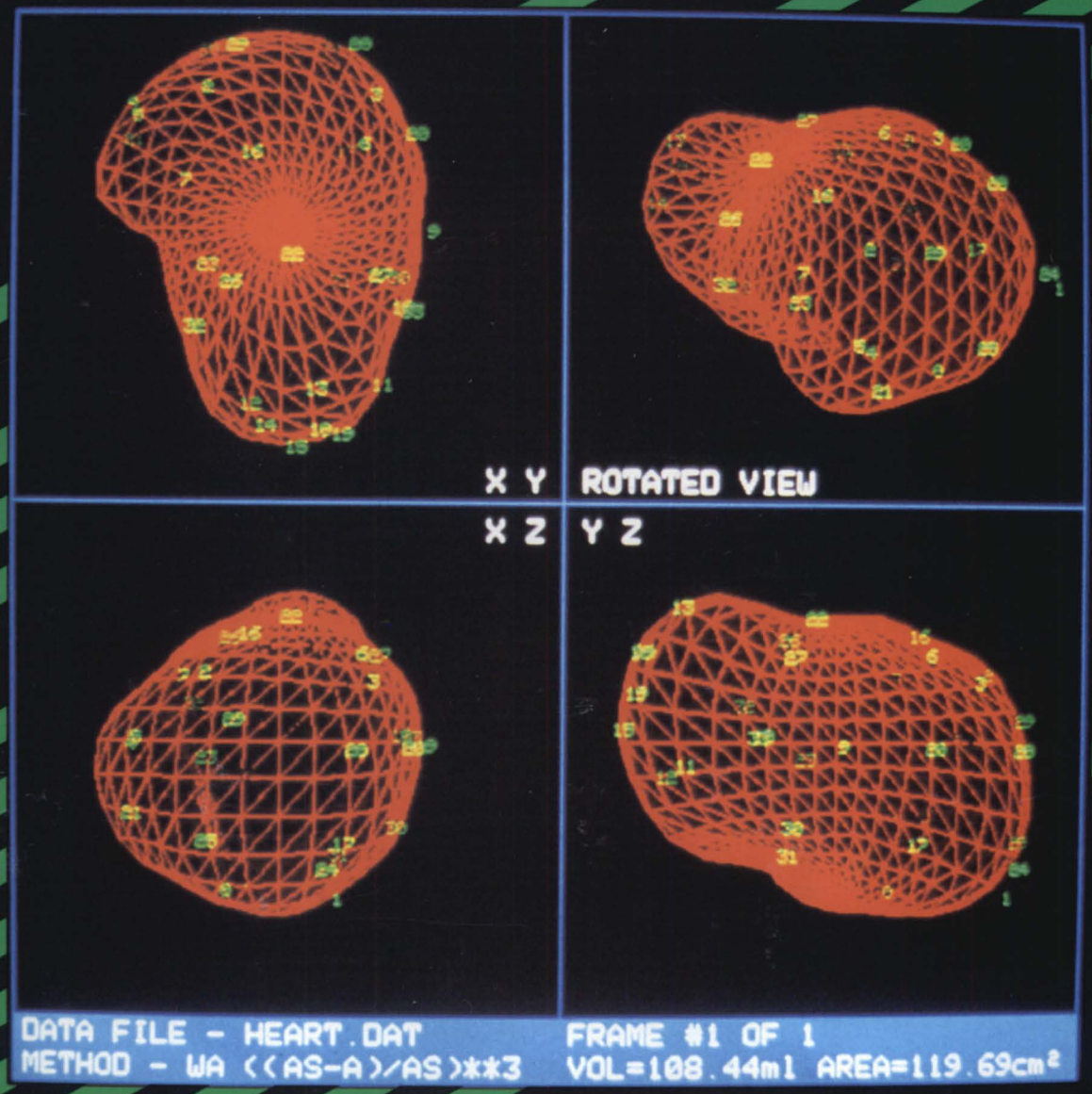
February 1987

FOCUS

The Magazine of the North American Data General Users Group



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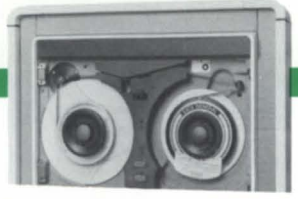

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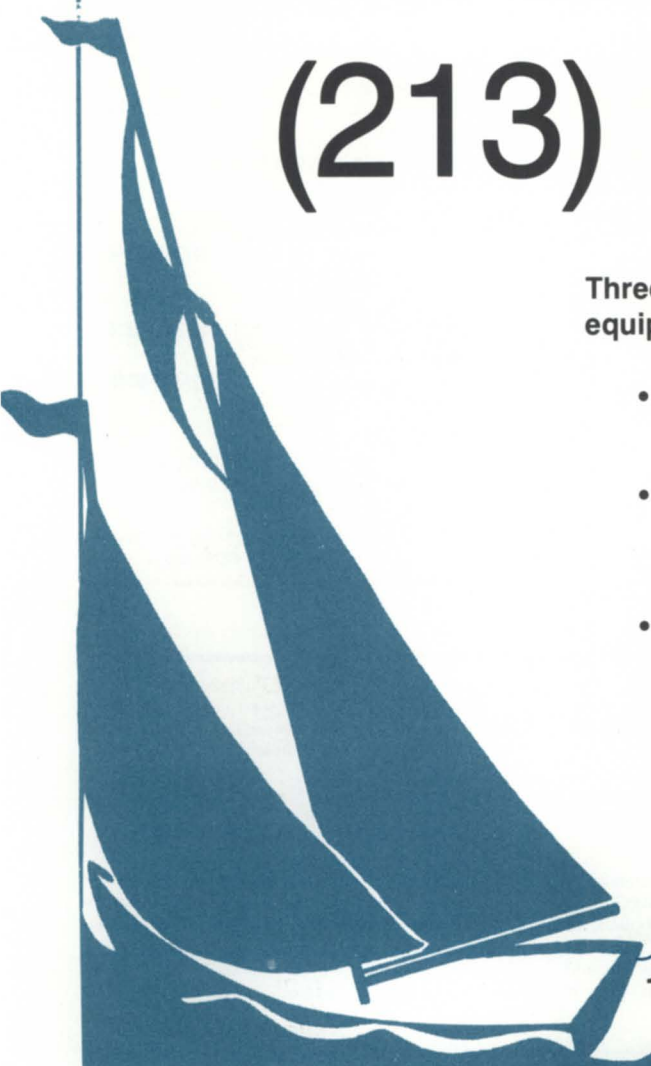

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ECT REPORT WORDPERFECT REPORT

WordPerfect® Library Delivers the Mail

The waiting is over. WordPerfect Corporation's recently released Library program is hard at work delivering phone messages, letters, memos, and files to Data General AOS/VS computers all over the country. In addition to the electronic mail features, WordPerfect Library comes with a Calendar, Scheduler, and a shell program to tie everything together.

First letter arrives

A large department of the U.S. Government became the first official WordPerfect Library installation. Their system, which uses 14 MV/10000s and 10 MV/4000DCs, supports more than 600 users. In a test of the new system, a phone message was sent from one coast to the other in less than 30 seconds, including notification. In less than eight minutes, a message was delivered to all 600 users in four states and six locations.

Confidential services

WordPerfect Library includes a Password Encryption feature which lets you create a password to encode any mail document or file. The encryption is practically impossible to break, since the password can contain up to 78 characters.

Right on time

The calendar has an attractive screen and supports to-do lists as well as daily appointments and memos. The alarm feature will notify you in advance of an appointment. And calendar entries can be converted to merge format for use with WordPerfect.

A complete package

The entire WordPerfect Library, including Mail, Calendar, Schedular, Phone Messages, and shell, are linked together into one program. The program requires only one PID for the mail server, one for the network server, and one for each user. DG's INFOS is *not* required.

With the shell, you can quickly move from one WordPerfect Corporation program to another, and with the shell clipboard, you can easily pass information between programs. The sources and explanations necessary for any software developer to support the shell and clipboard are included with the package at no extra charge.

P.S.

The price is just $2,000 on the 2000, $4,000 on the 4000 (and the MV/6000, MV/7800, and MV/8000), $5000 on the 10000, and $6,500 on the 20000. DG System Suppliers can receive the latest AOS/VS demonstration versions of WordPerfect, MathPlan, and WordPerfect Library for $90. Evaluation copies are available to end users for the same price. All orders are shipped within 3-4 working days.

For more information, call or write WordPerfect Corporation, or see your DG System Supplier.

To order WordPerfect Library, call toll-free at (800) 321-4566 and ask for Debbie.

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Circle 44 on reader service card

Here comes the Executive Board— get out the card tables

by Calvin Durden
NADGUG President

NADGUG Executive Board meetings aren't the cozy affairs they once were—and I couldn't be more delighted at the change.

Only a few years ago, the Executive Board could meet around a long table in a fairly small room. We rarely had more than 20 people attending. Since most of us already knew one another, the introductions were brief, and we could get right down to business.

The change was obvious last year when the Board met in Orlando. Not only were there a lot of new faces, but it took a large square of tables in a good-sized room to accommodate everybody. When the Board meets again March 19 and 20 in Las Vegas, it's possible we may have as many as 50 people attending.

The reason behind the expanding boardroom is simple enough: recent growth in NADGUG's membership rolls has been matched by perhaps even faster growth among the regional and special interest groups. NADGUG's by-laws recognize that the North American organization draws much of its strength from the affiliated RIGs and SIGs. Every recognized RIG and SIG has the right to send someone to represent them on the Executive Board— and there are more of them to exercise that right these days.

Most of the established RIGs and SIGs are as strong as ever, and there are more than 20 new regional groups now getting organized. For a few months following last year's annual conference, the NADGUG staff was getting an average of one new request each week for information on starting a new RIG or SIG. If all of these new groups send delegates to the next Board meeting in Las Vegas, we may have to get out the card tables to make room for them all.

■

For many RIGs and SIGs, getting a newsletter out to members on a regular basis is a regular headache. It takes a lot of volunteer effort to get the articles written, compiled, assembled, printed, and mailed.

CADGUG; the Chicago Area Data General User Group, is experimenting with an alternative. They are the first RIG to publish their newsletter as part of *Focus*. It's an option other RIGs and SIGs may want to consider. It works like this:

1. Make sure all members of the RIG or SIG are members of NADGUG (so they will be on the *Focus* mailing list). CADGUG did this by combining the dues for the two organizations.

2. Have the person who is responsible for the RIG or SIG newsletter get in touch with the *Focus* Editor to find out how to submit newsletter items.

3. As newsletter items are submitted, the *Focus* staff will take care of getting them published in the next issue.

■

The NADGUG officers are encouraging all RIGs and SIGs to send representatives to the next Board meeting. We also want them to know about NADGUG's support for RIGs and SIGs. Paul Duck, the chairman of the RIG/SIG committee, has been pretty busy trying to give recognition to people who have "gone the extra mile" to get things rolling for their RIG or SIG. There are a lot of people in that category, and NADGUG now offers a variety of services to help ease the load. For example . . .

- Start-up funding to help pay for mailing invitations, renting meeting rooms, and so on until the group can get on its feet.
- Coordination with local DG offices to identify potential members and arrange for other assistance from DG.
- Help with programs. NADGUG has a library of videotapes from past annual conferences, and offers partial reimbursement for outside speakers.
- Reimbursement of expenses for hotels and meals for RIG/SIG representatives at Executive Board meetings.

There are more, but you probably get the idea. To get more information about NADGUG's support for RIGs and SIGs, contact Paul Duck (216/892-3070), or Barbara Hoogasian, the NADGUG coordinator (617/870-7830). Δ

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□ REASON #2: ARRAY PROCESSING OPTIMIZES ACCESS TO LARGE SETS OF DATA.

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□ REASON #3: PARALLEL-PROCESSING OPTIMIZES COMPUTER RESOURCE USAGE.

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□ REASON #4: MULTI-TABLE CLUSTERING OPTIMIZES JOINS.

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□ REASON #5: HIGH-SPEED RELATIONAL SORT FACILITY OPTIMIZES DATA AGGREGATION

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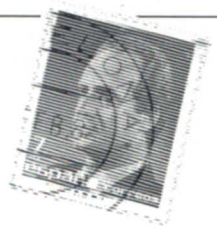

Tricks for IMPORTing DIF files

If one is attempting to move spreadsheets from a non-DG computer to CEO, the procedure would seem simple: generate a DIF file on the source machine, use communications software to move the DIF file into the DG, then enter CEO and IMPORT the DIF file. In practice, this procedure works just fine—until you see the error when CEO_CONVERT.PR errs out while reading the DIF file. In the absence of CEO Connect, one would seem to be out of luck. It looks as if there is in fact no IBM compatibility.

I happened on a solution that is easy to implement and has worked well for me. First, you must generate a DIF file in CEO—a small spreadsheet as a DIF file is fine. Name your DIF file something like "DIF_IMPORT." Then generate an inventory, with filenames, of the drawer and folder where the DIF file is. With the inventory in hand, start the CLI and move to the :CEO_FILES:[!USERNAME] directory where the DIF file is. Now, DELETE this DIF file in the CEO_FILES area and CREATE a LINK with the same name as the one you deleted with the LINK "DIF_IMPORT" in the CLI area. You now have created a permanent path to IMPORT DIF files into CEO. You shouldn't have to do this again. CEO should have no problems with it and should be able to do normal functions with this "pseudo" file, including deletion.

To use it, follow this procedure. When you transfer a DIF file from your PC, give it the AOS name of "DIF_IMPORT" (or whatever you named the LINK file). Then, enter CEO and create a spreadsheet. READ the DIF file you created in CEO into your spreadsheet. You should find that the spreadsheet magically IMPORTed.

I can also offer a few hints on moving DG spreadsheets to Lotus 1-2-3 as DIF files. One important fact is that the DG SPD files have Lotus 1-2-3-compatible DIF files, but the Decision Base FMT (DTB) files do not. To move a Decision Base (FMT) file to Lotus 1-2-3, you must first save it as a DG spreadsheet. Then save the spreadsheet as a DIF file, EXPORT the DIF file to the :UDD area, and then use your communications software to move the file to the PC.

I have had success in moving spreadsheets created in Lotus 1-2-3 from DG spreadsheets into Decision Base documents, but for some reason the conversion is not always successful. If you can discover why the conversion sometimes fails, I would appreciate your letting me know.

Gary Sanford
USDA Forest Service
Willamette National Forest
P. O. Box 10607
Eugene, OR 97440

Disaster recovery service available

In the December issue of *Focus*, the Discoveries column asked for information on any hot sites available to Data General users. I am pleased to announce that Fast Track Systems, Inc. has recently been established to provide disaster recovery services to Data General installations.

Our company provides comprehensive, fully supported disaster recovery services for all Data General users. Hot sites in New York and Chicago are equipped with multiple Data General MV/10000 computers with extensive disk storage, CRTs, printers, tape drives, and communications equipment. Software support personnel are on site and available at all hours. Clients of Fast Track can communicate with our processors from remote sites or can utilize the available office space at each of our hot sites.

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Fast Track sales offices are located in Dallas, Philadelphia, San Francisco, and New York City. I would be pleased to provide your readers with additional information. I can be reached at 212/422-9880.

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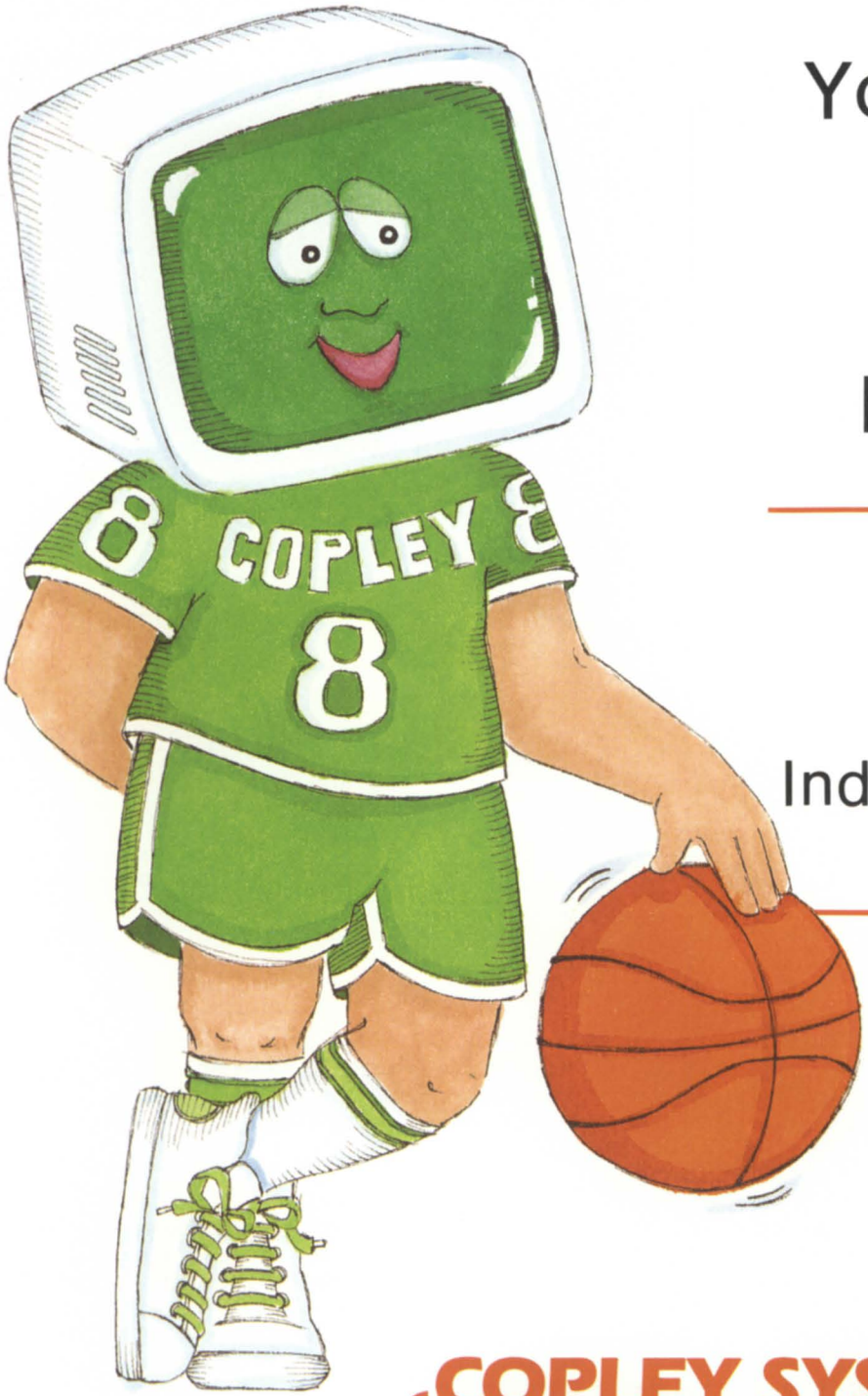

