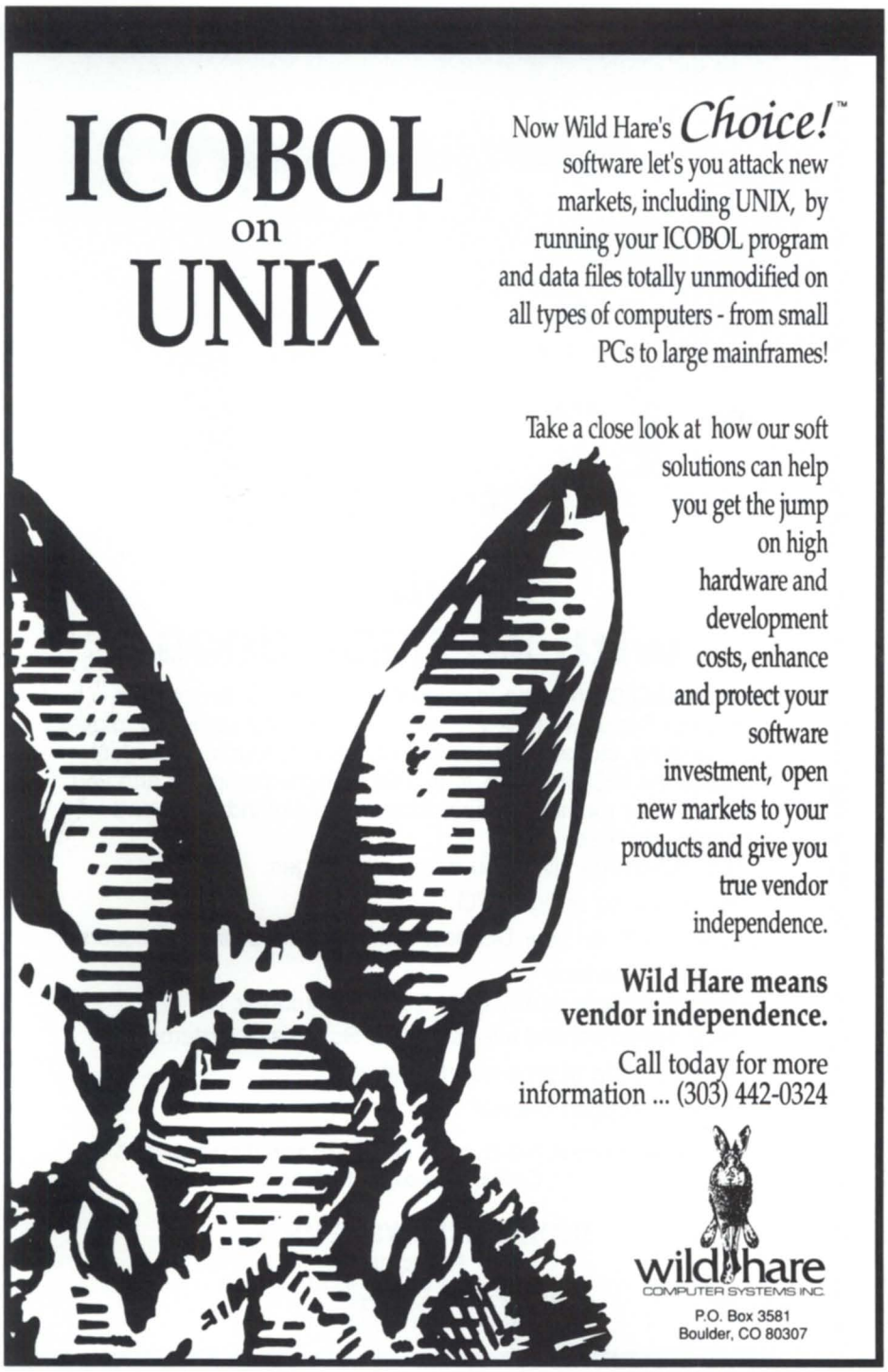
Thanks for the feedback. I've located the problem. It appears that the format on the Mac was set up for the Times font, and the transmission was set up for Courier. If I convert back to Courier, the problem goes away. Now the problem is that they want the document in Times, not Courier. Oh well, users are never satisfied.

From: Mark Chappell

When downloading a dump file on a Mac using Versaterm, what Xmodem protocol should be used? Versaterm has Mac Xmodem, text Xmodem, and Macbinary Xmodem.

