FOCUS

The Magazine of the **North American Data General Users Group**

August 1986

Special Conference 86 Issue

networking

***n* : People establishing or using an interconnected system of computers, terminals, and data bases to exchange information or services.**

Also inside this month:

- **A report on this year's meeting with DG management,** by Rene Dominguez
- **Disaster! Planning ahead to assure a recovery,** by Daniel Kilburn
- **Compiling solar radiation data: Space Environment Center,** by Carole Kellett

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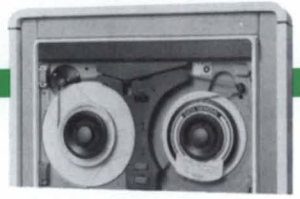

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ECT REPORT WORDPERFECT REPORT

WordPerfect Corp. steps up development efforts.

As of May 6, Satellite Software International became known as *WordPerfect Corporation*—a name change due primarily to the success of WordPerfect. In addition to impressive sales increases for the DG versions, WordPerfect is now the best-selling word processing package for the IBM PC. We think the increases are directly related to our intensified development efforts.

We're not slowing down

The latest version, released in February for AOS and AOS/VS, has practically all of the features of the PC version. Tom Mallory, Director of Development for DG products, is particularly proud of the performance increases. Informal benchmarks demonstrate that 4.05 is as much as *40% faster* than previous AOS and AOS/VS WordPerfect versions. 4.05 files are compatible with the PC 4.1 files.

We're not finished yet

Due to space limitations inherent in a 16-bit program, the software changes for the AOS version will be limited to fixes rather than new enhancements.

The new 32-bit version for AOS/VS, however, will soon catch up to the PC version. Work on the *Thesaurus* has already begun, and it, along with *many other features*, will be available before the end of the year. (We're also working on a VAX version.)

The price of the next release will be slightly higher than the current version. Potential customers should be happy to learn that the cost of 4.05 and the update to 4.1 will be less than the new price for 4.1. In this case, *it won't pay to wait.*

There's more on the way

A new product, *WordPerfect Library*, will be released in late summer for AOS/VS, featuring some attractive enhancements over its PC counterpart. The DG version of the library will include *electronic mail, calendaring and scheduling*, and a *shell* program to integrate these new programs with WordPerfect and MathPlan. The pricing will be very aggressive.

The e-mail and calendar programs are already installed at the U.S. Department of Justice as part of a $30 million hardware and software contract won by Tisoft, a DG System Supplier. As you might expect, the new programs are written in assembler and use fewer resources than similar products from the hardware manufacturer.

The numbers are there

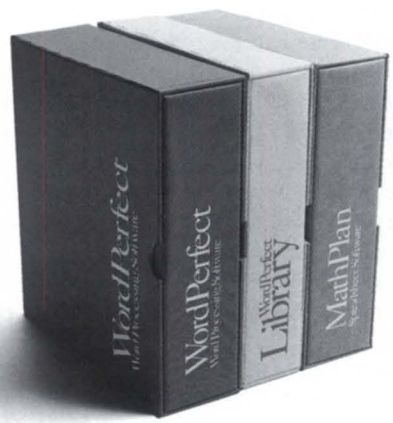
A new version of MathPlan which contains Lotus-like macros and a new template is now available. The update is available for only $100. The price of the AOS version ($1000) and the AOS/VS version ($2000) remain the same.

The price is right

As of June 1st, a 40% discount will be offered for a Subsequent License for our DG products. Also, special discounts will be offered to *government* and *education* installations. The discounts to authorized WordPerfect resellers will reflect the new discounts.

Just give us a call

We're very excited about the future of our DG products. For more information, call 801-226-6800 or write WordPerfect Corporation, DG Products Division, 288 West Center Street, Orem, Utah, 84057.



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The livin' is easy?

I can't recall who said it. He must have been a literary luminary, because a reporter asked him for a list of his favorite English words. "Summerafternoon" made the top ten. Whether or not it's really a word is beside the point. I thank him for his opinion, because recalling it has helped put my summer in perspective. The runtogether word summerafternoon promises soft, slow hours sipping lemonade in a rocking chair on the front porch—but its cadence says you better keep running.

Business-oriented magazines traditionally expect their summer issues to be thin affairs, easy to produce. Advertisers assume their potential customers are out of the office, at the beach, not in a buying mood. "Why advertise to an empty office?" they reason—so they don't. With fewer ads in the summer issues, there are fewer words to write and edit, fewer pages to design and fill, fewer problems to solve.

Focus is bucking that tradition. You may have noticed by now that our August issue is *much* bigger than anything we've done before. That's largely due to the excitement and anticipation that has been building for Conference 86. After all, the NADGUG annual meeting brings the most active members of the DG user community together to share and discuss what's on their minds. Advertisers want to be part of that—hence the long list of companies supporting this issue. Hence more words to write and edit, etc.

The conference partly explains the size of this issue, but I sense something else as well. *Focus* has been growing steadily through the spring and summer; it seems to address a need that knows no season. What I'm saying is that the leisurely summer image just doesn't fit the facts where NADGUG members are concerned. The people I talk to may look forward to a long weekend, but not many are planning an extended stay at the beach. In fact, the only "vacation" many will get is a few days with their families before or after the conference.

There doesn't seem to be a slack season for NADGUG members—and not for *Focus* either. As Jim Siegman observes (see page 54), this is the twelfth issue since *Focus* began publication in its current format. It's fun to think back on all that has happened in the last year, but a bit daunting to think there will be at least as much to do next year. And the pace appears to be quickening.

The fast pace is just a fact of life for most NADGUG members. The computers we tend have become so important that most businesses simply couldn't do without them—or the people that keep them working. NADGUG members for the most part have grown used to the deadlines and demands. It's just part of the price you pay for doing work you enjoy.

Still, I look forward to spending a few days among friends at Conference 86. If you're like me, you justify the trip in terms of cost and benefit. There will be a lot of business transacted, to be sure, and a lot of information gleaned. But just as important will be the acquaintances made, the common problems discovered, and the networks of contacts established.

■

One subject that's sure to be discussed at Conference 86 is disaster recovery. Although we know how crucial it is to keep our computer systems running, most of us haven't made arrangements to guarantee that we could keep going if disaster struck. It's so important a concern that *Focus* is devoting parts of three issues to it. Last month James McMonagle told how his company managed to get back on its feet after a disastrous fire. This month, Dan Kilburn gets down to the specifics of planning for recovery (see page 32), and next month Lana Stein will add practical advice based on her experience setting up a recovery site.

One of the most common recovery "plans" is the handshake agreement between companies that have similar systems. If the unthinkable happens, they promise to backstop one another until the damaged system can be restored. It's not a foolproof solution, nor is it supposed to be. It's a workable answer based on our mutual assistance. In other words, it's the kind of solution we've come to depend on as NADGUG members. That's not a bad recommendation. Δ

—G.F.

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LETTERS

PostScript postscript

I read with interest your April 1986 issue of *Focus* with the theme "Computers and the Mass Media: Improving on Gutenberg." There was much useful information, especially the "Media Sampler" on page 16, which had an item on subscription fulfillment from Epsilon Management Systems, Inc., which is of interest to my company.

However, I found your coverage of publishing to be bereft in one area. There was no mention of PostScript, the page description language from Adobe Systems, Inc. As anyone familiar with the new concept "desktop publishing" knows, PostScript has made it all possible. A trip to a computer store to examine the difference in quality of output from a Hewlett-Packard LaserJet and an Apple LaserWriter demonstrates the power of PostScript. Both laser printers are based on the Canon 300 dots-per-inch engine. Thus, they both have the same inherent resolution. However, the quality of output from the Apple LaserWriter is considerably higher. The difference is PostScript, which is buried on a ROM inside the LaserWriter. This also accounts for the approximate $2,000 difference in price between the two devices, and also the Data General Model 4556 you cited on page 10.

This brings me to my current state of affairs. After seeing a desktop publishing demonstration at my local computer store I bought an Apple LaserWriter and two textbooks on PostScript. I hooked up the LaserWriter to a QTY channel on my Nova 3 operating under RDOS. I have been feeding it PostScript files with mixed success using the XFER command in RDOS, and my own software using write sequential and write line commands to the QTY. When it works, it works perfectly. When it doesn't work, it doesn't work at all. The LaserWriter requires the computer to which it is connected to obey XON-XOFF flow control protocol. Therefore, I think when it doesn't work, the problem is communications flow control.

I would appreciate hearing from anyone, either an RDOS or AOS user, who has had experience or offers products on Data General equipment that drives PostScript devices, either the Apple LaserWriter or any other PostScript device.

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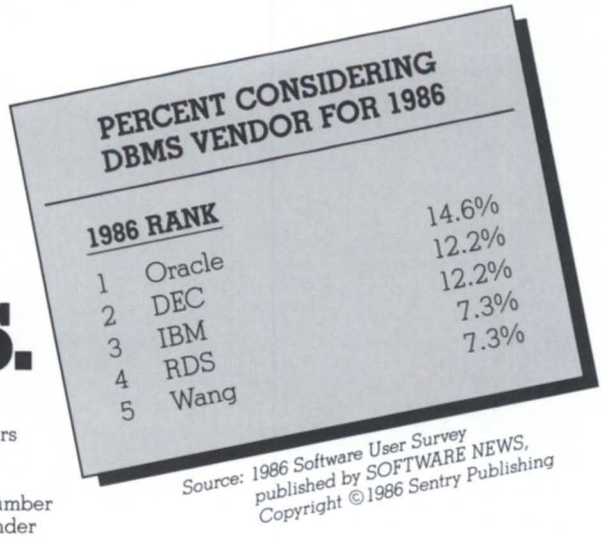

Source: 1986 Software User Survey published by SOFTWARE NEWS, Copyright ©1986 Sentry Publishing

Oracle Corporation ranks as the number one DBMS vendor for minicomputers, according to the 1986 *Software User Survey.* A lot of DG users won't be surprised. In 1979, Oracle introduced the very first *relational* DBMS and the first implementation of SQL.

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The Customers' Bill of Rights

by Lyn Jeffrey
Special to Focus

It's a scenario all too familiar—"The Case of the Vanishing OEM." A smiling, polished face offers a deal—a deal too good to be true, a deal too good to refuse. The machine is delivered, the software installed . . . and the problems begin. And by the time the dust has settled, often the OEM is nowhere to be found. The scene closes with the customer stuck with an expensive machine and software with no support in sight.

Fortunately, this scenario seems to be disappearing, to some degree. But there are still OEM/VARs who, even though their hearts may be in the right place, aren't giving their customers the support they deserve. The customers often don't know what to expect or demand from their computer supplier in terms of service and support. Following is a list of what customers need and deserve:

Customers' Bill of Rights

1. *Initially, a machine that is neither too large nor too small for the particular business, complete with an appropriate operating system.*
2. *Software that is functional and tailored to that specific industry.*
3. *Help when software/hardware problems develop (if the customer has paid for support service).*
4. *Availability of adequate training and documentation.*
5. *Updates of operating system and language as patches are released, and periodic updating of revision levels of that software when appropriate.*
6. *Availability of program customization.*
7. *Knowledgeable consulting regarding system upgrades as the company grows.*
8. *Availability of source code in the event the supplier stops supporting the software sold.*
9. *Properly executed license forms for software and maintenance agreements for the equipment.*

Similarly, the customer should be aware of the courtesies a dealer needs in order to be effective:

Dealers' Bill of Rights

1. *Notification when there is a problem with hardware or software. There is no way the dealer can help correct inequities unless he knows about them.*
2. *Loyalty when purchasing an upgrade. If the dealer has spent a good deal of time in configuring a system to meet your specific needs, consider buying from the dealer rather than from your "cut-rate" supplier. Realize that this is a service, but the dealer needs your business in order to continue to supply you with quality expertise. If you think you will be buying from someone else, tell your supplier up front. You usually can still use his expertise by paying a consulting fee.*
3. *If, over the years, the computer supplier has proven his competency, trust him to recommend what he knows will be the best solution for your company.*
4. *Read the mail you receive. If you don't understand a maintenance agreement, for example, don't let it stay on your desk for several weeks. Call!*
5. *Tell your friends about the good job the dealer has done. By increasing the installed base of a product, you have more clout and the dealer can afford to make additional improvements.*

This list is by no means complete. One could write a book on the subject. If your dealer is doing all of the above, why not tell him he is doing a fine job? And it is equally important to talk to him if his services do not meet these standards.

In the long run, it is the trust that is built between the dealer and you that makes a successful and profitable relationship. Δ

Lyn Jeffrey is vice president, marketing, for Program Systems, Inc. She can be reached at 265 Riverchase Parkway, East, Suite 101, Birmingham, AL 35244-1831; 205/988-4336.

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Wasteful thinking

Artificial intelligence lends a hand to wastewater treatment in a Texas facility

by Andrea Beebe
Focus staff

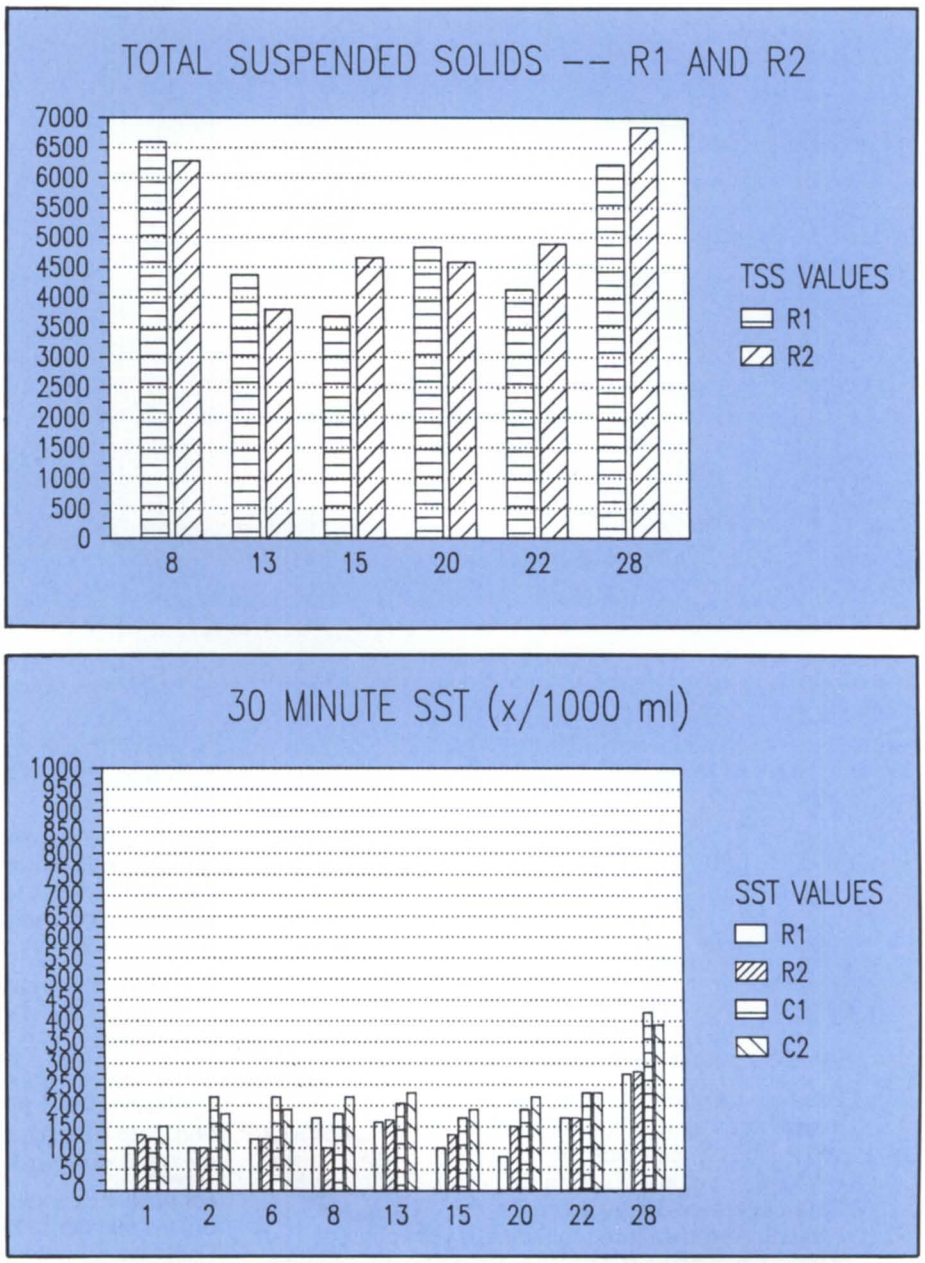
Public facilities such as wastewater treatment plants are designed to serve residents of a specific area. But the Kuehler Wastewater Treatment Facility in New Braunfels, Texas, is going one step further.

Plant managers are developing a knowledge-based system to help operators make decisions to ensure the quality of water in the Guadalupe River. And once the system is running—one systems analyst estimated by late summer—public utilities in other cities will be able to use the same ideas to develop similar software—and improve wastewater treatment techniques across the nation.

The Kuehler facility, which came on-line in March, 1985, is a state-of-the-art, fully automated treatment plant. It is a multivendor shop, using a DG MV/6000 for commercial/industrial billing and tracking, planning, and control.

"We have a legal and moral obligation to return the water to the river cleaner than it was when we took it out," says Barry Allison, manager of information services at the facility. Three cities draw water from the Guadalupe River below the New Braunfels plant.

The plant processes up to 3.1 million gallons of wastewater daily, monitoring the flow to keep the river clean. "It's sort of an intui-



The Kuehler facility already uses Data General equipment to monitor wastewater conditions and to produce displays such as these graphs.

"One feature of an expert system is when you present a problem and it provides the answer, it can also tell you how it derived that answer, so you can follow the logic back"

tive process," Allison says of the present monitoring system. "I don't mean to sound crude, but sometimes an operator will go in, take a deep breath and say, 'hmmm, something's wrong here.'

"Well, it's a little more involved than that, but it's still basically intuitive," Allison says. "We're trying to get away from the intuitive."

Part of the problem involves unreported high levels of sewage being dumped into the river. "Wastewater is only in the facility a very short time before it goes out. Normal testing (for high levels of waste) takes about five days, and we treat within two to three days," Allison says. If an industrial facility were to dump a large amount of waste or chemicals into the water, Allison explains, "it would be gone before we analyzed it."

Facility employees saw a solution in artificial intelligence and agreed to develop a knowledge-based system—a system to help plant operators make quick decisions based on the current conditions of water in the plant.

"What we're trying to do is increase the window of reaction time between discovering a toxic waste and doing something about it," Allison says. "Like I said, a lot of it is intuitive—you look at it or you smell it."

Under the system, a worker would enter observations into the system. As new conditions are discovered, the number of possible situations rises. "The progression is almost geometric as you run more tests," Allison says. "We're trying to speed the process (of deciding what the actual situation is) up and to give the field operators expert advice on what to do."

The system runs data through the applicable rules, and produces a plan of action based on those rules. "One feature of an *(continued on page 12)*

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Commercial knowledge-based systems are available in many diagnosis-oriented professions . . . . Many of the Fortune 500 companies are exploring knowledge-based applications

(from page 11)
expert system is when you present a problem and it provides the answer, it can also tell you how it derived that answer, so you can follow the logic back,'' Allison explains.

''The system is based on rules by which the program can make inferences,'' he says. ''It doesn't present data—it tells us what to do based on the rules.''

The program shell has a 500-rule limitation. John Toeller, supervisor of wastewater treatment, has the task of defining the rules governing the decisions; Allison plays the role of systems analyst, interpreting those rules for the computer. ''You might have 35 to 40 constants on one aspect, but then all these variables come in and affect the values of those constants,'' Toeller says.

''There could be 300 rules governing one situation,'' Allison says. ''An expert system has the ability to make inferences based on parameters—on rules that aren't there. It can weigh variables based on probability. It then makes an inference based on those parameters, and makes inferences from there.''

Toeller says the program will be used as a diagnostic tool. ''There are pre-set guidelines to go by to make educated decisions,'' he says. ''It's a matter of trying to decide what needs to be done.''

After analyzing their exact needs, plant managers developed specifications for the program. But no similar program was available on the market. Writing an original program was cost prohibitive, Allison says, so he located a program shell that would easily lend itself to wastewater applications.

''When you're dealing with artificial intelligence, or an expert system, you could theoretically develop it from any other higher level language like Fortran or C. But then you have the problem of overhead and development work,'' Allison says. ''It's better to use an off-the-shelf type application.''

The Kuehler Wastewater Treatment Facility in New Braunfels, Texas, will be using a knowledge-based system to help keep the Guadalupe River clean.

The software is being developed on a PC Convertible, which is normally used for electronic billing. Once developed, the software will be installed in a Dasher/One. The Dasher was selected for its ability to function as a personal computer and still access the mainframe.

Knowledge-based systems, which Allison says are virtually synonymous with artificial intelligence systems, have become more popular thanks to developments that allow end users to use them without a heavy drain on manpower. Commercial knowledge-based systems are available in many diagnosis-oriented professions, such as medical treatment and oil exploration. According to Allison, many of the Fortune 500 companies are exploring knowledge-based applications for other fields.

Still, knowledge-based systems are not yet in wide use, and many end users are easily threatened by the systems, Allison says. ''The concept of a knowledge-based system can be confusing. It can discourage end users from utilizing a powerful tool.

''We'd like to expose the average user to a knowledge-based system through the evaluation of what we were wanting to do,'' he says. He anticipates having the system installed for a Dasher/One before this month's NADGUG conference, at which he will present a case study of the project at Kuehler. Δ

Allison's presentation at Conference 86, ''Artificial Intelligence and Expert Systems—a Case Study, '' is scheduled for Wednesday, August 13, at 2 p.m. Contact Allison at the Kuehler Wastewater Treatment Facility, P.O. Box 289, New Braunfels, TX 78131-0289; 512/629-8491.

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Photo courtesy of NASA

The sky's not the limit

DG systems at the Space Environment Center compile vast amounts of weather data around the world and into space

by Carole Kellett
Special to Focus

Who could have predicted the enormous strides humanity has made toward understanding the heavens since Galileo first pointed his telescope toward the sky?

If anyone could have, the Space Environment Center (part of the U.S. Department of Commerce's Boulder Laboratories Center) would have—they've forecasted everything sky-related since 1965.

The SESC's customers range from worldwide classified military operations to homing pigeon owners. Hardware ranges from a Commodore personal computer to a DG MV/10000 with 16 MB of main memory connected to a network of WICAT microcomputers, each with 1 MB of memory. The data collected could fill 2½ gigabytes of disk storage, and ranges from customer mailing information to solar event logs and forecasts.

Providing forecasts, warnings, and summaries about solar-geophysical activity and its effects on human endeavors is the center's business. Manager Dean Schroeder says it is the only outfit in the world that does this on a real-time basis.

The purpose of the SELDADS (Space Environment Laboratory Data Acquisition and Display System) computer center is to serve the forecast center. InFoCen, 3CI's fourth generation relational data base management system, is also used to help manage the computer center's array of hardware, as well as managing its customers, hardware, collected data, and information dissemination.

SESC is in the process of switching to a system that can handle six times the capacity of the old system. Since 1974, they have been using two Novas, with 64 KB of memory, for data collection and processing. Two Eclipse S/200s, each with 128 KB of memory, were used for the user interface.

The new system, scheduled to be fully implemented this year, consists of a DG MV/10000, with 16 MB of main memory and 2 1/2 gigabytes of disk storage. The DG MV/10000 is networked to eight WICAT WS150 microcomputers, each with one MB of memory. This will be the communication network, decoding information from outside sources.

SESC is jointly operated by the National Oceanic and Atmospheric Administration and the U.S. Air Force. The center originated in the mid-sixties to provide warnings to NASA's Apollo project astronauts when conditions outside the earth's atmosphere could prove harmful. The Center provides "space weather" and also serves as the international world warning agency, coordinating reports daily from regional warning centers at Paris, Moscow, Darmstadt, Sydney, and Tokyo.

To monitor the flow of information, the center is staffed by a forecaster 16 hours a day, and a solar technician 24 hours a day. These staff members decide which data demands "alert notification."

The cause of the 1965 New York City blackout is commonly believed to have been a severe solar storm. Last February, the biggest magnetic disturbance since 1965 occurred, but this time it went unnoticed by many. Nonetheless, at least 25,000 private individuals, power companies, radio and satellite operators, and military personnel could have been affected had they not been forewarned by the SESC forecasting service.

With increased technology, magnetic disturbances caused by solar activity play a major role in communication, survey, and transportation networks, explains Schroeder. Magnetic surveys in search of petroleum sources would prove useless during a magnetic storm, for example.