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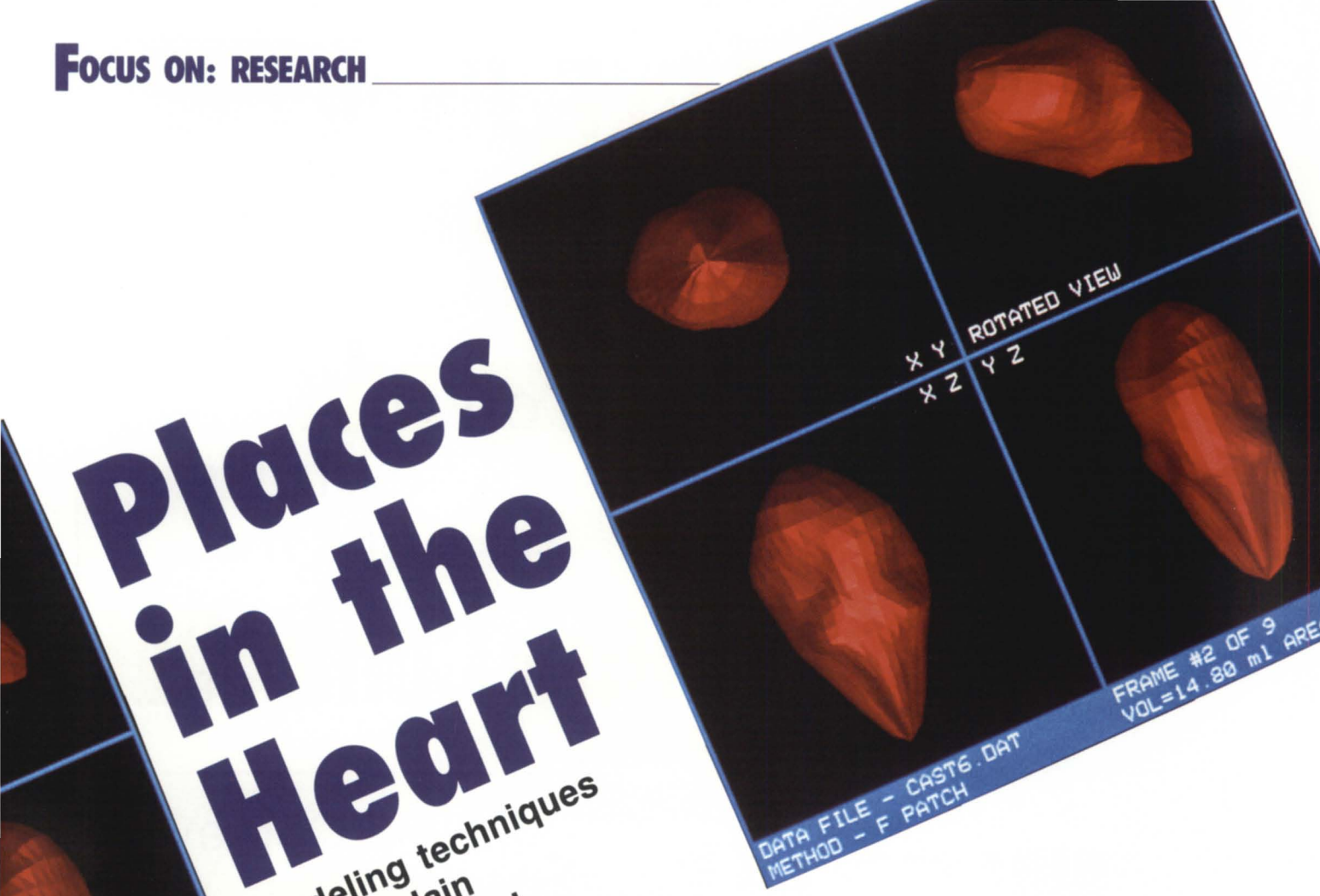

Places in the Heart

Modeling techniques help explain biomechanical properties of the heart

by Greg Farman
Focus Staff

Willard C. Graves is a mathematician and physicist by training, but he got interested in computers while studying heat and hydraulics at Chesapeake Bay. Eight years ago, while on sabbatical, he began working at the Clayton Heart Center of Johns Hopkins Hospital in Baltimore. Researchers there were trying to understand the complex biomechanical properties of the human heart. The problems were so interesting that Graves decided to stay.

Now an assistant professor of medicine, Graves directs the Clayton Heart Center's cardiology division systems and computing (CDISC). With a staff of six—all with at least master's degrees—CDISC owns more than $750,000 worth of hardware (supplied by private funds), and operates on a $400,000-per-year budget (60 percent from federal sources, the remainder from clinical and private funds).

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of understanding the heart. It's not all glamour, though. In addition to image programming, cardiovascular modeling, application program development, and system maintenance, the CDISC group is expected to repair just about anything that looks like it might contain electronics, "including typewriters and copiers," Graves says.

Data General hardware plays a prominent role in CDISC research. An MV/8000 with 2 MB of memory performs the intensive computations required to turn the raw data into three-dimensional models of a beating heart. Two Eclipse S/130s are used to maintain a clinical information data base and digitize the data that come from various imaging techniques. In addition, two DEC PDP 11/84 minicomputers drive some of the imaging equipment, and a variety of microcomputers handle data acquisition.

The CDISC staff uses Fortran, Pascal, APL, C, and BASIC to develop in house most of the application software used for their research. Exceptions are RED, a text editor purchased from Rhintek (a software firm based in Baltimore), and ABAQUS, a finite element analysis package developed by Hibbitt, Karlsson, and Sorenson, Inc. (based in Providence, Rhode Island).

As with almost any significant problem, the heart is so complex that the researchers have to make simplifying assumptions and limit the range of analysis. Graves' research focuses on the left ventricle of the heart, the large chamber that does the hard work of pumping blood around the body. The experimental subjects are dogs at the Johns Hopkins canine laboratory.

Before they can really understand how heart tissue responds to mechanical stresses and strains, the researchers must master a much more basic question. The fundamental problem is to know what the volume of the left ventricle is, was, and will be during the cardiac cycle. Thus Graves' research revolves around developing techniques for computing and displaying the volume and surface area of a living, beating heart.

By developing an accurate mathematical model of a healthy beating canine heart, Graves and the CDISC staff hope to be able to understand and predict what happens to human hearts during disease, intervention, and aging.

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Their basic technique is based on the fact that if they know the location of enough points on the surface of the heart, then they can fit shells to the points to form a closed surface. The volume and surface area can then be computed by adding the volumes and surface areas of the individual elements.

The first step is therefore to find the locations of the points. In the lab, doctors implant 30 to 40 radio-opaque markers—similar to stainless steel ball bearings—in the wall of a living dog's left ventricle. After the dog recuperates, researchers use techniques that range from X-rays to magnetic resonance imaging to capture the location of each of the markers through several heartbeats. One technique uses a process called biplane cineangiogram to film 90 X-ray images per second in two planes. Using the X-ray shadows of the markers and a Deanza digitizer, the researchers then reconstruct the positions of the markers as x-y-z triplets.

> *These techniques may become basic tools in the quest to understand not only the heart, but many other complex internal processes as well*

These coordinates are the data points that allow the researchers to compute the heart's volume and surface area. However, it is no simple matter to convert the raw data into a valid model of the heart. According to Graves, the procedure should be thought of as a two-step process. The first step is to create a "surface model"—a visual representation of the heart surface at a particular point in time, based on the positions of the markers. The problem here is to connect the points so they form a surface that matches reality. Only after they have constructed a reasonable surface model can the researchers go on to the second step, actually computing the volumes and surface areas.

Graves and his colleagues currently use two methods to generate surface models from the x-y-z coordinates. Both methods use the same file structure. The first method estimates points on the ventricle surface by using a weighted average of the actual data points in the neighborhood of the points being estimated. Starting from a computed centroid, they treat each of the markers as the endpoint of a vector, and then estimate the length of other vectors at intervals of 10 degrees, yielding 614 estimated surface points.

The second method estimates fewer surface points, and then interpolates

between them with bicubic surface patching techniques. The surface points are estimated as in method one, but at intervals of 30 degrees, giving 62 regularly spaced points. Using cubic spline curves, the researchers join points with the same latitude, and then with the same longitude, in order to describe the boundary of the surface.

A visual reality check is necessary before proceeding to compute volumes and surface areas based on the surface models. The researchers need to be able to look at the models to see if they are reasonable approximations of a real left ventricle. The CDISC staff has developed three methods of viewing the surface model and original data: wire-frame display, shaded surface display, and interactive display of the original marker data.

> ***The main thrust is to apply the best available technology to the problems of understanding the heart***

The MV/8000 with a 354 MB Argus and two 192 MB Zebra drives acts as host, while a Raster Technologies Model One/25 provides the color graphics display of the data. Converting the data to visual format is extremely compute-intensive, sometimes taking more than a day to process the data from a single exposure. The wire-frame display has proved itself a valuable tool for developing the surface modeling algorithms, while the shaded surface display is in many cases the preferred method for visually assessing the ventricle shape.

In the near future, Graves' research will proceed along three directions. In addition to working with new imaging techniques to get better raw data, he and his colleagues will also be developing more accurate techniques for modeling the surface, and better graphical displays of the surface models. They are already working on interactive rotation, scaling, and animation of surface models to display changes in shape during a heartbeat.

The techniques being developed at CDISC may become basic tools in the quest to understand not only the heart, but many other complex internal processes as well. For example, these tools have already been used to study what happens during swallowing. The hope is that better techniques for modeling the behavior of organs within living organisms may eventually provide what is most needed in medical research: insight. Δ

COVERING R&D'S NEEDS

4GL helps a one-man computer staff keep up

by Alex Robinson, Special to Focus

William Grzanich is the only person on staff to meet the computer-related R&D demands of Dexter Midland's domestic operations. That's why when the company replaced its aging Data General Eclipse C/330 with a brand new MV/10000, the company also searched for new software that would enable one programmer/analyst to handle it all alone.

A division of The Dexter Corporation, Dexter Midland is the oldest firm listed in the New York Stock Exchange and a Fortune 500 company that produces specialty chemicals and materials for a broad range of industrial, commercial, and consumer markets.

Dexter Midland operates four plants in the United States, producing coatings and finishes for markets such as packaging, cookware, bicycles, toys, and prefabricated building projects. In order to remain competitive in these markets and find new niche markets with high growth prospects, the company devotes a large share of its earnings to R&D.

The staff decided a 4GL would be the most efficient way to meet their needs. Previously, the R&D staff at Dexter Midland's Waukegan plant had used the C/330 minicomputer to run custom applications written primarily in BASIC, but with some Fortran applications. Then when the R&D computer department was combined with the larger financial/production department, Grzanich was left on his own in R&D. "With a staff of one, every step toward greater productivity and faster project development is an important and necessary one," Grzanich says.

"Our previous language of choice had been BASIC. It is simple to use, code, and debug, but it doesn't allow fast application development or processing. And the BASIC programs available on the C/330 are not very user-friendly, nor well integrated. Many of them were written years ago, and aren't documented.

"Maintenance of these programs is an ever present problem. Finally, the C/330 limited us to sequential file access, which requires enormous amounts of disk I/O for even the simplest application. Obviously, only a more modern and powerful approach would provide the information we required—and this pointed us in the direction of fourth-generation languages," Grzanich says.

"After some of the initial confusion and trial and error had passed, we were able to write as many as 10 of the reports in one week"

The most advanced 4GL environments feature a data dictionary, which connects and supports an on-line data entry processor, a report writer, and a batch processing facility.

4GLs also permit the building of a model, or prototype, of an application. This prototype enables an end-user to get an idea of what the final version of a system will be like before committing a large part of staff resources to do it. Prototypes allow end-users to influence the process of system development.

Grzanich and members of Dexter Midland's IS department looked at a wide variety of 4GL products through trade publications, though they didn't request bids from any particular software vendor. During this process, Grzanich heard about PowerHouse, a 4GL developed by Cognos Corporation, and about Data General's relationship with Cognos. After a product demonstration, Grzanich and the IS department bought a copy of the product in November of 1985.

There are three integrated processing components in PowerHouse: an on-line transaction processor, an ad hoc and production report generator, and a volume transaction processor. At the product's heart sits the PowerHouse Dictionary, a central on-line repository for descriptions of the elements and records that make up a system.

The first system Grzanich built with PowerHouse was a project management system. The system requires R&D personnel to enter a project number, customer number, the type of work they have been engaged in, and the number of hours they have spent. Each month the system generates a variety of reports summarizing the R&D effort by project, customer, department, and group.

"This system was selected as our first

because it is self-contained—it doesn't need another system to operate—and because it is reasonably well documented. A similar system in production on the older computer was written entirely in BASIC and is not nearly as flexible or as friendly," Grzanich says.

The project management system took approximately six weeks to write, and Grzanich points out that a portion of this time was spent learning how to use PowerHouse. "After some of the initial confusion and trial and error had passed, we were able to write as many as 10 of the reports in one week."

Grzanich found the prototyping capabilities of PowerHouse especially useful: "Once the data design has been established, I write the data entry and update programs and build on them, testing each step as I go. This technique allows the developer to see demonstrable progress at every stage of development."

Grzanich's next project is a system of programs to assist Dexter Midland's chemists in the formulation of paints and coatings. "Indexed INFOS files and PowerHouse—with its data dictionary—should help a great deal here, though for some tasks we envisage using programs written in Data General's compiled BASIC, which can be executed from within PowerHouse and so provide a relatively seamless interface to users."

He plans to use BASIC or Fortran for the more intensive number crunching or recursive applications, though he hopes these routines will be hidden within PowerHouse menus.

A second planned application is for Dexter Midland's maintenance department, which needs a way of tracking work orders for equipment repair and the routine maintenance scheduling of laboratory and plant machinery.

The final system on the drawing board will allow chemists to store and retrieve weathering data about various coatings used on the exteriors of buildings. "This information is often collected over a number of years and is currently recorded manually in notebooks. Needless to say, few people are willing to pore over dozens of notebooks looking for information about a particular coating or application. PowerHouse would provide an excellent means of storing and retrieving this information." Δ

Alex Robinson is on the staff at Cognos Incorporated, 3755 Riverside Dr., Ottawa, Ontario, Canada K1G 3N3; 613/738-1440, Telex 053-3341.

WHO'S ON FIRST?

User-friendly FIFO queues for intertask communication

by Karen M. Jackson
Special to Focus

In a real-time environment, there is often a need for multitasking to improve efficiency. In many applications, multiple task design is chosen because there are independent activities to be performed, with little need for communication or synchronization. However, in some applications there is a need for tasks to interact with each other.

In this article, I'll discuss communication between multiple tasks within a process in a Data General environment; our solution of using first-in, first-out (FIFO) queues; and how we implemented this solution using several DG system calls. I'll include possible applications for such a design, plus the details of the implementation.

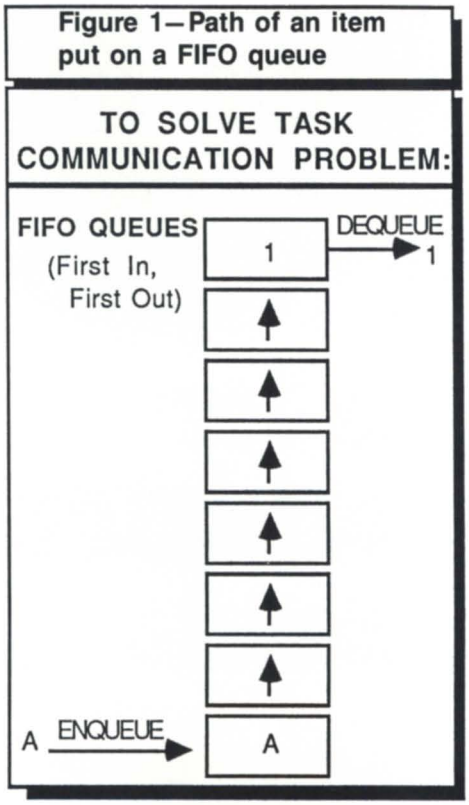
The environment we were working in consisted of a Data General MV/10000, which acted as the system CPU, and two Data General MV/4000s, which acted as redundant communication front-ends. We were designing a customized software system using AOS/VS Fortran 77. The system ran in real-time, and used multitasking within the system processes. Tasks communicated data to each other and synchronized the task activities.

There are a number of possible applications where communication between independent tasks would be desirable. For instance:

- A process containing a main task and a timer task. Both tasks interact with an action task, which performs particular activities. This action task may need to perform certain activities on a regular schedule (e.g., printing, polling for data, etc.), but may have too many other things to do to go to sleep for any period of time. The timer task can wake up periodically, tell the action task it's time to go to work, and go back to sleep.
- A control task coordinating and sorting through traffic in a process. A main task might handle input from other system processes, a read task might handle input from users, and a timer task might handle activities that take place on a scheduled basis. All of these tasks send their input to the control task, which decides what to do based upon the information, i.e., print a message, respond to the other processes or users, etc.

The method we chose for intertask communication was first-in, first-out (FIFO) queues. In a FIFO queue, items are put on the tail of the queue and removed from the head. This allows multiple users to communicate, messages to be buffered, and messages to remain in a set order. Figure 1 shows a FIFO queue and the path taken by an item put on the queue.

Figure 1—Path of an item put on a FIFO queue



We had several requirements for queuing for our application and environment. First, to prevent corruption of data, we wanted to lock the queue before adding an element. Second, we wanted our dequeuing task to wait if nothing was on the queue and to wake up immediately when something was added to the queue. This was very important—we didn't want the dequeuing task constantly checking whether something was on the queue because it could tie up the CPU and degrade system performance. Also, we didn't want the dequeue task to wake up on a periodic basis and check the queue, as the queue could fill up during the waiting period.

To fill these requirements, we used the AOS/VS ?XMIT and ?REC system calls. These calls allow tasks to send and receive messages via a software mailbox.

The ?REC call is performed by a task wanting to receive a message. The task will wait until a message is received in the mailbox. The inputs and outputs for this call as follows:

Input: AC0, address of mailbox
Output: AC1, the intertask message (integer value)

A non-zero message is received in the mailbox after the call has been performed.

Tasks that want to send a message to another task use the ?XMIT call. The task doesn't wait if there is no outstanding receive. The inputs and outputs for this call are as follows:

Input: AC0, address of mailbox
AC1, message to be sent
AC2, −1, if task wants to broadcast message
Output: None

A non-zero message is sent to the specified mailbox. If the sending task wants all tasks to receive the message, AC2 is set to −1. Otherwise, the message goes to the receiving task with the highest priority. If all waiting receiving tasks have the same priority, the task scheduler selects the receiver.

Using these two system calls, we can implement the necessary features for our queuing application. We used two mailboxes for each queue:

1. A "locking" mailbox, which is used to indicate if the queue is locked and unavailable for updating. It prevents two tasks from acting on the queue at the same time.
2. A "work" mailbox, which indicates if the queue has work on it. It allows the sending task to inform the receiving task when something is put on an empty queue.