From: David Down

The latest rev of Versaterm has binary Xmodem and three flavors of Ymodem. Don't use text mode on a dump file; it will kill it. If you want to use Macbinary, you will need to use "ki" options with TEX. If you are downloading from a BBS, you must be able to do a simple binary Xmodem. Δ



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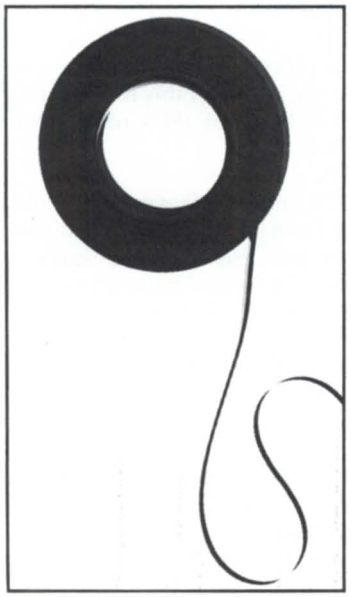
A complete listing of the NADGUG software library



NADGUG librarian Randy Berndt is now able to make the software library available to users of MV/2000 systems. Previously, MV/2000 tapes couldn't be serviced, but Kevin Danzig of the Danzig Corporation in Northvale, New Jersey, has volunteered to handle the conversions. All NADGUG members interested in receiving the NADGUG software collection should send a 1,200-foot tape to:

Randy Berndt
American Urological Association
6750 West Loop South, #900
Bellaire, Texas 77401

or call 713/665-7500. (MV/2000 and MV/1400 users should send one tape cartridge.) Software contributions should be sent to the same address. Be sure to include your membership number.

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

Please also include a self-addressed return envelope with sufficient return postage. In compliance with postal regulations, do not date the postage, because the tape will not be returned to you on that date. If you send it at the end of the month, please have the postage read for the following month.

Automatic logoff

This Pascal program automatically logs off users from the system after a determined period of time. Uses 246 blocks.

B.J.'s BBS contributions

This addition to the library consists of about 20 items, including various programs, documentation, and macros. Some of the more interesting items include the :SYSMGR benchmark suite, a continuous incremental backup, a clean-up file maintenance program, a program to find strings in files, and a type-backward program. Uses 5,749 blocks.

DBCHECK

This program checks the open status of

3

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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.

FILEMNGR

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

IMSLUTIL

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

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

MENUDIR

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

Misc Kerm

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

QHelp

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

SKLSCRN

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

SWITCHES

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

TEX

TEX (Terminal Emulator with Xmodem) is a terminal-emulation program written by David Down. He has recently revised the TEX software to include a command language. TEX is being distributed as shareware. Uses 495 blocks.

VT100KER

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

Xfer

Xfer is a tape conversion utility. Δ

Circle 65 on reader service card.

CEO Light available for small office systems

Westboro—Data General has introduced CEO Light, a lower cost version of CEO office automation software. CEO Light uses less system memory and disk space, but still offers such CEO functions as mail, filing, and calendar.

The smaller system is geared toward low-end MV system customers, MIS management systems, and VARs needing a small OA system to include with their package.

CEO Light now allows users to customize the Main and Interrupt menus with customer-specific applications or predefined applications from DG.

CEO Light can run on all Eclipse MV series computers with sufficient disk and memory space. CEO Light is compatible with DG/PC*I and CEO Connection 3.10. The basic CEO Light configuration is available with two optional word processing packages: CEOwrite or Wordperfect.

The price varies from $1,800 on an MV/1400 to $28,000 on an MV/20000 model II. Δ

Circle 80 on reader service card.

DG/INGRES announced for DG/SQL

Westboro—Data General has announced DG/INGRES for its DG/SQL relational data base management system. DG/INGRES is a comprehensive application development environment developed in conjunction with Relational Technology, a developer and supplier of integrated information management software.

DG/INGRES allows application portability and connectivity for users with multivendor environments. It offers a broad range of decision support and application development tools integrated with DG's SQL and CEO.

In addition, Data General will make INGRES for PCs available for purchase through the ISV Plus program. The PC-based version operates on DG's new Dasher/386, Dasher/286, and the DG/One laptop computer for application development.

DG/INGRES was developed as part of a three-year joint development agreement with Relational Technology signed in 1987. DG/INGRES is the first of a three-phase development plan, with the first phase consisting of end-user-oriented query tools and a PC-based INGRES version.

Phase 1 products include Query-by-Forms and the Visual-Forms-Editor. Query-by-Forms enables ad hoc queries on a DG/SQL data base and provides for application development by end-users. Tables residing in a DG/SQL data base can be created and screens can be defined and utilized to query, append, update, or delete information from the tables in the data base. The Visual-Forms-Editor features form customization capabilities using a screen painter interface.

Future phases of DG/INGRES will in-

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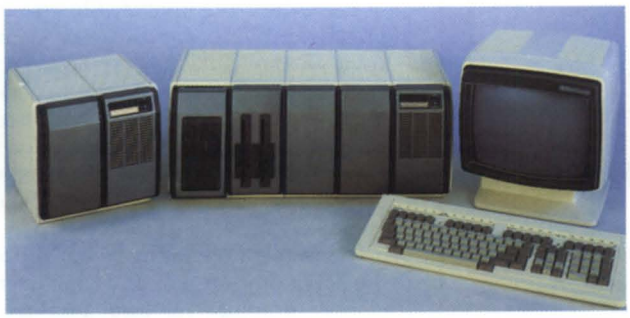

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clude the complete family of INGRES products, including sophisticated application development tools for professional programmers, graphics, report writing, PC-host distributed applications, and distributed data base system support.