Power lines are also affected by magnetic disturbances. Such a disturbance could induce excess currents, causing overloads and power outages. If the right people are notified, a flip of a switch at the main power station can fix the problem. At Arctic latitudes, a magnetic storm warning may save a snowmobile trip to investigate what appears to be a malfunctioning sensor, Schroeder adds.

Radio operators and the military may also be affected by distorted communication or radar. Even homing pigeons seem to be affected by solar magnetic activity. Although the direct cause and effect is not fully understood, increased losses of pigeons occur along with increased magnetic activity.

(continued on page 18)

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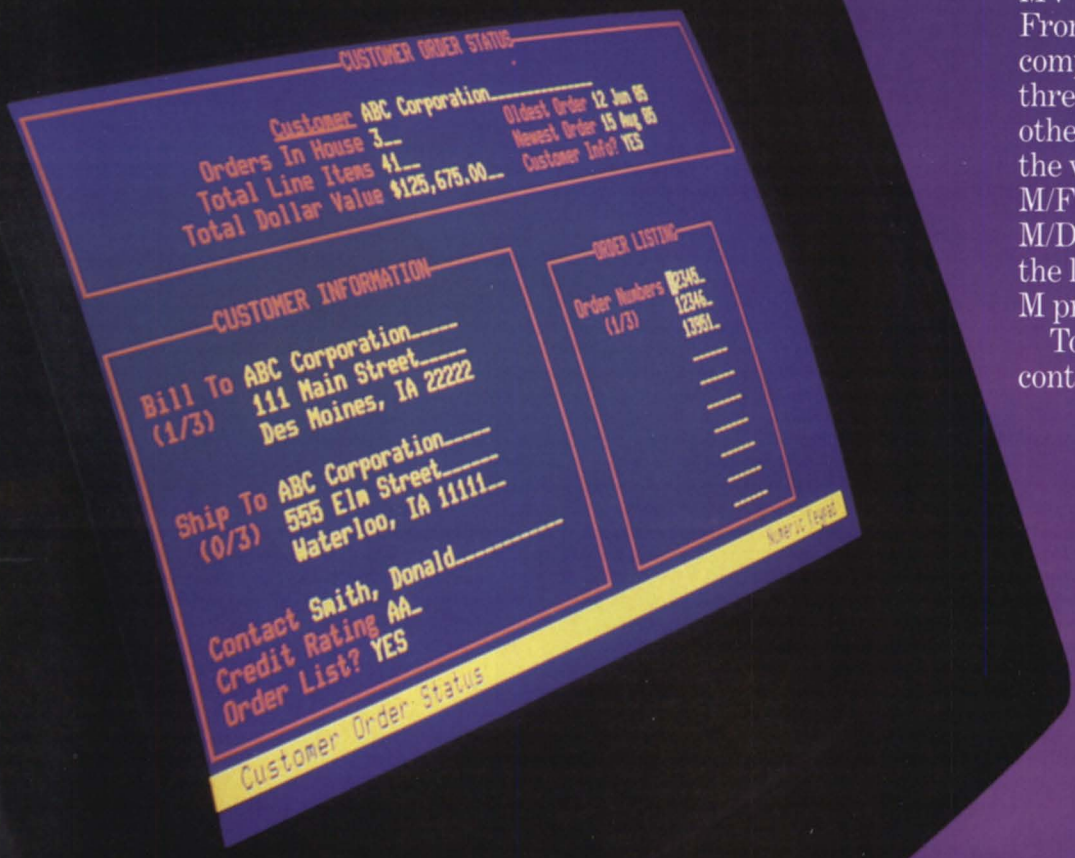

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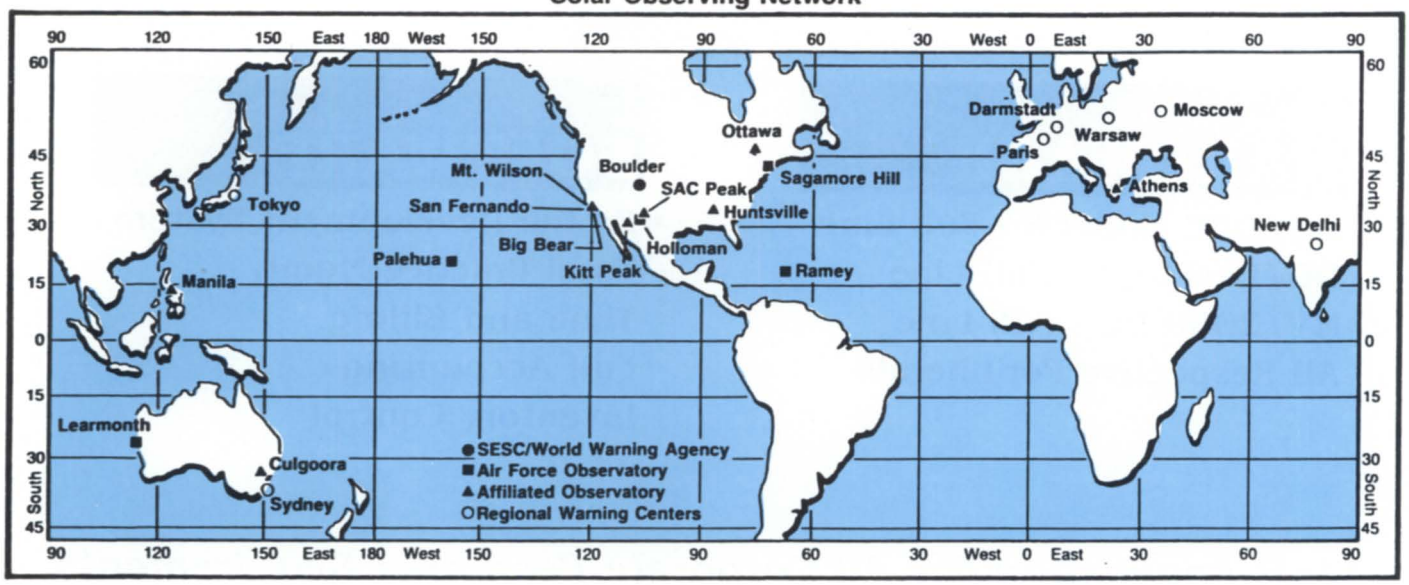


(from page 14)

Solar particles resulting from solar activity may also prove harmful to human endeavors. The aurora borealis (or "northern lights"), a spectacle of beauty to some observers, may cause concern to pilots flying in its range. Because the aurora is a concentration of particles released by the sun, it indicates high levels of radiation. To avoid the radiation, pilots may have to reroute flight patterns. In addition, commercial satellite operators fear damage to their satellites in the event of large solar activity. Other satellite operators may use the monitored solar activity to decide which experiment to turn on, and when.

To warn subscribers of these solar activities, SESC offers a variety of services, including daily or weekly summaries of solar activity, and forecasts ranging from one day to five years. Daily listings include solar summary forecasts, solar region reports, solar-geophysical activity, and a Geoalert. Information included in these reports includes features on the sun's surface, worldwide magnetic indices, and solar events, such as solar flares. The Geoalert is a coded summary of all conditions. These alerts are sent out as required, but not all subscribers require them, Schroeder says.

SESC offers a satellite broadcast service that transmits information once a minute so subscribers can review real-time information directly from satellites. This information includes X-ray and magnetic field values. The service is provided to anyone who can afford the equipment to receive this information.

InFoCen is used to sort out the different levels of these services, and the different levels of customers. Schroeder designed a system of data sets that determines when, how often, and who obtains which information, and where they obtain it.

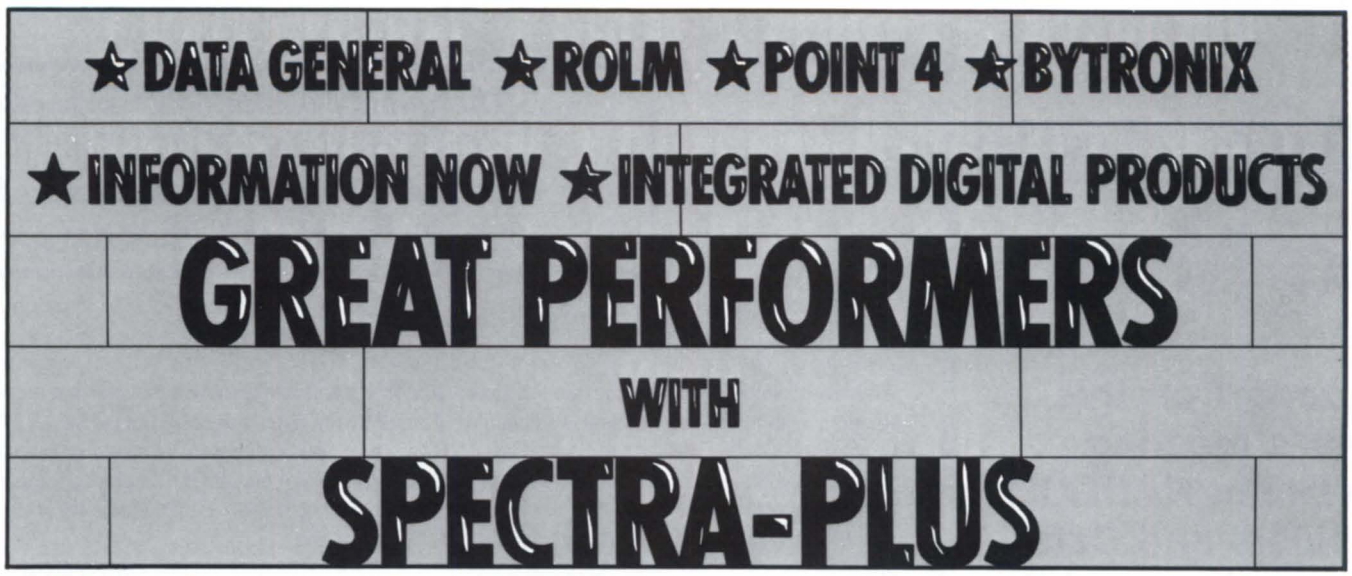
InFoCen manages SELDADS' sources of information and catalogs the resulting data. Sources of contributing data include 120 stations from 117 countries around the world. Data catalogued includes more than 800 data sets. Daily communication occurs between the regional warning centers. Telex and a military communication service provide communication lines. In addition, stations in Puerto Rico, New Mexico, and Australia provide real-time solar images, monitored through SESC's graphics Apollo computer.

SESC accesses the Geostationary Earth Orbitting Satellite (GEOS), which is the same satellite that takes pictures for weather forecasters on the daily news. SELDADS is interested in solar X-ray, proton, and magnetic field information the satellite provides. As the information is transmitted, SESC's real-time monitors plot different parameters.

Information sources also include a remote geophysical observations network chain through Alaska and Canada. Magnetometers, which measure the strengths of the earth's magnetic fields, transmit data through satellites to receivers in Maryland, then through telephone lines, to be processed at SELDADS—all in less than three seconds.

According to Schroeder, continually monitoring solar activity growth and decline will lead to more objective forecasting. By using the computer to track relative changes of solar activity, solar information can be used objectively to predict activity, rather than using subjective speculation. Δ

Carole Kellett is a technical writer for 3CI in Colorado. She may be reached at Solar Office Plaza, 155 West Harvard, Fort Collins, CO 80525; 303/223-2722, Telex 215406



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Circle 54 on reader service card

Two days in May

The quality of the STRs submitted has dropped significantly. Many do not include enough information to let the development staff track the problem

A report on this year's meeting between NADGUG officers and Data General executives

by Rene Dominguez
NADGUG President

Following a tradition set two years ago, NADGUG Vice President Calvin Durden and I travelled to Westboro on May 15-16 to meet with Data General executives and discuss issues and concerns NADGUG members have raised about their relationship with Data General.

We presented a package to the Data General executives that included the results of this year's RIG/SIG issues and concern survey. Much of the discussion that followed centered around the top four issues the survey had identified: software quality (and early warning when problems are identified), Data General's invoicing system for hardware and field engineering, remaining problems with the Atlanta Customer Support Center, and user input into software development.

We met with the following Data General personnel:

- Al Scura—division director, user systems
- Gerry Clancy—division director, systems software development
- Diane Clay—product manager, On-Line Information Service (along with the staff responsible for OIS development)
- Bill Bentley—vice president, North American field engineering
- Tony Nicoletti—vice president, support services
- Fred Cochrane—vice president, engineering services
- Frank Pinto—division director, North American sales (substituting for Frank Keaney, who at the last moment was unable to attend)
- Dave Lyons—vice president, business group marketing
- Bob Miller—senior vice president, business group
- Edson de Castro—president and chairman (Ed was not on our agenda but managed to spend a few minutes with us.)

In general the meetings were very informal and open. In all meetings except the one with Diane Clay and her associates, we basically presented our findings, then discussed the issues relevant to the executives' area of responsibility.

Software development issues

Our first meeting was with Al Scura and Gerry Clancy. Since the main issue confronting us this year was software, both Al and Gerry were informative.

We initially discussed ***software quality***, which was our number one issue. We asked if the cutbacks at Data General had included the quality assurance area. The response was that there were no cutbacks in that area, and that in fact there was an increase in the QA effort, particularly in the CEO product area. To indicate software quality and subsequent reliability, the development staff tracks the number of STRs (software trouble reports) on a release, the number of bugs per thousand lines of code, and a comparison to the Mil Spec standards. We were informed that the alpha testing included more than 50 systems (mainly Data General internal) and that the beta test sites were typically heavy users of the product being tested.

We came away from this meeting with the general feeling that software quality does *not* appear to be a real problem based on the criteria used by Data General (which seemed reasonable). We therefore concluded that the problem was either one of customer perception, or an actual problem that was not measured by the criteria used by Data General. We discussed perceptions, and concluded that part of the problem may be the result of problems in certain prior releases that took a lot of time to overcome.

We will recommend that *Focus* publish an article on Data General's software quality assurance program to let users see how DG is addressing the problem of assuring quality software. We also will also look at doing additional surveys of the membership to get a better handle on how big a concern software quality is for NADGUG members.

The fire and thunder we carried to Westboro regarding ***early warning of known software problems*** (our number two issue), was blown out very quickly by the new On-line Information Service offered by Data General Services, Inc. This service will provide access to internal Data General information on various known problems in a revision of software —and provide the information quickly. Likewise, STR tracking is also a feature of OIS.

Similarly, the issue of ***user input into software development*** was handled very nicely and positively in two ways. The first was the increased commitment of DG software development to have an open channel from our special interest groups. Currently this channel is very effective with OASIS (the Office Automation SIG). OASIS Chairwoman Charlene Kirian has developed close and effective working relationships between the SIG and the product marketing and software development organizations. Software development was recently represented at the spring meeting of OASIS in Indiana; Al Scura said it was *extremely* helpful, and that software development would be willing to do more participation on that level.

Another method of user input will be via OIS. There is a DG-Talk feature in this product which allows the subscribers to direct messages and information to software

development personnel.

The last of the big four issues this year was also software-related: ***documentation***. This issue was a surprise to Al and Gerry. As an example, of the last thousand or so STRs that were submitted on CEO, only four related to documentation. We were given a contact within Data General with whom to discuss this issue and we'll do so if time permits.

Our problem with respect to documentation is this: a small sample survey such as the one we conducted cannot refute statistics such as those we received from Al and Gerry on documentation STRs. The problem that we will face as users is to make sure that the cards and letters start to flow regarding documentation problems and issues—if in fact a problem still exists.

We told Al and Gerry we would come up with a method of providing better quantitative information regarding the software issues that concern users. We would like NADGUG members to let us know their thoughts about methods we can use to determine which software issues are *really* important to users.

Food for thought: if you are having problems with software, use the channels available to you to make sure that your voice is heard. ***STRs****—write them when there is a problem.* ***OIS****—use it to see if there is a resolution to your problem or communicate to DG via DG-Talk.* ***Software Support Center****—let them know of your problems.* ***Escalate*** *critical problems—don't take a less than satisfactory answer to your problems.*

Field engineering issues

Our second session was with Diane Clay and members of the staff of the expanded On-line Information Service (OIS) DG is offering through the CompuServe network. This short session was filled with information. Basically, OIS is an on-line menu-driven service available 24 hours a day. It provides quick access to information on Data General soft-

(continued on page 23)

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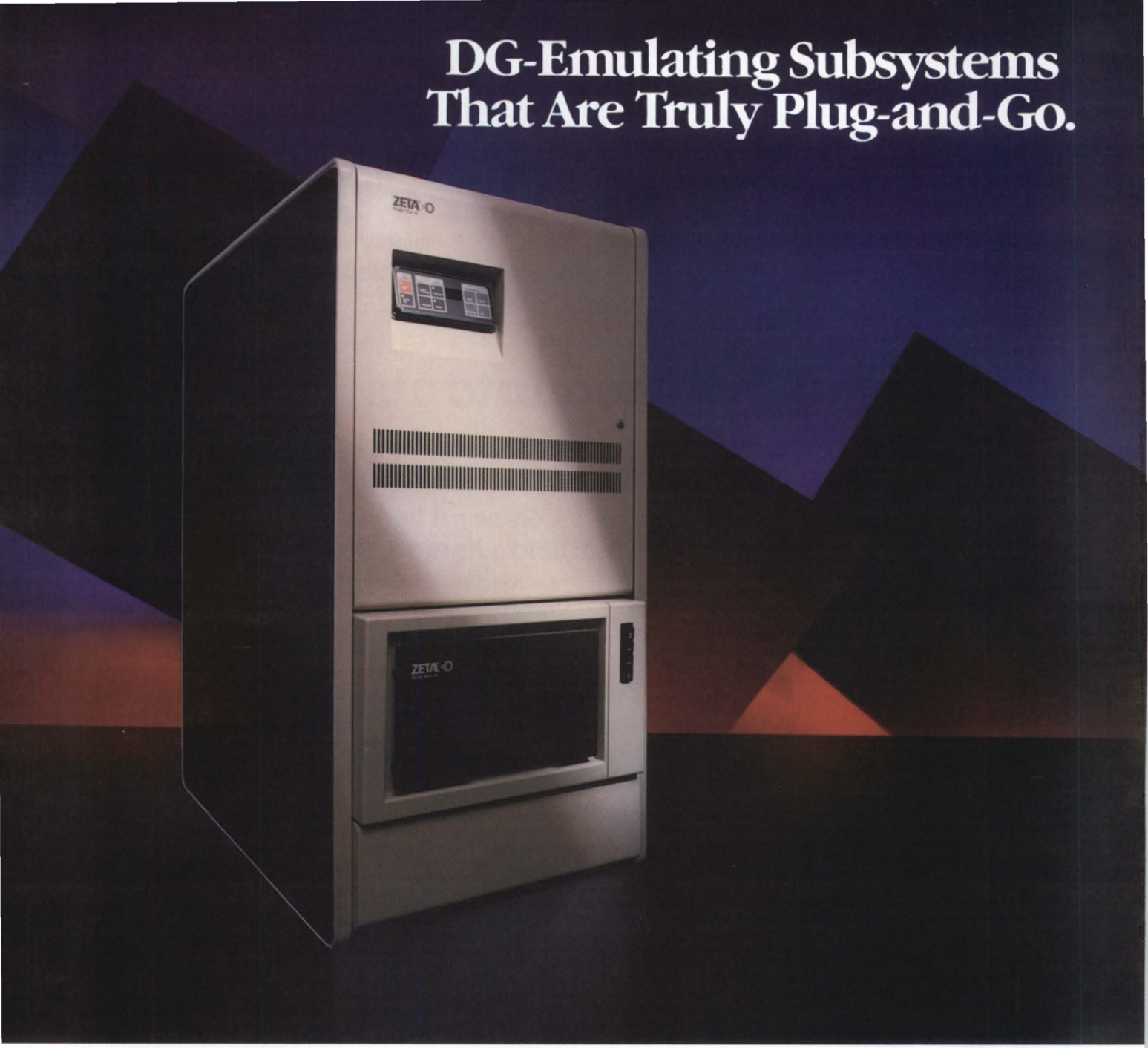

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ZETACO

The Link To Tomorrow.

Circle 62 on reader service card

We asked if the cutbacks at Data General had included quality assurance. The response was that there was actually an increase in the QA effort, particularly in the CEO area

(from page 21)

ware and hardware products and services. Included is an electronic DG-Talk section for posting messages to Data General, and a file transfer capability for downloading files to your system for patch application and printing. OIS includes information on everything from software ship dates and product information to STR status reports.

At the presentation, and in my subsequent use of this product (which is available to users who subscribe to the Support Plus service of Data General Service, Inc.), I was impressed by its capabilities—and by the fact that it is a potential resolution for some of the major issues and concerns facing our users. While the service has a price tag, the cost justification, in my opinion, comes easily when you take into consideration all the costs incurred while troubleshooting a problem—system down time (the value of lost user access), and technical support (the cost of the staff working on the problem) are expensive. Overall, I consider this product a worthwhile one that should be evaluated by every system user.

Data General Service offered to have NADGUG establish a bulletin board on OIS for potential use for *Focus* articles, SIG correspondence, etc. NADGUG's planning committee will most likely be addressing that issue shortly.

Atlanta Customer Support Center

Our meeting with the executives at Data General Service (Bill Bentley, Tony Nicoletti, and Fred Cochrane) was very upbeat compared to last year's meeting. Last year one of the key issues was the Atlanta Support Center. This year we were happy to report—and DGSI was equally pleased to hear—that the Atlanta Support Center had dropped in priority from the number 3 issue last year to number 8 this year.

We addressed the concern expressed by some users that there seemed to be a problem emerging with field engineering hardware support. The reaction was initially one of shocked surprise, in that field engineering's customer surveys have been on the upswing—last year's rating of 7.8 to 8.0 had moved up to 8.5, with the second quarter showing an 8.6. These results were based on a return rate in excess of 40 percent, from a larger customer base than our RIG/SIG survey. They did, however, recognize that there are certain parts of the country where there have been recent problems. They said these areas are receiving corporate attention and will be up to par in the near future.

North American sales

Our meeting with the North American sales representative, Frank Pinto, was equally cordial. We discussed the basic issues this year, and were offered a focal point within North American sales to which we can direct our concerns regarding software and hardware issues. We will be looking at ways in which we can take advantage of this offer so that our members will receive the attention they need. We mentioned specific concerns with the invoicing system, software/hardware pricing, and support for existing customers. All of these comments were well received, with a comment that some activity will be focused on the key facets of these concerns. We were not able to provide details on all issues, but will be following up with more comprehensive surveys to all users later this year or early next year.

Business group marketing

Our meeting with Dave Lyons produced continued support for the users group, and specific support for the issues we had discussed this year in our discussions with Al Scura and Gerry Clancy. Dave Lyons indicated there is an effort within Data General to provide more focus on targeted market industries with specific products. This will most likely result in an increase in the number of special interest groups in those areas. Areas initially identified were petrochemical, financial services, CAD/CAM/engineering, manufacturing, and education.

In meeting with Bob Miller we received some insight into the issue of software pricing within the industry, and within Data General. Data General has placed significant emphasis on efforts to develop and continually improve quality software. That is the good news for us as users. The other side of the coin is that the cost of software development, as many of us know, is very high. Data General is no exception. The return on a dollar-for-dollar basis on the sale of software products is very low when looking at what it costs to develop that software. Users expect a software company to price its products to get a good return on development and marketing costs, but seem to be reluctant to apply this same thinking to software products from a company that also makes hardware.

Overall, Bob Miller sees the future growth and development of Data General as being sound and realistic.

A surprise visit from the president

Edson de Castro was not originally on our agenda, but he did manage to take a few minutes to pay us a visit. In general, Edson felt that the corporation was doing well and reemphasized that Data General is in the computer business for the long run, and that they will continue to offer fully compatible products across the line to satisfy users' processing requirements. While 1986 will not be a spectacular year, he felt that the new products offered this year have been successful and that DG will have a good year.

All in all the meeting with Data General this year was positive. We have made known to DG management the issues our RIGs and SIGs have felt were important, and we believe that the issues will be addressed—in some cases are already being addressed. Time will tell.

In closing, I would like to recommend that all users attend this year's conference and see firsthand some of the new products being offered by Data General. More importantly, come and let Data General and NADGUG know the key issues and concerns you are facing. See you in Orlando! Δ

Rene Dominguez, president of the North American Data General Users Group, can be reached c/o Deutsche Credit Corporation, P.O. Box 329, Deerfield, IL 60015; 312/948-7272.

The development of micro earthstations has made satellite networks a cost-effective communications solution for companies involved in interactive inquiry-and-response applications

Up on the roof

Micro earthstations are proving themselves in interactive applications

by Sheldon Shapiro
Special to Focus

Accurate, up-to-date information is one of the key factors that distinguishes successful companies. While most medium-sized and large businesses employ some form of data communications, those with interactive data communications networks have a strategic business tool, because immediate access to current information in a central data base provides a competitive edge in the marketplace. For example, the insurance company that can quickly and accurately quote premiums and coverages will gain market share over a firm that takes hours or days to respond with similar data.