The lock mailbox is implemented in the following way. When a task (Task 1) wants to lock the queue, it issues a ?REC call. If the queue is unlocked, a message will be waiting in the mailbox (the queue initialization routine places a message in the mailbox at the start). Task 1 receives the message and performs its queue interaction.

While the queue is locked, the mailbox is empty. Any other tasks that want to use the queue will be waiting on a ?REC call. When Task 1 is finished with the queue, it unlocks it by placing a message in the mailbox using the ?XMIT call. Another task that is waiting on the mailbox will then receive the mailbox message and lock the queue for its processing.

Figures 2 and 3 demonstrate this interaction. Think of a ?REC call as taking the queue "key" out of the lock mailbox. In Figure 2, Task 1 issues a ?REC call on the lock mailbox, removing the "key," and leaving the queue locked. Any other tasks that want access (i.e., Task 2) have to wait. Figure 3 shows Task 1 returning the "key," allowing Task 2 to obtain the "key" and access the queue.

The second mailbox, the work mailbox, helps solve the requirement that the dequeuing task wait when nothing is on the queue and react when something is placed on the queue. If the queue is empty, the dequeuing task performs a ?REC on this mailbox and waits for a message. When the enqueuing task puts the first element on an empty queue, it sends (?XMIT) a message to the work mailbox. The dequeuing task at this point wakes up and locks the queue so it can dequeue the element.

Using these two mailboxes to meet our requirements for queuing, we still need to perform a number of steps to use the queues. These include declaring the queue in a common that all the tasks using it will share, initializing the queue elements, enqueuing elements onto the queue, and dequeuing elements off the queue.

Declaring a queue in Fortran 77 involves setting up an array in a particular way so that it can be used as a queue. Bookkeeping entries containing information for maintaining the queue are placed at the beginning of the array. These maintenance entries include the following:

1. Number of free elements in the queue
2. Lock mailbox
3. Work mailbox
4. Pointer to (array index of) the first free element (head of free list)
5. Pointer to (array index of) the first

active element (head of active list)
6. Pointer to (array index of) the last active element (tail of active list)

The actual queue elements follow these maintenance entries. Each queue element includes a forward pointer and a data area.

Two queues are maintained in the array: a free list and an active list. The free list contains all of the queue elements available for storing data. The active list contains the queue elements that currently contain data. Each list has its elements linked together with forward pointers, which point to the next queue element. Thus, the element at the head of either list points to the next element, and so on. The pointer of the tail element of either list contains a NIL value.

After a queue has been declared, it must be initialized by setting the maintenance entries to their initial values and linking the queue elements. Figure 4 shows how a five-element queue would be set up. Note how the two mailboxes Q_LOCKMB and Q_WORKMB are set up, with the lock mailbox set to contain a message (unlocked), and the work mailbox set to empty, indicating nothing is on the queue. When the queue is in its initial state, all elements are on the free list, as can be seen by the head of the free list pointing to the first queue element, and the head and tail of the active list pointing to NIL. Figure 5 shows how the queue elements are linked during initialization.

Once the queue has been declared and initialized, it is available for the enqueuing and dequeuing of information.

Figure 2—Task 1 locking the queue via the ?REC call

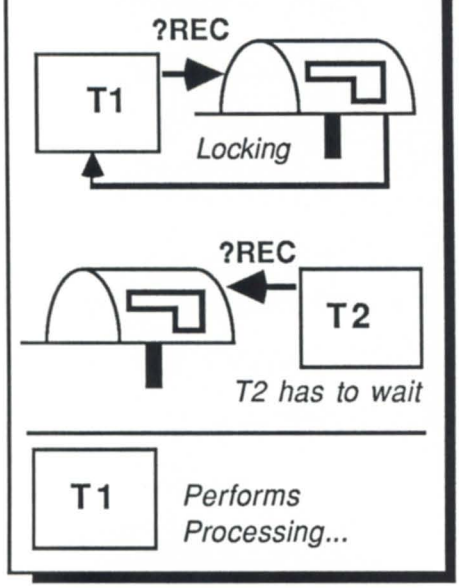


Figure 3—Task 1 unlocking the queue via the ?XMIT call

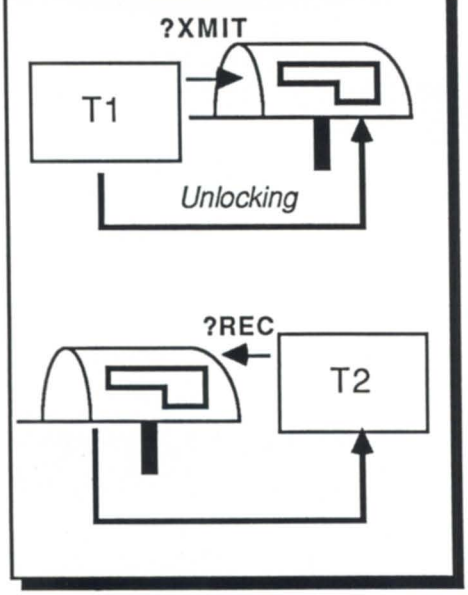


Figure 4—Queue maintenance area after initialization

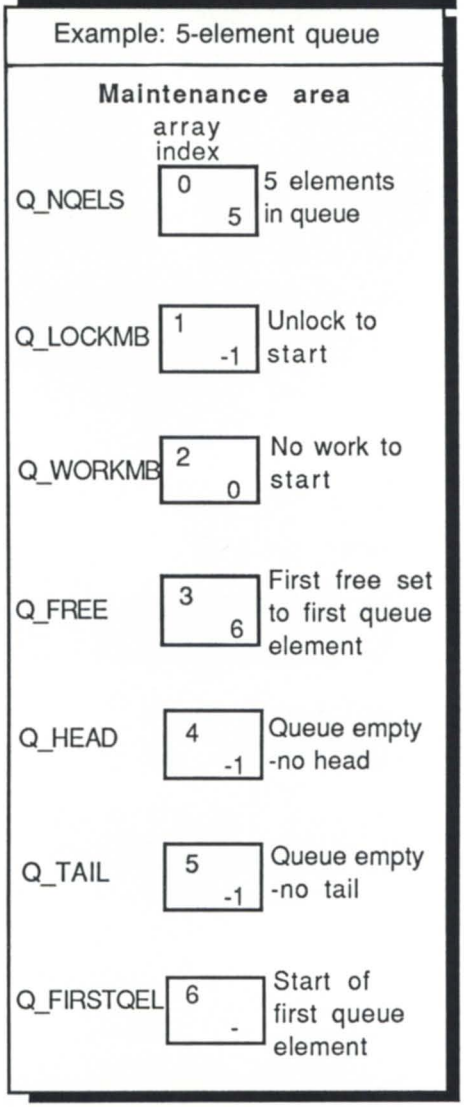
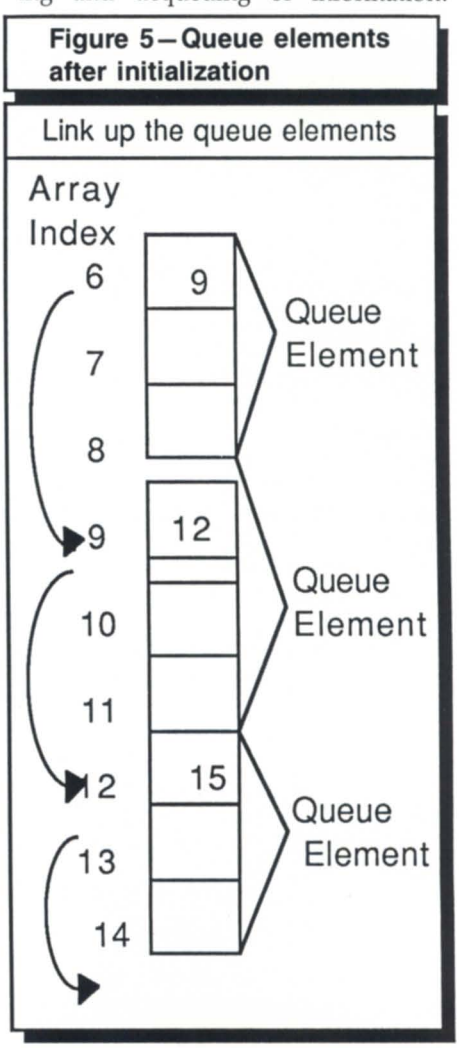


Figure 5—Queue elements after initialization



Enqueuing involves the following steps:

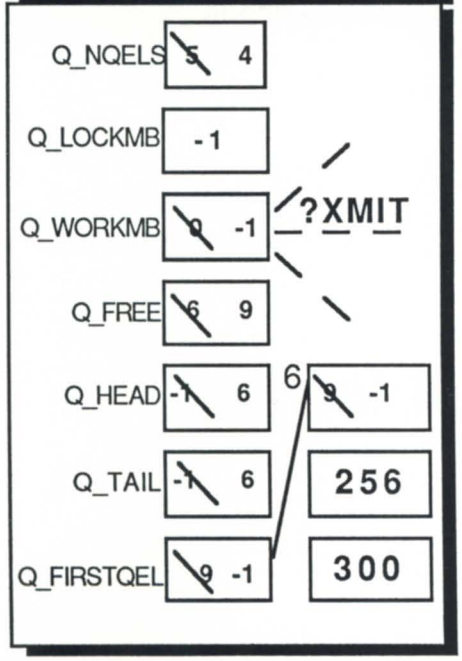
1. Lock the queue (?REC on the lock mailbox)
2. Get the next free element (pointed to by the head of the free list, Q__FREE)
3. Reset Q__FREE to point to the next free element
4. Store data values in the queue element
5. Decrement the number of free queue elements available
6. Put the new element on the tail of the active list. If the active list was empty, tell the dequeuing task that something was placed on the queue (?XMIT on work mailbox)
7. Unlock the queue (?XMIT on lock mailbox)

Figure 6 shows how our five-element empty queue looks after data has been enqueued.

Finally, once data has been placed on the queue, it can be removed through dequeuing. The following steps are necessary for dequeuing:

1. Lock the queue
2. If the queue is empty, (a.) Unlock it; (b.) Wait on work mailbox; (c.) When the task receives a message in the work mailbox, relock the queue and continue
3. Remove entry from the head of the

Figure 6—Status of queue after an element was added



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active list (find head of active list from Q_HEAD)
4. Store data in entry in a local variable
5. Put entry on the head of the free list (find head of free list from Q_FREE)
6. Increment the number of free elements available
7. Unlock the queue

Once these routines are established, they are very easy to use, and the details of queue maintenance are transparent to the user. The following are the subroutine calls and declarations in AOS/VS Fortran 77 employed by users of the queuing routines developed for our system.

A. Declare a queue

```
PARAMETER NQELS = number of queue elements
    QELSIZE = size of data portion of queue
      element, in array entries
I*4 SAMPLE_Q (0:Q_FIRSTQEL +
              (QELSIZE * NQELS - 1) )
```

B. Initialize a queue

```
CALL Q_INIT (SAMPLE_Q, NQELS)
```

C. Enqueue an entry

```
CALL NQ (SAMPLE_Q, USER_DATA(QELSIZE) )
```

D. Dequeue an entry

```
CALL DQ (SAMPLE_Q, USER_DATA(QELSIZE) )
```

The queue structures and routines described above provide a powerful yet easy method for task communication. The routines allow the user to declare, initialize, add, and remove elements from a queue, without having to be concerned with maintaining element pointers. Our goals were to use FIFO queues, lock to prevent data corruption, dequeue without constantly checking for queue items, and react immediately when an item is placed on the queue. These were achieved using the DG ?XMIT and ?REC system calls, along with a locking and a work mailbox, and a way to hold data.Δ

Karen M. Jackson (formerly Karen M. Lewis) is project engineer for Scipar, Inc., 26 W. Spring St., Buffalo, NY 14221. She holds an MS degree from Syracuse University in computer science. Her work has included a number of projects in the area of image analysis, including the development of image processing techniques as part of a library on a Data General Nova 4/X system under RDOS. In addition, she helped develop a system on Data General MV/10000s and MV/4000s which aids in forest fire management in the western U.S.

TRIPLE PLAY

New CPU triplets span MV/ family's mid-range

The new Data General Eclipse MV/15000 models 8, 10, and 20 are currently up and running at Texaco, American Medical International, World Computer Corporation, and HBO & Company.

The MV/ family grew suddenly bigger—and younger—when Data General recently introduced the newest three members of its family of 32-bit processors. The new MV/15000, which comes in three versions (models 8, 10, and 20), was designed to fill the niches now occupied by the MV/8000 and MV/10000. This means that the oldest actively marketed processor in DG's line is now barely a year old (The MV/2000 and MV/20000 were introduced in November of 1985).

The new triplets were born precocious: when announced on December 9 they were already being shipped—and were in fact already installed at customer sites that included Texaco, HBO & Company, World Computer Corporation, and American Medical International.

According to DG, the new processors offer a combination of price and performance that is distinctly superior to competitive offerings from IBM and DEC.

Perhaps the most interesting feature of the MV/15000 triplets is the interchangeability of their single-board CPUs. "The MV/15000 series offers a high degree of fundamental compatibility, going beyond software and peripheral compatibility to include board-level upgradability," said Robert C. Miller, senior vice president of DG's business group.

Described as mid-range, general-purpose 32-bit minicomputers, the three

AT YOUR SERVICE

Using state-of-the-art service tools to maximize up time and productivity

by Jacquelyn Thrasivoulos
Special to Focus

The Eclipse MV/15000 has broken new ground in the areas of reliability and maintainability. "The MV/15000 is the first MV/ class system to be sold with a standard one-year warranty," says Howard Glassman, marketing manager for large systems field engineering.

DG is able to offer this unprecedented one-year guarantee at least in part because of the investment that DG field engineering has made in applying the concepts of technology to service and support. "Service technology is our ability to take technology and apply it to the service business," says Paul Bielski, director of field engineering service technology at Data General. "It drives productivity, generates new service offerings, and allows us to funnel our expertise into customers' systems."

In order to meet customer needs and concerns, Data General field engineering gets involved with products long before they are manufactured, and works with Data General development and engineering groups on a daily basis.

The standard development life cycle (SDLC) for a Data General product typically spans a two- to three-year period, beginning with the concept stage. If the concept is deemed practical, it migrates to the product planning stage. Subsequent to product definition, the product moves into the design and development stage, and from this point on to manufacturing and finally, introduction.

According to Rich Maksian, who is responsible for the availability, reliability, and maintainability (ARM) of DG products, "Studies prove that within a product's SDLC, 85 percent of the support costs are fixed prior to entering the detailed design phase." To ensure that ARM tools are being built into new products, field engineering gets involved early in the SDLC.

The new Eclipse MV/15000 is a prime example of integral service technology. "The three processor models in the series allow customers to upgrade from Model 8 to model 10, model 8 to model 20, and model 10 to model 20 MV/15000s by merely replacing one processor board and reloading model-unique microcode," says Duane Tash, manager of field engineering systems maintainability engineering. "But cost-effective upgradability is only part of the good news. The MV/15000 has excellent ARM characteristics resulting from a combined design

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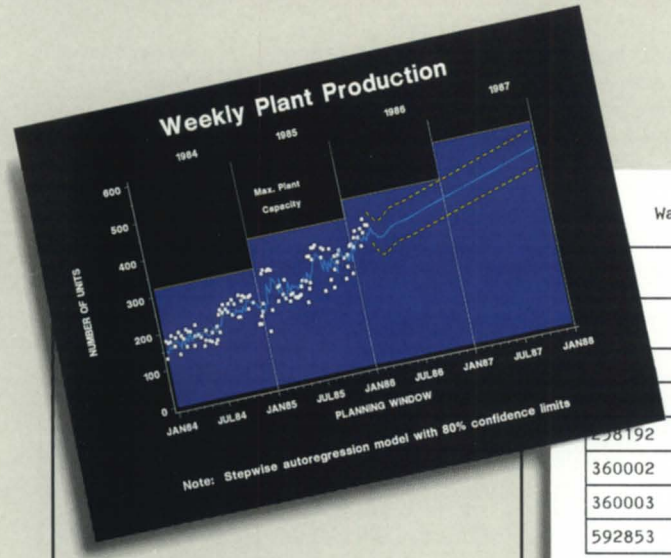

Warehouse Inventory Report - 16JAN87

	Quantity on Hand	Quantity on Order	Projected Reorder Date
	123980	10000	THU, FEB 12, 87
	89450	5000	FRI, FEB 20, 87
298192	20110	1000	MON, MAR 30, 87
360002	8585	0	TUE, FEB 10, 87
360003	15985	500	TUE, FEB 10, 87
592853	469120	20000	WED, FEB 18, 87

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

* Computer Intelligence, January 1986.

The SAS System runs on these minicomputers: Digital Equipment Corp. VAX™ 8xxx and 11/7xx series under VMS,™ and MicroVAX II™ under MicroVMS™; Prime Computer, Inc. Prime 50 series under PRIMOS®; and Data General Corp. ECLIPSE® MV series under AOS/VS. The SAS System also runs on IBM 370/30xx/43xx and compatible machines under OS, CMS, DOS/VSE, SSX, and ICCF; IBM XT/370 and AT/370 under VM/PC; and IBM PC XT and PC AT under PC DOS. Not all products are available for all operating systems.

versions of the MV/15000 are identical in nearly every feature—except processing speed. The model 8 is rated at 2900 single-precision KWhetstones and is said to support up to 60 active office automation users. The model 10 performs at 4300 KWhetstones and supports up to 100 active office automation users. The model 20 delivers 6400 KWhetstone performance and supports up to 160 active automation users.

DG also introduced new 16 MB and 32 MB add-on memory boards based on 1 megabit dynamic random access chips. The company said it is cutting prices by 45 to 50 percent on its older 4 MB and 8 MB memory boards, which use 256 kilobit chips.

Reviewing the technical specifications of the three versions of the MV/15000 demonstrates how nearly identical they are. All three share the following family characteristics:

Processor cycle time:	85 nanoseconds
Virtual address space:	4 GB
Maximum physical memory:	32 MB
Maximum disk storage:	16.5 GB
Maximum tape drives:	26
Maximum tape storage:	1.56 GB
Maximum terminals/printers:	432
Maximum processes:	1024
Maximum program size per user:	2 GB
Asynch communications capacity:	432 lines

engineering and field engineering developmental team effort.''

When the MV/15000 was under development, field engineering made sure that service tools such as the diagnostic remote processor (DRP) and coresident diagnostics (CRD) were integrated into the MV/15000's design.

Customers with on-call service agreements for their MV/15000 systems benefit from the DRP, an embedded diagnostic tool running parallel to the main CPU. It monitors the system's health by detecting and logging hard and soft system errors or faults as they occur. When the DRP detects an error, it automatically notifies the customer and the Data General customer support center (CSC) that the problem was logged. The DRP dials a unique preprogrammed phone number, and then reports the customer's service contract number and problem code, initiating service calls and putting the diagnostic process in motion.