Pricing for DG/INGRES starts at $1,260; INGRES for PCs starts at $950. Delivery is 60 days ARO. Δ

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DG/UX rev 4.0 shipped

Westboro—Data General has begun shipping DG/UX rev 4.0, the newest version of its native Unix operating system. DG/UX rev 4.0, based on System V Release 3 from AT&T, includes the following features:

- A new Unix kernel provides complete symmetric multiprocessor support.
- The file system provides full recovery and high-capacity storage capabilities.
- An enhanced portability platform includes most of the Berkeley extensions.

DG/UX is now available for the Eclipse MV series of computers and will also be implemented on the company's RISC-based 88000 systems currently under development.

DG/UX rev 4.0 complies with the System V Interface Definition (SVID), and passes the System V Verification Suite, except for the Network Services Extension. For distributed file support between computer systems, Data General offers a full implementation of the Network File System (NFS).

DG/UX systems can be connected with each other and with other Unix and proprietary systems (such as DG's AOS/VS) using standard communications capabilities such as TCP/IP.

DG has implemented the Unix kernel by identifying and localizing machine-dependent code to facilitate the porting of DG/UX to other architectures, including RISC-based systems. DG/UX takes advantage of the MVs virtual storage design and supports transparent, fully symmetric multiprocessing. For example, on the Eclipse MV/20000 model II, symmetric multiprocessing allows any part of the system, including operating system, I/O, or user programs, to be executed on either processor.

Unlike other System V implementations of Unix, the contemporary file system on DG/UX provides for greater system recovery and reliability by duplicating critical directory information, and checking this duplicated information for consistency when file systems are mounted. The system can support files of an infinite number of gigabytes in size on multiple disk spindles.

The DG/UX operating sytem supports the X Window system, allowing users to display graphics on local and remote workstations within the network.

Applications can interface with pop-up menus, windowing management functions, and shell programs listed as menu selections, allowing users to tailor their programming environments to suit specific needs. Δ

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Portability and SQL facilities for DG BBASIC

Berkshire, U.K.—DG users can now run

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BBASIC programs on multiple vendors' hardware with a new software product called Universal Business BASIC (UBB) launched by the British-based company Transoft.

Transoft also announced an ANSI-standard SQL that operates on DG BBASIC data files under UBB environments such as Unix, Xenix, and DOS. It also can be used on DG MV machines using AOS/VS. U/SQL enables users to produce custom-designed reports without any programming.

Universal Business BASIC allows existing programs written in Data General BBASIC to operate under Unix, Xenix, MS-DOS, and MS-DOS networks (including Novell Netware and IBM Token Ring). UBB provides a powerful development language that can be used to develop fresh applications in the new environments, as well as supporting ported software.

UBB has been designed to look and feel like BBASIC, thereby reducing the learning curve for existing users. It also incorporates new features such as windows, hot-key interrupts, and intelligent help. It also accommodates 1 MB programs; 65,000 line numbers; 65,000 variables; and 256 channels.

Because UBB works on existing BBASIC data files, no file conversion is necessary when porting to a new environment, avoiding rekeying data.

Transoft Ltd., Shear House, Peterfield Ave., Slough, Berkshire, SL2 5DQ, England; 0753 092332. Δ

Circle 83 on reader service card.

Gold Hill's Goldworks for MV computers

Westboro—Gold Hill's Goldworks, an expert systems delivery environment, is now available on Data General MV series 32-bit systems. The Goldworks MV series version is based on Gold Hill Computer's Goldworks for Intel 80286- and 80386-based personal computers.

The Goldworks PC version provides users with the ability to develop and test systems applications on the personal computer, while the MV version delivers those applications on MV processors as part of a commercial production system. It can be used in most commercial markets for a variety of applications, including manufacturing process control, insurance claims processing, and treasury and financial services.

Goldworks for the MV series is based on DG/Common LISP, DG's implementation of the standard Common LISP programming environment. The Goldworks MV version features the following:

- The Integration Toolkit with Report Writer allows users to incorporate artificial intelligence into production batch processing jobs without the need for interactive processing. The Report Writer facility allows developers to print the records of an Integration Toolkit data base.
- The Language Connection provides communication among expert systems based on COBOL, ICOBOL, PL/I, Fortran, C, Pascal, and LISP. In this way, a COBOL program can make requests to Goldworks for inferencing, and then have the results returned to the conventional language application.
- The CEO interface supports CEO mail services, allowing users to send, receive, and delete CEO mail and documents in a

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batch process.

•The foreign language interface allows users to easily access data base programs such as INFOS II, SQL, DBMS, and others through COBOL, PL/I, C, etc.

In addition, the Goldworks MV version provides external interfaces to Lotus 1-2-3, dBase III, and INFOS II. Prices range from $1,520 on a DS/7000 series to $24,370 on an MV/20000. Delivery is 90 days after receipt of order. Δ

Circle 84 on reader service card.