As interactive transaction networks grow in importance, changes in telephone tariffs resulting from the AT&T divestiture have sent many companies looking for better prices and performance than they can get from terrestrial common carriers.

Many companies needing to transfer large amounts of data from point to point—minicomputer to mainframe communications, for example—have already turned to satellite networks. These systems support high-speed batch transmission. They also free companies from dependence on the telephone company.

Not until recently, however, have transaction-oriented businesses, such as banks, retail stores, and insurance companies, had access to similar satellite networking capabilities. The development of micro earthstations (2- to 4-foot diameter rooftop dishes that send and receive satellite signals) has made satellite networks a cost-effective communications solution for companies involved in interactive inquiry-and-response applications.

Low-cost micro earthstations are particularly well suited for applications in which hundreds to thousands of geographically dispersed computer terminals must access a central data base.

Instead of common carrier leased telephone lines and modems, a satellite-based network is configured with a micro earthstation at each transaction site. Data inquiries are sent from the micro earthstation to a satellite transponder where they are relayed to a master earthstation, or "hub." The hub is connected to a central computer via telephone lines or an SCPC satellite connection. Data retrieved from the corporate data base returns to the micro earthstation along the reverse path.

Key advantages of this approach are:

- Reduced communications costs on multipoint leased lines by as much as 40 percent on a location-by-location basis;
- Fixed communications costs for five years or more;
- Significant reductions in data errors (satellite networks typically lower bit error rates to 1 percent of that normally encountered on leased lines.);
- Simple expansions in network services—with a satellite network, a company is not dependent on telephone carriers for expanded services, maintenance, or configuration changes.

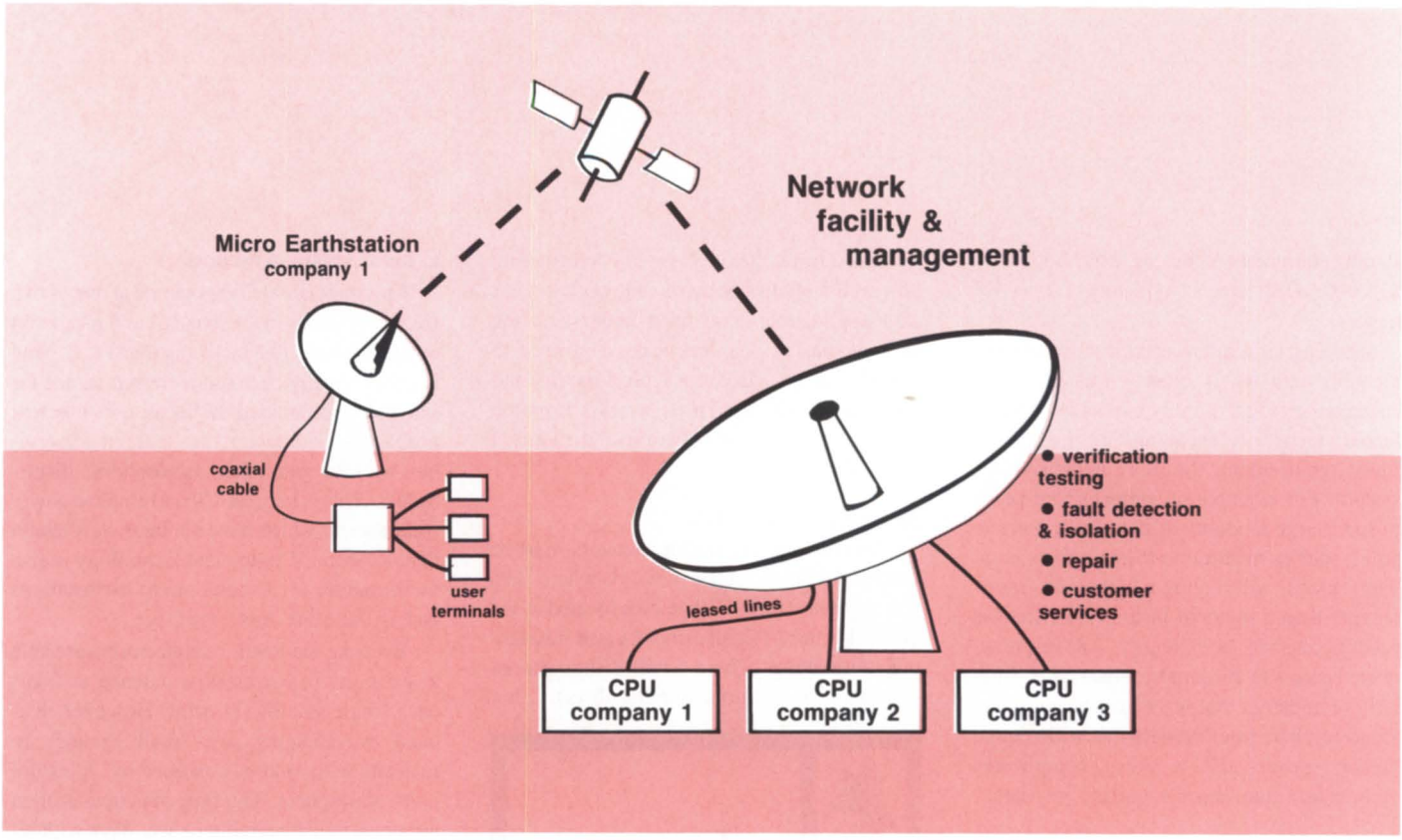
Analyze your data communication needs

A variety of different systems are marketed with widely ranging price/performance attributes. Failure to pick the right system for your data communications needs can reduce or erase the savings associated with the new system.

Start by identifying network goals. Why are you designing or redesigning the network? To cut terrestrial line costs? To cut operating expenses by centralizing network management? To improve reliability and availability of network services?

Typically, satellite communications networks are categorized into three tiers:

- *High-end systems*. These support host-to-host file transfers with data transmission rates up to 40 million bits per second (Mbps). Earthstation terminals are priced at approximately $200,000 and up. Dish size ("aperture") is typically 4.5 to 10 meters.
- *Mid-size systems*. These support batch file transfer, transaction processing, and optional single-channel voice with data rates up to 56 thousand bits per second (Kbps). Earthstation equipment is priced from $15,000 and up. Dish size is typically 1.2 to 1.8 meters.
- *Low-end systems*. These support point-to-multipoint or terminal-to-mainframe transactions with bit rates up to 19.2 Kbps. Earth-



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station equipment is priced from $6,000 to $15,000. Dish size is typically 1.2 to 1.8 meters.

The cost of a micro earthstation communication network is closely related to the characteristics and quantity of data to be transferred. Generally speaking, the higher the speed requirement, the more expensive the system. For example, a company that needs to send large amounts of data from point to point, such as mainframe-to-mainframe communications, will require a higher data transfer rate than a regional insurance office that needs occasional, brief inquiry-, and response-related access to the corporate data base. Similarly, companies that want to send voice and video on their satellite network will require higher speeds and a more complicated architecture than those requiring just data.

Choose the right speed for a transaction-oriented satellite network

There are actually two components to the speed question: the inbound data rate from the operator terminal and the outbound data rate to the terminal. On a transaction environment, most inbound data is limited to human typing speeds—for example, an airline reservationist keying in ticket information, or a retail clerk entering credit card data and product codes. Consequently, most of today's on-line transaction networks involve relatively low inbound data rates.

Outbound data rates from the host computer are typically higher because, generally speaking, data can be read faster from the screen than it can be entered. In a data base retrieval system, for example, a 9,600 bits per second line is often used, enabling a full screen of text to be transmitted to the terminal in approximately two seconds. This rate can support a cluster controller serving multiple video terminals with good response time for most applications. While a variety of satellite systems tout data transfer rates in excess of 9,600 bps, many transaction-oriented businesses would be well served with a 9,600 bps system specifically designed for interactive transaction processing. Not only would the system be optimized for the application, but the price of such a network would be substantially less than a higher speed system.

Speed is not the only issue in determining how well a satellite network will work in your data application. You must understand the flow of data in your network. You need to consider such variables as typical inquiry and response size, protocol used, average response time of your current network, and required level of availability.

Mixing voice and data

A small aperture satellite network must be configured as a "star" network where data is transmitted from a large dish located at the network's hub to small dishes located throughout the country. These small dishes cannot communicate with one another directly, but must transmit to and from the hub. This network topology complements the architecture of many data base access applications where a host computer conducts numerous transactions with terminals located throughout the network.

Voice applications, on the other hand, are based on a "mesh" architecture. With this architecture, each part of the network should be able to communicate directly with any other point in the network. A typical desk phone, for example, can dial up any other phone that is connected to the public network. As a result, the mesh architecture, which is more complicated and expensive to employ, is not well suited to transaction-oriented applications where terminals only need access to a central data base.

C-band versus Ku-band

Commercial satellites operate at one of two frequency bands, the C-band (4 to 6 gigahertz) or the Ku-band (12 to 14 gigahertz). C-band has traditionally been the preferred choice for satellite communications because its inherent propagation characteristics make it impervious to rain and other atmospheric disturbances. This is because C-band employs lower frequencies, which have a longer wavelength than Ku-band. Component technology is also more mature for C-band micro earthstations and is therefore less expensive.

By using Ku-band, manufacturers are able to get a micro earthstation antenna to focus on a single satellite in orbit. However, Ku-band wavelengths are small enough to resonate with, and be absorbed by, moisture in the atmosphere. This type of system is often not operational on rainy or wet days without significantly enhanced power.

To overcome the atmospheric problem, many Ku-band designers increase their system's power levels in an effort to "burn through" the atmosphere. However, this requires more expensive equipment, and installation costs and system complexity rise.

Until recently, capitalizing on the advantages of the C-band has required the use of larger antennas than Ku-band to transmit signals to a single satellite separated only 2 degrees from its neighbor on the same frequencies. The broader focus of a dish antenna at C-band is due to the larger wavelengths-to-diameter ratio. Another potential disadvantage of the C-band has been the possibility of interference from terrestrial microwave stations, which use the same frequencies.

It is likely both C- and Ku-band frequencies will continue to be used for micro earthstation applications. However, my company, Equatorial Communications, has learned how to use "spread spectrum" technology on C-band to produce small dish antennas (2 to 4 feet in diameter) that are not affected by atmospheric moisture or terrestrial microwave interference.

Previously used in radio astronomy and military applications where high interference and jamming are commonplace, spread spectrum solves the local interference problem and enables the use of 4-foot dishes for two-way

communications on C-band. Spread spectrum is a data encoding technique that enables data packets to be reconstructed even if there is considerable interference during transmission.

Required equipment and costs

Customers have a variety of options in obtaining, installing, and maintaining a satellite system. The system may be purchased outright, with the buyer retaining end-to-end responsibility over the network. Systems or services can also be purchased from third-party vendors and pieced together by the buyer, or a turnkey vendor can be employed for a complete solution.

The components and costs of a small aperture satellite network typically include:

• *A micro earthstation*—consists of a small aperture antenna connected via a coaxial cable to a controller, typically a typewriter-sized electronics package which in turn connects to a terminal by means of one or more built-in ports. Micro earthstations can be purchased or leased.

• *Satellite transponder capacity*—a unit on the satellite that receives a signal, converts it to the appropriate frequency, and relays the signal back to earth. Satellite capacity is available from many suppliers and can be purchased or leased. Most of these services are sold on the basis of month-to-month leases with no long term cost control and no long term availability guarantee. While this may be suitable for applications in the television and entertainment fields, for a fixed pointed small dish network, users want long term commitment on price and availability from satellite vendors.

• *Network facility and management*—this includes 1) a master earthstation, 2) a large hub antenna, and 3) packet-switching electronics, which connect to your central computer via leased lines or a satellite link.

This component provides centralized access for remote sites. Often, because of expense, master earthstations are shared by multiple users. Also included are network operation, monitoring, and diagnostics. Since a master earthstation is a relatively expensive facility, you should have the option to own your own, or to share a master earthstation with other users to keep costs in line. In the latter case, the master earthstation would be owned and operated by the same common carrier who supplies the small aperture earthstations and satellite capacity. This approach has a further advantage: the carrier can also supply the software and personnel required for network management.

Network management includes performance verification testing, fault detection and isolation, failure repair and service restoration, and such customer services as new service requests, change orders, trouble ticketing, dispatching of field personnel, and status reporting and verification.

A small aperture satellite network must be configured as a "star" network where data is transmitted from a large dish located at the network's hub to small dishes located throughout the country

• *Installation and maintenance*—field support must be considered an integral part of a network to ensure the high level of availability required by on-line applications. Installation costs vary from location to location and from one installation company to another. In addition to putting the antenna on the roof, installation involves getting site authority, preparing the site, running the cable, and installing the controller.

Choosing a network supplier

To be better assured of receiving the improved performance and cost savings that satellite transaction networks promise, you'll need to thoroughly qualify your network supplier. Many companies offer to integrate a variety of different vendors' equipment and services into one cohesive network. Other companies take end-to-end responsibility for your network's successful operation, i.e., they provide fully compatible micro earthstations, satellite transponder capacity, network management, and nationwide service.

You'll want to choose the solution that provides the best opportunity for long term cost control, availability, and technical service. Before you make your decision, ask the vendor the following questions:

—Are your micro earthstations specifically designed for my network?

—How many earthstations have you installed?

—How many years of experience do you have manufacturing small earthstations?

—Do you manage your own network or do you rely on other suppliers' services and equipment?

—Do you offer guarantees on network availability, reliability, and data transit time?

—Do you have references from companies similar to my company?

—Do you provide long term service contracts?

—Can you provide sufficient satellite capacity to operate my network over the long term?

—Do you own satellite transponders and provide long term service contracts for them?

—Do you have a nationwide factory trained field service force?

—Do you support a range of standard protocols and offer customization services to meet specific requirements?

For transaction-oriented companies, small dish networks can offer both price and performance advantages over existing leased telephone lines. By carefully analyzing your data communications needs, you may be able to free your company from dependence on the telephone company *and* increase the capabilities and performance of your data communications network. Δ

Sheldon Shapiro is manager, interactive network development, Equatorial Communications Company, a Data General ISV. Contact him at 189 N. Bernardo Ave., Mountain View, CA 94943; 415/969-9500.

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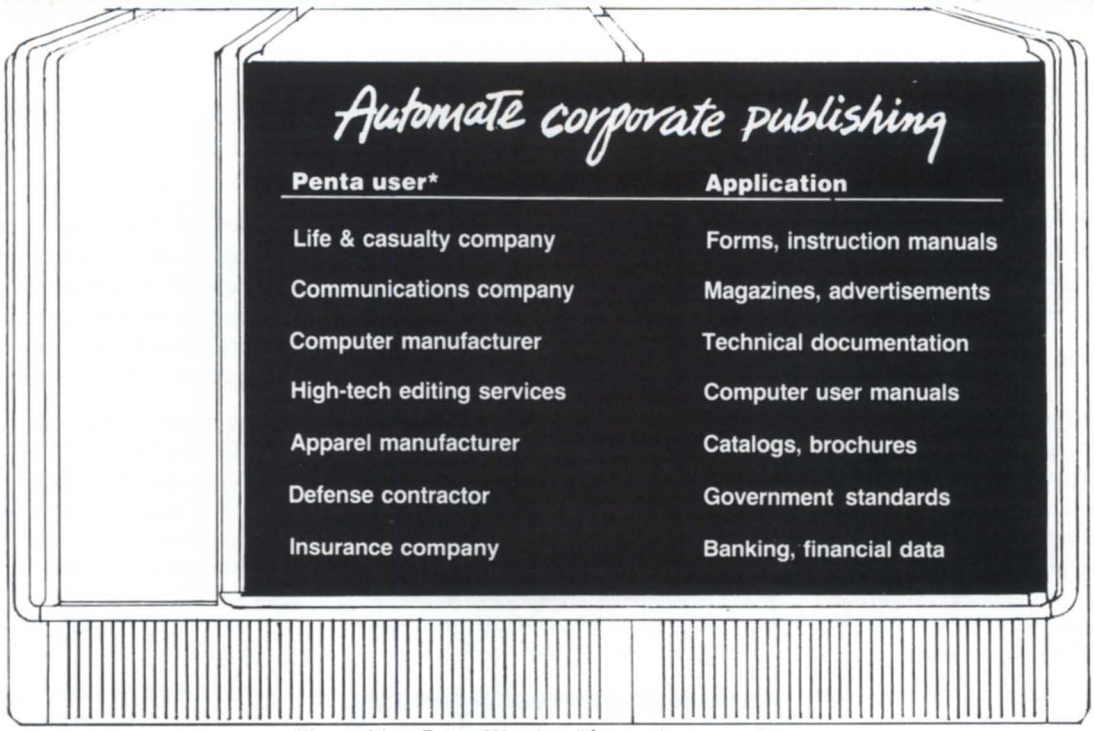

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Emulations: two that succeed

Terminal emulation with a little extra for the Macintosh

by Richard Katzman
Special to Focus

In the turbulent world of data processing, some of the most interesting and vicious battles have been fought between business managers hovering over their microcomputers, and data processing managers defending their mainframes. In the mainframe world, microcomputers are like small children—meant to be seen and not heard. When micros are hooked up to mainframes, it's usually done with terminal emulation software that reduces them to imitating dumb terminals, with some occasional leeway to show off with file transfers and other tricks.

Yet the truth is that micros are better at some jobs than the larger machines. Word processing, spreadsheets, and graphics programs excel on personal computers. Mainframes, on the other hand, are the only real choice for a multi-user business environment involving large volumes of data that must be accessible by all. The two do not conflict with each other—until they come together.

A typical scenario might include a business manager putting together a presentation with his favorite word processor, spreadsheet, and chart programs. All is well until he decides he needs some supporting data from the mainframe—for example, all transactions in the travel expense account greater than $1,000, sorted by amount and profit center. He switches to his terminal emulation software, and the trouble begins.

Finding the needed data is not the problem. But the data is in the wrong order and includes some information he doesn't need. Furthermore, he needs to get the data into his spreadsheet without reorganizing his whole model. The DP manager is not especially eager to write custom software for specific one-time uses, so our business manager must go back to the PC to key in his data manually.

For both DP managers and DP users, the ideal solution would resemble the automated bank teller machine. The user could put his card in, and data would come out, with no annoying human to tell him why he can't have what he wants. The DP manager would also need to support only a few fixed combinations of data. He wouldn't have to make small change—he would just provide the round numbers.

FrontEnd, a software package that hooks the Apple Macintosh to a Data General minicomputer, was designed to produce a simlar result. It runs on the Macintosh and its basic function is to emulate a D210 terminal so the DG host thinks it is talking to a D210. The Macintosh can access the DG applications like any other terminal.

FrontEnd takes emulation a step further, however. It takes advantage of some of the unique features of the Macintosh to allow the DG

And don't forget the Amiga

by Jim Phillips
Special to Focus

When I purchased my Amiga a few months ago I was surprised to find a D200 terminal emulation program already on the market. I had been hoping for something that would let me get rid of the D211 at my home, so I contacted SKE Software of Clearwater, Florida, and ordered a copy of SKEterm.

What I received was a folder that contained a manual, a disk, and a surprise—an STR report form. Sound familiar? I found out the developers work in DG and DEC data centers. I count that fact as quite a plus for this product, because if you do have to call SKE for help in using it with a DG system, you'll be talking with someone who knows DG products.

So far, SKEterm has been easy to use. I use it to check on my system from home, help users on the weekend, do some software development, and dial in to various bulletin boards. I use it in conjunction with a Ventel MD212 modem (which is not Hayes compatible).

SKEterm requires that you first boot the Amiga system up with Kickstart, and then load the Workbench disk into the system. SKEterm can then be used either from the internal or external drive. I have made a bootable disk, so all I have to do is insert my disk to proc up SKEterm as a separate process and display the menu.

SKEterm not only emulates the D200, but also TTY, ANSI, VT-100, and ADM-3A terminals. You can maintain a phone book of up to 16 phone numbers; if you have a Hayes compatible modem, your phone book entries can also automatically dial for you and log you on to a remote system.

SKEterm supports three kinds of data transfer protocols: XMODEM, KERMIT and SKEfer. XMODEM and KERMIT are common procotols, but SKEfer was designed specifically for file transfers between two Amigas with SKEterm. Baud rates can be set from 110 to 19200.

You can run SKEterm by using the icons, or you can write a startup macro that will run it as a second process. This feature will let you take advantage of Amiga's multitasking capabilities. Then, if you need to access a file on a disk or you want to do something else while you're logged on to another system, you can "size" down the CLI window to keep it available as you do your other work. Just close the other window when you're finished and you're back to your terminal session.

SKEterm has 13 switches or features you can select to tailor its operation to your needs. You toggle them on or off with keystrokes like ALT C (for adding a carriage return after a line feed), ALT L (for adding a line feed after each carriage return), ALT D (for turning on data capture), ALT E (for echoing keystrokes

In the mainframe world, microcomputers are like small children—meant to be seen and not heard

to create multiple windows containing grids of data or freeform text. The user can then copy and paste that information into other Macintosh applications, using the standard mouse-driven Mac interface.

That means our frustrated business manager could log on to the DG from the Macintosh, call up the same program as before, and have the travel expense details appear in a second window on the Mac screen. He could scroll to the relevant section, point to the figures he needs, and copy them to the spreadsheet program for sorting, analysis, and graphic presentation.

The overworked DP manager would be as content as the robot teller, because the DG system is putting out only the predetermined fixed format of data. It is actually simpler than displaying the information on a regular terminal, since no screen handling routines are called for.

The Mac can remember all of the expense details and the user can search or scroll forward or backward without bothering the host.

It takes 3 to 10 lines of code to tell FrontEnd to open a new list or text window, format that window, and direct data to be displayed there. The commands can be thought of as powerful screen control codes. Remember that the DG still thinks it is talking to a D210. Instead of a code to clear the screen or start underscore, though, the function is to create a new window or change the font size and style.

The example program demonstrates how to send an array of numbers to a FrontEnd "List Window" from Data General Business BASIC. A 10 x 10 array of row * column is sent to the list window. Two small subroutines are included in the program to create the list window, and then to show it after the data is sent. The screen dump shows the newly created list window in front. The scroll bars allow the user to see the data cells that are not currently visible.

The first cell is indicated as selected. Behind the list window is the terminal window, which is the equivalent of a DG D210 terminal. The example program is visible. The standard Macintosh menu bar is at the top.

FrontEnd also takes a step toward solving another great DP bugaboo. Almost all software—mainframe and micro—suffers from inconsistent user interfaces.

Invariably, even programs on the same system call for different and incompatible combinations of function keys, control codes, and arcane commands to implement essentially similar functions. Data from one subsystem or application can seldom be copied and pasted into another application.

The Macintosh is the first personal computer designed around strict user interface guidelines. The user can start a new application already knowing how to scroll through the data, open files, select commands, and print in various modes. Even more importantly, data can be copied from any application and pasted into any other. This includes graphics, figures, or text.

All applications rely on standard controls and dialog boxes that show the user the available choices and wait for him to select one by pointing to it and clicking the mouse button.

FrontEnd puts this interface into the hands of the Data General programmer.

back to your console), ALT R (for receiving a file), ALT S (for sending a file), ALT P (for changing protocol types), and eight others. Being able to toggle the switches comes in handy when you're on a system and the configuration has been changed, or you guessed wrong when you set up your dialing sequence.

All of these changes, as well as your baud rate, type of terminal, parity, character length, and file transfer procotol are displayed on a status line at the bottom of the screen. Thus you can see how you have configured your session and change it if you so desire.

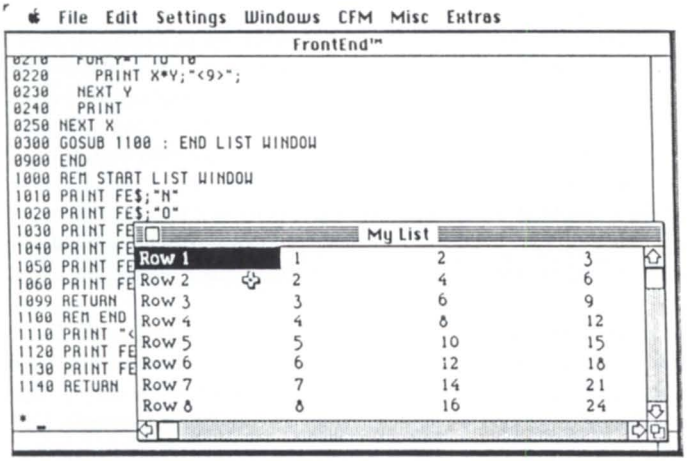
How does it work as a D200 emulator? Very well, considering the Amiga does not have function keys 11 thru 15. It's also missing a few others, so the developers have had to remap quite a few of the keys. The result is that you have to use some unusual combinations to produce DG key sequences. For instance, it takes a CTRL-SHIFT 6 followed by "p" to generate an F15. Because of a characteristic of the Amiga's operating system, CTRL+Fkey or SHIFT+CTRL+Fkey will not work directly. Instead, you combine the special key ALT with the other keys, i.e., ALT+CTRL+Fkey and ALT+SHIFT+CTRL+Fkey. The DEL key has been remapped as F11 and the BACKSPACE key remapped as the DEL key.