Shortly after learning of a problem, engineers from the CSC's remote assistance center (RAC) use system diagnostics to troubleshoot and isolate the problem; if necessary they dispatch a field engineer. When the RAC dispatches a field engineer to a customer site, the engineer has the right tools and knowledge to get a system back up and running.

Field engineering developed coresident diagnostics to further reduce down time. CRD can speed up the diagnostic process by as much as 40 percent because diagnostic software is put right on the operating system disk, which eliminates the need to mount tapes or locate diagnostic diskettes. Although diagnostics can still be accessed only after the operating system is down, CRD cuts execution time because disks can load software into memory faster than tape-based diagnostics.

Only those diagnostic tests required by a system are loaded onto the disk. Supporting the newest revision of most operating systems, CRD occupies minimal disk space, averaging less than 1 percent of typical disks on MV/ family systems.

CRD can be installed on all Eclipse MV/ family 32- and 16-bit systems, and is being built into newer systems such as the MV/20000, MV/15000, MV/2000 DC, MV/7800 systems, and DS/7500 workstations.

The DRP and CRD are designed to incorporate the benefits of remote support. Though it will never replace the on-site field engineer, remote support does offer a means of faster, more efficient problem identification. In many cases, problems can be resolved without ever dispatching a field engineer.

When the MV/15000's DRP detects a system error, it initiates a call to a remote engineer at the CSC. A remote engineer returns a customer call, generally within 30 minutes; working with the customer, the engineer then begins the diagnostic process. Since coresident diagnostics are already in place, time is saved by not having to load tapes.

As the diagnostic process runs, the engineer works to isolate the problem. In many cases, the remote engineer can identify the problem and resolve it on-line. If the problem cannot be resolved on-line, a field engineer is dispatched within the terms of a service agreement.

The MV/15000 series was designed around reliable components to improve the systems' availability and lower the cost of ownership. Double-bit error checking capability, for example, will minimize down time and maintain memory integrity by correcting soft errors even after a chip has developed one hard error. The advanced gate arrays and AS-technology support chips used in the MV/15000 series consume less power, and have reduced failure rates.

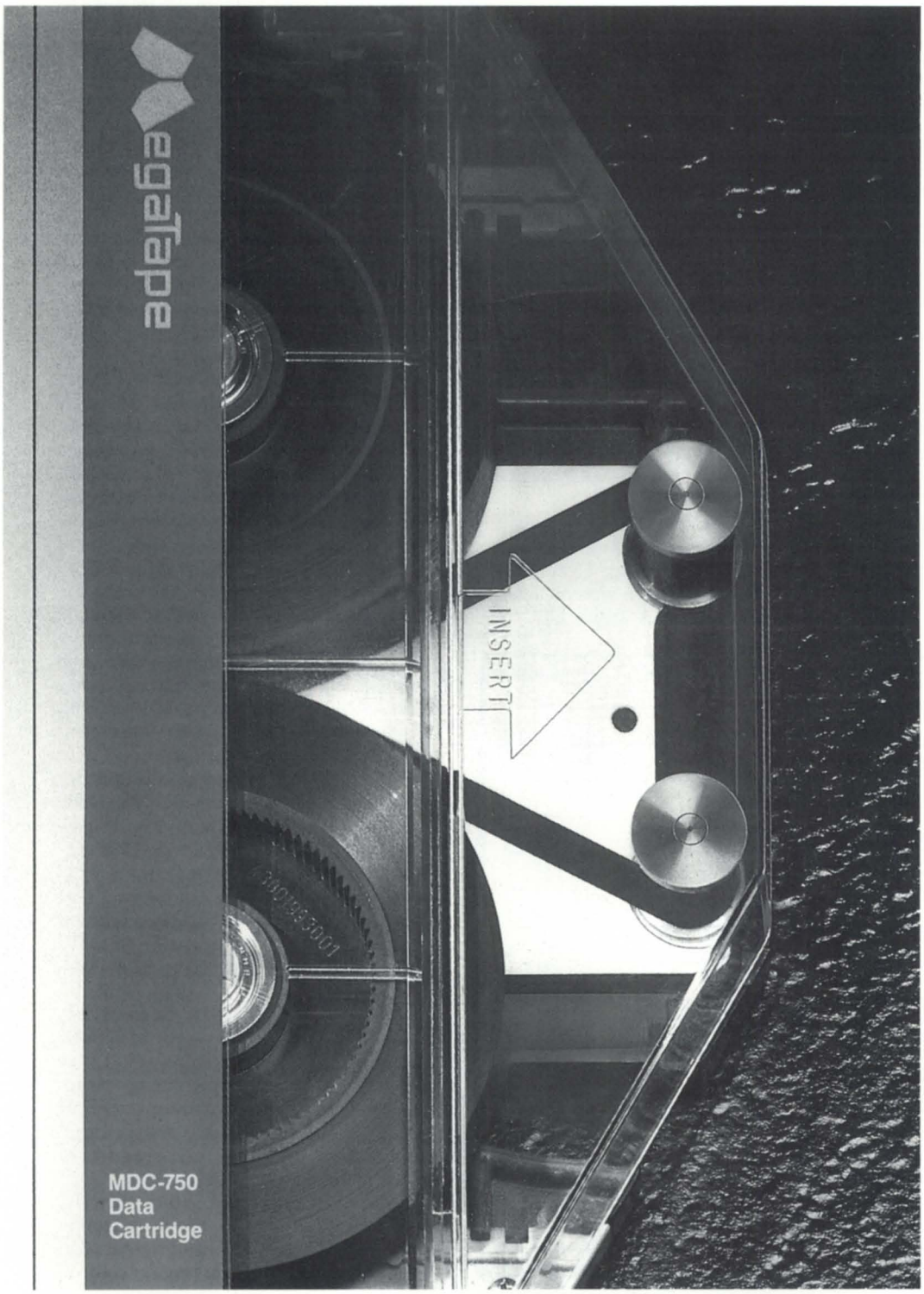
Another example of the evolution of service technology over recent years is field engineering's communications switch (Comm Switch) device. An integral part of the remote assistance program, the Comm Switch allows a field engineer to access system error logs or run diagnostics from a remote console.

''In 1983, we introduced Comm Switch I, which gave the field remote hardware access,'' says Dennis Symanski, manager of field engineering tools and test equipment. ''Since that time we've enhanced the product with the Comm Switch II, which offers tight security features, as well as hardware and software support. . . Currently we're working on putting Comm Switch functionality into a chip set,'' he says.

To safeguard a customer's system data and applications, Comm Switch II features a user-selected password and telephone access list, modem-directed call-back capability, and a key-locking access level switch. This communications device also allows users to transfer information between systems. Δ

Jacquelyn Thrasivoulos is an editor for the customer communications group for Data General Service, Inc. in Milford, MA. She can be reached at 617/478-4000, ext. 2753.

Any disk backup system can save your data. This one can save your life.



Most people would agree that life is too short to spend sitting in front of a tape drive, swapping reels or cartridges while disk backup grinds on and on.

It's boring, error-prone, and expensive.

It's also unneccessary.

Just get an inexpensive MegaTape drive. Plug it in right where your 9-track was (your system won't know the difference). Pop in a cartridge. Push the button.

Then turn out the lights and go home.

When you come back in the morning, all your data—up to an amazing *630 megabytes*—will be safe and sound on a single book-size cartridge. That's an entire Argus 2 or Fujitsu Eagle 2, with room to spare. *Room enough even for the next generation of ultra-high capacity drives.*

No other tape backup system—existing, rumored or announced—offers anything close to this kind of convenience. And we've been delivering it for over two years.

So why waste your life babysitting a backup, when with MegaTape you can save it for more important things?

MegaTape

BECAUSE ONE IS ENOUGH
AND TWO IS TOO MANY.

Synchronous communications capacity:	10 lines
LAN communications:	4 lines
I/O-to-memory bandwidth:	16.74 MB/sec.
CPU-to-memory bandwidth:	47 MB/sec.
Data cache size:	16 KB
Instruction cache:	4 KB
Burst multiplexor channel:	14.5 MB/sec. (input) 12.3 MB/sec. (output)
Data channel—fast:	2.24 MB/sec. (input) 1.67 MB/sec. (output)
Data channel—slow:	1.47 MB/sec. (input) 1.00 MB/sec. (output)

All three models operate under AOS/VS. AOS/DVS (distributed virtual memory), DG/UX (Unix-standard), and AOS/RT32 (real-time) will be supported in the future, the company said.

The processors and memory boards are housed in a 12-slot chassis that can be mounted in a meter-high or 60 inch-high cabinet. Up to two expansion chassis can be added.

DG said that the cost of configuring, operating, and maintaining MV/15000 systems for five years would be 16 percent less than for comparable IBM systems, and 28 percent less than DEC systems

Upgrading from one model to another is as simple as replacing a single processor board (and floating point unit in the case of the model 20) and loading the model-specific microcode. A hardware floating point unit is standard with the model 20, and is offered as an option on models 8 and 10. According to DG, any of the upgrades (model 8 to 10, model 10 to 20, or model 8 to 20) can be completed within 20 minutes. DG says it is also ready to begin an MV/15000 upgrade program for customers with MV/4000, MV/7800, MV/8000 II, and MV/10000 systems.

"The MV/15000 series signals the completion of our third generation of technology and represents a very strong leadership edge when viewed against competitive offerings from DEC and IBM," said J. David Lyons, vice president of group marketing. "Data General offers both a lower purchase price and lower five-year cost of ownership relative to similar but less competitive Digital VAX and IBM 9370 systems. This is in addition to generally higher discounts on multiple systems sales from Data General relative to the competition."

DG claims the MV/15000 has a 33 percent to 60 percent price/performance advantage over competitive offerings from DEC and IBM; it also supports 25 percent to 100 percent more office automation users, and performs technical computations up to 62 percent faster.

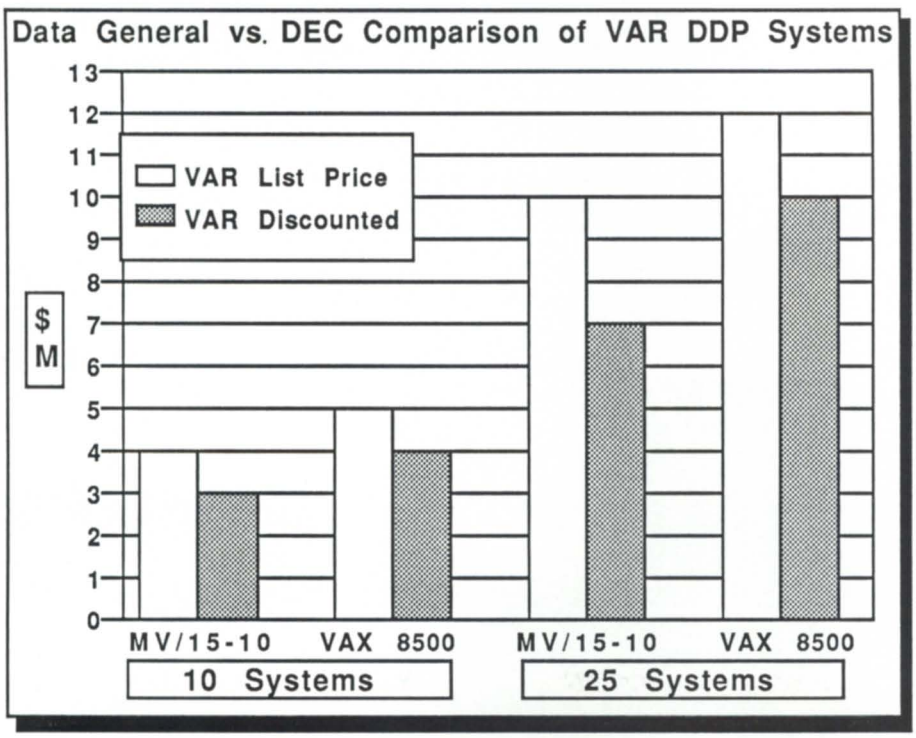
For example, using the double-precision Whetstone benchmark, the MV/15000 models (with 32 MB of memory) were reportedly 35 to 62 percent faster than comparable DEC VAX 8300, 8500, and 8550 systems. The MV/15000 was up to 40 percent faster than the IBM 4381-13 on the same test.

DG used single-precision LINPACKS to compare the IBM 9377-90 and 9375-60 with the MV/15000 model 10 and model 20. On average, the DG products were 12 percent faster. LINPACKS were the only technical benchmark data available for the IBM products, which will not be delivered until late 1987. The MV/15000 models equipped with floating point unit, 8 MB of memory, and operating system were about 40 percent less expensive than the 9370 systems.

DG said that the cost of configuring, operating, and maintaining MV/15000 systems for five years would be 16 percent less than for comparable IBM systems, and 28 percent less than DEC systems. This calculation assumed that the customer was an end-user with 10 systems. Base system prices for the MV/15000 range from $60,000 to $230,000.

"The fact that Data General has already shipped the new MV/15000 models to customers in targeted industry markets such as health care, petrochemical, and banking demonstrates our commitment to industry marketing," said Donald McDougall, vice president of DG's industry marketing division.

Texaco Incorporated, which uses DG equipment worldwide, has been testing the MV/15000 model 10 and model 20 in applications that include process control,



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Circle 2 on reader service card

information systems, office automation, and application development.

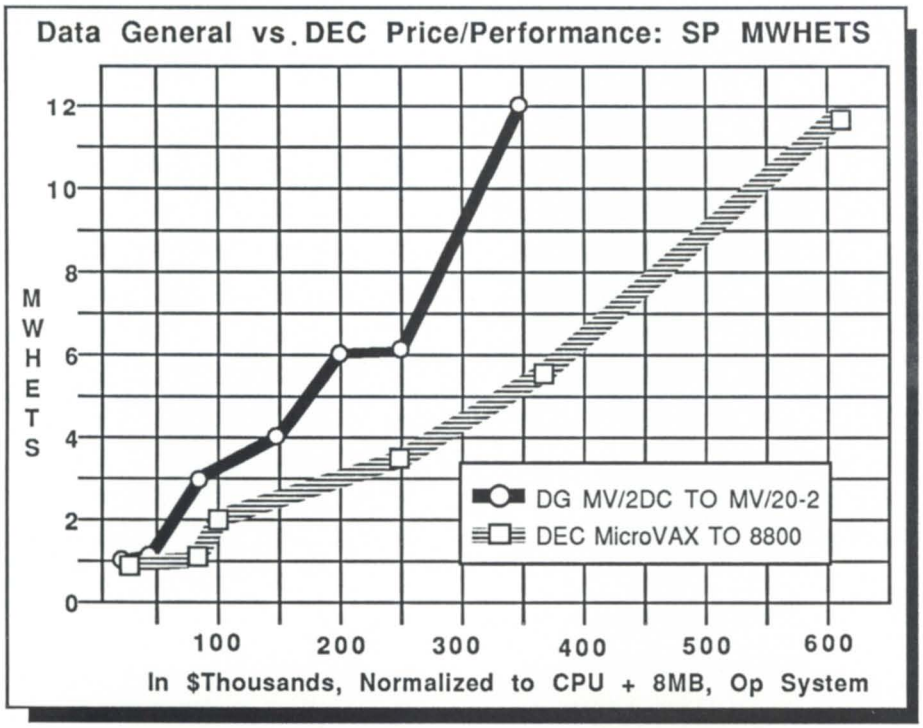
"We switched from a MV/10000 to the MV/15000 model 10 virtually without our programmer or user community noticing," said Leland Chvatal, manager of distributed processing for Texaco's computer information systems department.

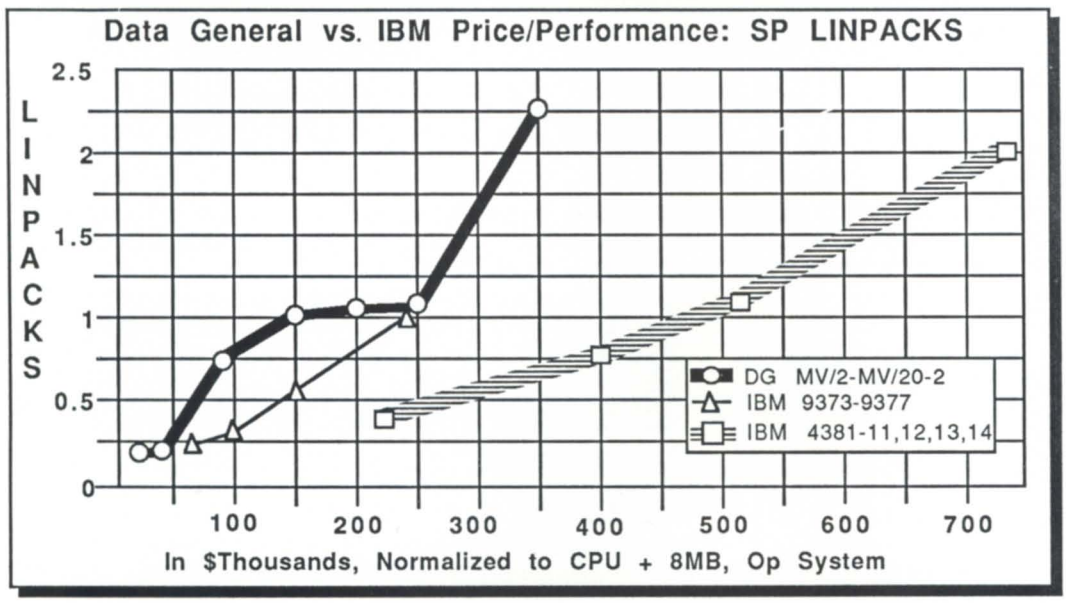
"Two weeks later we simply changed the CPU to upgrade the model 10 to the model 20—a procedure that was accomplished in approximately one hour." Chvatal said the upgrade from the model 10 to the model 20 resulted in approximately 50 percent better performance on various in-house benchmarks.

David J. Selina, senior vice president of marketing for World Computer Corporation, said, "We received a model 8, plugged it in, and were able to run our software immediately with no modification—and upgrading the hardware to a model 10 took less than 10 minutes." World Computer Corporation, a DG OEM since 1973, markets complete systems and software to the financial industry. "The fact that these machines can grow so easily with a customer's needs makes it (the MV/15000) an excellent, cost-effective choice," Selina said.

Two companies that market systems to the health care industry also praised the performance and upgradability of the MV/15000. Dennis M. Peck, senior vice president of the professional hospital services division of American Medical International, was "especially pleased with these systems' ease of installation, low cost of ownership, compact size, and the fact that the CPU can be upgraded by simply changing one board."

The improved reliability and ease of upgrading the new MV/15000 models is very important to our marketplace," said Peter van der Grinten, vice president of clinical products for HBO & Company. "Being able to migrate to more powerful machines with minimum upgrade cost and minimum down time is crucial to hospitals." Δ





Texaco switched from an MV/10000 to the MV/15000 model 10 virtually without their programmer or user community noticing

MVs, PCs, and OA

How are they getting along?

by Tom Rice
Special to Focus

"My department needs to access the corporate mainframe's data base from our PCs."