DMS Disk Optimizer and Management Utility released

Salt Lake City—DMS Systems announced a new product at the NADGUG conference in Philadelphia—the Disk Optimizer and Management Utility (Diskopt). Designed to maintain disk operation at peak efficiency, Diskopt makes fragmented files contiguous, consolidates free disk space, and optimizes file and directory locations, thereby reducing disk head movement involved in reading and writing files.

Diskopt can optimize system disks and single disk systems and is fast enough to be run on a daily basis. Diskopt eliminates traditional dump/format/load reorganization efforts and increases overall system throughput.

Diskopt furnishes information about disk organization that isn't obtainable with standard system maintenance tools. Diskopt generates numerous reports, including detailed reports on disk fragmentation, file fragmentation, compressible files, and directory and file counts.

DMS Systems, 1111 Brickyard Rd., Salt Lake City, UT 84106; 801/484-3367. Δ

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New additions to Terminal Services

Westboro—DG has introduced the ITC/128 Intelligent Terminal Controller, an IEEE 802.3 LAN controller for the Term Server networks. The ITC/128 supports up to 64 terminals or printers connected to an Ethernet IEEE 802.3 LAN via Term Servers. Together with the Term Manager, a PC-based network manager for the Term Server environment, these products enable asynchronous devices (terminals, personal computers, printers, host computers, and modems) to communicate across an IEEE 802.3 LAN. The Term Controller, model number 4586, sells for $9,500. Δ

Circle 86 on reader service card.

Data Bank Associates offers Xmodem/Ymodem

Germantown, MD—Data Bank Associates has released Turbotran, an Xmodem/Ymodem file transfer protocol for Data General users.

Turbotran is fully supported, and provides multiple, simultaneous, error-free file transfers without driving the system into the dust.

Turbotran offers features such as creation of a permanent trail file, switches to allow chaining into other programs or back to the original program, batch mode

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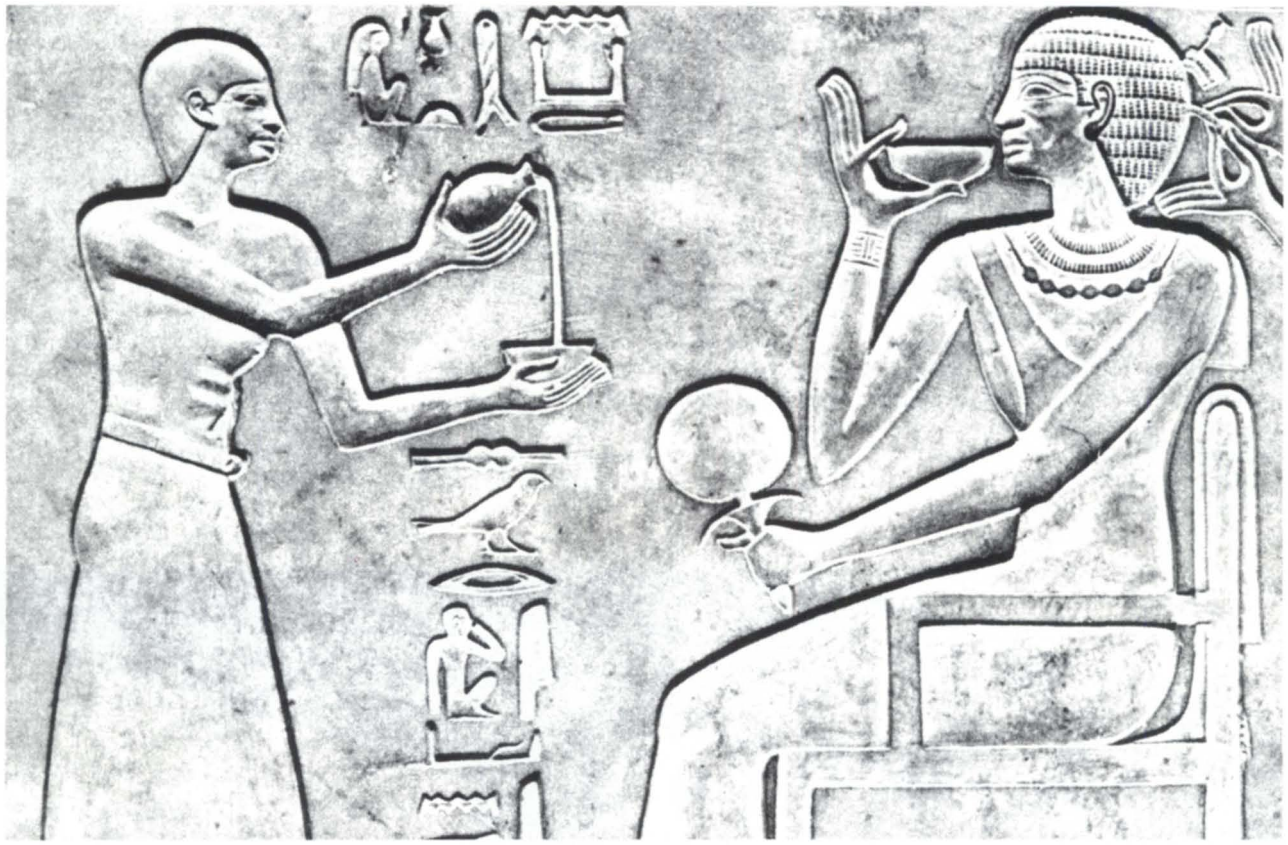

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for remote retrieval, automatic truncation of pad characters, and more.