None of these changes have really been a problem. I have used SKEterm with SED, WordPerfect word processing, and DG's EMACS editor without any difficulty. The video attributes of the D200, including inverse video, underscore, and blinking are supported. In fact, I have colleagues who have used the D200 emulation to dial in to a data switch equipped with a protocol converter that transformed it again to make it look like an IBM 3278 terminal! Others have used it with VADIC 3415 and Hayes compatible modems with no problems. All said the product was easy to use and did a good job of emulating a D200.

I have had no problems using SKEterm to transfer files to and from my system. The manual, however, is short on information and examples of how to use the product—but you can get plenty of help from the developers if you give them a call. They are open to suggestions and are serious about the STR forms that come with the program.

If you have an Amiga and need an easy-to-use telecommunications program that emulates a D200, you might give SKEterm a try. You can get more information from SKE Software Company in Clearwater, Florida, phone 813/787-3111. The program retails for $49.95. Δ

Jim Phillips recently became the director of information services for the Health and Tennis Association of America in Dearborn, Michigan, which makes him the former president of the Mississippi Users Group. Contact him at 19853 West Outer Drive, Suite 350, Dearborn, MI 48124; 313/277-2929.




```
0010 REM Example of a FrontEnd Host Application 0020 REM 0030 DIM FE$(8)
: FrontEnd Command Header 0040 LET FE$ = "<27>L"
: All List Commands start <esc>L
0100 GOSUB 1000 : START LIST WINDOW
0200 REM Display the data 0210 FOR X=1 TO 10 0220 PRINT "Row";X;"<9>;
: Put the heading in column one 0230
FOR Y=1 TO 10 0240
PRINT X*Y;"<9>";
: Separate columns by TAbs 0250
NEXT Y 0260
PRINT
: Separate rows by CRs 0270 NEXT X
0300 GOSUB 1100 : END LIST WINDOW 0900 END
1000 REM START LIST WINDOW 1010 PRINT FE$;"N"
: create a new list 1020 PRINT FE$;"O"
: open a new list 1030 PRINT FE$;"F2 12"
: set the font and font size 1040 PRINT FE$;"TMy List"
: set the window title 1050 PRINT FE$;"D0"
: turn drawing off to increase speed 1060 PRINT FE$;"A";
: start sending output to List window 1099 RETURN
1100 REM END LIST WINDOW 1110 PRINT "<27>"
: <ESC> code sends output back to main screen 1120 PRINT FE$;"D1"
: turn drawing back on 1130 PRINT FE$;"W1"
: bring the List window to the front
1140 RETURN
```

For example, a typical subroutine will ask the user a question and require a "yes" or "no" answer. There are many places on the screen to display the question, and even minor considerations such as upper- or lowercase and what to do on a null carriage return can make this part of the program inconsistent with other parts.

Working through the Macintosh, however, a dialog box is displayed with the question and two buttons for "yes" and "no." No illegal response is possible, so no error handling has to be written. The choices are clear to the user, so no confusion can occur. The DG gets back a simple reply that it can count on being legal.

The Macintosh has some powerful text-editing features built in, so the DG can send unformatted text to the Mac, and FrontEnd will put it into a text window. Text can be added, deleted, copied, or pasted from/to other Mac applications, and the final text is then sent back to the DG.

It is easy to believe that the future will see Data General systems connected to intelligent frontend computers as managerial workstations. Δ

Richard Katzman is vice president of Kaz Business Systems, 10 Columbus Circle, New York, NY 10019. He is the author of FrontEnd. Kaz Business Systems is a Data General OEM as well as a Macintosh developer.

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The hot site solution

How would you keep critical functions going if disaster struck your site?

by Daniel B. Kilburn
Special to Focus

The computer-dependent world has emerged, and with it, an endless list of difficult problems for management information systems (MIS) managers. High on the list of yet-to-be-tackled priorities for most is the need for a workable disaster recovery plan.

Disasters come in many forms, and almost always without warning. Acts of God, such as fire and flood, constitute the most common cause of computer center catastrophes, but they are not the only threat. Employee sabotage is on the rise in the data processing world and, to an unprecedented level, terrorists are recognizing the vulnerability of computers as the nerve center of most organizations.

Most experts agree that few organizations are adequately prepared to respond to a serious computer calamity. Some estimate that less than five percent of the vulnerable companies have well-conceived, proven recovery plans.

To be workable, a contingency plan must be testable. To assure the protection of a computer-dependent company's assets if a major catastrophe strikes, an alternative online data processing capability is almost requisite.

According to a University of Minnesota MIS Research Center study, a typical company loses over 40 percent of its operational effectiveness by the fourth day of a major computer outage. Less than 25 percent of its operations can continue after the first week, and less than 10 percent after only nine days. A total computer center disaster would clearly be devastating. One study concluded that over 93 percent of companies experiencing such disasters filed for bankruptcy within a year.

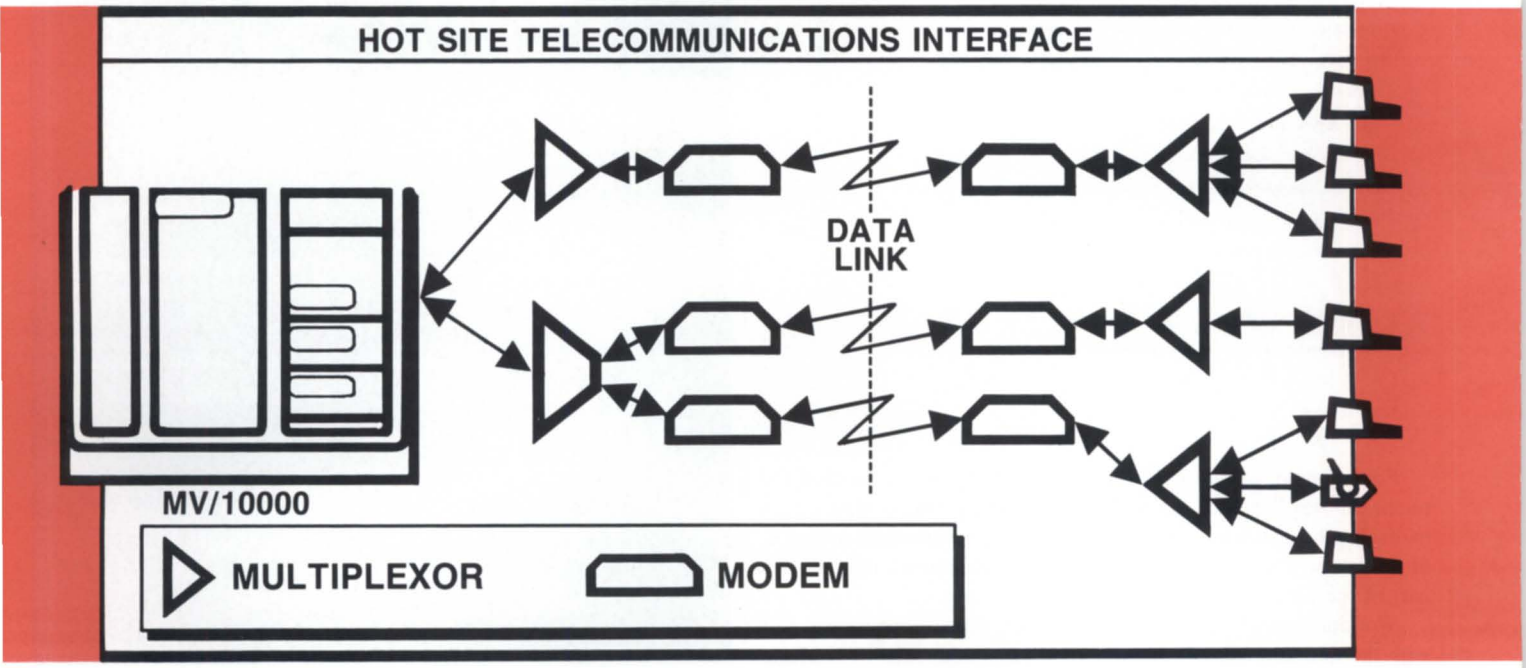
All officers and directors have legal and fiduciary responsibilities to protect their data processing assets. The Foreign Corrupt Practices Act of 1977, in addition to setting penalties for any corporation and its officers engaged in foreign bribery, amended the 1934 Securities Exchange Act to require corporations to keep accurate records and maintain internal control systems to safeguard a company's assets. Assets have been judicially defined to include the computer system itself and the data it contains. The Comptroller of the Currency requires that boards of directors of banking institutions be briefed annually on the results of testing their disaster recovery plans.

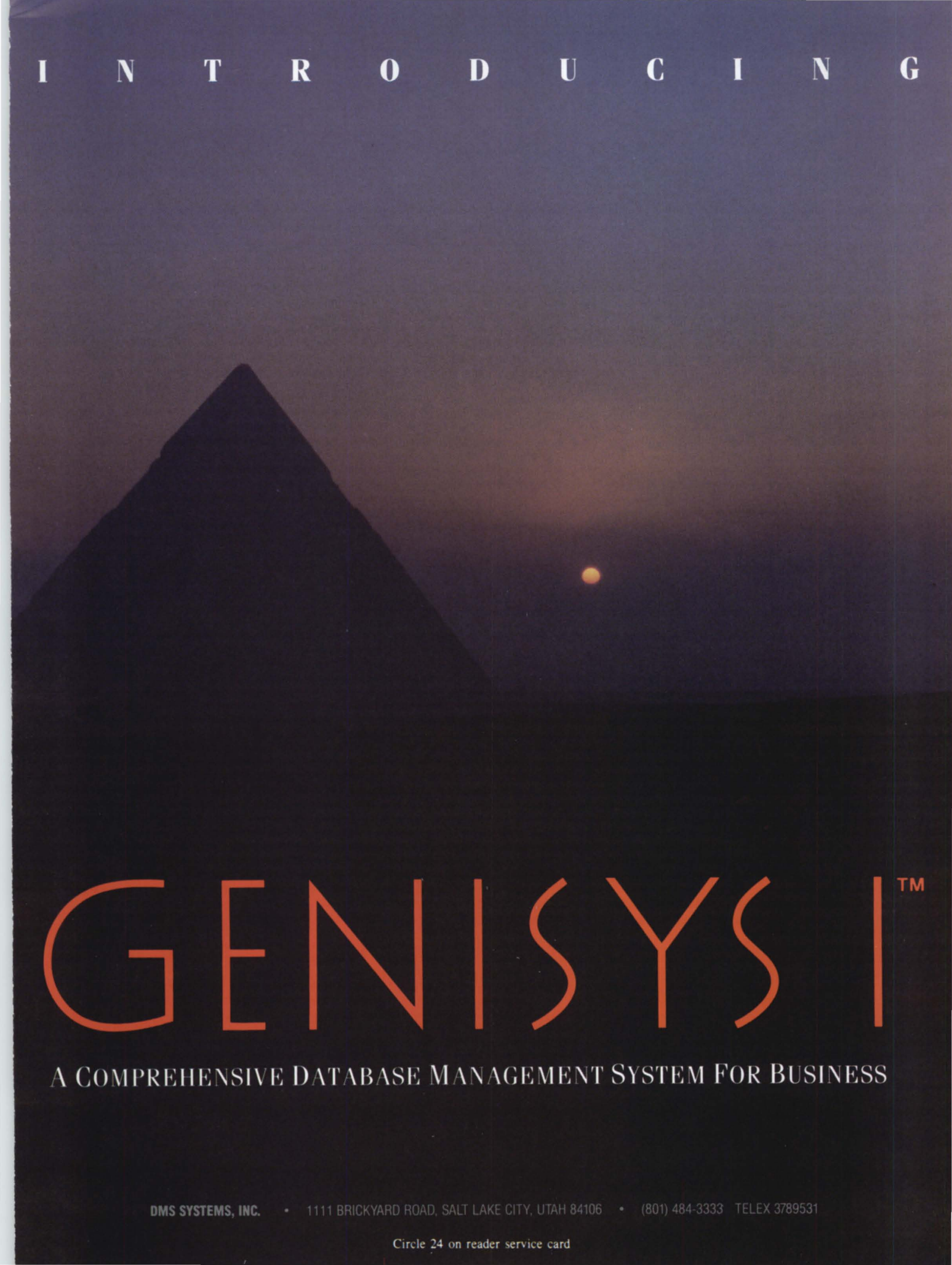
Why then are so few prepared? Complacency and confusion. Companies have never had to write such plans before, and many starts wind up as abortive attempts. Cost becomes the major obstacle. Senior executives frequently insist that their MIS managers pursue the least expensive alternative. Least expensive, however, usually means least workable.

The classic "lunch meeting" solution is the reciprocal agreement between two companies with similar equipment configurations. For years this idea satisfied the audit community primarily because there were few other alternatives.

The disaster recovery industry is only a few years old, and even now, few companies

(continued on page 34)

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(from page 32)

exist that offer comprehensive, on-line backup to other than IBM users.

Let's address alternatives. The spectrum runs from the previously mentioned reciprocal agreement to having a completely redundant, fully equipped backup facility. The choices depend on the computer dependency of an organization. The search for alternatives should start with an evaluation of organizational dependence on computers for financial survival.

The first step is calculating what would happen if the plug were pulled on the information system. The next step is charting the impact in terms of dollar cost and loss over time until on-line processing can be restored. Using the chart to determine the point from which a company can no longer assure its financial survival, staff members can develop criteria for a solution—perhaps one of the solutions described below:

The **reciprocal agreement**, which allows for batch processing on another company's equipment when it isn't using it, could work if the impacted company can go weeks, even a month or more, without on-line processing. The reciprocal agreement also assumes both companies are basically static. For example, what happens if one company decides to upgrade its hardware configuration and the two are no longer compatible? Or if either company grows into a two- or three- shift operation? Each company in a reciprocal agreement must also understand the effect of sharing its facilities with its partner company—how long could you afford to have another company processing on your equipment before it becomes your disaster, too?

The next most frequently mentioned "inexpensive" solution is the **cold site**. A cold site is a computer-ready envelope with environmental controls and communications interface equipment in which hardware can be installed. Depending on the complexity of the telecommunications network and availability of hardware and peripherals, this could be a workable solution.

But a company would have to be prepared to live with manual operations until new hardware is located, installed, and operations are restored. There are no guarantees as to how long this might take. No vendor will guarantee no-notice delivery times. The cold site solution can also become very expensive if dedicated lease lines, conditioned lines, or other communications interface devices must be in place in order to restore vital operations.

A third alternative, **duality**, requires the operation of two compatibly equipped data centers operating at well less than capacity. It is presumed that if one is destroyed, the other will assume the full critical processing load until reconstruction is completed. While this provides full control by a company over both centers, it can be very expensive, and the continuing evolution of new technology and applications further complicates the maintenance of twin data processing centers.

The ideal answer is the most expensive—**a second, completely redundant center** totally dedicated to backup. Companies opting for this solution sometimes find that the demand for processing time eventually leads to the use of their backup site for daily processing and

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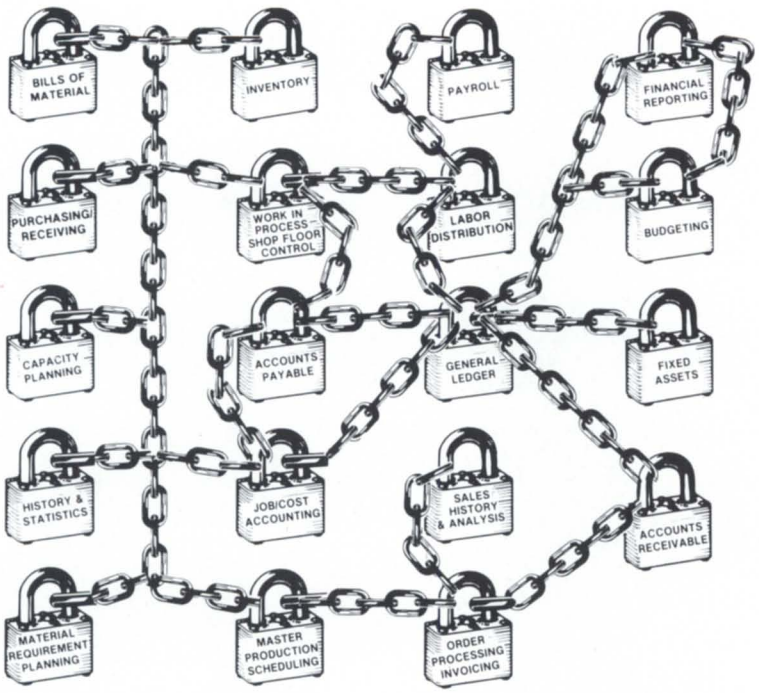

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its loss as a dedicated backup capability.

In my opinion, the most cost-justifiable method of assuring continued, on-line critical processing is to subscribe to a **hot site**. A hot site is a preconditioned, compatibly equipped facility operated by a third party. The hot site computers can be dialed up in the event a disaster strikes.

By subscribing to a hot site, there is no capital outlay for expensive, in-place hardware and telecommunications equipment until a disaster actually strikes. Some hot sites provide their customers an equipment pool of multiplexing devices and dial-up telephone modems for their use if disaster strikes without warning.

As quickly as a company can locate into alternate space and obtain terminal equipment while their files are being restored in the backup site, on-line operations can be resumed, normally in just a matter of hours. Most hot site companies allow use of their backup facilities for up to six weeks, affording the affected client, even in a worst case scenario, time to regroup in an alternate location until their primary facilities are reconstructed.

Keeping it simple during the few weeks following a complete computer catastrophe obviates the need for maintaining costly spare communications equipment. Most DP managers agree that they could continue vital processing functions via dial-up lines, bypassing complex local and remote communications networks and advanced telephone switching equipment, at least until an alternate facility is established.

It is ironic that successful companies have responded to the availability of high technology computer operations to become leaders in their industries, but refuse the modest investment to assure their financial survival by subscribing to a disaster recovery hot site.

The irony continues as large computer-dependent organizations, almost without exception, subscribe to companies for storage of their vital data files in massive, secure vaults, yet do not plan for alternate computer facilities to permit continuing on-line operations. Reconstructing data is a somewhat meaningless exercise if critical operations cannot continue.

Most executives view subscribing to a hot site as expensive insurance. Insurance, however, merely compensates for documented loss, while the availability of an on-line processing capability will prevent the loss from occurring.

More importantly, insurance can never compensate for the incalculable loss of business during the computer disruption, or the business that never returns. Few managers have even tried to work out the financial impact of a complete computer calamity. In reality, it is probably impossible to calculate because the effects are so far-reaching. Δ

Dan Kilburn is president and cofounder of Denver-based Data Assurance Corporation, which provides disaster recovery services for DG-equipped companies. Send questions or comments to Data Assurance Corporation, 6551 S. Revere Parkway, Suite 130, Englewood, CO 80111; 303/792-5544.

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By using sophisticated techniques, you can create error-free programs in a procedural language such as COBOL as quickly as you could produce 4GL applications

What price productivity?

Use care in choosing application development systems—you may get more or less than you need

by Mike Norton
Special to Focus

With all the attention being showered on 4GLs, today's application developers are both teased and perplexed. While they are excited by the prospect of huge gains, they are at the same time perplexed by the prospective pitfalls of adopting a radical new development strategy. Given their current applications backlogs, many data processing departments are in desperate need of tools to increase productivity, both in terms of creating new applications and maintaining existing ones. However, they are wary of being caught in situations similar to that of the New Jersey Division of Motor Vehicles recently, where the gains in creating applications with a 4GL were gobbled up by system response.

The good news is that there *are* sophisticated tools for the applications developer—tools that can increase productivity by factors of five or more and place the programmer/analyst in a true software development environment.

The bad news is that unless you're careful you could create a bigger problem than you now face with backlogs and maintenance.

The solution is based not on a vendor's claims but on understanding your own situation. First, you need to consider the type of applications needed and the hardware environment available to develop those applications. Then consider your personnel. What are their strengths and weaknesses? Are they proficient in RPG or COBOL? If so, are there Applications Development Systems (ADS) available for those languages? If not, what is the effect of bringing in a system that may be foreign to them?

If your primary needs are query and ad hoc reporting for nontechnical personnel, a micro-based query language could solve your problem.

If, however, you're developing serious operational systems for internal use or for resale, carefully consider questions like these: What kinds of programs do you need? Are they complex and unique to your situation, or of a more generic nature? If you are developing software for resale, do you want it to be portable and able to run on a variety of systems?

You must also consider the features end users will require, and whether these features will require custom programming. In some cases, adding custom code within a 4GL-generated application is difficult—if not impossible.

There are three basic types of application development systems on the market today, and, as usual, the lines of distinction between them are somewhat blurred. The first is designed to make programmers out of non-programmers. This type of ADS is relatively easy to use, but you will pay for ease of use with less flexibility. The second, which includes most of the more sophisticated 4GLs, is mainly designed for decision-support type applications. The third uses the same techniques to produce the very types of procedural code 4GLs purport to replace.

It is the second type—the 4GL—that is gaining the most attention these days, as both a savior and a culprit in development projects. These products employ their own native programming language to create applications. They feature such concepts as an active data dictionary used to centralize file and field definitions, screen painting, and prototyping.

Data dictionaries are usually considered to be either active or passive. An active data dictionary differs from a passive one in that the active version will not allow duplicate file or field definitions. In almost all cases, an active data dictionary is preferred by software developers. A good active data dictionary will eliminate many of the repetitive aspects of creating definitions by not only storing each definition, but also by providing a variety of maintenance options. Data dictionary maintenance options permit developers to quickly create a number of similar files and/or fields with different characteristics.

Screen painting is a buzzword used for any method that makes designing a screen or report format more user-friendly. Some ADS systems let developers actually draw the fields on their CRTs, while others require the developer to plot the fields on a screen.

Prototyping allows software developers to create prototypes of applications quickly, show the prototypes to end users, get feedback, and then complete the applications. This generally works in one of two ways: by letting developers create 'dummy' screens to show end users without actually creating an application, or by enabling developers to

(continued on page 38)

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For Data General Users, too...

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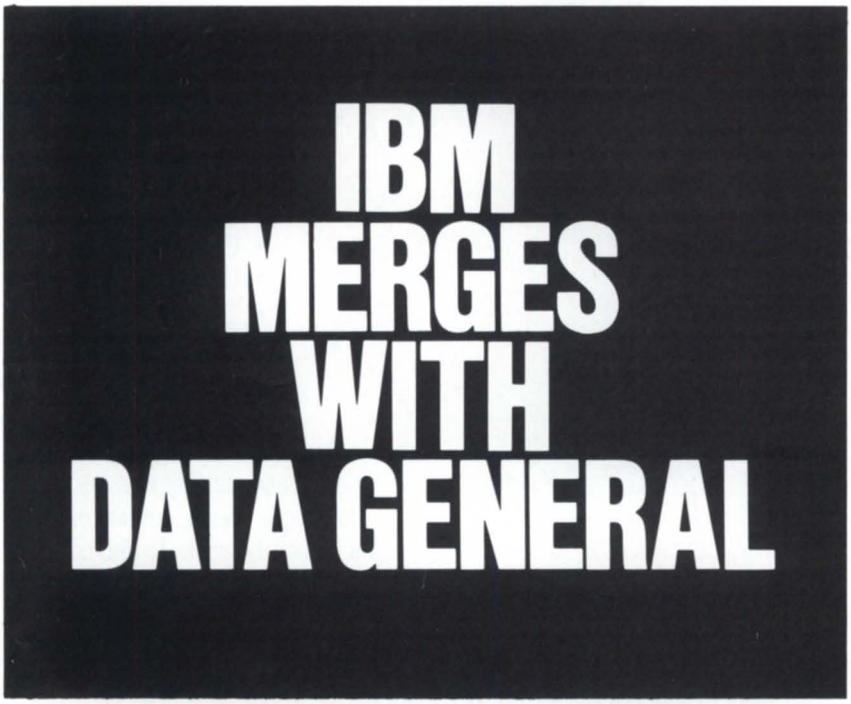
(from page 36)

quickly generate a program and then make user modifications directly to the program's parameters.

Putting these methods to work in application development is perhaps the most significant feather in the 4GLs' cap, because the methods are significant improvements in the application development process.



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The advantages of using a 4GL are, first of all, productivity. In this regard these products are impressive. The disadvantages include the heavy taxing of machine resources, maintenance, and the difficulty of customizing applications. The learning curve for programmers in mastering a new language varies, but can pose difficulties.