"In my company's five-year M.I.S. plan, sharing information and connectivity are the biggest issues to be resolved."

Have you noticed how often quotes such as these are cropping up in data processing periodicals recently? The emphasis the media are putting on communications is probably a pretty good index of the requirements data processing managers currently face.

The purpose of this article is to explore one of the reasons for the increased demand for communications and connectivity. As the title implies, I will discuss some options for interfacing two distinct classes of computer, MV/ family minicomputers and IBM-compatible PCs, and some of the ramifications of doing so. My analysis will be oriented toward office automation (OA) environments, although some of the ideas will be useful to anyone trying to interface PCs and MVs.

Employees need to share information, and this creates the need for communications between *all* classes of computers. Establishing communications between PCs serves only part of this need, but it can still provide some very significant benefits:

- Distributed processing improves efficiency by allowing several employees using multiple computers to work on a complex task.
- Centralized data storage makes professional system management easier to administer.
- Paperwork and phone tag can be reduced if large files and short messages can be transferred via a computerized system.

An in-depth analysis of why MV system managers need to establish communications with PCs is hardly necessary, because the roots of the problem are obvious: the overwhelming presence of PCs and the PC users' loyalty to MS-DOS applications. Most organizations with MVs and PCs use some communications technology to link the two, thereby gaining the benefits listed above. This does not necessarily mean that all requirements for PC-to-MV connectivity have been met.

One principle of the scientific method is that every solution generates new and unforeseen problems. Just as the popularity of PCs created the need for communications with an MV, the communications link itself has created a new problem: office automation software needs to be standardized across the CPU-class boundary to make the information communicated more easily accessible to users on its new host. When work done on one class of computer is readily accessible to a user working on a different class of computer, data becomes a valuable resource within an information system.

Each class of CPU has its own OA applications, each with its own merits. However, the benefits of communication are more likely to be realized if the applications in each environment are as similar as possible. Productivity improves, because the repetition of certain tasks is avoided. Demand for minicomputer resources is reduced, because more work can be done on a less expensive processor (the PC). Training and support costs are reduced because there are fewer applications to learn and support. In short, standardization of office automation software streamlines data processing when organizations rely on both MVs and PCs.

For users of MV/ family systems, two examples serve to define the nature of the problem. CEOwrite on MS-DOS resembles CEO's word processor. However, if a CEOwrite file is to be used under CEO, it is the MV's responsibility to convert the CEOwrite file into a CEO-compatible format. WordPerfect is an excellent example of a seamless interface between PCs and MVs. Once an MS-DOS WordPerfect document arrives at the MV, an AOS/VS WordPerfect user can begin to edit it immediately—there is no need to run a file conversion program. In addition to 100 percent file compatibility, the MS-DOS and AOS/VS versions of WordPerfect also offer an identical user interface.

What about office automation requirements beyond the scope of word processing? Is it possible to find separate solutions for MVs and PCs that work well together? For PC-to-PC or MV-to-MV connectivity, several excellent options are available. 3Com's EtherSeries and 3+ products, and Data General's XODIAC and CEO are good examples. Their collective features include electronic mail, file transfer, concurrent access to data, and distributed processing. DG BLAST provides error-free file transfer between PCs and MVs, but has none of the other features just mentioned.

I have identified three levels of support for CEO users looking for PC-to-MV connectivity:

1. The intelligent workstation. My definition of an intelligent workstation is a PC that can also serve as a terminal on an MV system. CEO Connection is one intelligent workstation option. It provides file transfer and terminal emulation, and it gives a PC user indirect access to CEO's filing system. PC users can convert a WordStar document into CEO format, switch to terminal emulation, and edit the same document with CEO's word processor. The reason that CEO Connec-

WordPerfect is an excellent example of a seamless interface between PCs and MVs

tion can only be considered a first step is its asynch implementation. Due to boundaries imposed by hardware and software, a limited number of PCs can run this application. How many IAC ports are available? How many concurrent file transfer and document conversion sessions can one MV handle? Half a dozen CEO Connection users could have a serious impact on an MV's performance.

2. The high-performance intelligent workstation. This is typified by Rational Data Systems' PC/VS and PopTerm/200. PC/VS employs Ethernet technology—controllers in each computer, and 10 megabit per second coaxial cable between them. Even Ethernet has its limitations, but hundreds of local PCs can be supported by one I/O slot in an MV. Supporting file transfer throughput of up to 25 KB per second, PC/VS offers a number of additional features that help span the boundaries between MV and PC:

- PC users can execute CLI commands from a DOS prompt without a terminal emulator. For example, PC workstation users can list the files in an AOS/VS directory before importing a file with a forgettable name.
- Hooks in PC/VS software allow DOS applications and AOS/VS processes to achieve true distributed processing. For example, an order entry application on a PC can query an INFOS data base.
- Memory-resident programs increase the PC's flexibility. For example, a "Notifier" opens a pop-up window when a user receives CEO mail, and an optional terminal emulator that supports the PC's "Print Screen" operations can be activated by pressing a "hot key."

3. The extremely intelligent high-performance workstation. Rational Data Systems will soon begin shipping its latest addition to the PC/VS family, PC/Mail. This new product allows interactive use of CEO mail from within MS-DOS. PC users can read, create, send, and forward CEO mail, delete old messages, and even mail an MS-DOS file via CEO. PC/Mail uses pop-up windows, and users can scroll up or down within PC/Mail windows to review a message or survey their inbox. PC/Mail uses Lotus-style menus and CEO's format, so it is familiar to anyone with CEO experience.

With PC/Mail, there is no need for the MV to run the CEO control program. Character I/O is also eliminated. Only when a CEO mail action is complete (e.g., a message is composed and sent) is the transaction conducted with the MV. Since electronic mail is the most heavily used CEO program, PC/Mail may

Half a dozen CEO Connection users could have a serious impact on an MV's performance

eliminate the need to run a terminal emulator on the PC. This is especially important for users of small MV/ systems, because one Ethernet controller can support an almost unlimited number of CEO mail users.

One of Data General's greatest strengths is communications. XODIAC and IBM 3270 emulation are well-established products, and they give DG a tremendous competitive edge. The current challenge for office automation is to build on this strength to solve two problems faced by users of MVs and PCs: the need for communications, and software standardization.

There is no single solution for all PC-to-MV connectivity requirements in office automation environments. For MV users, I have described three types of products for linking PCs with CEO (CEO Connection, PC/VS, PC/Mail), each of which has specific advantages to recommend it. CEO Connection provides indirect access to CEO's filing system and word processing document conversion utility, and it supports remote PCs. CEO Connection allows an organization to standardize on CEO and CEO-like (CEOwrite) word processing, because it also provides terminal emulation and file transfer capability. PC/VS and PopTerm/200 solve the need for high-performance connectivity, but do not convert files between CEOwrite and CEO format. PC/Mail makes it easy to standardize on MVs, CEO (mail), and PCs, because it exploits the PC's processing power to a higher degree than DG BLAST or CEO Connection.

I anticipate that many companies will begin to stress how easily their existing PC- and minicomputer-based products interact, and that a lot of new software will be announced to meet the burgeoning demand for this type of intra-class connectivity. Therefore, it makes good sense to evaluate PC-to-MV connectivity solutions in terms of performance requirements. One can count on the software that is available today, and hope for more powerful options to become available. There are no guarantees in this business, but it seems inevitable that supply will catch up with the demand we've all been reading about.

Tom Rice, the sales manager at Rational Data Systems, has been involved in PC-to-MV integration for three years. For more information, contact him at 5725 Paradise Drive, #410, Corte Madera, CA 94925; 415/924-0840.

HAVE YOU TRIED OIS LATELY?

Recent improvements make it a central store of current product and service information

by Anna Mae Malozzi
and Alex Cullen
Special to Focus

If you haven't tried OIS lately, we think you'll be pleasantly surprised by recent enhancements. In case you haven't tried it at all, we should start with a brief description of what it is. The On-line Information Service is Data General's on-line data base of current product and service information. The only things a customer needs in order to access OIS are a phone line, a modem, and a terminal or computer with appropriate communication software. Customers can dial into OIS at their convenience, and use the information it contains at their discretion.

Prices for accessing OIS are based on connect time, with a tiered pricing structure that takes into account the value of the information the customer uses. If you are a Support Plus customer, we hope you responded to our May mailing, received your ID, and are already using your one hour per month free of charge.

It will be simpler to explain how OIS works if we walk you through a session. Assume that you are a new OIS customer with three objectives: (1) reviewing the customer alerts, (2) researching a XODIAC FTA problem, and (3) reviewing any recent software trouble reports (STRs) relating to the most recent revision of INFOS II.

The first order of business is to find the local telephone number you'll use to dial into OIS. OIS is provided via the CompuServe network, so in most cases there will be no long-distance charges. To find the CompuServe telephone number nearest you, set up your terminal and modem, then dial 800/848-4480. After you make a connection, your screen will display a "Host Name:" prompt; type "CPS" (for CompuServe). It will then prompt you for user ID; type "74,74". Next it will prompt you for a password; type "Network". This dialog will bring up a menu of information about CompuServe. We suggest that you select option #2, Search, which lists local access numbers for both CompuServe and other network vendors.

Next you can dial your local access number to begin logging on to OIS. When you make a connection this time, the host name will still be "CPS," but now you'll respond with the ID and password you got when you signed up for OIS with Data General Service.

The next thing you'll see is the Data General welcome banner, followed by the customer alert banner. As we were writing this article, the customer alert banner read: "10/28/86 CEO Information Management rev 2.22 (VS) problem with document conversion. For information, go to CEO Int TIPS, WORKAROUNDS & FIXES, and use 'CEO' and '2.22' as keywords. . . . "

Problems listed on this banner could have serious consequences. If an alert could affect you, it would be a good idea to make a note of it so you will remember to get the rest of the information.

OIS will then check to see if there are any electronic mail messages for you. OIS electronic mail lets you send messages, questions, and problems to DG, and you can expect a response in your OIS mailbox within three working days. Since this is your first time to use OIS, you won't have any mail.

After taking care of electronic mail, OIS will display the top menu, from which you could log on to the NADGUG Bulletin Board. Being in a hurry today, you'll choose "$Log Onto OIS" to get to the technical information you're looking for. The first problem you want to address is the XODIAC FTA problem. The best place to begin researching a product problem is the data base for product tips, workarounds, and fixes. You can get there by navigating through the menu structure, but you can also use "GO" commands to bypass the intermediary menus. (GO commands include GO and a synonym, where the synonyms are typically product names. For a complete listing of synonyms, type "GO SYNONYM" at any "!" prompt.)

If you enter "GO XODIAC", OIS will display the following options from the XODIAC INFORMATION menu:

1. $ Product Tips, Workarounds, and Fixes
2. $ Software Fix Data Base
3. $ Software Assistance Request
4. Product Description
5. Current Revision Notes
6. Most Recent Monthly Newsletter

Choice 1 leads to a banner that contains information about the keyword search data base, and how to search within it. If you make selection #2, Search for a Solution, you'll get the following prompt:

```
ENTER A PRODUCT NAME,
A TRUNCATION OF A PRODUCT NAME,
or THE REVISION NUMBER OF A PRODUCT:
```

The response "XODIAC" would select any appropriate items from the keyword search data base. OIS uses a combination of menus and keyword search data bases to provide the most efficient method for accessing particular types of information. Keyword search is a tool that is used when new items are constantly being added to the data base with several paths for finding them.

By using a keyword approach, OIS eliminates the possibility of missing articles. Within this data base, the search for articles may be narrowed or expanded by using additional keywords. For example, to find the article referred to by the customer alert banner, you could use the keyword "CEO" and then narrow the search by adding the revision level "2.22."

When we wrote this article, a keyword search on "XODIAC" found 10 items, including the following patch file article:

```
Patch file for FTA.VS__5.20__PATCH.PF
    November 1986
THIS IS PATCH #1
This patch prevents FTA from producing an error
when it receives an ident reply from a DEVIOS or
encrypted system.
THIS IS PATCH #2
This patch fixes the problem of "FILE DOES NOT
EXIST" error being reported when a pathname has
:NET: embedded in it.
FOR THIS PATCH, GO TO THE SOFTWARE FIX
DATA BASE AND USE THE PATCHNAME AS A
KEYWORD
```

This new XODIAC FTA patch file hasn't been released in an update, and it includes a patch to fix a problem similar to what you had been experiencing. You need to access the software fix data base in order to down-line load the patch file. You can access it as option #2 on the same menu you started from to get to product tips, workarounds, and fixes. Follow the same keyword search procedure as above to find the same article, and then respond ''Y'' to the prompt, ''DO YOU WISH TO RECEIVE THIS FILE?''. After some additional prompts, the patch file is loaded. You now have the most recent XODIAC FTA patch file, which you expect will fix your problem.

To address your second concern, which was to review STRs that relate to the most recent revision of INFOS II, you'll want to access the STR look-up keyword search data base. Enter the command, ''GO STRLOOK''. (STRLOOK is the synonym for the STR look-up data base.)

You now have the option of searching by STR number or by product name and revision. Since you want to know which STRs have been submitted, you would select the second option. This would generate a list of STRs that are currently open or that have been closed within the past six months. You can read any or all of these. After reviewing the STRs, you would conclude that there are no critical problems that affect your operation.

That takes care of your initial objectives, but you may want to scroll through the latest software bulletins before logging off. These are the bulletins used by DG's systems engineers and software support representatives, and OIS updates them weekly at the same time the SEs and SSRs receive them. Issue the command ''GO BULLETINS'', and your screen will display a list of bulletins from the four most recent weeks.

You could also visit the NADGUG and OIS user forums, the ISV vendor forum, the educational services area, and a few other unexplored areas. But you're probably tired by now. Enter ''BYE,'' and you'll see:

```
Off at (time) (date)
SRUs used = 0
Connect time = 27:01
```

Not a bad half hour's work! Δ

Anna Mae Malozzi is the marketing specialist for OIS, and Alex Cullen is the project manager. Contact them with questions at 617/478-4000. For more information on OIS or to request an ID, call DG Telemarketing at 800/325-3065, 800/952-4300 in Massachusetts, or 416/823-7830 in Canada.

BY TIM BOYER

TERMINAL DEMISE

A review of three programs for turning PCs into DG terminals

I think we're about to witness the demise of "computer terminals." Not that they won't still be around—we just won't be calling them that anymore. So, what will replace them? Well, I've just seen an IBM PC with two drives, a monitor, and a color card on sale for $995. Tandy's Model 1000 SX runs about $800. Hunyadi is all set to introduce its Blue Chip PC, complete with monitor, for $699. And if you look in just about any issue of *Byte*, you can find PC clones for around $500 to $600.

At that price, it's cheaper to buy a PC and an emulator than a terminal. The next question is, "Why buy an emulator?" I've had people tell me that they don't need an emulator, because the person doing keypunching never needs to do word processing, and vice versa. There are a number of good reasons.

One of the reasons I have a PC and an emulator is that it's cheap insurance. If a PC goes out when I really need it to run some figures through Lotus, or a tube goes down at fiscal year end, I can switch another terminal from one function to another with the press of a button. An emulator also increases my flexibility—at month end, when the word processing load is low, a PC can become an extra terminal and handle some of the data processing load.

The most important reason is that an emulator helps my productivity. For example, I'm using NEWKEY (a public domain PROKEY clone) to set up keystrokes used most often. From the emulator, all I have to do is press Alt-S and I can bring the system down to the CLI from any program (it does the ABORTs and everything). Alt-G gets the system going in the morning. I use a calendar program and notepad on the PC, and have a lot fewer little yellow scraps of paper with telephone numbers on them hanging around my desk.

Now, since you know that you've just *got* to have an emulator, the question becomes which one to buy.

Boy, am I glad you asked that question. For the last few months, I've been testing three different emulators in our office—EMU rev 1.61 from Rhintek, PopTerm/200 rev 1.30 from Rational Data Systems, and SmarTerm 400 rev 3.2a1 from Persoft. EMU and PopTerm are D200 emulators, while SmarTerm emulates a D400.

EMU is your basic nuts-and-bolts emulator. There's nothing fancy here—just good, solid, proven code. While in EMU, you can change the comm port, parity, baud rate, and switch between CR and LF for your return key—no need to end the program and set up different parameters. You can capture an incoming ASCII file or send a file. EMU, like SmarTerm, features a quick return to DOS, but because of its compact code (19 KB versus 96 KB for SmarTerm) you can do a lot more once you're down there.

That, except for a few bells and whistles, is about it. EMU doesn't allow you to switch word length or stop bits, or to switch between DG mode and ASCII mode, so don't call CompuServe and expect your backspace key to work.

But if all you want is an emulator, EMU can handle anything thrown at it—including running at 19,200 baud, which the other two emulators won't. In fact, according to the manual, EMU can run at 38.4 Kbaud, although you might need an AT for EMU to keep up. I don't know about 38.4 K, but the screen performance and even file transfers were rock solid at 19,200 baud.

PopTerm is the new kid on the block and technologically the most impressive (but I'm prejudiced—I *love* RAM-resident programs). It's memory resident—once you've invoked PopTerm, you can be sitting in the middle of Lotus, hit Alt-=, get a job started, and return immediately to Lotus. This is worth lots of time, especially if you're short on terminals—and aren't we all? When you tell someone that you're going to interrupt them for just a second to get a job started, with PopTerm it really *is* just a second.

PopTerm comes in two flavors—a normal, asynchronous version and a local area network version. It supports file capture and send, D200 and ASCII emulation, and any combination of parity, word length and stop bits. PopTerm comes with an on-line help screen and PopGen, a utility for setting communications parameters. While you do need to exit the program to set up new parameters, once they're set up you can switch from one to another by pressing the Alt-C key.

PopTerm has two minor annoyances. Due to the memory-resident scheme used, you can't invoke PopTerm from certain programs—WordStar, for instance. Rational Data designed PopTerm so that it can be used with other RAM-resident programs, such as Borland's Sidekick. WordStar, however, grabs hardware control of the keyboard—a particularly nasty thing to do. RDS decided to keep PopTerm compatible with the RAM-resident programs, even if it meant losing the hot key activation in others. I think it was a good choice—at worst, it makes activation just as fast as the other emulators—but if you have a much-used PC program that you were planning to jump in and out of, you'd better contact RDS first and find out if it will work.

The other minor annoyance is a bug that's being worked on. In RDOS, if you're on the last line of the screen and want to delete a character, the whole screen jumps up a line. It doesn't affect the deletion; it's just a little distracting.

SmarTerm 400 is the most feature-packed of the three. Although it isn't memory-resident, it has all of the features of PopTerm and more. Particularly helpful is a keyboard mapping help screen. Since the PC keyboard only goes up to F10, there has to be some scheme to emulate the additional function keys. If you happen to forget what you're supposed to press to generate the Ctrl-Shift-F15 sequence, pressing Alt-M will display a chart of the translations.