Turbotran utilizes CRC for error checking, is fully integrated with CEO, has PC support utilities, and is available for all AOS and AOS/VS systems. Prices are $200 for prepaid or COD orders, or $225 with a purchase order.

Data Bank Associates, 20010 Century Blvd., Suite 104, Germantown, MD 20874; 301/540-5562. Δ

Circle 87 on reader service card.

Case History for the legal profession

Germantown, MD—Data Bank Associates has released Case History, a software package designed to provide law offices with the ability to perform all work based on client matters without any additional overhead to the computer system. Case History integrates with Wordperfect, GATE, and Intercon's Office/Publisher.

Case History automatically captures and reports billing information on all word processing activities, printed pages, and scanned pages when used with a DEST scanner, and the use of Lexis and Westlaw. The intermediate billing file can be used with any existing accounting system and provides full documentation that will stand up to fee inquiry or justification often required by courts or clients.

Case History is written to run on all Data General AOS/VS systems and can be customized to meet specific requirements of law offices.

Data Bank Associates, 20010 Century Blvd., Suite 104, Germantown MD 20874; 301/540-5562. Δ

Circle 88 on reader service card.

Chargeback resource accounting software

Germantown, MD—Data Bank Associates has released Chargeback, a resource accounting system for Data General users.

Chargeback is a menu-driven program used to capture and report information on all work performed on the system, including connect time, CPU seconds, page-per-second, and I/Os and disk space used accounted by the time of day. Chargeback provides a user-defined rate structure with differentials for prime, evening, and night.

Chargeback allows for an unlimited number of cost/profit centers, as well as unlimited usernames associated to each center.

Chargeback's report generator produces both an invoice report and a resource utilization report. An invoice is produced by username, while the resource report is output by username within cost/profit center and contains the associated summary breakdowns. These intermediate billing files can be used as an actual invoice or can integrate with any existing billing system.

Chargeback can be used for overall management of computer operations, for billing time-share customers, to provide cost verifications, and to support system-cost modeling.

Data Bank Associates, 20010 Century Blvd., Suite 104, Germantown, MD 20874; 301/540-5562. Δ

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The Value Added Resellers whose products are advertised on these pages are all Data General VARs and have been recognized in the marketplace as leaders. This section of Focus provides a sampling of the products that are available through DG VARs. If your company is a DG VAR that would like to be included, or if you know of other DG VARs that may be interested, please contact the Focus Associate Publisher at 512/345-5316.

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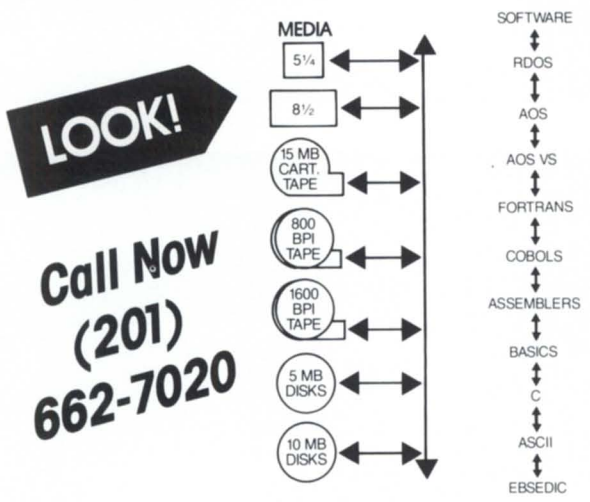

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Paul, Hastings, Janofsky & Walker, one of the 50 largest legal firms in the U.S., has acquired two of Data General's recently announced DG/Sniffer LAN Protocol Analyzer units. At the core of the law firm's information system is the DG/PC*I communications platform. DG/PC*I will link 300 attorneys in Los Angeles; Atlanta; New York; Washington, D.C.; Tokyo; and Stamford, Connecticut. PHJ&W's system need for a networking monitor led to the choice of the DG/Sniffer. It offers a way to measure LAN data flow, to capture packets of data in order to analyze, and to debug network software.

■

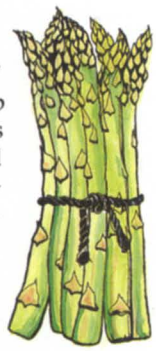
Data Bank Associates, a Maryland software manufacturer, has signed a remarketing agreement with Intercon Associates, the makers of Office/Publisher, a desktop publishing software system. Data Bank will market the Wordperfect-compatible version of Office/Publisher.