Another problem is that some of these new languages are designed more for creating decision-support type applications than for operational applications. In other words, they may be great if you are dedicating a machine to MIS-type applications, but they are less adept at creating complex operational applications to perform the more mundane but necessary tasks of creating files, maintaining files, batch updating, reporting, and on-line inquiring.

The use of these methods in the development cycle increases productivity. The productivity gains over procedural languages such as COBOL are very impressive, but comparisons are usually based on the handcoding of COBOL. Any ADS looks good when compared to handcoding. What the 4GL vendors fail to mention is that there are ADS systems that offer active data dictionaries, screen painting, prototyping, *and* produce COBOL or some other procedural language.

Products from the third group of ADS are similar to 4GLs, but with one significant difference: they produce procedural third-generation code (usually COBOL, though some produce Business BASIC or RPG). Many of these products have evolved from early program generators and now incorporate the same productivity concepts of the 4GLs. One significant qualifier for any of these products is whether it will allow you to use all of the functionality and flexibility inherent in the language it generates—some place arbitrary limitations on what you can do.

The primary advantage here is also productivity. By using sophisticated techniques, you can create error-free programs in a procedural language such as COBOL as quickly as you could produce 4GL applications. The methods are often similar, as productivity is increased by eliminating repetition and centralizing data definitions. Prototyping and screen painting are also available in some of these systems.

To select an ADS strictly on productivity gains would be a mistake

One advantage not shared by 4GLs is the ability to use a trained workforce already in place. Another advantage is that if the code is compiled COBOL, it will be relatively portable from machine to machine. This is especially important to shops that develop systems for resale, or for organizations with a centralized DP shop that create applications for use in remote sites.

Maintenance also becomes less of a problem because these systems produce clean, error-free, structured code that in some cases can easily be regenerated with modifications.

One interesting feature of some of these systems is the ability to customize the way the generators produce code. This can be very important to shops with existing development standards. Customization is usually accomplished by having a modifiable outline that the generators use in structuring the program. By modifying the outline, developers can create multiple outlines or skeletons for many different types of programs or standards.

Each type certainly has its place. The real question is not based on what these systems have to offer, but what the environment and the demands of the user require. If, for instance, you work in a COBOL shop developing operational applications for use in-house or applications that will be sold or distributed throughout your organization, you would be better off using a system that develops COBOL applications. You would have far less machine overhead, little or no learning curve, and maintenance would be less of a problem with the structured, easily modifiable code these systems produce.

There is no simple answer to this question. Every ADS promises impressive productivity gains. But to select an ADS strictly on productivity gains would be a mistake. Focus on improving productivity within the confines of your unique environment and needs. The real issue is how to develop the applications you need on the machines you have with the personnel you have available, and how to accomplish these goals without creating future problems.

Don't fall into the trap of being sold on mere productivity gains, or on buying a system that pretends to replace COBOL. Choose a system that will best satisfy the unique needs of your situation. Δ

Michael Norton is the marketing manager of CS Laboratories, Inc. CS Labs develops and markets COBOL application development systems for Data General, IBM, and Unix-based minicomputers. He may be reached at P.O. Box 2871, Auburn, AL 36830; 205/821-1133. © *1986.*

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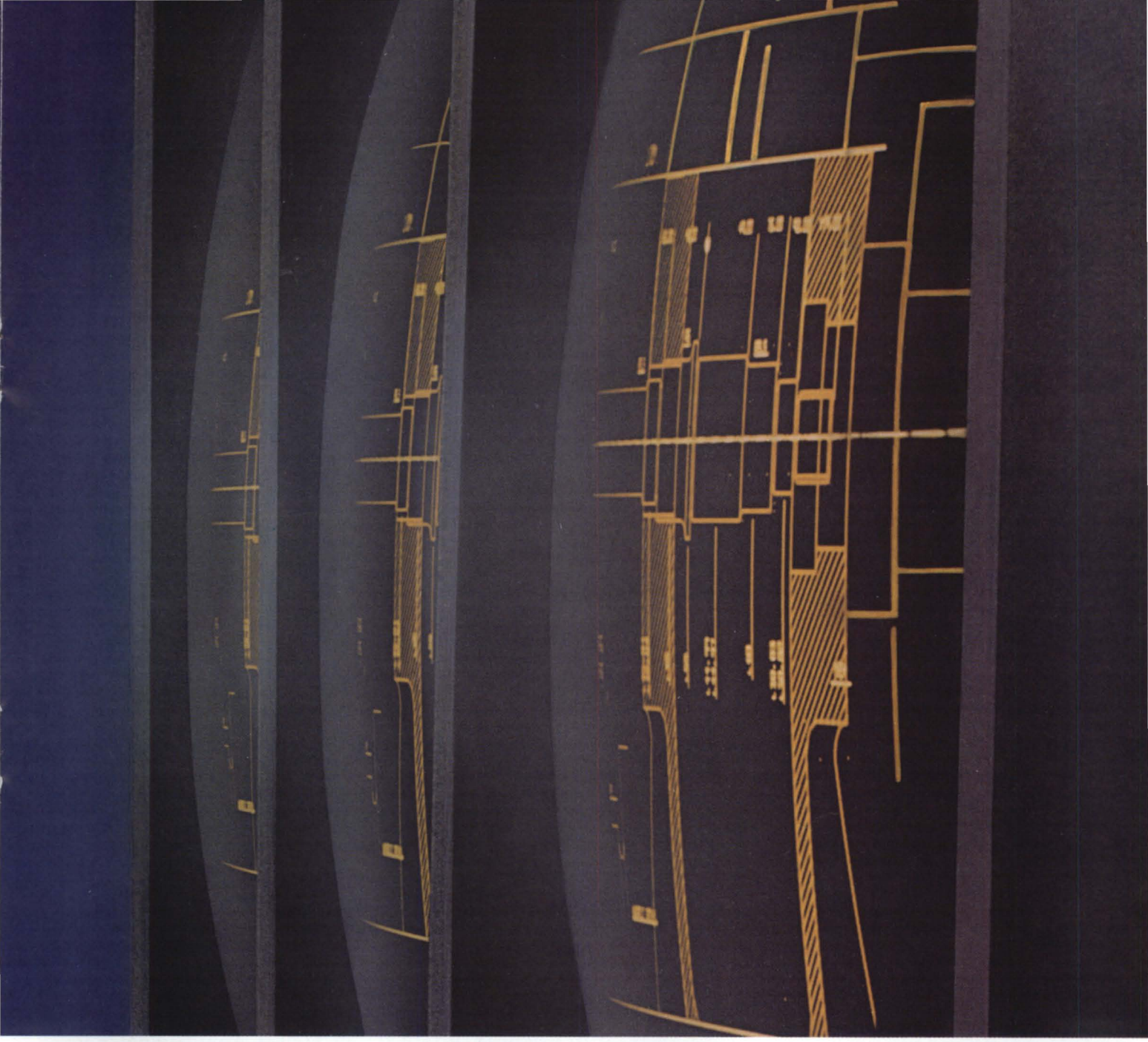

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VAXinating your DG Data

Routines for decoding Data General binary data on a VAX

by John A. Grant
Contributing Editor

The traditional wisdom for transferring data between dissimilar machines has been, "Write it in ASCII—almost any machine can read that." While this is still the easiest method if you want to transfer data from a machine with a 2**n-bit word size to 60 or 36 bit machines, it is definitely not the only method, nor is it the most efficient method. (I have unpacked Data General integer and real unformatted data on a Control Data Cyber, but it's a bit messy.)

This article discusses the interchange of binary data between Data General Eclipse and MV/ systems and DEC's VAX system. Related conversion issues such as record length and type, block size, and unlabelled versus labelled tapes are beyond the scope of this article.

While binary (unformatted) REAL*4 data always occupies 4 bytes of storage (at least on Data General and DEC machines), the ASCII (formatted) equivalent depends on the selected output field width; F4.n, F8.n, F12.n, and G16.n formats in Fortran require 4, 8, 12, and 16 bytes of storage, respectively. Generally, a format of F8.n or more is required, thus the amount of tape you would need is double or triple what you would use if the data were written to tape in binary mode. If your files are small, this is not a problem, but transferring a 20 MB file using ASCII will probably exceed the capacity of a 1200 foot tape, even at 1600 bpi. High density (6250 bpi) tape drives are one obvious solution, provided each of the source and destination machines has one.

Formatting data for output also requires you to make an intelligent decision regarding the range of each set of data. While ******** (Fortran's method of indicating field width overflow) may be only annoying on a printer listing, it is downright embarrassing when the person to whom the tape was sent complains that more than half of the tape contained asterisks. Of course you don't know that until you try to read the tape.

Another problem with ASCII-formatted output is that it takes a long time to write (and a correspondingly long time to read on the other machine). I have found that the overall time required to write and read the tape in binary mode and decode the binary data is less than the time it takes to write and read the tape in ASCII mode.

We routinely need to transfer 10 to 15 MB (binary) of data from our MV/4000 to a VAX for final processing (the VAX has a graphics package that we can't afford to purchase for our MV/4000). It takes about 60 minutes to write 16 MB of data to tape in ASCII mode, but only 9 minutes to write the tape in binary mode! The ASCII tape (using F8.2) contains about 3600 blocks, while the binary version requires only 1800 blocks. Block size in both cases is 8192 bytes and the record length is 128 bytes.

A longer record length would speed up the operation, however a record length of 128 bytes is required for some index files on the tape. Once a tape has been mounted on the VAX with MOUNT/FOREIGN, all files on the tape are considered to have the same record and block size (either default or as specified with /BLOCKSIZE=n and /RECORDSIZE=n).

Foreign tape handling is not well supported by the VAX/VMS operating system. (There are apparently many programs in the DECUS library that address this problem.) We are currently using the routines discussed in this article to decode binary integer, logical, and floating-point data on a VAX as read from tapes created on an MV/ machine.

With rev 3.00 of Fortran 77, Data General amazed us all by supplying source files and an 81-page appendix (G) in the Fortran 77 Reference Manual (093-000162-03) that detail not only the differences between DG and VAX-11 Fortran, but also the file structures and binary data formats for both machines.

Thanks DG, your efforts are appreciated!

The source files include several F77 functions that convert VAX bit patterns for INTEGER*2, INTEGER*4, REAL*4, REAL*8, COMPLEX*8, and COMPLEX*16 variables to their equivalent Data General bit patterns: VAX__<I2 I4 R4 R8 C8 C16>__TO__DG__<I2 I4 R4 R8 C8 C16>.

I want to suggest a few improvements to some of these routines, and also present some complementary routines to convert Data General bit patterns to VAX bit patterns (The byte-flipping algorithm is *not* the same!). I have also added routines for decoding LOGICAL variables on both systems.

First, some terminology . . .

I won't be using bit numbers in this article, because of the confusion that could result from resolving DG's backwards bit-numbering scheme (compared to the more common system used by both F77 and DEC). Instead, I will use a non-partisan byte labelling scheme in which the variables are viewed as linear entities, with the significance of each bit decreasing from left to right. Figure 1 demonstrates how my labelling system compares with the methods used by DG and DEC to store the bytes in memory.

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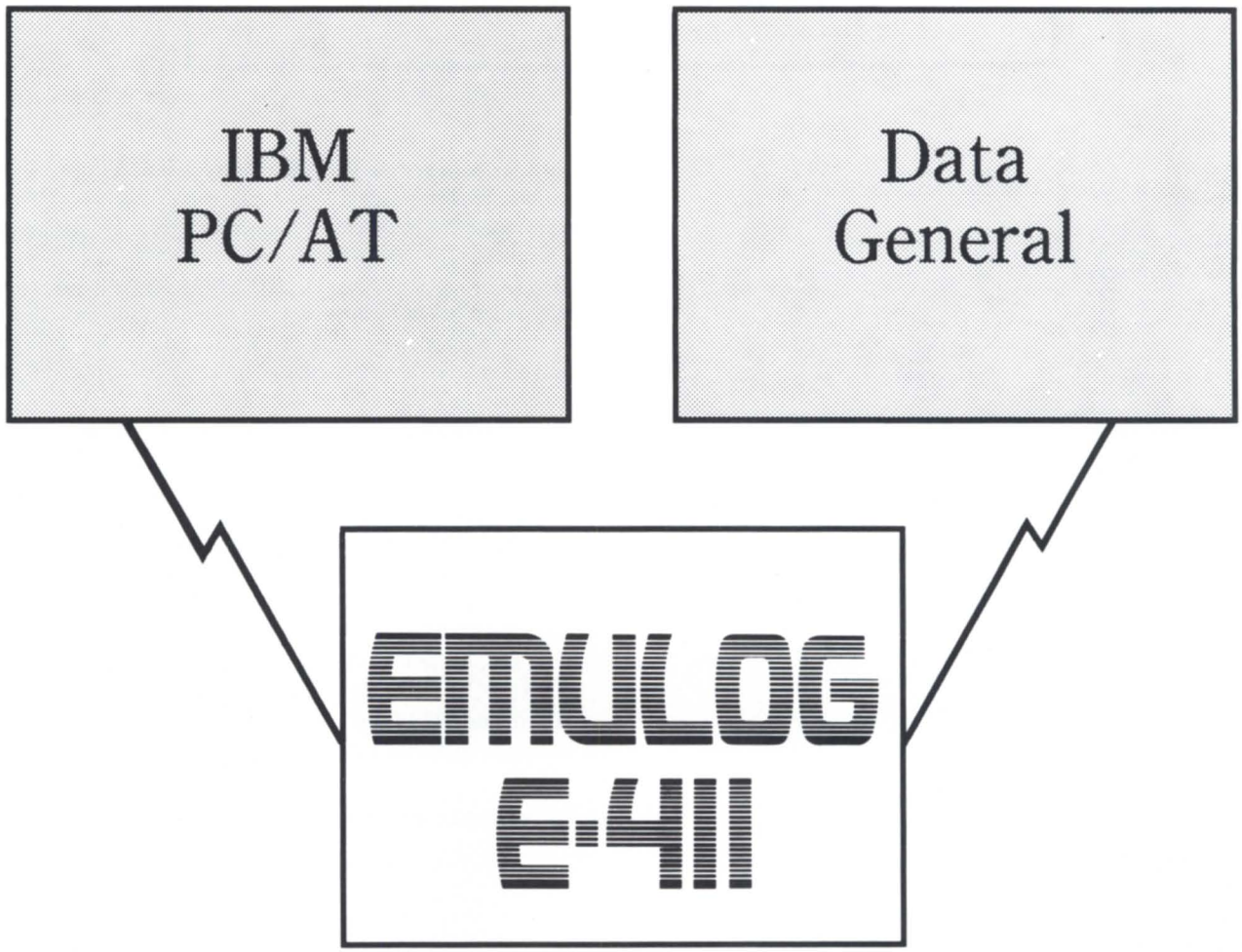

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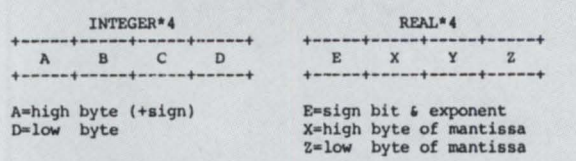
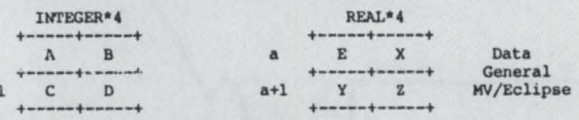
The anomalous pattern is the VAX REAL*4 storage, since the address points to the "middle" of the variable, rather than to one end or the other

Figure 1: A non-partisan byte designation scheme

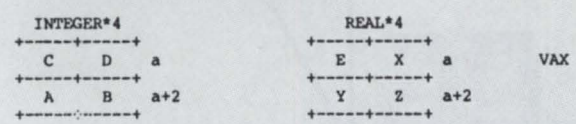
I label the bytes in INTEGER*4 and REAL*4 variables as follows:



On a DG system these entities are stored in memory as:



Whereas on a VAX, they are stored as:



The "a" on the left side of the DG pictures refers to the DG word address, and the "a" on the right side of the VAX pictures refers to the VAX byte address. The start address "a" is adjacent to the "start" byte in both cases.

At first glance, it might appear that REAL*4 storage is the same on both systems, but look again. The anomalous pattern in all four pictures is the VAX REAL*4 storage, since the address points to the "middle" of the variable, rather than to one end or the other (what a silly concept!).

On a DG system, if you EQUIVALENCE the INTEGER*4 and REAL*4 variables, then A=E, B=X, C=Y, and D=Z, so the 24-bit mantissa maps to the least significant 3 bytes of the integer.

On a VAX, however, EQUIVALENCE results in A=Y, B=Z, C=E, and D=X—no such direct mapping of mantissa to integer exists. More on this later.

Each system copies variables from memory to tape (or disk) as a stream of bytes starting from the address "a" of the variable to the last byte. Therefore, a DG system will write "ABCD" and "EXYZ," but a VAX will write "DCBA" and "XEZY." When reading a variable, the process is reversed and the bytes are stored in increasing memory locations.

Clearly, INTEGER*2 and INTEGER*4 (and LOGICAL) variables will be read by the foreign system and stored with all 2 or 4 bytes swapped end-for-end, while REAL*4 and REAL*8 variables will be read by the foreign system with each successive pair of bytes swapped.

Integer data are obviously very easy to transfer between the two machines, requiring only a 2- or 4-byte end-for-end swap. Since both machines use 2's complement integer architectures, the bit patterns are identical.

The DG-supplied VAX__I4__TO__DG__I4 routine uses four calls to subroutine MVBITS to swap the 4 bytes end-for-end. This can be done more efficiently by using an "EQUIVALENCEd" four-element BYTE array as in the routine in Listing 1, which works on both a DG machine and a VAX.

The DG-supplied VAX__I2__TO__DG__I2 routine uses ISHFTC to swap INTEGER*2 bytes with a circular 8-bit shift. It will also perform the same function on the VAX. You could write a simple NATIVE__I2 routine similar to NATIVE__I4 shown in Listing 1. Since neither DG's F77 or VAX-11 Fortran generates in-line code for this function, swapping with the BYTE arrays may be more efficient.

You can treat LOGICAL variables similarly, but there is no need to swap bytes. DG's F77 stores .FALSE. as 0, and .TRUE. as −1 (all bits set), while VAX-11 Fortran uses only the least significant bit (1=.TRUE., 0=.FALSE.), and leaves the other bits undefined.

To decode DG LOGICAL on a VAX, simply check for zero, as in Listing 2. To decode VAX LOGICAL on a DG system, simply check

Listing 1: End-for-end byte swap

```
      integer*4 function NATIVE_I4(foreign_i4)

      integer*4       foreign_i4
      integer*4       itemp
      byte            btemp(4),bsave
      equivalence     (itemp,btemp(1))

c>>>begin
      itemp=foreign_i4          !so we can EQUIVALENCE
      bsave=btemp(1)            !swap bytes 1 & 4
      btemp(1)=btemp(4)
      btemp(4)=bsave
      bsave=btemp(2)            !swap bytes 2 & 3
      btemp(2)=btemp(3)
      btemp(3)=bsave
      NATIVE_I4=itemp
      return
      end
```

Listing 2: DG LOGICAL to VAX

```
      logical*4 function VAX_L4(dg_l4)

      logical*4       dg_l4
      integer*4       itemp
      logical*4       ltemp
      equivalence     (itemp,ltemp)

c>>>begin
      ltemp=dg_l4               !make copy for integer compare
      VAX_L4=itemp.ne.0
      return
      end
```

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The problem lies in the use of EQUIVALENCE, which works differently on a VAX—the address of the REAL*4 variable points to the middle of the variable

the least significant bit, as in Listing 3. (Since its byte is written out first, it appears as the most significant byte on the DG system.)

Listing 3: VAX logical to DG

```
      logical*4 function DG_L4(vax_l4)

      logical*4       vax_l4
      integer*4       itemp
      logical*4       ltemp
      equivalence     (itemp,ltemp)

 c>>>begin
      ltemp=vax_l4                !make copy for btest of integer
      DG_L4=btest(itemp,24)       !same as lsb on VAX system
      return                      !test bit 8 for logical*2
      end
```

Enough of the easy stuff! Let's move on to the REAL*4 and REAL*8 variables.

The easiest way to decode a real variable is to isolate the sign bit, exponent, and mantissa from the foreign bit pattern, and then use these components to "build" the equivalent number in the host's internal format.

The sign bit is used simply as a "+" or "−" flag by both systems. Although both systems use a 24-bit mantissa, the VAX mantissa is always normalized so that the top or twenty-fourth bit will be set. Therefore, it is redundant and is "hidden" (assumed to be set). On the other hand, DG's mantissa is normalized so that the top "hex" (4-bit) digit is non-zero (the top 4 bits of the mantissa may be anything in the range [0001,1111]).

If we treat the mantissa as a 24-bit integer, the decimal place exists to the left of the top bit, so the "true" floating-point mantissa can be obtained by dividing the 24-bit integer by 2**24.

Finally, the DG exponent is a 7-bit excess-64 hexadecimal exponent, but the VAX exponent is an 8-bit excess-128 binary exponent.

To summarize, the numbers can be created from the "foreign" bit pattern as follows:

```
dg_r4  = sign*vax_mantissa*( 2**(vax_exp-128))/(2**24)
       = sign*vax_mantissa*( 2**(vax_exp-152))
vax_r4 = sign*dg_mantissa*(16**(dg_exp-64))/(2**24)
       = sign*dg_mantissa*(16**(dg_exp-64-6))
```

Now here's where it gets tricky. I mentioned above that the REAL*4 and REAL*8 variables will be read by the foreign system and stored in memory with successive pairs of bytes swapped. The DG-supplied VAX_R4_TO_DG_R4 routine swaps successive pairs of bytes, therefore the complementary DG_R4_TO_VAX_R4 routine on the VAX should apply the same operation to DG REAL variables, right?

Wrong!

Look at the pictures of the memory storage again. The 4 bytes of the foreign entity are rearranged so that a 24-bit mantissa can be considered as a contiguous ordered series of bits, i.e., a 24-bit integer. The 4 bytes are accessed by addressing another entity, which is EQUIVALENCEd to a copy of the foreign bit pattern. This can be a 4-element BYTE array (as in NATIVE_I4 above) or an INTEGER*4 variable whose bits are accessed by MVBITS.

The problem lies in the use of EQUIVALENCE, which works differently on a VAX—the address of the REAL*4 variable points to the middle of the variable, and the bytes of the mantissa are not stored contiguously in memory with increasing byte addresses. As it turns out, all 4 bytes of the DG REAL*4 variable must be swapped end-for-end on the VAX (exactly like INTEGER*4!), and each group of 4 bytes of the REAL*8 variable must be swapped end-for-end.

My routine for decoding DG binary REAL*4 data on the VAX is shown in Listing 4; it also incorporates some changes from the equivalent VAX_R4_TO_DG_R4 routine supplied by Data General.

Listing 4: DG binary REAL*4 to VAX

```
      real*4 function VAX_R4(dg_r4)

      real*4          dg_r4, temp
      integer*4       itemp, mantissa, iexp
      byte            btemp(4), bsave
      equivalence     (temp,itemp), (temp,btemp)

      integer*4       ibits, iand          !F77 intrinsic
      logical*4       btest                !F77 intrinsic

 c>>>begin
      temp=dg_r4

      if(itemp.eq.0) then           !don't test temp!!!
           VAX_R4=0.0
      else
           bsave=btemp(1)           !swap bytes 1 & 4
           btemp(1)=btemp(4)
           btemp(4)=bsave
           bsave=btemp(2)           !swap bytes 2 & 3
           btemp(2)=btemp(3)
           btemp(3)=bsave

           iexp=ibits(itemp,24,7) - 64
           mantissa=iand(itemp,'77777777'o)   !get 24 bits

           VAX_R4=sngl(dble(mantissa)*(16.0d0**(iexp-6)))

           if(btest(itemp,31)) VAX_R4=-VAX_R4
      end if
      return
      end
```

You can improve the efficiency (and readability) of the DG-supplied VAX_R4_TO_DG_R4 and VAX_R8_TO_DG_R8 routines by replacing the calls to MVBITS with the byte-swapping algorithm used in VAX_R4. Both the DG-supplied "R4" and "R8"

The easiest way to decode a real variable is to isolate the sign bit, exponent, and mantissa, and then use them to "build" the equivalent number in the host's format

routines extract the mantissa by summing the corresponding fractional weight associated with each bit that is set. This algorithm is speeded up by using a lookup table of bit weights, but this is offset by the overhead of the "DO" loop and setting up the bit pointers for the BTEST4 operation. In addition, some precision may be lost by summing the bit weights, and the weights themselves are not exact.

In VAX_R4, I have simply extracted the 24-bit mantissa and divided it by a single constant (2**24).