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In SmarTerm, you can also have up to 20 "soft keys." Soft keys are keys that you define, with up to 50 characters per key. Once they're defined, you can do operations such as dialing up a remote system, logging on, transmitting a file, and logging off—all by pressing one key. You can also choose which terminal to emulate—TTY, D100, D200, or D400 family. SmarTerm emulates the full range of D400 features, including 132-column mode if you have a 132-column card in your PC.

SmarTerm also includes both an XMODEM and error-free file transmission mode, with accompanying Fortran code for the DG end of the error-free transfer. Unfortunately, like so many other software companies, Persoft forgot about the RDOS world and included only AOS and AOS/VS versions of the code.

Function keys are handled differently by SmarTerm. PopTerm and EMU will allow the normal sequences—e.g., CTRL-SHIFT-F8 will get you out of CALC. SmarTerm substitutes the ALT key for CTRL-SHIFT. Not a big change, but still something for your keypunchers to get used to.

The bottom line is that all three emulators worked. They all handled any weird code that I threw at them, in any language. Next, I decided to try some benchmarks to see if emulation slowed down terminal response. With all three emulators running at 9600 baud, the time to display a single line 1,000 times is as follows:

D410—1:49
PopTerm—1:58
EMU—1:58
SmarTerm—3:20.

EMU, incidently, will run this program in a blinding (literally) 54 seconds at 19200 baud.

While PopTerm and EMU are about 7½ percent slower than the straight terminal, SmarTerm is more than 45 percent slower. This has the effect of slowing down your 9600 baud terminals to 5200 baud.

To make sure that a peculiarity of ICOBOL wasn't giving me strange results, I tried the same program in BBASIC. To display a line 100 times, the D400 took 7 seconds, EMU and PopTerm 8 seconds, and SmarTerm 48 seconds, over six times as long! For 1,000 displays, the D400, EMU, and PopTerm were identical at 74 seconds. SmarTerm never made it to 1,000. At 111 displays, SmarTerm died completely, giving me a bunch of those little triangles that usually indicate parity error on the PC.

Next, I tried doing some straight RDOS things—no interpreter between me and the emulators. It took SmarTerm over 50 seconds to display a 500-line program, while PopTerm took a little over 21 seconds. In SPEED, a 16-line display took about 1½ seconds with EMU, and

6 seconds with SmarTerm. Using CRTEDIT, the results are even worse. PopTerm re-displayed a 16-line screen in about ¾ of a second. SmarTerm needed 7 seconds to do the same.

I called Persoft to find out if anyone could explain this horrendous slowdown. They said that they were working on a new version that would take care of the problem, and would send me a pre-release copy of the new version. The new version, rev 3.2bp5, was a pre-release that solved most of the problems. The display time in ICOBOL was identical, but in BBASIC the times for 100 and 1,000 displays were 10 and 95 seconds, respectively. SmarTerm still took 50 seconds to type the 500-line file, but re-displaying the CRTEDIT screen was much faster, at 1.2 seconds. Maybe the results would be better in AOS{/VS}—if anyone has done any timing tests in AOS, please get in touch with me.

I talked to Ed Harris, president of Persoft and the man who wrote the original code. He told me that SmarTerm 400 is the oldest emulator in their product line, and was originally written in compiled BASIC and assembler. A new version, emulating the 460/410 family, is in the works. It will be rewritten from the ground up in C, but won't be all that much faster—it takes a lot of code to emulate a D400.

So, you've got a choice. If you need the functionality of the 400 series, with other goodies thrown in, and are willing to put up with some loss of speed, there's SmarTerm 400. If all you need is a D200 emulator, but you need it to be fast and inexpensive, you can get EMU. If you like the convenience of a RAM-resident emulator or need to run an emulator on a local area network, buy PopTerm.

The next time you need to buy terminals, consider a PC and an emulator. They're probably less expensive than you think, and the side benefits make them worthwhile. Δ

PopTerm is available for $150 from Rational Data Systems, 5725 Paradise Drive, Suite 410, Corte Madera, CA 94925; 415/924-0840.

EMU is available for $95 from Rhintek, Inc., P.O. Box 220, Columbia, MD 21045-0220; 301/730-2575.

SmarTerm 400 is available for $149 from Persoft, Inc., 2740 Ski Lans, Madison, WI 53713; 608/273-6000.

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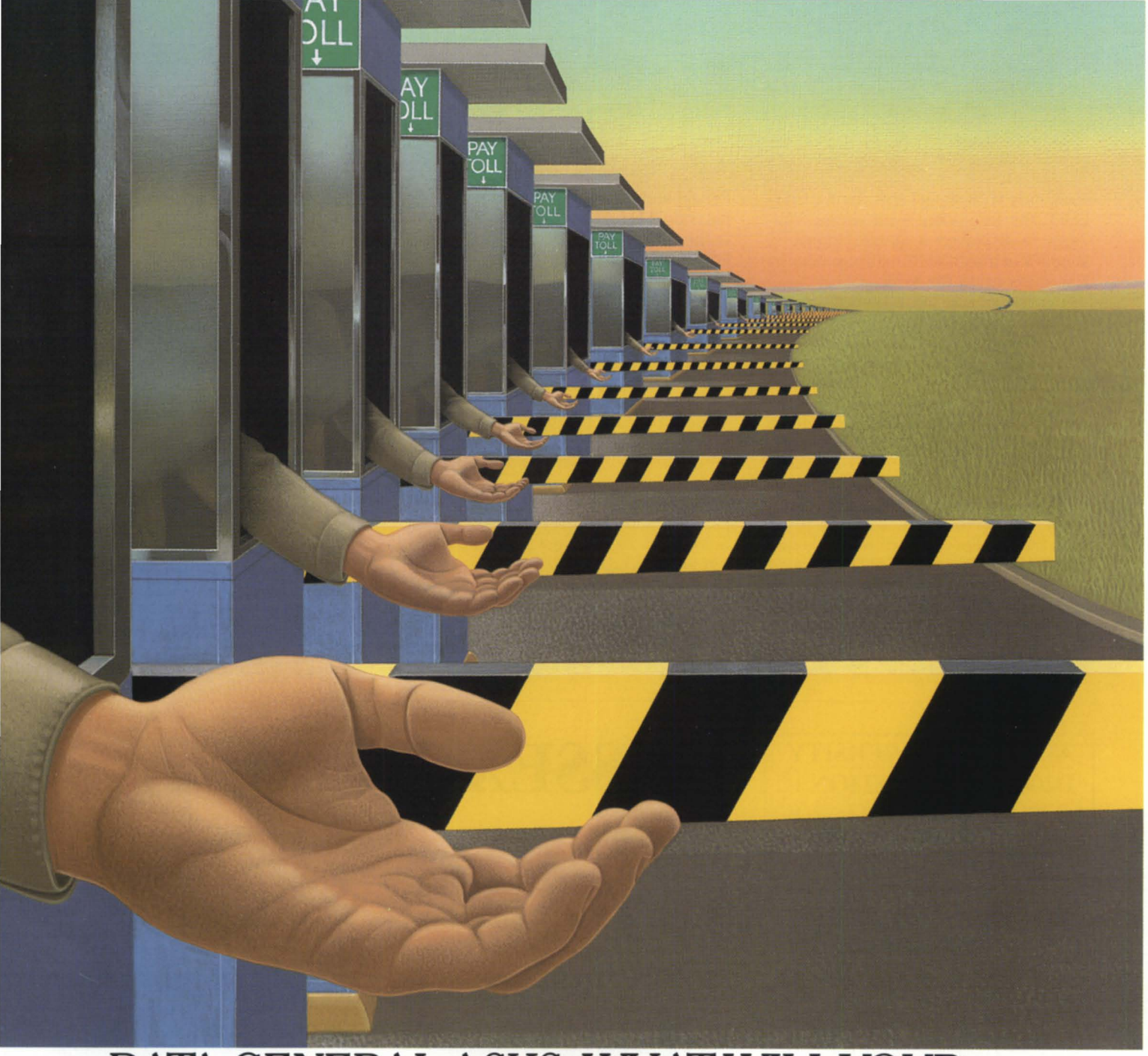

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BY BRIAN JOHNSON

DISK PERFORMANCE PRIMER

Cutting through mythology and misconceptions that can drain system performance. Part II

This is the second part of a two-part column on the subject of disk subsystem performance under interactive user loads.

Interactive loads are characterized by multiple competing requests for each disk unit. The requests arrive randomly over time, and the requests are scattered randomly across the unit. This type of behavior is typical of "on-line" systems where the progress of the application software is paced by the humans at the terminals.

In last month's column we saw that DG's disk controllers are designed to take advantage of the fact that disks spend most of their time seeking when under interactive load: thus all of the units attached to a controller can be kept busy when the controller uses overlapped seeks. We also saw that the transfer rate of a particular disk is less important under interactive loads than it is when sequential processing is done by a handful of processes.

A review of some simple queueing theory gave us two non-intuitive results for disk units under interactive load: (1) you can't use the disk to its full capability because the average queue length approaches infinity exponentially at high loads, and (2) the worst case grows at an even steeper rate than the average queue length at high loads.

Based on the results of queueing theory and the goal of offering users fast, consistent I/O, I recommended average unit wait percentages of 25 percent for system disks and 35 percent for user (i.e., non-system) disk units.

:BATCH_CONSIDERATIONS

What effect does running a batch or batch-like function (an interactive process that becomes I/O intensive for more than a few seconds, or a real, live batch job) have on the results we've seen so far? Not good, I'm afraid.

Batch behavior is characterized by a persistent demand for service. No sooner does the batch-behaving process get service than it shows up back in line again. That's cheating. From the point of view of the more random interactive users, there always seems to be at least one person waiting in line whenever they arrive. Referring to Figure 1, that translates into $N = 1.0$, or $p = 50$ percent, which violates our rule of keeping p below 25/35 percent.

Figure 1: The worst case

p	N	Std Dev
0 %	0	0
10 %	0.11	0.12
20 %	0.25	0.31
30 %	0.43	0.61
40 %	0.67	1.1
50 %	1.0	2.0
60 %	1.5	3.8
70 %	2.0	7.8
80 %	4.0	20.
90 %	9.0	90.
99 %	99.	9900.

Does this mean that we can't run batch-like processes and interactive processes at the same time? If they use the same disk, I'm afraid the answer is yes, unless we're willing to give up our goal of reasonable and predictable disk I/O (i.e., response time) for interactive users. An obvious solution is to move the files accessed by the batch-like process to a different disk unit. Sounds good, but what happens when interactive users need to access the same data base that the batch-like process is trying to run a report on? Don't look at me—except for limiting batch to times when interactive users aren't active, I don't have a pat answer. The best I can do is recommend that you keep the average p even lower than 25 to 35 percent for those disks that support mixed interactive and batch usage.

In the case of systems with combined interactive and development activity (a recipe for lousy interactive response time in any event), the best recommendation is to put the programmer's files on a separate disk, including the compiler and library files.

What about process priorities? Couldn't we use those to keep the batch-like processes from interfering with the interactive processes by lowering the priority of the batch-like processes? Practically speaking, the answer is no. If you have any idle CPU at all after the interactive people have had their fill, then the batch-like process will sneak into line. If you don't have any idle CPU, then they won't sneak into line very often. However, they also won't finish before the interactive processes are all done, and your interactive response time will be lousy anyway, due to the lack of CPU. CLASP (the class allocation and scheduling processor in AOS/VS rev 7) isn't a solution either, since it only throttles CPU time in situations of zero idle CPU; it has little effect on disk I/O.

:BALANCING_ACT

A lot of people with multiple disk units are under the mistaken impression that units should be balanced according to the "total accesses" or the "percent of total" figures shown by DISCO.

I hope you can see from the discussion above that the important number is actually the average queue length, since that is what determines how long an access takes (assuming similar seek distances). Since the average queue length during interactive load is strictly a function of unit wait ("percent busy" according to DISCO), balancing according to unit wait accomplishes the same thing as balancing according to "avg queue."

For an experiment, try plugging your unit wait percentages into the formula for N ($N = p / (100 - p)$), and you'll see that they match DISCO's "avg queue" numbers quite nicely for disks subject to interactive usage.

Now look at "total accesses" and "percent of total" compared to "percent of busy." Often there will be little (if any) correlation, because things like nighttime batch jobs involving sequential file

accessing tend to increase "total accesses" while lowering unit wait (one batch job can hardly wait in line behind itself).

:UBJIOQI

One of my favorite indicators of whether or not you're making good use of a disk unit is to calculate something I call "Uncle BJ's I/O Quality Index," or the UBJIOQI. It's calculated from the DISCO information as the sum of blocks read plus blocks written, divided by the number of accesses. The resulting number is the average number of blocks I read or wrote each time I did a disk access.

AOS{/VS} does two kinds of disk accesses—single-block and multi-block. Single-block accesses are used to read/write directory blocks, random index blocks, bitmap blocks, and a few other things not worth mentioning. Multi-block accesses are used to read full or partial chunks of file data elements.

If the system cache has been properly sized, if heavily used files have no more than one index level (check it using FILESTATUS/INDEX), and if there aren't a lot of people working in large directories (more than 200 or 300 files), regardless of how well the directory hash frame size has been set, then I expect the UBJIOQI to come out closer to my I/O block size (4 on AOS/VS, somewhat less on AOS) than to 1.

A good rule of thumb is that system disks should have a UBJIOQI of at least 2.5, user disks should be at least 3.0, and INFOS disks with 4096-byte page sizes should be at least 6.0. If you get numbers less than these, your file structure needs some attention. Note that some programs (like LOAD_II and DUMP_II) do their I/O using huge buffers of as many as 32 blocks at a time and skew the UBJIOQI numbers slightly.

Poor directory hash frame sizes are an overrated issue. If your UBJIOQI is low and you suspect the cause is excessive I/O for directory blocks (lots of geeks doing F/AS/S in fat directories), then changing to a hash frame size that avoids directory overflow blocks doesn't solve the problem.

Proper hash frame sizes are important only on random directory accesses (like open, close, create, delete, and rename) as opposed to sequential directory accesses (FILESTATUS/SORT or any operation involving a template). Excessive directory blocks competing for the cache are excessive whether they are hash overflow blocks or not.

The real solution is to break up massive directories into groups of smaller directories so that fewer directories' blocks are competing for the cache (most

users usually access one directory at a time). Do the same thing to people with overpopulated directories that you would do to a secretary who filed everything in one cabinet labeled "A to Z"—have a nice little chat with them about how the concepts of file cabinets, drawers, and folders map onto the AOS{/VS} directory structure.

Lastly, plotting UBJIOQI values versus system cache size is a good way to size the system cache for those of you without performance monitor programs that show cache efficiency percentages. (See my September 1986 column, page 25, for information about sizing the system cache.)

:SMART_DISKS

Intelligent disk units are becoming more popular. Do they really contribute anything?

The answer is yes, but not as much on AOS{/VS} as they do on dumber operating systems (why do MS-DOS and Unix come to mind?).

The key feature of intelligent disks is that they provide a level of caching over and above what the operating system provides. Well, it turns out that AOS and AOS/VS are two of the better operating systems when it comes to disk caching. The main assistance you get from an intelligent disk comes during sequential file reads and cached writes.

The disk logic assumes (usually correctly) that when you read some sectors, your next request will probably be for the next few sectors on the same or next track, so it reads the entire track and keeps the extra sectors in the on-board cache. If you manage to ask for the next few sectors before other users' requests to the same unit have forced your read-ahead blocks out of the cache, then you win. Unfortunately, interactive applications often don't get back in time.

Cached writes win big, assuming the drive isn't so busy that it has a big backlog of previous writes.

The ideal situation would be if AOS{/VS} could tell the disk when to cache and when not to. AOS{/VS} has a much better idea of when a sector might be needed again soon or when reading ahead might make sense (e.g., a file opened for sequential access). The disk has no idea and must treat all requests the same. Maybe someday . . .

:BIG_DISKS

When you buy a disk, you buy two things: storage and I/Os per second. Give or take a few milliseconds, all disks are pretty much the same speed: about 25 ms average access. But space varies by a factor of 10.

Unfortunately, too many people buy disks based solely on their storage requirements. Then they go for the best bucks per MB units, which usually means the big drives. The result is that they try to cram too many users on a drive (from the point of view of I/Os-per-second) and the unit wait percentage climbs off the chart, with queue lengths resembling the ones down at the Driver's License Bureau.

Especially pitiful are systems with all large disks. Once the system software is loaded (rarely more than 20 or 30 MB), the first thing you notice is all that space left on the system disk. Gotta use that space, right? So then you start loading (Gak!) user directories and files onto it until you're using a respectable 75 or 80 percent of the space, albeit with a unit wait of 60 percent.

Do yourself a favor. Got more than about 10 users? If so, then buy a nice little (!) 74 or 147 MB disk (size depends on expected :PAGE, :SWAP, and :QUEUE usage) for the system, and put all the user files on those big disks you bought. The difference in response time will amaze you.

:BOGUS_ISSUES

We saw above that the controller is busy for about 29 percent of the average access. Does this say that putting disks on separate controllers will speed things up? Not usually.

A separate controller will only speed things up in those cases where two units want to seek or read/write at the same time. In that event, one will have to wait until the other is done. What's the chance of that happening? You've got me, but luckily AOS{/VS} measures how often it occurs. AOS/VS DISCO shows it as "percent intf" (interference). A better description would be controller wait, as opposed to unit wait. As a rule of thumb, an average controller wait percentage of more than 5 or 10 percent indicates that a second controller would be of some benefit. I've never seen a controller wait above 5 percent on a disk whose unit wait

is below 25/35 percent. If you see one, call me. I'd like to hear about it.

Some people are fond of using DISCO to monitor the average seek in order to determine when a disk is becoming fragmented. You should be aware that the average seek can just as easily give a false indication of fragmentation when there isn't any, or vice versa. The only sure-fire way to check for fragmentation is to rebuild the unit by dumping it off to tape, deleting all the files or doing a full DFMTR, and reloading it. Then monitor the average seek and see if it drops. If it doesn't drop appreciably, then you'll know better next time someone suggests rebuilding the disk.

The real danger in rebuilding disks to eliminate fragmentation is that you create an artificial environment where disk response time is better than it should be for a few days or a week, and in the process you foster unrealistic expectations on the part of your users. They start complaining as soon as the disk begins to return to its (normal) fragmented state. Next thing you know, you're spending your weekends rebuilding disks when you should be out playing. Sometimes I think on-line users shouldn't be allowed to use the system for the first few weeks after it gets installed so that you have time to fragment the disks first.