■

Banque de Paris (BNP), the second largest bank in France with more than 2,000 branch offices, has acquired more than 650 DG/One PCs. The model 2 and 2T computers are valued at more than $1.7 million.

■

Ripe Asparagus. The engineering team working on DG's "Asparagus project," a joint agreement to develop communications products with Nippon Telegraph and Telephone, are reporting significant progress at DG's R&D lab in Rockville, Maryland. They are now getting the last of the bugs out of the printed circuit board set so that the software can be tested and integrated.



■

Grumman Systems Support and Sysgen Recovery Services have signed an agreement to market each other's services to the DG user community. Grumman TPM services include on-call and on-site repair, depot repair, and preventive maintenance. Sysgen's services include disaster recovery planning and the use of hot sites where back-up tapes are retained and from which a customer's computer data can be retrieved.

■

DG: Live at the Hollywood Bowl. DG corporate sponsorship of the Hollywood Bowl Summer Festival allowed DG customers in the Los Angeles and southern California area to attend the opening gala for the famous amphitheater's summer concert series. Data General was given recognition for its sponsorship on the marquee outside of the Bowl. Flutist James Galway was the special guest of the evening.

■

The Dallas-based c-Systems Software recently purchased $1 million worth of DG/500 computers running RDOS and BBASIC software. The company, a value-added reseller of outdoor power equipment, plans on installing two systems each week throughout the next several months.

■

Data Assurance Corporation (DAC), a disaster recovery service company, has opened its second hot site. Located near the Philadelphia International Airport, the facility is intended to serve DG installations on the East Coast. DAC presently supports 80 subscribers in 28 states with its Denver-based hot site. The new facility, which has served as a DG-equipped hot site since 1986, was acquired from O'Neill Data Systems. The new site now contains 48 data-entry workstations with DG D215 terminals, a DG MV/10000, four DG 592 MB disk drives, two tape drives, and printers.

■

Data General sold its printed circuit board plant in Singapore to a local management group backed by Prudential Asset Management Asia for approximately $13 million. The buyers will continue operations at the plant as an independent manufacturer of printed circuit boards to sell in the Far East, Europe, and the U.S. Many of the 280 Data General employees were offered jobs with the new company. Details of the sale were to be complete by October.

■

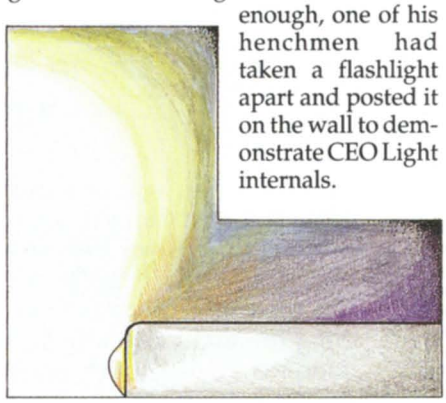
A new VAR program at Data General has already recruited two new VARs to the DG market. The New Orleans DG sales office in tandem with the Solutions Recruitment Development group in Westboro recently held six seminars for a total of 39 companies during a two-week period. One VAR signed a contract for $250,000 worth of DG equipment, and another company joined the new Agent Program, in which VARs can sublicense their software.

■

A new custom at DG. Data General's facility in the Philipines recently donated an MV/8000 and a DG/One model 2T portable computer to the Philippines Bureau of Customs. A DG spokesperson attributed the gift to DG's desire to "upgrade community relations."

■

Dishonors for the worst pun at the recently completed NADGUG conference in Philadelphia go to an anonymous staffer (we'll protect your identity, but *you* know who you are) in the DG exhibit area. The slimmed down version of CEO, called CEO Light, would probably have gotten quite a lot of attention in its own right, but Jeff Clack, the product's marketing manager, decided to promote it with pint-sized flashlights inscribed with (you guessed it) "CEO Light." As if that wasn't enough, one of his henchmen had taken a flashlight apart and posted it on the wall to demonstrate CEO Light internals.



■

The chutzpah award, if one were given, would go to Guy Pribyl, a man who loves a crowd and goes to impressive lengths to draw a big one to his employer's booth. The technique that got him the best results was to announce a drawing for which you had to be present to win, then lead the assembled prize-seekers in a spirited chant of the company name: "Wordperfect! Wordperfect! Wordperfect!" Everybody seemed to love it—with the possible exception of the people staffing other booths nearby.