There is another very subtle difference between my VAX_R4 routine and the DG-supplied VAX_R4_TO_DG_R4. The DG-supplied routine tests the floating-point bit pattern for 0.0; if the test succeeds, it returns 0.0. This is OK, because both MV/ and VAX systems store 0.0 as all 0 bits, and the DG floating-point processor will not choke if it encounters a strange bit pattern during this test (however, an intrinsic instruction will trap).

On a VAX, however, this test may cause a trap.

According to the VAX Architecture Handbook, "A reserved operand is defined to be any bit pattern with a sign bit of 1 and a biased exponent of 0. On VAX machines, *all* floating-point instructions generate a fault if a reserved operand is encountered." That means that a floating-point trap will occur if the VAX encounters a floating-point bit pattern that matches the pattern in Figure 2.

Figure 2: Bit pattern triggers floating-point trap

```
+--------+--------+
 10000000 0xxxxxxx  a          REAL*4 storage on VAX
 xxxxxxxx xxxxxxxx  a+2
+--------+--------+            (x=anything)
```

Since the bytes are already scrambled in the bit pattern read from the DG tape, the high order byte of the original DG mantissa maps directly to the byte in which the VAX floating-point processor expects to find the exponent. Therefore, there is a good chance it will detect a reserved operand, even though the bit pattern may be entirely valid on a DG system. To avoid this trap, test the EQUIVALENCEd integer for 0, rather than the floating-point variable (it is the same test, i.e., all 0 bits).

A bit more trickery is required to handle the 56-bit mantissa for the REAL*8 case, since the largest integer is only 32 bits. The 56-bit mantissa must be assembled in a REAL*8 variable and then divided by 2**56 (16**14). The 56-bit mantissa is isolated as high-order 24 bits and low-order 32 bits. The low-order 32 bits must be treated as an unsigned integer (if negative, add the 32-bit complement, i.e., 2**32).

The mantissa is assembled in two pieces so the exponent won't overflow, as shown in Listing 5 (the maximum exponent on the VAX for 'D' and 'F' floating-point variables is +/− 38).

Listing 5: Handling 56-bit mantissa

```
  VAX_R8=(high24*(2**32) + low32) * 16**(exp-64-14)
        = high24*(16**(exp-64-6)) + low_32*(16**(exp-64-14))

where 'low32' is the unsigned real*8 value of the lower order
32-bits of the mantissa.

      real*8 function VAX_R8(dg_r8)

      real*8          dg_r8, temp
      integer*4       itemp(2)
      byte            btemp(8), bsave
      equivalence     (temp,itemp), (temp,btemp)
      real*8          mant_low              !low order 32 bits
      integer*4       mant_high,iexp
      integer*4       ibits, iand           !F77 intrinsic
      logical*4       btest                 !F77 intrinsic

 c>>>begin
      temp=dg_r8

      if(itemp(1).eq.0.and.itemp(2).eq.0) then   !not 'temp'!
          VAX_R8=0.0d0
      else
           bsave=btemp(1)             !swap bytes 1 & 4
           btemp(1)=btemp(4)
           btemp(4)=bsave
           bsave=btemp(2)             !swap bytes 2 & 3
           btemp(2)=btemp(3)
           btemp(3)=bsave
           bsave=btemp(5)             !swap bytes 5 & 8
           btemp(5)=btemp(8)
           btemp(8)=bsave
           bsave=btemp(6)             !swap bytes 6 & 7
           btemp(6)=btemp(7)
           btemp(7)=bsave

           iexp=ibits(itemp(1),24,7) - 64

           mant_high=iand(itemp(1),'77777777'o)
           mant_low=dble(itemp(2))
           if(itemp(2).lt.0) then
                mant_low=(2.0d0**32.0d0) + mant_low
           end if

           VAX_R8=dble(mant_high)*(16.0d0**(iexp-6)) +
          &             mant_low *(16.0d0**(iexp-14))

           if(btest(itemp(1),31)) VAX_R8=-VAX_R8
      end if
      return
      end
```

One final note: the exponent of REAL*4 (F_FLOATING) and REAL*8 (D_FLOATING) on the VAX is limited to +/− 38, whereas REAL*4 and REAL*8 on a DG system can have an exponent of about +/− 75. These routines will blow up if you attempt to convert DG numbers with exponents larger than +/− 38. In that case, you will have to use VAX G_FLOATING format.

Happy bit-twiddling! Δ

Geological Survey of Canada Contribution 22286. John A. Grant is a geophysicist with the Geological Survey of Canada. He is also the "system manager, chief cook, and bottle washer" for the Exploration Geophysics Subdivision's MV/4000. He may be contacted at 601 Booth St, Room 591, Ottawa, Ontario, K1A 0E8; 613/996-2325.

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When space is basic

A tool for managing disk space for Business BASIC systems

by George Henne
Contributing Editor

Before I launch into my subject this month, let me share two of the sillier computer ads to appear in print this month. I frequently read computer ads for amusement—it's often all they're good for. If you have any doubt, find yourself a 1969 copy of *Datamation*.

The first guffaw came courtesy of a major micro software company. Their new product is an IBM PC version of PROLOG, a language used for artificial intelligence. The ad claims the product "redefines Artificial Intelligence." No doubt it has to—it costs just $95.

The other was from a producer of mainframe accounting software. The ad described their software as "Worth its Weight in Gold." This caught my eye immediately. I called my local Data General systems engineer and asked him how much more an MV/ running CFO weighs than a plain old MV/. "No difference," he said, leaving me to draw my own conclusions about how valuable the software is.

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The primary mechanism for determining how much disk is left is the SPACE command. It will tell you how many blocks are used and how many are left in the current control point directory. By doing this command in the root directory, you can get a quick picture of how much of the entire disk is used. Of course, it will just tell you what

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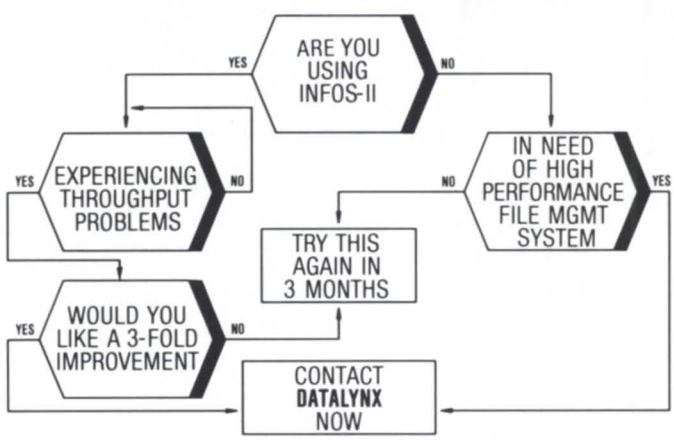

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SPACE will just tell you what you've pretty much suspected: that the disk is too full

you've pretty much suspected: that the disk is too full. How do you figure out what's using up all the space on the disk?

If you're like most people, you've organized your disk as a tree structure of directories. Using a top-down solution to the problem, your obvious first step is to find out how much space each directory takes, so you can identify problem areas. Here is where the SPACE commands starts letting you down. Remember, it only works on control point directories, so if you didn't use CPDs, SPACE won't help you. If you did use CPDs, SPACE will be of some help.

You should also remember that the SPACE command calculates how many blocks are left in the CPD based on how big you said it would be originally. Therefore, the answer it gives could very well be larger than the actual amount of disk storage remaining; be careful not to fool yourself into thinking you're better off than you are.

At MICOM, we tend to use regular directories, so we don't have to worry about them getting full. To find out how much space we were using in each directory, we wrote a BBASIC program to add up the sizes of each of the files in the directory and print the totals.

Listing 1: Report on space used by directory

```
0010 REM REPORT ON SPACE USED BY DIRECTORY -- XXXSPACE
0020 OPEN FILE[0,1],":UDD:OP:OUTPUT"
0030 DIM CMD$[512],DIR$[100],D$[20*15],
     DIREC$[80],LINE$[80]
0040 DIM B$[40],FILE$[80]
0900 LET LEVEL,I8=0
0910 LET DIREC$=""
0920 LET D$,B$=FILL$(32)
1000 REM GET TOTAL FOR EACH DIRECTORY
1030 GOSUB 3000 : CREATE A LIST OF FILES IN
     DIRECTORY DIREC$
1040 GOSUB 2000 : ADD UP TOTAL BLOCKS IN A LIST
1050 REM ARE THERE ANY SUB DIRECTORIES?
1060 GOSUB 4000 : SCAN FOR A DIRECTORY
1070 IF FILE$="." THEN
1080   REM POP UP A LEVEL
1090   CLOSE FILE[CHAN]
1095   LET D$[LEVEL*20+1,LEVEL*20+20]=FILL$(32)
1100   LET LEVEL=LEVEL-1
1105   IF LEVEL=-1 THEN GOTO 9000 : FINITO
1110   LET CHAN=LEVEL+1
1190   GOTO 1050 : ARE THERE ANY SUB DIRECTORIES?
1200 ELSE
```

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AOS/VS allocates elements to a file only as they are needed; until then, they are available for any file to use

```
1210   REM PUSH DOWN A LEVEL
1220   LET LEVEL=LEVEL+1
1230   LET DIREC$=FILE$
1240   LET D$[LEVEL*20+1,LEVEL*20+20]=FILE$,FILL$(32)
1250 END IF
1280 GOTO 1000 : GET TOTAL FOR EACH DIRECTORY
2000 REM ADD UP TOTAL BLOCKS IN A LIST
2010 LET CHAN=LEVEL+1
2015 LET BYTES=0
2019 LET FILE$=":UDD:OP:LIST",LEVEL
2020 OPEN FILE[CHAN,5],FILE$
2070 INPUT FILE[CHAN],USING "","",LINE$
2080 IF EOF(CHAN) THEN G=4O=:H2800 : END OF DIRECTORY
2090 IF LEN(LINE$)>46 THEN
2100   LET I=VAL(LINE$[47],I8)
2110   LET BYTES=BYTES+I
2130 END IF
2140 GOTO 2070
2800 REM END OF DIRECTORY
2810 LET LINE$=B$[1,LEVEL*2+1],DIR$,FILL$(32)
2820 PRINT FILE[0],USING "A60,D8.0,D8.0",LINE$,BYTES,
     (BYTES/512)+1
2830 PRINT LINE$[1,60];BYTES;" ";(BYTES/512)+1
2900 POSITION FILE[CHAN,0]
2910 RETURN
3000 REM CREATE A LIST OF FILES IN DIRECTORY DIREC$
3010 LET DIR$=""
3020 FOR I=1 TO LEVEL-1
3030   LET DIR$[0]=":",TRUN$(D$[I*20+1,I*20+19],1)
3040 NEXT I
3041 LET DIR$[0]=":",DIREC$
3050 LET CMD$="ON/S ; DIR ",DIR$
3056 LET CMD$[0]="; DELETE/2=IGNORE :UDD:OP:LIST",LEVEL
3060 LET CMD$[0]="; F/S/ASS/L=:UDD:OP:LIST",LEVEL," +"
3080 LET E=0
3090 STME 19,E,":CLI.PR<0>",CMD$
3100 RETURN
4000 REM SCAN FOR A DIRECTORY
4005 LET FILE$="."
4010 INPUT FILE[CHAN],LINE$
4020 IF EOF(CHAN) THEN RETURN
4025 IF LEN(LINE$)<25 THEN GOTO 4010
4030 IF LINE$[21,23]="CPD" THEN GOTO 4100
4040 IF LINE$[21,23]="DIR" THEN GOTO 4100
4050 GOTO 4010
4100 LET FILE$=TRUN$(LINE$[1,20],1)
4110 RETURN
9000 REM FINITO
```


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FILESTATUS doesn't really tell you how big a file is. It tells you the highest address you've ever written to in the file

I see a hand at the back of the room. Yes, there is a problem with this approach. But before I tell you about the problem, let me describe the program, since it works in most cases. It gets the size of each file from the FILESTATUS command, and reports the total space used in each directory. It only shows the space actually used within each directory. If there is a subdirectory, the total for that directory is shown separately. By working recursively, the program traces the tree structure of the directories. Since it opens another BBASIC channel for each level, it is limited to about 15 levels. If you exceed that, you've got some very different problems.

Be sure to run it from a password that has SUPERUSER privileges. I won't make any claims that it will work for all cases, but you should be able to modify it if you have problems.

The problem? FILESTATUS doesn't really tell you how big a file is. It tells you the highest address you've ever written to in the file. If the file is contiguous, or if you've written to every address up to the full size of the file, it is correct.

However, such is not always the case. AOS/VS allocates elements to a file only as they are needed; until then, they are available for any file to use. A two-line BBASIC program to create a file and write out one byte at address ten million will not create a 10 megabyte file, but rather a file one element in size. But the FILESTATUS command will tell you the file is 10 megabytes long! That's why the program may yield incorrect results.

There are a couple of interesting observations and problems that come about as a result, so I'll continue with this subject next month. Meanwhile, you might try the accompanying code to see whether it will help manage disk space on your system. Δ

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

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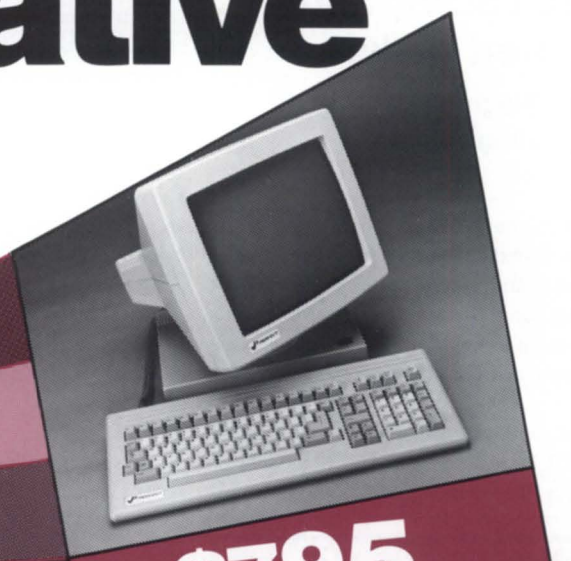

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Circle 47 on reader service card

Planting seeds

Scheduling, new memory boards, EXECVS.PR, and mirrored disks

by Jim Siegman
Contributing Editor

This column will be changing during the next few months. Ever since the first issue, the Editor and I have been talking about including some sort of a technical or practical forum on a regular basis. With this issue I will begin acting as the host rather than the author.

What will be discussed? Anything of interest. I hope to be mainly the moderator and editor. The main attraction will be member contributions. I will review questions, comments, and ideas that readers have discovered, developed, and sent to this column ("Discoveries"), care of *Focus*. I will also plant some seeds by asking questions and making statements that will provoke responses for an interesting discussion.

■

Let me start with some information on a topic that affects everyone who uses AOS/VS. AOS/VS defines three groups of processes. Unless you change the sysgen default parameters, group one processes are those with a priority of 0 to 255, group two priorities are 256 to 258, and those in group three are 259 to 511. The priorities on the system are:

1) Interrupts
2) Scheduler
3) System calls—Group 1 processes
4) User code—Group 1 processes
5) System calls—Group 2 processes
6) User code—Group 2 processes
7) System calls—Group 3 processes
8) User code—Group 3 processes

The default priority for user processes created by EXEC is swappable, two. Their assigned priority of 257 places them in the middle of the group two processes. Note that a group two process can't run if a group one process is active. Likewise, a group three process can't run if a process from either group one or group two is active.

I'd like to hear how other users are assigning priorities and what results they're getting. XODIAC is typically set at a priority in group one (unless you have taken Brian Johnson's advice). This is why it can place an incredible drag on the system when it is active. Thus, system managers should take care when assigning any process a group one priority on a permanent (or even temporary) basis, unless

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it absolutely has to be there. (I tend to put EXEC up there simply because it rarely does very much work at any given time and spends most of its time waiting for something to happen.)

■

I would like to pose another question that I don't have an answer for, nor do I have the resources to determine the answer. The MV/20000 product brief states that the 2 MB board is built with 64 K-bit 150 nanosecond memory chips, but the new 4 MB and 8 MB boards are built from the newer 256 K-bit 120 nanosecond chips. The brief also states that the maximum CPU-to-memory bandwidth is 47 MB per second. Since the larger boards have chips that are 20 percent faster, does this imply that you could see a performance improvement with 4 MB boards? How about it? Somebody must know, or at least be curious enough to run some simple tests.

■

Another thing we will cover in this column is tidbits and trivia. For example, have you ever wondered what EXECVS.PR is? I've never seen it running with PED, but it's always in :UTIL. After some research I found out it's the ring 6 part of EXEC on AOS/VS. Apparently, PED shows only the .PR file that was PROCed, executed, or chained—and not what may have been ringloaded later by the original program.

■

I need to follow up with a comment on the macro presented in the "Top form" article in the May issue (page 28). Since some of the VFU files that might be downloaded to a printer could contain non-ASCII data, you probably would need to add one more line to the macro. After you start the printer, but before you continue it, add the command "CONTROL @EXEC BINARY @CON%1%."

■

Now seems a good time to make a request of the user community. We would like to hear from someone who is using the new disk mirroring feature in rev 7 of AOS/VS. What we would most like to see is benchmarks comparing throughput on a single drive versus a mirrored drive. Also, some information on the reliability of the mirror would be welcome. The rev 7 seminar presented the mirror feature as well designed, flexible, and seemingly rather easy to implement. However, all that flexibility and ease of use might be the result of an elegantly simple interface to a very intricate piece of code. If so, there would be a lot more potential for the dreaded "known bugs," and I, for one, would like to hear how others are faring before I try it myself. Δ

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

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Circle 15 on reader service card

The $50,000 mistake

RIG membership keeps companies from being hit where they live

by Tim Boyer
Contributing Editor

This month, I'm going to put on another of my many hats—that of regional interest group president—and talk about something that's near and dear to the heart of every company: money.

I came upon a horror story last week that caused me to stop and think—just how much is membership in a local users group worth to a company? $50? $500? $5,000?

How about $50,000? If you don't think it's possible, read on.

A friend of mine called last week about a company in northern Ohio that was about to move from a CS/60 running ICOS to an MV/8000. He wanted to know if there was any way I could talk them out of it. Now, I'll be the first to admit there are times when a jump that big is warranted. But these guys were running only 10 terminals.

There was no doubt that they were dragging, but it sounded to me like they didn't really need a new machine—just new software. An ICOS-to-ICOBOL upgrade should take care of their problems—at rather less than the cost of a new MV/8000.

Always being one to tilt at windmills for a good cause, I decided to give their DP manager a call. He confirmed what I already suspected: he didn't know about the 400 to 500 percent performance increase at 10 terminals he could have gotten by going to ICOBOL. He said he really wasn't the technical type.

Obviously, he had never been to one of our local user group meetings. For the last couple of years, I've been telling anyone who will listen how great the new ICOBOL is—how it will make your system run faster, with more terminals, give you more power, make programming easier—even cure dandruff. I suspect that one of the reasons he didn't go to meetings was that, as he said, he wasn't a technical type. But nontechnical types are precisely the group of people who will get the most out of users groups, because they have the greatest need for an impartial opinion.

We kept talking, and he mentioned the other reason they didn't want to convert to ICOBOL: they didn't want to go through the ICOS-to-RDOS conversion process. At that point, I realized it was a lost cause, so I said my goodbyes and hung up.

I've never written an article about the ICOS-to-RDOS conversion, mainly because the Editor frowns on 10 word articles, but here goes. You know in your startup macro where it says EMMCI/I/B? To convert to RDOS, that has to be changed to ICX/I/B.

That's it. No recompilation, no file conversion. One of the reasons we originally went with Interactive COBOL was its amazing transportability. ICOBOL will run on *anything*—from the PC to the Macintosh to the MV/20000, no conversion necessary, no recompilation needed.

Getting back to my story, here's the kicker. If this DP manager had been attending users group meetings, he would have received a copy of the Research Triangle Park benchmarks. At a 10 terminal count, an MV/8000 is *slower* than an S/140, running the AR64 benchmark. I haven't priced an MV/8000 lately, but I'll bet we're talking about $50,000—for a slower machine!

For the same amount, we would have made him a lifetime member of the users group, and showered him with all the free advice he could ever use.

It's hard to blame the salesman in a case like this. Unless he goes to RIG meetings himself, how would he know there was an alternative? And if he did make a habit of telling customers to upgrade to the newest rev of RDOS instead of buying a new machine, he'd soon starve.

Is user group membership worth $5,000? I almost made a mistake that would have cost at least that much. Back when I first joined the Northern Ohio Data General Users Group (hereafter mercifully referred to as NODGUA), we were looking around for more disk space. The Phoenix was full, and our options were two 20 MB Gemini drives, which we would back up to each other, or a 50 MB Zebra, and DBURST to our 5 MB removable. We couldn't afford a tape drive, and neither of those choices looked good, but we *needed* disk space—I was running out of room when printing reports.

At my first NODGUA meeting, the guy across the table asked if I had ever considered compatibles. I didn't even know there *were* DG-compatible drives. I eventually bought an 80 MB drive, controller, and streaming tape drive—all for about the same amount of money we were going to spend on the 50 MB drive. In effect, we got 30 MB of disk space and a tape drive for free—all for taking two hours to drive up to Cleveland for a meeting. Now *that's* return on investment! Since then I've bought two more compatible drives, saving even more money.

Is participation in your local users group worth $500 to you? It was to me, back when we made the switch from a CS/40 to an S/140. Once again, I was in Cleveland attending a meeting, and asking if anyone knew where I could get a cheap ALM-8. One of the members who was familiar with my configuration asked why I would want to do that, when my CS/40's SBS mux would work perfectly well in the S/140.

Sure enough, it certainly would—and still does. Of course, that's not documented anywhere. Information of that kind only comes from other users.

Last week, my friend Lenny called and asked if I knew anyone with a dual-density tape drive. He had a 1600 bpi tape that he needed to convert to 800 bpi. I didn't know anyone with that type of drive, but I told

(continued on page 61)

Network news

DG's On-line Information Service makes a promising start

by Tim Maness
Contributing Editor

I had the opportunity in late June to try the new DG videotex service called On-line Information Service (OIS). It's a 24-hour service that DG has been offering since May. The initial promotion was for Support Plus subscribers, but the service is available for all users and authorized dealers. DG graciously provided me with a free user ID and password for a few sessions so I could investigate the different services OIS offers.

Accessed through the CompuServe network, the system provides current DG product information, including technical information, shipping dates, product tips, workarounds, patches, and revision notes. The information is organized around three product categories: MV/ family, Desktop Generation, and DG/One software. The information you can view is not limited to the products you use, however; once you have a username and password, all the services are available. For example, you don't need to have a FORTRAN 77 license to look at the FORTRAN 77 articles.

In addition to the DG services, OIS provides an interface to 12 independent software and hardware vendor bulletin boards. I was disappointed to find that all of these were PC-related. I had hoped they would be DG ISVs like Oracle, Henco, etc.

The service can be a two-way communication tool because its DG Talk facility will let users communicate ideas, concerns, and questions to DG. Responses from DG are supposed to be sent to the subscriber's personal mailbox within two working days. There's also a Software Assistance Request service to ask for help with a software problem. It promises a response from DG within three working days.

OIS is available to anyone with a DG program license agreement or sublicense agreement. It's a subscription service, with billing based on connect time and type of service used. The rates are $40 per hour for general information; $55 for support information, STR information, and product tips and workarounds; and $70 if you want to download patches. DG/Blast is required if you do want to download.

The organization for technical information about products is hierarchical, but there are special commands to short-circuit the menu traversals once you learn your way around. I focused on the MV/ family software branch and looked at all the options in the system. Under the MV/ family heading, the products are listed under the following subheadings: operating systems, CEO products, data base software, communications software, graphics software, languages and utilities, and special applications. Each of these subheadings has a list of specific products.

At the end of each path the user may select to search two keyword data bases, one with product tips and workarounds, and the other with patch information. If you find a description for a patch you want in the first data base, you can access it by name in the second data base. Keyword searching in either data base incurs the higher connect-time charge. It is at this level that a user can opt to submit a Software Assistance Request (SAR), a $55-an-hour option.

Other information at this level that can be obtained at the base $40 rate includes product descriptions and current revision notes. The product descriptions are just that. The revision notes are just copies of the information provided in the notes and warnings section of the current release notice shipped with the product.

The results of several searches I tried in the keyword searchable data bases were confusing. For example, I got the same set of 206 articles for two different searches, one looking for keywords starting with A under AOS/VS, and the other under Sort/Merge.

When I followed a path such as "Operating Systems:AOS/VS:Product Tips," and then entered a keyword, many of the resulting choices appeared to have nothing to do with AOS/VS. There were entries for CEO, COBOL, etc. Trying the path "Languages:VS/FORTRAN 77:Product Tips" with a keyword of 3.10 resulted in two COBOL 3.10 articles.