:NET__NET

- Keeping the unit wait for your disks below 25/35 percent is key to good, predictable response time. Do this by moving files around to balance the unit wait percentages. If balancing doesn't result in percentages below 25/35 percent, then you need more disk units.
- Systems with more than 10 interactive users typically will require a disk unit dedicated to the operating system's I/O needs.
- Putting batch files on different units from interactive files helps.
- All bets are off in pure batch situations; run the disks as hard as you can.
- Balance multiple disk units solely based on unit wait ("percent busy") in order to get uniform response time.
- Big disks are a potential cause of problems, because you tend to add too many users in order to use all the space, and unit wait becomes too high. Use big disks for big files or mixed active and inactive (archival) file storage.
- Rebuilding disks to reduce fragmentation only makes sense if the file structure on the unit is relatively constant (e.g., dedicated system disks). Beware of creating unrealistic expectations among users by rebuilding user disks that will quickly become fragmented again.
- Putting disks on separate controllers is a waste of time and money unless the average interference shown by DISCO is above 5 or 10 percent. Δ

 B.J. is the president of B.J. Inc., a San Francisco-based consultancy specializing in system auditing, system management, and performance analysis. He is also a contributing editor to Focus Magazine. He can be reached at 109 Minna St., Suite 215, San Francisco, CA 94105; 415/550-1444, Telex 296544.

BY JOHN A. GRANT

WHAT REVISION?

A new method for finding and setting the revision level of programs

There are three ways to set the revision of a program: use the /REVISION = <n> switch on LINK, use the .REV pseudo-op in assembler, or use the CLI REVISION command. However, until today, there was only one way to actually look up the revision of a program (the CLI REVISION command); now there are two methods.

Why do you want to know the revision of a program? Well, if you implement your own revision numbering scheme, then you can interlock several programs by revision. Perhaps a program needs to ensure that the program it is about to chain is at the same revision level, or certain data sets may require a particular revision of a program.

You may also wish to have each program announce itself with a banner that includes the program revision number. You can hard code the revision number in the banner text; however, each time you edit the program, you must also remember to edit the text string (ha!). If you also use the /REVISION = <n> switch when you LINK the program, then sooner or later you will create a version of a program that has a different revision in the banner than is shown with the CLI REVISION command (that Murphy fellow again!). It is better to leave a blank in the revision slot of the banner and have the program fill it in at runtime after looking up its own revision number.

If you are going to look up and display the revision number of the .PR file, then you must ensure that it is correct. Although it is just as easy to forget to use the /REVISION switch when you LINK as it is to forget to edit the banner, you can set up your LINK macros to increment the revision number automatically each time a program is re-LINKed. The LINK macro can look up the current revision number of a .PR program file, modify it, and then LINK the program with the new revision number. The following is an example.

If you are going to look up and display the revision number of the .PR file, then you must ensure that it is correct.

```
comment-macro F77REVLINK.CLI
push;prompt pop
[!equal,([!pathname,%1%.pr]),( )]
    var(0 1 2 3) 0
[!else]
    delete/2 =ignore  =?[!pid].rev.tmp
```

Figure 1: Subroutine GET_REVISION(program_name,rev)

```
Subroutine GET_REVISION(program_name,rev)
    include         "qsym.f77.in"       !see Focus, July/86

    character*(*)   program_name
    integer         rev(4)              !rev(3,4) n/a for aos

    character*256   pathname
    byte            brev(4)             !for reading revision

    integer         ch_f77              !a free f77 channel
    integer*4       ac0,ac1,ac2,ier,i
    integer*4       isys                !f77 intrinsic

c>>>begin
c-->get pathname first
    if(program_name(1:1).eq."<0>") then
        ac0=-1                          !get pathname of self
        ac1=0                           !reserved
        ac2=byteaddr(pathname)
        ier=isys(?gprnm,ac0,ac1,ac2)
        if(ier.ne.0)   go to 99         !oops
    else
        pathname=program_name           !make copy,
        i=index(pathname," ")           !  find end,
        pathname(i:i)="<0>"             !    & append null
    end if

c-->find a free f77 channel no. to use
    call get_free_f77_channel(ch_f77)

c-->open .pr file
    open(ch_f77,file=pathname,status="old",access="direct",
   #          form="unformatted",recfm="fixed",recl=2,
   #          iostat=ier,err=99)

c-->read 2 records of 16-bits each at offset USTRV at UST
    read(ch_f77,rec=?ust+?ustrv+1) (brev(i),i=1,2)
    read(ch_f77,rec=?ust+?ustrv+2) (brev(i),i=3,4)

    close(ch_f77)

c-->extract revision of program
    do i=1,4
        rev(i)=brev(i)
    end do
    return

c-->error: list error & return 0
99  do i=1,4
        rev(i)=0
    end do
    call errcode(ier,0)                 !not fatal
    return

    end
```

```
    revision/l = =?[!pid].rev.tmp %1%.pr
    string [ =?[!pid].rev.tmp]
    GETREV0123 [!explode,[!string]]
        delete  =?[!pid].rev.tmp
[!end]

var1 [!uadd,[!var1],1]

string [!var0].[!var1].[!var2].[!var3]

F77LINK/REVISION =[!string]%0/% %1-%
pop
```

```
comment–macro GETREV0123:
          set var<0 1 2 3> from args
comment–won't work if any part
          of rev is 100 or more!
var0 %1%%2%
var1 %4%%5%
var2 %7%%8%
var3 %10%%11%
```

In this example, the F77REVLINK.CLI macro acts as a front-end for the F77LINK.CLI macro. You can create a different version for each language, i.e., CREVLINK.CLI, PL1REVLINK.CLI, etc.

Figure 2: Subroutine GET_FREE_F77_CHANNEL(ch_f77)

```
Subroutine GET_FREE_F77_CHANNEL(ch_f77)
     integer         ch_f77

     integer         ier
     logical         open

c>>>begin
     do ch_f77=255,0,-1
          inquire(unit=ch_f77,iostat=ier,opened=open)
          if(ier.eq.0) then
               if(.not.open)  return          !found one
          end if
     end do
     stop "Panic: no free channels"
     end
```

Note that the CLI REVISION command always lists at least two digits for each field of the revision, including leading 0 values. If any of the fields exceeds

99, then GETREV0123.CLI will have to be modified to find the "." in the [!EXPLODED] string.

The default revision number of a program is 255.255.255.255, unless a .REV pseudo-op or /REVISION switch is encountered by LINK. The Fortran 77 compiler also inserts a .REV block in each module, which corresponds to the current revision of the compiler (rev 3.10 allows you to specify a different revision for each object module with /REVISION); other languages are probably similar. Note that the last two numbers of the revision are only valid for AOS/VS.

F77REVLINK.CLI increments only the second field in the revision number, but you can insert any algorithm you wish. If there is a chance that a revision field will ever reach 255, then you will need to reset it to 0 and increment the next field instead.

Now that you have an automatic method of incrementing the revision each time a program is LINKed, you need a non-CLI method for a program to look up the revision of a .PR program file so that it can be displayed in a banner or cross-referenced with revisions of other programs. However, there is no system call that corresponds to the CLI REVISION command!

How does the CLI do it? Simple—LINK puts the revision number in the .PR file, so the CLI REVISION command reads the .PR file! The location of the revision number is defined as offset USTRV (10 octal) from the start of the User Status Table (UST) which begins at 400 (octal). These offsets are defined in PARU.<16 32>.SR. The structure of the UST is also described in Appendix C of the *AOS Programmer's Manual* (they forgot to include it in the *AOS/VS Programmer's Manual* or *LINK Manual*).

The subroutine in Figure 1 (GET_REVISION) will look up the revision of the current program if called with a null program name:

```
integer rev(4)
call GET_REVISION("<0>",rev)
```

or the revision of any .PR program file:

```
call GET_REVISION("CLI.PR",rev)
```

GET_REVISION uses another handy little subroutine called GET_FREE_F77_CHANNEL. Although ?OPEN can ask AOS{/VS} to pick any free channel number, all of the high-level languages I am familiar with require an explicit channel number. This makes it difficult

(continued on page 54)

START LPQ @BOB

Putting printers on a first-name basis can simplify system management

It's amazing how fast time flies when you're having fun. Yesterday I finished my annual Christmas letter; today I'm working on my column for the Valentine's issue. The closest I can come to something appropriate for the holiday is to talk about something near and dear to my heart, the CLI.

In the May 1986 issue, I wrote a column titled "Top Form" (page 28) that presented a method to send VFU control codes to printers on IAC ports. One of the assumptions I made was that the operators would need to know which port each printer was currently connected to. Now I want to show a technique for using printer "names" instead of "CON" numbers.

This scheme is really quite simple to implement. All you need to do is to create a link for each printer name and use the printer name in the CONTROL @EXEC commands. Let's assume the printer configuration shown in Table 1.

In :UP.CLI you would add the following lines:

```
CREATE/LINK @MAIN @LPB
CREATE/LINK @SECOND @LPB1
CREATE/LINK @AR_DEPT @CON14
CREATE/LINK @FACTORY @CON28
CREATE/LINK @LETTERS @CON18
CREATE/LINK @INVOICES @CON17
```

You would then change all references to device names in the CONTROL @EXEC statements. For example, you may have the following statements to bring up the printer queues:

```
CX START LPT @(MAIN SECOND)
CX START BATCH_OUTPUT @(MAIN SECOND)
CX START BATCH_LIST @(MAIN SECOND)
CX START ARQUEUE @AR_DEPT
CX START LPQ @LETTERS
CX START INVOICE @INVOICES
```

After this, all other CX commands would reference the printer name. For example:

```
CX CONTINUE @MAIN
CX EVEN @SECOND OFF
CX CONTINUE @SECOND
CX (HEADER TRAILERS) @INVOICES 0
CX CONTINUE @INVOICES
```

I can think of two major advantages to this technique. First, it allows operators to deal with the printers on a "first-name" basis. Second, it allows COBOL programs to be spooled to a "logical printer" instead of a physical one. In Table 1, a COBOL program could open the output queue "@INVOICE" and have invoice forms spooled for printing under control of EXEC. However, if it opens the file "@FACTORY" (which is not under control of EXEC), the operator would still get the correct printer, regardless of what port it may be plugged into today.

Actually, the second advantage is even more significant if your printers back up each other. For example, if the @INVOICES printer was a backup to @LETTERS, you could issue the following commands:

```
CX PAUSE @INVOICES
CX START LQP @INVOICES
CX STOP INVOICE @INVOICES
CX DEFAULTFORMS @INVOICES LETTERHEAD
CX CONTINUE @INVOICES
```

Another interesting effect is that instead of using the current console port assignment or using an arbitrary numbering scheme as in my "Top Form" column, the despooler process is given the name of the printer. Thus, when you're running PED you'll see that the XLPT program is running in processes named "MAIN", "SECOND", "INVOICES", and so on, instead of "LPB", "LPB1", and "CON17".

In addition, the actual cross-reference between printer and port is contained in one and only one place on the system—the :UP macro, thus making it easier for the system manager (or system mangler—it's site-dependent) to manage and maintain the configuration.

■

On to the mailbag . . .

I received two questions on the same software product, Present. Since I don't use this product regularly, I called on a couple of people who do (after all, that's what the Users Group is for).

The first question comes from Osama Wahba in Jeddah, Saudi Arabia, who asks, "What is the required hardware to install Present to generate graphic output?" First, let me point out that Present doesn't generate graphics—Trendview is required to do that. After that, your hardware requirements depend entirely on what kind of graphics you want. Data General provides a number of graphics devices (plotters, laser printers, etc.)

However, one site I talked with simply sent the Trendview output to a disk file and then used a program developed in-house to translate the Trendview graphic commands to those used by a Centronix printer. Then they QPRINTed it! The most important factors are what

Table 1

Printer Name	Printer Model	Device Name	Spooled by EXEC
MAIN	Band Printer	LPB	Yes
SECOND	Drum Printer	LPB1	Yes
AR_DEPT	Dot Matrix	CON14	Yes
FACTORY	Dot Matrix	CON28	No
LETTERS	Letter-Quality	CON18	Yes
INVOICES	Letter-Quality	CON17	Yes

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kind of quality graphic you need and how much in-house expertise is available to fully exploit the hardware and software you get.

The other Present question comes from Doug Cover of Data General. He asks, "I've not been able to get Present to access multiple input files, namely INFOS II files. Is there a bug or is my macro wrong?" After searching the Present manual (093-168-03) that applies to version 4.10, I can't find any reference that would indicate that Present is capable of using multiple input files, or even of accessing more than one index path. This is something I've considered a long-time deficiency in both Present and its predecessor, INFOS Query, both of which I used several years ago. I eventually abandoned them for Sort/Merge with Report Writer, which at the time had nearly all the features, was just as efficient, and didn't add the cost of an extra software module.

The only way I had ever been able to use more than one input file (which includes both logical files within a data base and physical INFOS files on disk) was to use Sort/Merge to extract and sort the records from all of the different files into a single file and use that as input to Query/Present. However, since the Sort/Merge Report Writer module was so powerful, I eventually quit bothering with the Query/Present pass and just defined a report format for it. The whole process gets even trickier, though, if you want to access a secondary file (i.e., get customer record by customer number to print the name); as the volume of data you are working with gets large, this becomes impractical. In such cases I would write a COBOL program using C/Script.

Many users have often told Data General that this one-file (logical or physical) limitation is a major drawback, and Data General has on occasion hinted at plans to change it. Unfortunately, I haven't seen the results of the plans. I'm thus hoping that your question indicates that perhaps you have a pre-release incorporating these features.

■

Dan Lapp, president of CASI, asks, "What software products are available to: (1) run ICOBOL programs on IBM PC, (2) develop (compile) ICOBOL programs on IBM PC for execution on an IBM PC?". To the best of my knowledge, there are only two ICOBOL runtime systems available for the IBM PC. I don't know of any ICOBOL "compilers" that run under MS-DOS.

One of the two runtime systems is from Data General. It runs on not only

the IBM PC series but also on Data General's MS-DOS based systems. For more information, contact your local DG salesperson.

The other product is "Choice!" from Wild Hare Computer Systems in Boulder, Colorado. This product will execute ICOBOL —.<PD DD> program files or —.<NX XD> data files on any MS-DOS 3.1 system, VMS system (from the unmentionable company), Unix/Xenix system, or MCS system. All you need is something like BLAST to move the files over. The only requirements for the PC are 200 KB of user memory space and at least one disk. If your data files are small enough, you can even run on floppy drives. There's also full support for any MS-DOS 3.1 network, so you could have a number of user terminals running software and sharing a common data base over the network. For more information, call Bruce Ray, Wild Hare's president, at 303/442-0324.

■

Dr. Richard T. Kouzes of Princeton University sent a response to the questions in the November 1986 column (page 43):

"With regard to B. G. Redmon's letter on Tektronix 41xx terminals, the PLOT10 software package in Fortran from Tektronix supports 40xx (and I assume it supports 41xx) terminals. DG's GKS also has support for 40xx terminals. If Redmon wants something for free, we have a 40xx package in Fortran that's pretty good. It wasn't clear what he's looking for in terms of sophistication.

"With regard to connecting DEC and DG for high-speed file transfer over Ethernet, I think the only option is TCP/IP. On the DG end, this requires about $5,000 for hardware (ILC) and software (from DG), and on the DEC end about $7,000 (from Wollongong). There are problems with DG's software—these are being worked on (see my December 86 article in *Focus*, page 49, for more details)."

I'd like to thank Dr. Kouzes for sending this information, and for his offer to share the terminal package they have developed at Princeton. I was unaware of the plans for the December issue when I wrote the November column, or I would have referred to it right away. Δ

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

'C' FOR YOURSELF

Two-pass conversion to Unix or MS-DOS raises interesting possibilities

One of the signs of health of Business BASIC is the continuing interest shown by its users in moving the language to environments other than Data General. While it may seem a bit odd to discuss this topic within a publication of the Data General Users Group, it is relevant in that there will always be market niches where DG equipment doesn't quite fit, niches that would be nice to address with Business BASIC.

The first of these products came out several years ago. A company called Bluebird Systems came out with their own micro-based system that could run a version of BASIC not too different from Business BASIC. They did better when they changed their product to work on standard IBM PCs.

Today, there are OEMs using Bluebird's software to create up to eight terminal systems using an IBM PC AT as a CPU along with dumb terminals and 70 megabyte disk drives. These systems are quite cost competitive with other low-end systems.

The newest product to come along is BB/C, from Script Systems of Hackensack, New Jersey; 201/343-8500. It allows Business BASIC to be run on Unix and MS-DOS systems. BB/C works in two passes: first, the Business BASIC code is converted to C, then the C code is compiled.

A couple of years ago, a DG systems supplier from Holland was at a meeting of North American Data General OEMs. He announced that he had a BBASIC-to-Unix translator. The general reaction was, "OK, show me that it works, and maybe I'll get interested when I get around to looking at it." Some people went so far as to send sample programs over to be converted: not much was heard again.

Script Systems got more interested than most. After getting a copy to play with, they decided it didn't work well enough, but had the potential to become useful if some more work was put into it.

Today, they appear to have it working. In fact, they are ready to start selling it to other people. So far, they have been using it with good success on their own customers.

As I'm sure you're all aware, Unix is a very different environment than AOS/VS or RDOS. Furthermore, C is a very different language as well. Just how compatible is BB/C with Business BASIC?

In general, it's pretty compatible with RDOS Business BASIC rev 7.0 and AOS/VS rev 3.0. Most of the enhancements in the newest revisions have not yet been added to BB/C.

In order to understand what's going to be different in BB/C, it's important to understand some of the fundamental differences in the implementation.

To begin with, the result is a compiled program. All editing and writing of code is done under normal DG Business BASIC, and the resulting programs are given to the translator in LIST format. It then takes each statement in the program and translates it to the equivalent code in the language C. C is the main programming language on Unix systems: in many implementations, most of Unix is actually written in that language. The language is fully structured, looking a bit like PASCAL or PL/I. (I wrote a BASIC interpreter in C, over a dozen years ago. I remember that it was an OK language for writing an interpreter in, but I would hate to use it for a business application. Give me Business BASIC any day!)

Anyhow, the source program in C is then fed to the C compiler on the Unix machine, which creates an executable object file. By doing it in two steps, additional flexibility is gained in terms of machines that can be used. Since C is also available under MS-DOS, it can be compiled for IBM PCs in the same fashion.

You see, the whole idea of Unix is that software written under Unix can be run on any computer that has the Unix operating system. Unix is relatively easy to put up on different types of CPUs, that is, compared to AOS/VS, VMS, or MVS. Also, Bell Labs, Unix's originator, made porting the operating system available and inexpensive.

As a result, most new startups today who want to create a new type of CPU look to Unix. The cost of creating a totally new operating system is in the 100 man-year plus range, and takes considerably longer than developing the new CPU itself. Data General, DEC, and IBM aren't the least bit interested in helping these startups run their proprietary operating systems on competing hardware.

So what happens when you have a whole bunch of startups, all using the hot new Motorola or Intel CPU chip sets to design a hot new computer, all using the same operating system? First, no one makes much money: competition is fierce. Second, they all look for ways to make their systems run better or faster than the next guy. One of the easiest ways to do this is to tweak the operating system, right?

Guess what? Unix isn't as standard anymore! There are differences from one machine to the next: an absolutely standard machine won't be competitive.