■

The count of conference registration attendance easily surpassed the 1,200 mark, confirming all suspicions that the conference in Philadelphia attracted the most people ever to attend a NADGUG conference. This means a 40 percent increase from last year's number of 850. Congratulations NADGUG! Δ

THE Data General SOURCE

DATA GENERAL SPECIALS

MV4000 DC With Additional I/O Slot, 2MB, 70MB, Disk Floppy, Cartridge Tape Backup $8,500
MV10000 System 2MB, BBU $34,000
Eclipse S280 System with BMC, 2MB $9,500

DISK

6067 50 MB $500
6060 96 MB $750
6061 190 MB $1,200
6160 73 MB Winchester Disk Sub/Sys $3,500
6122 277 MB $1,900
6161 147 MB Winchester Disk Sub/Sys $5,500
Zebra Adaptor sets $250
6234 50 MB Winchester Disk Sub/Sys $1,800
6236 354 MB Winchester Disk Sub/Sys ... $12,500
6239 592 MB Winchester Disk Sub/Sys ... $16,500
Controller 5-13602 ..... $350
Controller 5-5799 ..... $250
DCH I/F 5-6538 ..... $100
6214 602 MB Winchester Sub/Sys w/DG Letter $6,500

TAPE

6026, 800/1600 S/S-Brown $3,000
6026A, 800/1600 Add-on-Brown $2,000
6021, 800 S/S-Brown $1,000
6021, 800 S/S-Blue $900
6125, Streamer, S/S $1,200
6125, Streamer, (Hard) $2,000
6123 Streamer $2,000
6299, 800/1600/6250 S/S $18,500

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MicroNova MP100, 200
Eclipse S200, S230, S250, S130
Eclipse C330, C350, C150, M600
Eclipse S2801
MV6000, 8000, 8000II, 10000, 4000, 7800

PRINTERS

6321 LQ Printer $900
4434 Graphics Slave Printer $350
4518 LQ Printer w/Sheet Feeder $800
6194 TP2 Printer $900
6140 TP1 Printer $200
4363 300 LPM Band Printer W-DCH $2,800
4354 354CPS Printer $1,200
4364 600 LPM Band Printer W-DCH $3,800

C-350

Spare Board Set $900
8656 256 KB Memory $100
Chassis w/Power Supplies $500

TERMINALS

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D200 ..... $250
D210 ..... $450
D211 ..... $600
D220 ..... $900
D280 Color $500
D214 ..... $600
D215 ..... $700
D410 ..... $500
D411 ..... $950
D460 ..... $700
D461 ..... $1,200
D400 to D450 Upgrade $50
D470 ..... $1,500
5821 NT Penta Monitor $800
5242 Penta Monitor $1,500
6012 ..... $50
6262 Desktop Color Monitor $700

CABINETS

1605, Meter High $1,200
1605-A, Meter High $1,000
1344, 5 ft. Brown $900
1144, 5 ft. Blue $500
1012, Brown $500
1012, Blue $100
1148, Blue $300
1348, Brown $500

COMMUNICATIONS

4255 ALM8 ..... $200
ALM 8/4 ..... $100
4257 ALM16 w/CL IF $500
ALM 16/8 ..... $200
4340 AMI 8 ..... $450
4254 DCU200 ..... $300
4345 CSI2 ..... $500
4380 ISC2 ..... $1,500
SLM2 ..... $175
ATI16 CL IF $25
4369 IAC8 ..... $2,500
4370 IAC16 ..... $4,000

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Model 10 SP, w/10 256K, KB 15 MB Winchester, Floppy $2,400
Model 20, w/1512 KB Winchester, Floppy . $2,500
Model 30, w/512 KB 15MB Winchester, Floppy $2,500
4463-ZT USAM4 ..... $650
Upgrade Model 10 Mono to Color $500
Model 2704 Dasher One $1,300
6271, 15MB Disk $500
6301, 38MB Disk S/S $1,500
6336, 71MB Disk S/S $2,000
8713R Mod. 10, 512KB Memory $500
8736R Mod. 20, 512KB Memory $500
4435 Plotter (HP 7470-A) $900
4436-AR Optical Mouse Pad $200
4437-AAR Digitizer Pad w/AC Adaptor, Stylus $900

NON-DG INVENTORY SALE!

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DEC VT100 ..... $175
DEC VT132 ..... $175
Emulog 200 As Is $50
Hazeltine 1500 ..... $175
Hazeltine 1520 ..... $175
Hazeltine 1420 ..... $100
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LS ADM 3 As Is $75
LS ADM 3A As Is $75
LA ADM 31 ..... $100
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Media III 4161 ..... $50
Televideo 970 ..... $200
Visual 110 ..... $100
Wyse 50 CRT $400

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Sanyo MV 4209 9" $25
Sanyo MV 4215 14" $25
Sanyo DM 5012 12" $25

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CITOH 1025 LQ $200
Data South DS180 ..... $450
Data Product B300 ..... $1,700
Data Product B310 ..... $1,900
Data Product 2230 ..... $300
Data Product 2260 ..... $500
Data Product M200 ..... $1,100
DEC LA36 ..... $100
DEC LA34 ..... $100
DEC LA35 ..... $50
GE terminate 200 ..... $200
Diablo 630 LQ $500
Diablo 1650 ..... $300
HP Laser 2686-A $1,200
NEC 5525 ..... $550
NEC 7710 ..... $650
NEC 7725 ..... $650
STAR SD10 ..... $300
Talley M132 ..... $100
TI 820 ..... $400
TI 743 ..... $75
Wang 6581W w/Sheet Feeder $500