The intervening menu choices were not affecting the search space in a way I could discern. Mike Curran, one of the OIS program managers, later explained that selecting specific products as you go through the menu does nothing to narrow the search space. At the point you get to the menu with the choices for keyword searching, the search space is the same no matter how you arrived there. I'm not sure why it is set up this way. It would be less confusing if the escape to the keyword data bases were at an earlier level and the directions explained that the search space includes the entire data base, and not just the specific products you had been scanning.

As an example of the articles available on OIS, the path "Operating Systems:AOS/VS:Product Tips," with the keyword "MV2," resulted in the following three entries:

- MV2000 STARTER.SYS PCOPY PROBLEM; 4/17/86
- MV2000 HANGS FROM MODIFYING UP_EXEC.CLI; 4/17/86
- MV2000 UNABLE TO USE 48 TPI DISKETTES; 4/17/86

At this point you may enter the number associated with one of the articles to see the full text. I would have thought that with all the activity in the MV/2000 area there would have been a larger number and more current entries in the category. The entries described the problems, but in the case of the problem I discussed in my June column (when I wasn't able to boot the system because I couldn't restore a renamed file), there was no workaround mentioned.

The on-line information said that there were no AOS/VS patches because of the fast update schedule for AOS/VS. It appeared, however, that there were some patches for AOS/VS—at least I found a few. Alex Cullen, another of the OIS managers I spoke with, told me there are no plans at this time to add all the AOS/VS patches because of the interrelated nature of the patches. The few that are there are those standalone patches judged to

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If OIS evolves to contain current fixes and workarounds, it could serve as a front-end for calls to Atlanta for sophisticated users

be relatively straightforward. I think it would still be useful to have all the patches available, because it isn't that difficult to list the relationship between patches.

I tried to use the STR lookup facility for the three days I had access to the system and each time the system responded: "The STR Lookup System is being updated, and is not available at this time. We apologize for any inconvenience this may cause. Please access this feature the next time you log on." I checked into this and found that updating is supposed to only take overnight, but during the time period I was trying there was a software problem and it could not be used.

STR lookup is only by number. This limits its usefulness, since one of the logical things to do would be to see if other people were having the same problem I was experiencing. Mike says this type of service could be an eventual goal for OIS if this customers want it.

Alex explained the relationship between making a software assistance request and the existing STRs. An SAR is not an STR. If there is no solution known for your SAR, the response from DG is to ask the requestor to submit an STR.

What is the relationship of OIS to the services provided by the Atlanta Customer Support Center? This is still a little unclear in my mind. Atlanta has its own internal data base, so unless the two data bases are merged, I wonder how current the OIS one will be. If in fact OIS does evolve to contain current fixes and workarounds, it could serve as a front-end for calls to Atlanta for sophisticated users. There will always be users who require different levels of support, and this particular service would be very valuable to the system managers who can diagnose their own problems, recognize a solution when they see it, and apply their own patches. Obviously this isn't everyone.

What is the relationship of OIS to the NADGUG bulletin board operated by Rational Data Systems? There are only a finite number of problems and it's usually the case that someone else has a solution for your problem—but it may not be DG. The success of bulletin boards stems from this fact, and the idea of having DG and user solutions integrated into a single system has a lot of appeal. Perhaps these services will eventually merge.

The idea behind OIS is excellent, but so far the interface is just OK. The information is not complete or current at this point, but I think this will change with time and usage. Whether the service evolves into something truly useful depends on how the user community responds.

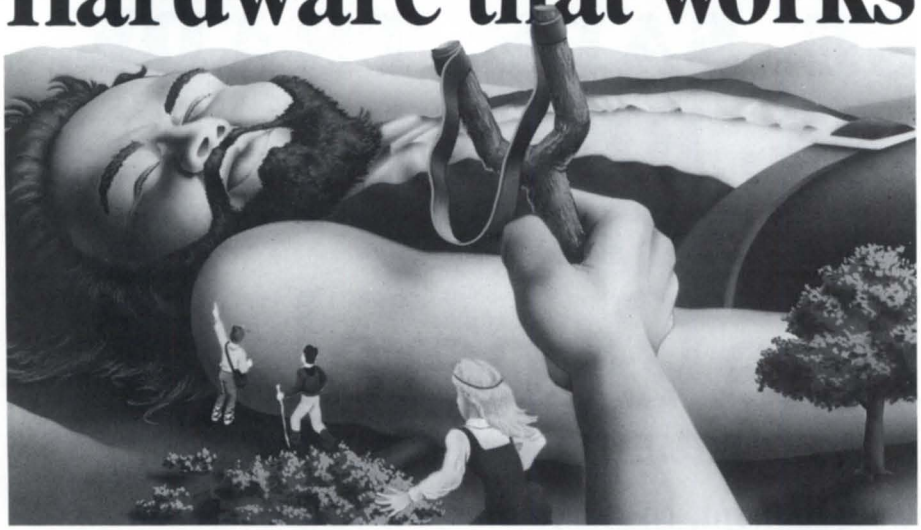
Personally, I find it fairly remarkable that DG has approved a service that promises two- or three-day response to questions and access to workarounds and patches at a price that doesn't make you wince. The success of OIS depends on whether the information can be kept current, and this depends both on the demand for the service and on DG's internal cooperation.

We, as users, can certainly influence the demand side of the equation by subscribing and using the services. I intend to get my subscription and see what develops on the DG side of the equation.

August is NADGUG month, and I'll be in Orlando for the annual meeting and a little of that Florida sunshine and humidity! I hope to see you there. Δ

Tim Maness is president of DMS Systems, Inc., a software development firm specializing in data base management. He can be reached at 740 E. 3900 South, Salt Lake City, UT 84107; 801/268-6671.

Hardware that works



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In effect, we got 30 MB of disk space and a tape drive for free—just for driving up to Cleveland for a meeting

(from page 57)

Lenny that if he'd send me the tape, I'd transfer it onto a 6045 disk pack and send it up to John Ferry (John has a 6045 drive and an 800 bpi tape drive), and Lenny could pick his converted tape up there.

What does that have to do with users groups? The three of us met at a NODGUA meeting. How much money Lenny saved through these connections I don't know—due to weird exchanges like this, I've never had to use a conversion service. However, I'd be willing to bet that the savings in time and media charges alone were enough to pay his dues for next year.

The national users group has been very helpful to me. I've been supporting NADGUG ever since I knew about it, but the backbone of NADGUG has got to be at the local level, where the month-to-month interaction is. I can write in general about ICOBOL, but there are too many strange configurations out there for me to be able to help solve a particular problem with a specific machine. For instance, I would bet there would be very few people wanting to read how we added an eighth bit to the printer controller on our SBS mux so we could do forms control on our line printer. It might, however, make a good 10-minute presentation at a users group meeting.

If you belong to a local group, attend the meetings. If you don't, join up. If there is no group in your area, call the NADGUG staff in Westboro (617/366-8911, ext. 4721), or contact your local Data General office, and get one started.

A few of the members of our local group have to pay their own dues. Apparently the management of their companies doesn't know how much money a users group can save them. I'm giving those people a copy of this article; if you have to pay your own dues, pass this magazine along to your boss. If *you're* the boss, and you make your employees pay their own way, you should start supporting your users group. It could be *you* making a $50,000 mistake!

While you're reading this, I'm sitting in sunny Orlando at the NADGUG annual meeting. If you're down here with me, and have an interesting story or an idea for an article, please look me up. If you're not down here, you should be.

Next month—back to weird technical stuff!

Δ

Tim Boyer is EDP manager at Denman Rubber Mfg. Co. and president of the Northern Ohio Data General Users Association. 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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Class action

Class scheduling lets you fine-tune the assignment of CPU time

by Brian Johnson
Contributing Editor

:ERRATA:ERRATA

I committed a cardinal sin in my June column: I made a last minute addition without checking out the facts.

The problem concerns the new (AOS/VS rev 6) /CALLOUT console characteristics and how to use a line connected to a "smart" modem for dialing in and out.

I couldn't find any reference to the new characteristic anywhere in the rev 6 documentation, including the 093 updates supplied on the release tape, so I assumed that /CALLOUT solved the dial-out problem.

/CALLOUT does *not* solve this problem. It apparently applies only to some kind of PBX interface. I say "apparently," because a subsequent exhaustive search of the AOS/VS rev 6 documentation yielded only shreds of information about /CALLOUT: a terse comment field in PARU.32.SR and a cryptic description in :HELP:CLI.CMD.CHARACTERISTICS.

So, I'm afraid we're back to the old situation of having to use the master console to remove the /MOD characteristic from the line to let you dial out, and then add it back to allow others to dial in (assuming you are security conscious and want users who hang up without logging off to have their process tree terminated).

I have a patch that will allow any AOS{/VS} user to change /MOD, /MRI, and default console characteristics from any PID, but I hesitate to publish it, because I think rev-dependent patches are tacky. I'll give you a hint: use DEDIT (or FED) to check around label "SDCHR" in {L}PMGR.PR. Look for code that checks AC1 for a 2. No-op it.

Thanks to all the readers who called or wrote.

:ORLANDO

For any of you who show up in Orlando for the NADGUG Conference, feel free to hit me up with any questions you might have about any of my columns. Look for a fat bald guy with a Harley belt buckle, and a Coke can in his hand (my MEC), or come to the System Manager's Roundtable.

The third annual meeting of the Sleazy Bar SIG will be held sometime during the conference. Applicants are welcome.

:RUNAWAY

The response to the offer for copies of RUNAWAY.SR has been overwhelming. Initial feedback indicates that the average system has at least two runaway lines, and capping them has invariably produced noticeable results.

:SORRY.16

This month's column only applies to AOS/VS managers. AOS managers can take the month off, with pay. I promise this won't become a habit.

:CLASP

In last month's issue, Tim Maness gave a quick summary of CLASP, the new class allocation and scheduling package that is part of AOS/VS rev 7.

Since this column has discussed the issue of scheduling and process priorities several times during the past year, I thought I'd take a look at how Class Scheduling impacts my previous advice. *(Editor's note: see BJ's columns in the January, March, and May, 1986 issues of Focus for more on this subject.)*

I recently received a preliminary copy of the manual for the new Class Allocation and Scheduling Package for AOS/VS rev 7 (093-000422). My comments are based on that document, because I haven't been able to do any hands-on testing with a fully loaded rev 7 system yet (MV/2000s with a handful of users don't count).

:QUICKIE_REVIEW

I was going to title this section ":CAPSULE_SUMMARY," but with all the tampering problems these days I decided against it.

Under AOS/VS rev 7, both specific usernames and specific .PR files can be assigned "localities." They are called, oddly enough, "user localities" and "program localities." Locality is apparently programmerese for "category." (God forbid that users should understand what we're talking about!) You can think of this as segregating CPU consumers according to who they are and what they're running.

In addition, "logical processors" can be defined. A logical processor is a provider of CPU time, and is associated with one or more "job processors" (i.e., physical CPUs). This allows you to apportion your available CPU(s) among the logical processors you have defined, even if you have only one job processor (i.e., anything but an MV/20000 with more than one CPU).

Finally, "classes" can be defined. A class is nothing more than a set of user/program locality pairs for which you would like to have nonstandard scheduling.

Class scheduling allows you to associate logical processors with one or more classes to override "standard scheduling." The association can be on a percentage basis (by giving each class a specified percentage of the processor's time), or on a priority basis (by ranking the classes).

Standard scheduling works two ways. Processes in priority groups 1 and 3 get control by assigned priority, with round-robin scheduling for processes that have the same priority. In group 2, processes still get control by assigned priority, but within an assigned priority AOS/VS favors those processes displaying "interactive" behavior over those with "batch" behavior.

In mixed interactive and batch situations (software development environments, typically) where batch is starving, class scheduling will cause interactive response time to suffer to some extent. The real question is whether or not the suffering will be significant. In this case the only way for you to find out is to try class scheduling and see if the increase in response time is tolerable, given the improved batch turnaround times.

For most systems, this scheme is ideal when properly used. Who could argue with giving interactive users higher priority in general?

However, standard scheduling has at least two limitations. Paraphrasing the manual, they are: (1) you can't give one compute-bound process priority over another compute-bound process without starving the lower priority process, and (2) interactive processes can starve batch processes at the same (or lower) priority level on systems with a heavy interactive load.

Class scheduling overcomes both these limitations—and adds a third feature as a freebie. It allows apportioning of the CPU among competing jobs on a percentage basis (e.g., up to 80 percent for me, up to 10 percent for

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you, and the remainder to the other guys).

:WHO_PAYS?

As you should be painfully aware by now, few things in life are free.

Class scheduling is only beneficial when idle CPU is zero most of the time. In this case the underlying premise is that Paul is not getting the CPU he needs because Peter is using it. In this case you can use class scheduling to rob Peter and pay Paul. If Peter is interactive and Paul is batch, Peter will suffer.

In the case of a batch-only system where class scheduling is used to control the percentage of time allotted to competing classes of jobs, then the danger is that net throughput can actually decrease due either to increased scheduling or to decreased resource utilization (disks).

:NET:NET

At any instant in time, AOS{/VS} systems fall into three general categories: interactive only (rare), mixed interactive and batch (common), and batch only (usually when it's dark outside).

In interactive-only situations with idle CPU available, class scheduling won't help. However, few systems are purely interactive. Even CEO-only systems have batch-like processes, such as the formatter processes created as sons of CEO_QMA, which can cause sustained periods of zero idle CPU. In this case class scheduling might help.

In batch-only situations with zero idle CPU, class scheduling will allow you to apportion the CPU among the competing batch jobs, but net throughput will remain the same at best, and could actually be worse. However, you can cause some jobs to finish sooner, at the expense of other jobs that will finish later.

In mixed interactive and batch situations (software development environments, typically) where batch is starving, class scheduling will cause interactive response time to suffer to some extent. The real question is whether or not the suffering will be significant. In this case the only way for you to find out is to try class scheduling and see if the increase in response time is tolerable, given the improved batch turnaround times.

:SOCRATES

Q: Can CLASP be used on any MV/ system running AOS/VS?

A: Yep.

Q: Is it true that CLASP is required for multiprocessor MV/20000 systems?

A: "Classes and logical processors aren't required to run an MV/ family computer that has multiple job processors" (page 0-3 of the manual).

Q: Once set up, is class scheduling "automatic?"

A: To the exent that the behavior of your process environment stays the same, yes. Even if it doesn't stay the same, predefined "scripts" can be built to allow easy changing from one class scheduling configuration to another (e.g., day vs. lunch vs. night vs. weekend). However, changing the current configuration does require executing CLASP with /BATCH/SCRIPT= switches from either the CLI or via a /AFTER batch job using a username with system manager and superuser privileges.

Q: Will class scheduling allow me to postpone upgrading to a faster CPU?

A: It might. If you have no idle CPU, but your interactive response time is very good, and you're willing to give some of it up to improve the turnaround time of critical batch jobs, then the answer is "yes." If your interactive response time is already unacceptable, then class scheduling won't help. Batch-only systems that are out of CPU will only improve if a faster CPU is used.

Q: Will class scheduling be worth the trouble on most systems?

A: Obviously it's a little premature to answer this question. My gut reaction is that many users will find it useful, but few will find that it is the key to solving serious performance problems. Δ

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CEO Connection makes emulation of the D200 and D400 terminal and conversion of certain PC-based word processing packages relatively transparent to the user

CEO Connection

DG's link to PCs

by Charlene A. Kirian
Contributing Editor

CEO Connection is the new terminal emulator and file transfer facility from Data General. It was developed to link DG's CEO (Comprehensive Electronic Office) system to the PC world, and will run on an IBM PC, a Dasher/One, and a DG/One. With the complementary software required on the mainframe, CEO Connection makes emulation of the D200 and D400 terminal and conversion of certain PC-based word processing packages relatively transparent to the user.

One of the nicest features of CEO Connection is its ability to access wide documents. The screen will scroll horizontally to allow you to view lines of up to 160 characters. It is menu-driven and supports bi-directional file transfers. Using the Import function within CEO, the conversion will store CEOWrite, WordStar, and WordPerfect documents in the format specified. Using the Export function, you can transfer a CEO document onto your PC diskette, but at present, only in a few specific formats. The number of formats supported is supposed to increase in future revisions of CEO. Be sure to read the release notice accompanying the software for specifics.

The major drawback that I can see at this time with CEO Connection is that it has to run from both drives on a two-drive configuration. DG has left no room on the key diskette to make it bootable. But there is an option—running a virtual disk. With help from a nearby SE from DG, I was able to implement this, and it works very well. However, I hesitate to release it to the users at my site because of problems that can occur with virtual disks—specifically, loss of data in a power outage! I'm not sure that some users are sophisticated enough to understand what the consequences could be. However, I would like to share with you the configuration that the SE gave me for setting up CEO Connection to run on a virtual disk. Keep in mind that I am setting this up to run on an IBM PC with two floppy drives.

VDisk Preparation

1. Format a diskette with a system. FORMAT/S "drive".

2. Do an INSTALL on your CEO Connection system diskette with the INSTALL B command. This will set up your CEO.BAT file with your default drive as B. You will then need to go into the CEO.BAT file and change CEO_MENU.EXE B: to go to drive C: instead of B:. (We tried using the INSTALL C command, but it would not work correctly.) This will direct your PC to look in your virtual disk for the CEO Connection system files.

3. Copy VDISK.SYS onto the new system disk (VDISK is a command from DOS 3.+).

4. Copy the following CEO Connection files onto the new disk:
CEO_MENU.EXE
CEO_W410.EXE
'host config file' Ex: CEO_DFLT.HST
CEO.BAT
COMMAND.COM (optional—from your MS-DOS diskette)
CEO_CNFG.EXE (also optional, from your MS-DOS diskette)

5. Create an AUTOEXEC.BAT file with the following information:

```
ECHO OFF
COPY A:CEO_MENU.EXE C:
COPY A:CEO_W410.EXE C:
COPY A:'host config file' C:
COPY A:CEO.BAT C:
COPY COMMAND.COM C: (optional)
COPY CEO_CNFG.EXE C: (optional)
PATH C:  ;A:
C:
CEO 'host config file' (without .HST extension)
```

6. Create CONFIG.SYS file with the following information:

```
BUFFERS=15
FILES=20
DEVICE=VDISK.SYS 250 128 64
```

(Note: 250 is the VDisk size in KB buffers; 128 is the sector size; 64 is the maximum.)

7. Boot the system with the new system disk. It will automatically load all of the CEO Connection files from the AUTOEXEC.BAT macro. Once you get the CEO Connection main menu on the screen, take out the bootable VDisk diskette and insert the CEO Connection system disk in Drive A.

I found that this configuration works well, but you must be careful about creating files on the VDisk. When you change anything that resides on the VDisk, all the information will be lost if you power down your system.

We encountered a few other areas of note when using the package (I had thought some of these were unique to our installation, but now am sure others will have similar

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The CEO Connection package instructions are adequate, but I was disappointed by the lack of detailed explanations of commands

experiences). When logging on, most of our accounts are "chained" directly to CEO, and denied any CLI access. CEO Connection was designed to be linked to CLI, then CEO. We have had to make major changes to logon sequences to accommodate this configuration. In the host ID file, the logon sequence must be modified by deleting the type of terminal and the CEO command. The logoff sequence must also be changed. The default sequence gives you two BYE commands, but since CLI access is denied, only one BYE command is necessary.

This arrangement has created several obstacles for us. One we haven't been able to overcome is the usage of the utility to send or retrieve files. The utility goes directly to the CLI for transfer, so our "chained" accounts prevent us from using its functions. It tries to do a logon into CLI, is denied access, then gives a communications time-out error. The only way I've found so far to get around this is to use the "Mail a File" function within CEO. It works in much the same way, yet requires you to be in CEO to carry out the request. I'm sure we're not the only site that is experiencing this difficulty; I'm going to request a change in functionality so that others can access this capability.

When first testing CEO Connection, I found one small point that became a major irritant. Since the IBM PC keyboard does not have "idiot" lights to indicate status such as CAPS LOCK, NUM LOCK, etc., I thought it would be sensible to ask for an enhancement to the software to display the status on the status line at the bottom of the screen. However, the people in software development must not agree, because I just received the answer to my STR (Software Trouble Report) saying that it was *not* being considered in future enhancements, but thanking me for the request!

We have a very confusing situation at our site. Before accessing any of our Data General processors, some users need to go through a port selector (switching station) before logging on to the DG systems. Our problem is that this device (called PACX) is set with mark parity. CEO Connection offers only even, odd, and none. I understand that mark is not a common parity so it was never considered. Right now, we have the DG processors set with eight parity bits, one stop bit, and no parity. After several attempts to find a workaround, we were told to try seven data bits, two stop bits, and even parity. It worked! Somehow it fools the PACX system and everything works fine. So if you have a similar situation, you might give it a try.

The CEO Connection package instructions are adequate, but I was disappointed by the lack of detailed explanations of commands. There are many advanced CTRL and ALT sequences that can be incorporated into the logon and dial-up sequences, but very brief explanations of what they do. My biggest problem, however, was finding the expertise for help. In addition, there is no on-line help facility. DG needs to beef up their support efforts for this product. It was with persistence that I finally found my "expert" in the package.

CEO Connection is a powerful package that I hope will help link our PCs to the Data General with a smooth transition. Data General is offering classes for this product, but at present the classes are taught in conjunction with CEOWrite classes. Δ

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

Circle 2 on reader service card

Preventive maintenance for a sleeping dog

Regular inspection of INFOS files can head off trouble

by Tom Duell
Special to Focus

Have you taken a close look at your INFOS files lately? If you're like most users, you haven't. Users typically inspect their INFOS files only when an application change is required, when a major performance problem develops, or when a system failure or an INFOS crash occurs. Otherwise, the basic attitude toward INFOS seems to be "let sleeping dogs lie."

My attitude is that preventive maintenance is just as important for your data as it is for your hardware. Periodic inspection of your INFOS files could give you advanced warning of problems brewing in your data base. Considering the value of the information you manage, the cost of learning how to inspect and maintain your INFOS files is a small price to pay.

Several tools are available to make INFOS file inspection easier. I generally use four of them, two of which are the Data General utilities IFILE and IVERIFY. The other two are The Inspector and The Investigator (both are modules in the VS Toolbox developed by my company). In this article I will describe briefly how each of these utilities works.

IFILE is Data General's utility for reporting statistics about a specific index and data base. It reports the number of disk blocks used by index and data base, and the element sizes of the volumes. It also reports the recovery mode status (e.g., differential files and logging enabled, etc.). IFILE is useful when you don't need extensive information, but remember that when it reports the number of disk blocks used, it doesn't include the blocks not yet used within the last allocated file element. If you are using a large file element size, the SPACE command will report more disk blocks used than IFILE will.

IVERIFY is another Data General utility that can examine an INFOS file to report many useful statistics about the file's internal structure. Running IVERIFY can be quite time-consuming for large files, however, so carefully scheduling its use may be advisable. You should run IVERIFY only when no other users are using the file. While IVERIFY is most often used for limited file recovery after a system or INFOS failure, the information it yields can also be helpful. It reports the total number of records, the empty pages, and allocated space in the data base—all of which may assist you in improving file usage.

This brings us to the subject of indirect records. IVERIFY identifies and counts indirect records, and reports how many it finds in the data base. Indirect records can be created in two ways. If a user modifies a record and increases its length, INFOS may not have room to keep the record on the same allocation page. In this case it will relocate the record on a different page that has enough space. INFOS will then find the record by going to the original location, where it reads a pointer to the new location. Thus, access to the record is indirect.

But what if you still have indirect records even though you never change the length of a record? This can happen if your file was created with data record compression, as many are. With file compression, INFOS will compress out recurring characters in your records, for example, blanks in a field. When this field is updated with non-blank values, the record can't be compressed as much and therefore will be larger. If INFOS finds that the page cannot hold this expanded record (due to other records already on the page using up most of the space), then the indirect pointer is created and the record relocated.

Not all compressed records will suffer this fate when updated, but many do. This operation is totally transparent to the user—except for the increased record access time. If a data base contains too many indirect records, the average record access time can be severely affected.

Another utility that can be helpful in examining the internal INFOS file information is The Inspector, which examines INFOS files for "internal fragmentation" and potential performance problems. While The Inspector doesn't report all the information about a data base that IVERIFY does, it reports the most important data and runs much faster. It prints out the number of records and pages, and the number of indirect records. Its index information reports the number of keys, subindices, and pages. A figure-of-merit called the organization factor is calculated, which varies from 0 (most fragmented) to 1 (most organized). This statistic is meant to assist users in determining a proper time to rebuild a file.

A variation is The Investigator, which does everything The Inspector does, but also monitors the organization of a specific subindex, and not the entire index. This is useful for determining the fragmentation of a subindex that is often scanned sequentially. It is important that this subindex be as "organized" as possible for the fastest program execution times.

By looking at the statistics on an INFOS file you can have a better idea when to rebuild the data base for improved performance. Since INFOS files can become severely fragmented the same way disks often do, applications should include a rebuilding procedure. (I will include more information about tools to do this in a later article.) By periodically rebuilding an INFOS file, the records are placed in portions of the file that will optimize performance.

If you have questions, comments, or suggestions concerning file design and performance issues, I'd like to hear from you. If you have a novel approach that works well, I'll report on it in a future article. Until then, scrutinize your files! Δ

Tom Duell is the president of Eagle Software, Inc. Send questions or comments to him at P.O. Box 16, Salina, KS 67402; 913/823-7257.

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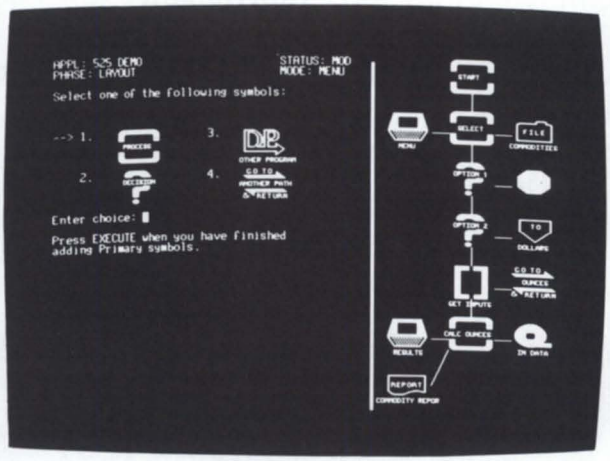

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Memory, disk storage expansion for MV/2000

Westboro—Data General Corporation has announced a doubling of the maximum memory capacity of its packaged office and engineering workstation systems. The company now offers 4- and 8 MB expansion memory modules for the Eclipse MV/2000 DC and the DS/7500, effectively increasing maximum memory on both systems by 100 percent, from 5 to 10 megabytes.

The MV/2000 DC and the DS/7500 were introduced in November, 1985. Both systems incorporate a single 15-inch system board that includes two megabytes of parity memory based on 256 KB DRAM chips. The new 4 MB module, Model 8924-D, and the new 8 MB module, Model 8924-E, add to the series of half-height memory modules (1-, 2-, and 3 MB capacity) currently available. The two new modules are also based on 256 KB memory chips.

The new 10 MB memory maximum on the MV/2000 DC and DS/7500 systems is achieved by adding the new 8 MB memory module to the 2 megabytes of standard memory. Both systems still support only one expansion memory module.

The 4 MB module Model 8924-D costs $8,600; the 8 MB module Model 8924-E costs $17,200. Both are available 60 days ARO.

At the same time, the company also introduced a 160 MB, 5 ¼- inch Winchester disk drive that increases the maximum disk storage capacity of its packaged office systems and engineering workstation products by 33 percent, from 240 to 320 megabytes. The Model 6363 160 MB disk drive expands the memory options on Data General's Eclipse MV/2000 DC, Eclipse MV/4000 DC, and DS/7500. These systems support up to two disks and are currently available with a choice of 38-, 70-, or 120 MB disk units.

The Model 6363 160 MB Winchester disk drive is priced at $9,500, and is available immediately. Δ

New floppy allows Desktops to talk to MV/2000s

Riverside, CA—Delphi Data has introduced a Desktop floppy upgrade kit. The kit includes a special 96 tpi floppy disk drive and the software to allow the writing of MV/2000-style diskettes.

Using the kit, a user can transfer data and programs from any Data General Desktop Generation computer to the new MV/2000.

Installation consists of simply plugging the new module into an existing system.

The Floppy Kit costs $1,495 in single quantities.

Delphi Data, 12155 Magnolia, Suite 6C, Riverside, CA 92503; 714/354-2020. Δ

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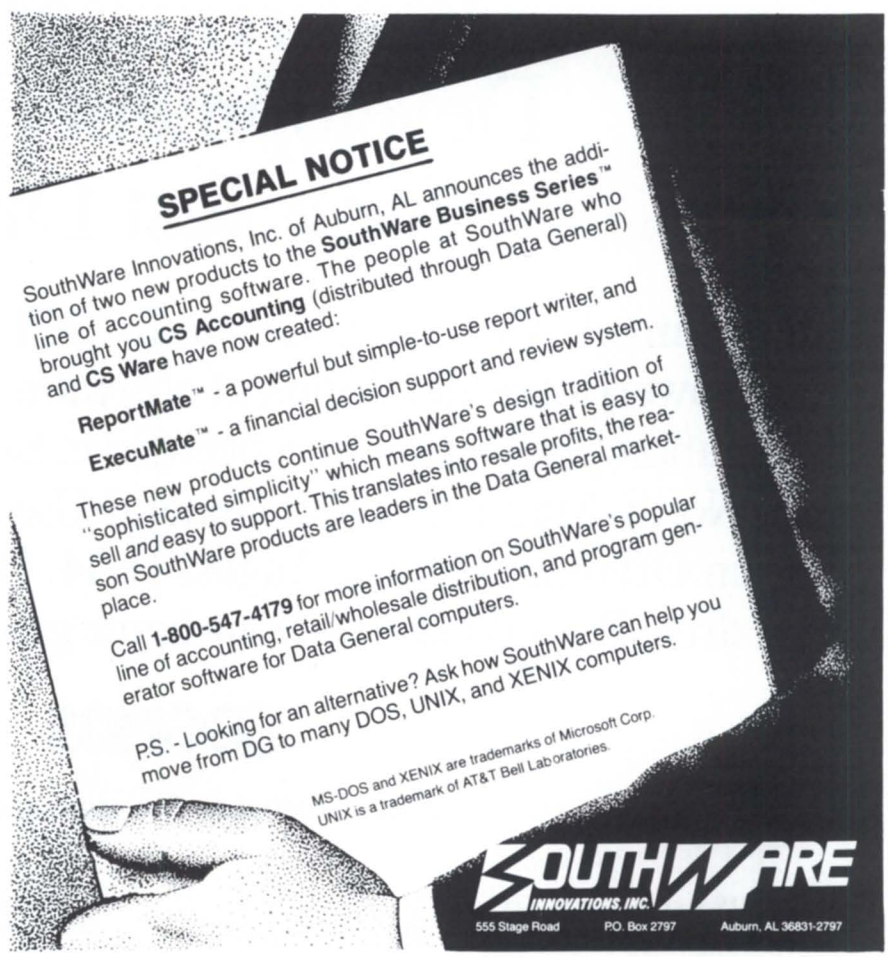

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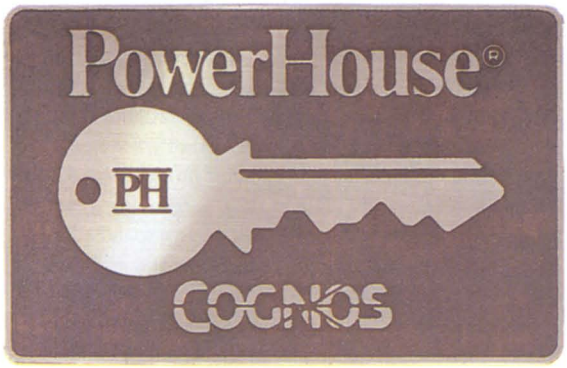

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DG will distribute C/SCRIPT II plus

Auburn, AL—CS Laboratories, Inc., and Data General Corporation have announced that Data General will act as a distributor for the C/SCRIPT II 'plus' family of COBOL application development systems. The agreement covers DG's MV/ family of superminicomputers, the DS series of engineering workstations, and Desktop Generation computers. The C/SCRIPT II 'plus' Family of COBOL application development systems is an integrated system of productivity tools designed to expedite software development.

"The agreement exemplifies DG's commitment to not only provide sophisticated productivity solutions to software developers but to also offer viable alternatives to fourth generation languages," said Bob Stover, vice president of sales at CS Labs. "We will, of course, continue to sell and offer support to the DG marketplace, but we will be working closely with Data General in the marketing of the C/SCRIPT II 'plus' family," Stover added.

The C/SCRIPT II 'plus' family is designed specifically for DG INFOS II users creating COBOL applications. According to CS Labs, C/SCRIPT II automates the repetitive aspects of COBOL development and produces error-free AOS, AOS/VS, or Interactive COBOL source code. This data dictionary-driven system allows users to design prototype systems with COBOL and then regenerate programs with modifications.

The C/SCRIPT II 'plus' family includes C/SCRIPT II plus DBAM, designed for use with Data General's INFOS II Data Base Access Method (DBAM), and C/SCRIPT II plus ISAM, which is designed for developers creating COBOL applications accessing ISAM or ICOBOL file structures.

Complete training and software support will be available from either CS Labs or Data General's systems divisions. Pricing begins at $8,000 for smaller AOS systems and increases to $26,000 for the MV/20000.

CS Laboratories, Inc., 459 North Dean Road, Auburn, AL 36830; 1-800/626-0381 (205/821-1133 in Alabama or outside the continental United States). Δ

Enhancements to CEO/DXA, DG's DISOSS interface

Westboro—Data General Corporation's CEO/DXA software now allows Eclipse MV/ family system users to access both DISOSS Document Distribution Services and Host Library Services. Recent enhancements to the software also let users participate as SNA Distribution Services (SNA/DS) nodes in a distributed SNA environment by utilizing the physical unit 2.1 and logical unit 6.2 protocols. CEO/DXA is Data General's Docu-

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ment Exchange Architecture interface between CEO and the IBM DISOSS office environment.

The new version of CEO/DXA incorporates:

- Expanded DISOSS interface to include Document Distribution (hierarchical), and Library Service (centralized data base)
- PU 2.1, LU 6.2 and SNA/DS networking software
- Application program interface LU 6.2

According to J. David Lyons, vice president, business group marketing, this version of CEO/DXA with the PU 2.1 and LU 6.2 interfaces positions DG as the only major minicomputer vendor other than IBM to make an SNA/DS support product available for delivery.

According to Data General, DISOSS products from other vendors focus on a central host for message distribution purposes. CEO/DXA enables MV/ system users to participate in IBM hierarchical DISOSS networks as well as IBM-distributed (peer-to-peer) SNA/DS networks. CEO/DXA users participate in IBM's distributed network by using the PU 2.1 network interface and the SNA/DS addressing and routing architectures.

With CEO/DXA, CEO users send messages, files, and documents between peer nodes located down line in the network, but don't have to rely on the IBM host for message/document/file distribution services. CEO/DXA implements IBM's physical unit 2.1 network interface (PU 2.1), logical unit 6.2 application interface (LU 6.2), and SNA/DS: the MV/ system serves as, and appears to be, an office systems node—or IBM System 36—in this distributed SNA environment.

Physical Unit 2.1 makes it possible for devices to be networked together without requiring a front-end processor and hierarchical communication relationship. PU 2.1 provides low-level interfaces in IBM's SNA environment, which would allow "peer-to-peer" connection between a Data General MV/ system and a System 36, which could then be connected to an IBM 5520, and so on.

Logical Unit 6.2 builds on these low-level connections by enabling Data General application programs to communicate with IBM application programs, thereby allowing an MV/ system to share applications programs in the IBM SNA/DS environment. The LU 6.2 software consists of a series of subroutines that translate applications program commands from one device to another.

Applications Program Interface LU 6.2 software provides an "open" communications interface to programs adhering to IBM LU 6.2 protocols, IBM's standard for advanced program-to-program communications. APILU 6.2 enables applications programs written in Data General's AOS/VS COBOL, Fortran, PL/1, or macro assembler languages to interact with other programs following the LU 6.2 protocol. Through APILU 6.2, Eclipse MV/ users can write programs that communicate, exchange data, and pass messages with applications programs running in IBM host and peer-to-peer environments. Δ

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Circle 20 on reader service card

DG unveils high-speed solid-state disk

Southboro—Data General has announced a high-speed solid-state disk that can enhance performance by eliminating the head movement and latency of standard disks. This product features a fixed seek and rotational latency time of 1.5 milliseconds, and a data transfer rate of 2 megabytes per second. Depending on application, the solid-state disk can increase system performance as much as 10 times over a standard Winchester disk drive.

The solid-state disk (Model 5064R) appears to the computer system as Data General's 354 and 592 MB disk drives (Models 6236/6239). Contained in a 10 1/2'' chassis, it uses the same disk controller as these other high-performance drives.

Solid-state disk Model 5064R

The product can be used standalone or in the same subsystem with Winchester disk drives. A battery-backup option is available for withstanding power failures.

Fully supported under AOS/VS, the solid-state disk is available in capacities of 8 MB, 32 MB, 64 MB, or 120 MB per chassis. It can be daisy-chained with Data General's standard Model 6236/6239 Winchester disk drives. A multiple solid-state disk chassis can also be configured on the same controller. A single controller can support up to four solid-state disks or 354/592 megabyte high-performance disk drives in any combination.

Pricing starts at $18,995 for an 8 MB solid-state disk subsystem (Model 5064R).Δ

Send your new product announcements to Focus! Address them to Greg Farman, Editor, Focus Magazine, 5332 Thunder Creek Road # 105, Austin, TX 78759. Black-and-white photos welcome.

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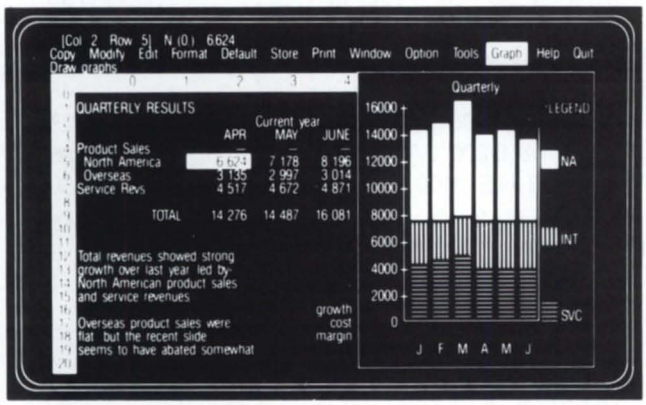

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Fujitsu 2284 169MB Drive (Complete)	2,200
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Promotions, etc.: Data General named Senior Vice President Colin Crook to head the new communications systems group.

Richard A. Camuso will succeed Frank P. Silkman as DG's senior vice president for worldwide field engineering. Silkman vacated the position last March, when he took over as senior vice president for manufacturing. Camuso was formerly a group director for finance with IBM.

Interscience Computer Services appointed Frank Salowitz to a business development post. He will report to John Kjos, vice president of marketing for the Chatsworth, California, supplier of DG-compatible disk, tape, and printer subsystems and services.

Peter Koiwai will be the new regional sales manager for Perfect Terminal, Inc.'s Northwest region. PTI also announced that reduced manufacturing costs and higher volume will permit it to reduce the price of its DG-emulating P210 terminal to $649. The company also opened an East Coast regional sales office in Boston.

■

Manufacturing and marketing for DG's high-volume products (DG/Ones, Desktops, terminals, etc.) is being consolidated as a separate division headed by James R. Barnes. The volume products division, located in Durham, New Hampshire, will absorb the peripherals development activities from DG's Austin facility.

At the same time, DG announced it is consolidating all of the company's MIS activities into a new organization. Although data processing will remain decentralized on distributed systems, the revised organization chart is supposed to allow for better coordination.

■

Belt tightening continued at DG during the third quarter. Stock prices slipped during the week before the company announced that it would take a charge of $5 million and fire about 500 more workers. This was in addition to the $6 million charge earlier in the quarter, when DG laid off workers and closed plants in Hong Kong and Austin, Texas. The combined effects of the charges produced a net loss for the quarter.

Stock analysts called the cutbacks a painful but necessary step to adjust to the continuing computer industry doldrums—not unlike what is happening at IBM and other companies. Although DG's total workforce will decline to about 16,000, the company planned to expand its sales and research staff in an effort to build more business.

■

The May issue of *Focus* carried a product spotlight about the new performance analysis services provided by Data General systems engineering. A surprised representative at DG's Customer Support Center in Norcross, Georgia, has handled quite a few calls from users who somehow managed to get through to her—despite the fact that the phone number listed doesn't exist. (Their typo, not ours.) The correct number is 404/448-6072, *ext. 2136.*

■

A new breed of Data General service technicians. Note the shirts.

George Henne sends this note for auto racing fans: "Data General is making its debut on the Grand Prix Formula 1 auto racing circuit this year. By taking over the sponsorship of the Tyrrell team, driven by Martin Brundle and Phillipe Streiff, DG is getting a lot of high-profile publicity, especially in Europe. Recently, the tour went to Montreal, where Data General invited key customers (and DG execs!) to see Data General Team Tyrrell in action. While the cars finished in the middle of the pack, it was nice to see the new, improved chassis was at least competitive with Ferrari's."

■

Complaints surfaced in June on NADGUG's electronic bulletin board that rev 6.04 of AOS/VS was grabbing 10 to 15 percent more disk space than rev 5.06. It was blamed for causing an MV/4000 to crash, with an error message that the page swapping area was too fragmented. One user was able to suggest a fix: change the sysgen to set page/swap areas to 2,000,000 blocks rather than the MV/4000's default of 2,000. Dial up the bulletin board (415/924-3652) for more details.

■

Meanwhile, rev 2.20 of CEO was getting favorable reviews. Bulletin board reports said it was easy to install, and required no document conversion if the system was already running rev 2.12. Users were tickled by the improved performance, but some complained that it took a bit longer to get through the menus. A pleased and surprised Mike Johnson summed it up: "One 'attaboy' to the CEO group."

■

After evaluating four major fourth generation languages, Data General's MIS organization has chosen CQCS as a standard for internal operations. CQCS, marketed by Cybertek Software Incorporated, includes an inquiry system, report generator, screen builder, and text processor. It is designed to work with INFOS, both for new applications and to retrofit existing INFOS-based applications.

■

Actel, a newly formed semiconductor firm based in Sunnyvale, California, will get a boost from an agreement recently signed with Data General. DG will get a minority interest in Actel and will be represented on its board of directors. Actel gets a three-year engineering development agreement whereby the companies will jointly develop products based on Actel's new technology. DG support will include personnel and equipment from its facilities in Sunnyvale. Other terms of the arrangement weren't disclosed.

■

Beneficial Corporation took delivery in June on 21 MV/2000s—out of an initial order of 200. The nation's largest independent consumer finance company, Beneficial has one of the largest CEO installations in the world at its New Jersey headquarters. Beneficial has committed to install more than a thousand MV/2000s to link more than 1,100 branch offices and 11,000 employees.

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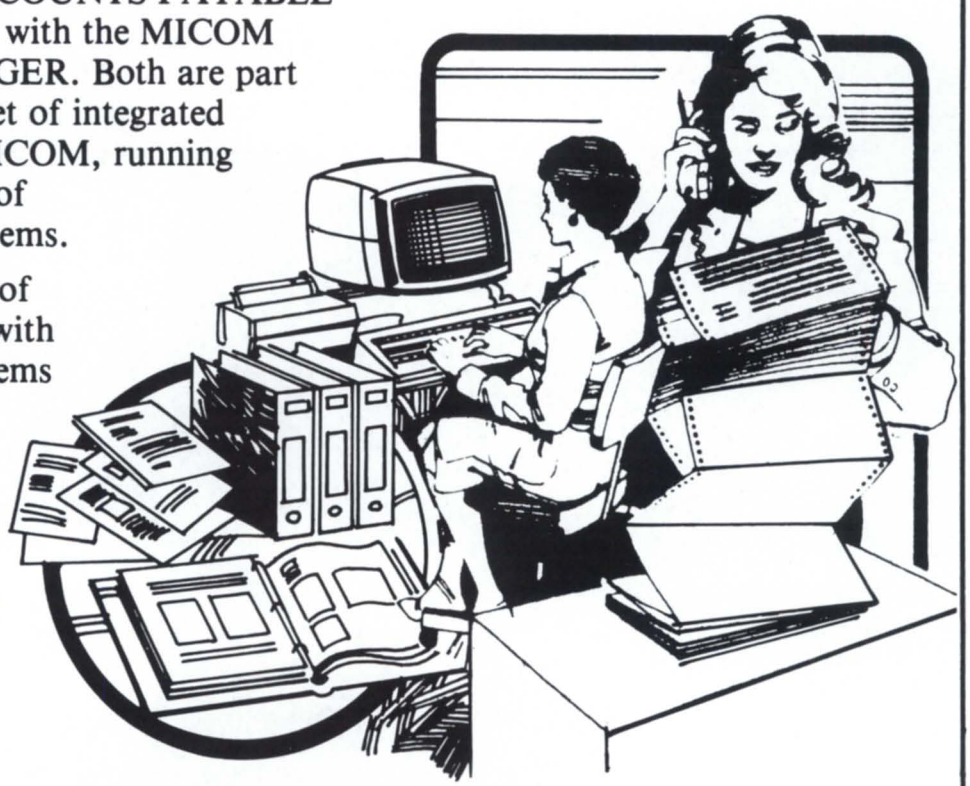

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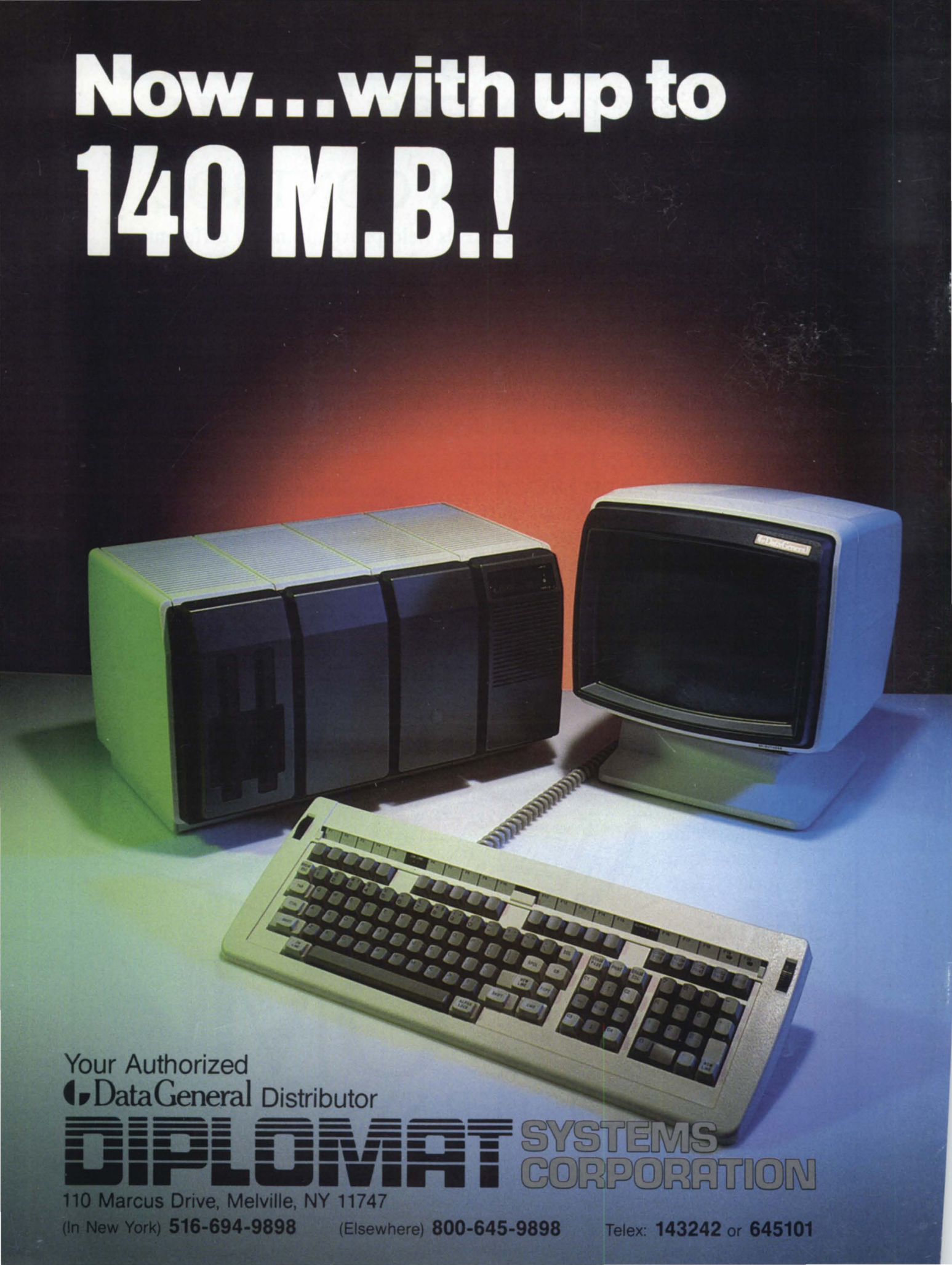

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