PLOTTER

Calcomp 5105 ..... $500
Calcomp 936 ..... $500
HP 7221-A $500
HP 7221-B $500
HP 7470-A $900
Houston Ints. DMP 29 ..... $750

MAG TAPE

Custom System 295 Controller $650
Pertec/Cogar 7.5 CTU $100
Tanberg 1050 ..... $400
Wangco 10 ..... $200

DISK DRIVE

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CDC 9730 80MB $1,500
CDC 9762 (1200 Hrs) $700
CDC 9448 ..... $500
CDC BK53CA $200
Diablo 44 ..... $200
Dynex 6222 ..... $200
Ball BD50 ..... $200
Perkin Elmer 300 MB Disk S/S $6,500
Fujitsu 2284 160 MB Winchester $1,100

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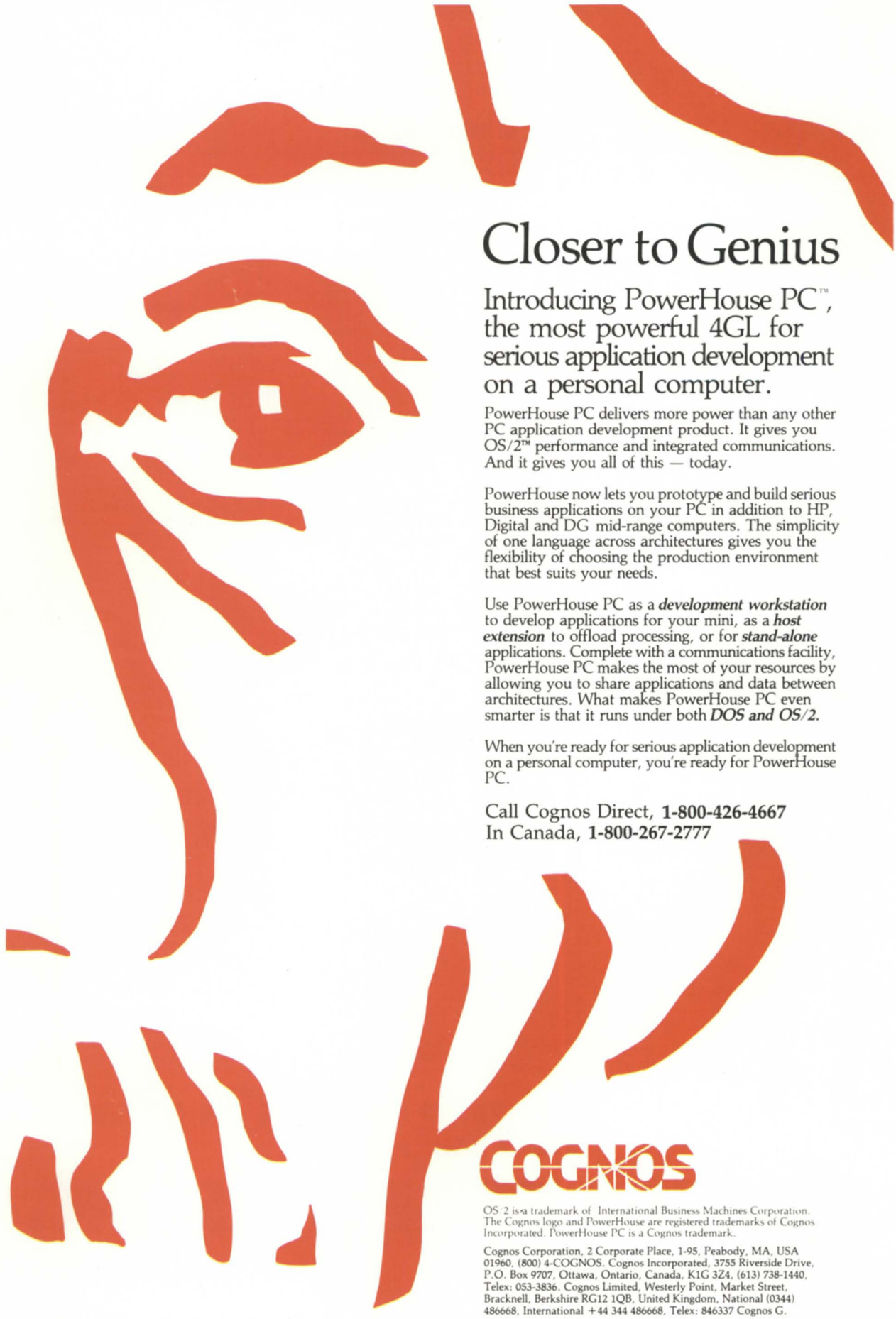

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