By translating to C first, BB/C avoids some of the incompatibility problems. C is still considerably more standardized than Unix, particularly if you are conservative in its use. You can then give the C code to the compiler on a particular machine, and get a good compilation. Furthermore, should a machine have a different version of C, the translator is

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relatively easy to adapt.

The alternative would be to write a BASIC interpreter in C. I speak from experience: Business BASIC would be a big job to do, and would probably have to be redone for each new machine.

Getting back to the point, BB/C is therefore a compiled version of Business BASIC and subject to the restrictions of compilers. Commands such as ENTER, ERASE, REPLACE, SAVE, LIST, LOAD, and CON make no sense at all. You can't interrupt a program, change a line of code, and CONtinue it. You can't fix errors on the fly. In fact, you can't fix them at all when they happen; you have to repeat the whole cycle of changing the Business BASIC program, LISTing, translating, and compiling. And on two different computers, no less.

A second set of commands has not been implemented, either because they aren't possible with Unix, or because Script Systems hasn't needed them. They include STMB, STMC, STME, UCALL, the logical file statements (LOPEN, LREAD, LWRITE, . . .), the Q statements (QMUL, QDIV, . . .), the new string handling statements (EXTRACT, PACK, UNPACK, SCANWHILE, SCANUNTIL, VALUE), and the INFOS statements (DBREAD . . .).

A third set of commands exists in BB/C, but with some changes to operation. These include Kfile statements (logical files not supported), some of the STMA commands, PRINT USING, and SYS.

I'm sure the list of commands not supported, or supported with an asterisk, changes regularly as new revisions are released and as a result of customer demands. However, it is quite possible to develop complete systems in Business BASIC that use only the subset of commands fully supported.

What I find most impressive about the product is Script Systems' claims that no fixup is needed to the C code produced from the translator, and that their programmers therefore need to know nothing about C. Many translators I've seen have been fatally flawed by needing a serious amount of work to "clean up" the last 5 percent of the code that couldn't be properly translated.

The staff at Script Systems still does all their development on their in-house DG machine, using standard Business BASIC. Their code runs on both DG and Unix machines, since they take care to use just the subset.

Incidentally, the performance isn't supposed to be bad. In single user benchmarks, BB/C over Xenix on an IBM PC beats RDOS Business BASIC on a Desktop! This raises interesting possibilities for using the new Data General Dasher 286 . . . .

Meanwhile, the controversy over MV/7800 performance continues. There is no doubt now that the only resemblance between the 7800 and an 8000 is the model number, and that a better number might have been MV/3800. But remember, it's the marketing division that names the machines, not engineering.

At best, the machine should be viewed as a replacement for the MV/4000. For Business BASIC users, at least, the upgrade that DG sells to change a 4000 to a 7800 should be ignored.

Tom Walker, of Walker Interactive Systems, has run some interesting benchmarks on the machine. He first set up a bunch of programs using CFM, the file maintenance utility provided as part of Business BASIC by DG. He was only able to get five or six terminals running before performance degraded seriously: up to 30 seconds to retrieve and display a record. Next, he translated the programs to B32. This time response was instantaneous.

Finally, he did a full test using 24 terminals, running an actual application system. The MV/7800 pulled like a champ this time, running just like an MV/4000 would have.

The conclusion is that there seem to be certain operations that Business BASIC has some real problems with on the MV/7800, but not all operations. The sites with the performance problems seem to have as a common element large, complex, messy programs with lots of inefficient, unnecessary operations.

The recommendation is that you should try before you buy, if you can. I hope to have some more experience to tell you about next month: my company is installing three of these machines in the next two weeks.

It seems the new MV/15000 series of machines will do what we all were expecting the MV/7800 to do, and more. They replace the MV/8000, MV/10000, and offer a low-end MV/20000. The pictures of the CPU board sure look like the main CPU board on the MV/20000. Could this machine really be the same board, just slowed down a little? We'll see.

One final note: the MV/2000 DC is really looking to be a little powerhouse. One user reported to me that response time is adequate with 24 users on-line, and Steve Bliss of CMS/DATA in Tallahassee reports it ran his prime number generating programs just as fast as his MV/7800 did. Δ

George Henne, a contributing editor to Focus, has worked with Business BASIC users for nearly a decade. He is the vice president of MAXON Computer Systems, and can be reached at 575 Madison Avenue, Suite 1006, New York, NY 10022; 416/445-4823.

(from page 45)

to write portable subroutines that can be used by any program without running the risk of a conflict in logical unit numbers. It is important to note that while older versions of Fortran would report a "channel already in use" error if an OPEN was attempted on a channel already open, modern Fortran 77 treats it as a re-OPEN! I don't know if this is part of the standard or not.

Since most programmers use lower unit numbers, free channels are most likely to be found at the higher numbers, so GET_FREE_F77_CHANNEL (see Figure 2) scans from high to low. The routine is also usable on DEC's VAX-11 Fortran even though the maximum logical unit number is 99. In that case, there will be an error on channels 255-100 that is ignored.

You can also read the revision number by positioning to absolute byte (?UST + ?USTRV)*2 in the .PR file. Although Fortran 5 supplies a runtime routine (CHRST) to do this, no such facility exists in Fortran 77. Instead, you have to do it the hard way with ?OPEN and ?READ.

In the November issue (page 18), I described a method of overriding the CLI "BYE" command. A more useful command to subvert is QPRINT. I once had someone QPRINT a .PR file (he was having a problem with his program and I told him to print it out so I could have a look at it!), and careless users often use QPRINT + without verifying the template with FILESTATUS first. If you replace QPRINT with something like QPRZNT in the CLI command table, then you can write your own QPRINT.CLI macro (with links QPR.CLI, QPRI.CLI, QPRIN.CLI) that executes the QPRZNT command.

```
comment-macro QPRINT.CLI
[!equal,%0/check%,]
    [!equal,%1%,]
        QPRZNT ;comm-let it tell you it needs args
    [!else]
        %0%/check ([!file,%1-%])
    [!end]
[!else]
    [!equal,[!eextension,%1%],.PR]
        write You twit-you can't print %1%!
    [!else]
        QPRINT%0  check% %1%
    [!end]
[!end]
```

Δ

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

RAM cache disk expansion for DG CPUs

Beverly Hills, CA—System Controllers and Interface Products (SCIP) is now shipping their CDO19-40, a 4 MB ram memory that emulates a Data General 4019 fixed head disk or a Point 4 Data cache memory (via switch selection). The CDO19 is available in 1 MB, 2 MB, or 4 MB sizes. It provides performance boosts to I/O bound systems by being used either as a swapping disk or "most frequently used" data disk.

The data or user programs are then available at the CPU access speed of a microsecond instead of 15 to 50 milliseconds of average disk access time. This saves processing delay moving data between high-speed main memory and slow disk memory in a multiuser system.

Prices for single quantities are $2,800 for 1 MB, $3,800 for 2 MB, and $5,500 for the expanded 4 MB size. VAR, OEM, and volume discounts are available, as well as a unit for evaluation. Delivery varies from stock to 30 days, with most orders filled within 3 days.

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

Eagle Software enhances the Paramedic utility

Salina, KS—Eagle Software, Inc. announces an enhancement to the Paramedic, one of 15 utilities found in their VS Toolbox.

The Paramedic allows the records to be recovered from the data base volumes of a corrupt INFOS file. With this enhancement, the Paramedic allows the records to be recovered from differential volumes. Without the Paramedic, data in the differential volumes is lost following a system hang or crash.

Companies that have already purchased the VS Toolbox will receive this enhancement at no additional charge.

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

Origin Tracker Dialer allows telephone dialing capability

Los Angeles—Origin Incorporated recently announced the Tracker Dialer, which gives mini- and mainframe computer users telephone dialing capability from their terminals. According to the company, a simple computer connection uses the same port as the terminal, automatically adjusts its baud rate from 300 to 19,200 baud, and no switches need to be set. This allows phone numbers stored in data bases or accounting packages to be dialed at the touch of a key.

The dialer is unique in two ways, Origin reports. First, by connecting to the same RS-232 port as the terminal, it frees

the printer port. Second, the modular connection to the telephone doesn't disrupt any of the signals. Because of this, it works with most telephone systems, including AT&T's System 75.

The Tracker Dialer is $160 in single unit quantities and is available from stock.

Origin, Inc., 9136 Gibson St., Los Angeles, CA 90034; 213/202-0772, telex 704 809. Δ

Cipher announces two high-performance disk controllers

Mountain View, CA—The Spectra Logic Business Group of Cipher Data Products, Inc., recently introduced two new data channel high-speed controllers (DCH) for use on Data General and Data General plug-compatible systems.

The S310-PLUS disk controller and the S320-PLUS disk/tape controller provide up to 3 MB per second transfer rates for the DG Nova 3/4, the Eclipse S/120 through C/350, Bytronix, Information Now, Integrated Digital Products, Point 4, and Rolm/Nova systems.

According to Mike Rogers, sales vice president for the business group, "The new Spectra Logic controllers are the first of their kind capable of handling up to 3 MB per second disk transfer rates and 1 MB tape transfer rates on a single board concurrently, a valuable feature where slot limitations, power consumption, and cost are systems requirements."

The 7-sector buffers and the read-ahead attributes of both controllers have increased systems performance by removing the need for interleaving, according to Rogers.

"When using most backup utilities, read-ahead is providing up to 50 percent more performance for our customers, compared to other controllers without 7-sector buffers," he said.

Both disk and tape functions are combined on a single controller, so the number of bus slots available for other devices is increased, Rogers said. The disk/tape controllers operate independently without degrading either function's performance.

The Spectra 320-PLUS supports up to four SMD disk drives with transfer rates up to 3 MB per second and up to eight 1/2 inch NRZI (800 bpi), PE (1600 bpi), and GCR (6250 bpi) streaming or start/stop tape drives with up to 160 inches-per-second performance.

The Spectra 320-PLUS supports RDOS, AOS, IRIS, BLIS/COBOL, MUMPS, and MIIS operating systems. The Spectra 320-PLUS emulates 606X, 616X, 6214, 6122, and Lotus disk drives.

The Spectra 310-PLUS is the disk-only version of the Spectra 320-PLUS.

The list price of the Spectra 320-PLUS is $4,200, and $3,400 for the 310-PLUS. Volume pricing is available.

*Cipher Data Products, Inc., 10101 Old Grove Road, P.O. Box 85170, San Diego, CA 92138; 619/578-9100, telex 910-335-1251.*Δ

DG surprises CADGUG members with reorganization announcement

by Dave Angulo, President
Chicago Area Data General Users Group

Editor's Note: what follows is the newsletter of the Chicago Area Data General Users Group. CADGUG is the first of the NADGUG regional interest groups to distribute its newsletter through Focus; perhaps others will follow. Since CADGUG members are automatically enrolled in NADGUG, publishing CADGUG news in Focus saves the volunteer effort that usually goes into typing, proofreading, designing, and distributing a RIG newsletter.

Although this column is directed toward CADGUG members, many items will interest people throughout North America. Should anyone—in Chicago or elsewhere—have comments, suggestions, or questions about any articles contained here, you can contact the author through Focus or one of the CADGUG officers listed below.

Chicago—The December meeting of the Chicago Area Data General Users Group was sponsored by Data General at their Schaumburg area headquarters on December 16. As DG had just announced its new MV/15000 CPU the week before, users expected DG to spend the majority of the time talking about that machine. However, DG shocked those attending by announcing a major reorganization of the Illinois region of Area four.

Alan Cox, the regional sales manager, announced that the Illinois region would be the first to undergo this restructuring, but that if it works out well here, it will be a model for all the regions in the country.

Specifically, in the sales force, the Chicago metropolitan area will be broken into three sales branches. The branch responsibilities will be based on the function of the clients rather than geographical areas. The first branch will be geared toward the financial industry, servicing clients in the banking, insurance, and brokerage industries. The second branch will service the manufacturing community. The final branch is geared towards OEMs and clients in the service industries (e.g., health, legal, education, and government).

Mr. Cox said that SEs will specialize in one of the three fields above, which will let them be more application-focused and better informed about specific customer needs. Chuck Saponaro will be branch manager for the service branch based in Schaumburg, Jim Spartz will head the financial branch based in downtown Chicago, and a yet-to-be-announced branch manager will head the manufacturing branch based in Schaumburg.

Mike Fowler, the regional SE manager, announced that the regional SEs had been divided into three branches that parallel sales. He said the total staff of SEs in the region has doubled in size. In addition, a number of new SE positions have been added: now there are SE positions ranging from customer service representatives whose main responsibility is to show new users how to use CEO, to a position that requires 10 years of SE experience. This, Mr. Fowler claimed, will create a career path that will encourage SEs to stay with DG for the long term, thus providing DG with senior SEs that understand users and their specific problems.

Paul Vann, the regional FE manager (DGSI), explained that the FE branches in the region are also undergoing a reorganization that will be a pilot program for North America, assuming that it works satisfactorily in the Illinois region. The FE restructuring took place on December 1.

The thrust of the FE branch restructuring is to reduce the administrative workload and the customer caseload of the branch managers, thus allowing them to service customers better and giving them a more intimate and thorough knowledge of each site.

One change is the consolidation of all contract administration and other administrative duties to the regional office. This is also a cost containment move, because the secretarial staff was moved to the regional offices and reduced in number.

To oversee the staff at the regional level, the new post of regional operations manager was created under the FE regional manager. It will be filled by Bob Letts. Under him will be the SSRs, the regional operations specialist, and the regional administration manager. The regional operations specialist, John Kotlarchik, will handle problem escalation and will coordinate the allocation of regional aid to local problems. The regional operations specialist replaces the branch operations specialist posts that were previously at the branch level. The software service representatives are now based at the regional level rather than the area level, so they should be more available to regional customers.

The branches have undergone a restructuring as well. There will now be five branches in the region as opposed to four. Basically, the southern portions of the Chicago and Schaumburg branches have been cut away and placed in a new branch headquartered in Hazelcrest. The St. Louis branch (headed by Keith Mangels) won't be affected. The Central Illinois branch (Schaumburg remote) is also not affected and will be headed by Tom Conran. The Chicago Loop branch will now extend south to the Eisenhower Expressway, north to Skokie, east to the lake, and west to O'Hare. The Chicago branch, headed by Suki Kroeber, will still have its offices in the loop. The new Chicago South branch in Hazelcrest will be headed by Mark Heikes. It extends south from the Eisenhower to Kankee, and from Aurora on the west to Gary, Indiana on the east. Finally, the Schaumburg branch will be headed by Jim Kroc and will only extend as far south as the East-West Expressway.

The final speaker, Don McAfoose, is the new area technical services manager, a new post reporting to Harold Dolezal, area SE manager. The people on his staff will concentrate on specific areas. Bill Cusack will specialize in industrial automation; Terry Hartigan in IBM communications, PC communications, SNA, LANs, etc.; and Pat Walsh will specialize in operating systems and data bases.

Finally, Mr. McAfoose came to the topic users were expecting: new hardware announcements. DG products now start at the MV/2000 DC (.9 MIPS) and continue with the MV/7800 DC (1 MIPS, replacing the MV/4000 DC at .6 MIPS). Then come the MV/15000 model 8 (2.8

MIPS, replacing the MV/8000 at 1.2 MIPS), the MV/15000 model 10 (4.3 MIPS), the MV/15000 model 20 (6.4 MIPS), the MV/20000 model I, and the MV/20000 model II.

He claimed that the MV/15000 model 8 could be upgraded to the model 10 (going from 2.8 to 4.2 MIPS) by changing one board and the microcode—at the "cost of approximately a disk drive." It later turned out to be a very expensive disk drive—about $75,000. To go to the model 20 would cost $160,000. Upgrading the MV/4000 to the MV/15000 model 8 costs about $60,000, while upgrading the MV/10000 to the MV/15000 model 10 would cost about $85,000; upgrading an MV/8000 model II to the MV/15000 model 8 would cost about $55,000.

1986-87 CADGUG officers and committee chairs:
President—Dave Angulo, Angulo Consulting; 312/342-7368
Vice-President—John Eymann, DB Credit; 312/948-7272
Secretary—Ron Roller, Roller & Associates; 312/858-2856
Treasurer—Jim Siegman, McDonnell Douglas Automation; 312/318-0700
Past-President—Jim Siegman
Program Committee—Art Lewandowski, Republic Service Bureau; 312/420-6800
Technical Committee—Neil Redshaw, DB Credit; 312/948-7272
Financial Committee—Jim Siegman
Membership Committee—John Eymann Δ

OASIS lives up to definition

by Carolyn Kelly
Focus Staff

The word "oasis" means a fertile place in an unexpected area. That's what the Office Automation Special Interest Subcommittee (OASIS) was—rich with ideas—at its third CEO workshop, held in Peapack, New Jersey, last December 4th and 5th.

With about 60 people in attendance, the workshop featured guest speakers, product reviews, and open discussion forums on office automation. Topics included a review of CEO rev 2.20, a talk on how to improve system performance by monitoring space use and cleaning files, and a look at the Eagle Software's Terminator, a VS Toolbox utility that helps reduce unwanted PIDs on CEO CP.

The event was organized by Bobbie Pressman, the vice president of OASIS, and Kay Breece of Silent Watchman, and was coordinated by Janet Elston for the host company, Beneficial Data Processing Corporation. OASIS, a special interest group of NADGUG, has grown quickly by offering free memberships to attendees. With approximately 130 members at this time, OASIS could be the largest SIG, according to Pressman.

The CEO workshop attracted about 40 newcomers (almost half the total attendance) and a high turnout of Data General employees. In fact, several speakers were from DG. Leonard McNulty reviewed some familiar facts about the Atlanta Customer Support Center and listened to users' opinions, complaints, and suggestions. David Dabbs talked about improvements in rev 3.0 of CEO Connect. Skip Richards discussed some tightly guarded information concerning the latest revisions Data General is working on.

Other discussions focused on special CEO applications such as the bulletin board and corporate uses. "Just the idea that you can use public files is the center of attention," Pressman said. Some other tricks were shared concerning the use of list processing and how to schedule vacations with CEO's calendar.

With the success of this workshop behind them, OASIS members are planning their next workshop for (tentatively) late April in Chicago. They are looking for attendance to beat last year's count of 125. Pressman is also thinking of ways to better suit the needs of those attending, such as holding split sessions. Groups would be divided into new versus well established installations, technical personnel versus CEO managers, or large versus small systems.

For more information on OASIS, please contact Charlene Kirian c/o On-Line Computer Library, 6565 Frantz Road, Dublin, OH 43017; 614/764-6435 or Bobbie Pressman at 312/948-7272. Δ

AD INDEX

CLASSIFIED ADS

MEMBER ANNOUNCEMENTS

Calling all FEDs: newly formed NADGUG Federal Special Interest Group (FEDSIG) open for membership, seeking U.S. Government and contractor employees who work with Data General computers. Organization's intent is to review new DG products applicable to federal marketplace, disseminate information about public domain software, and keep abreast of changing government procurement policies. Will be geared to real-time oriented contingent as well as business/office professionals. Annual dues of $25 include monthly newsletter (the FEDRAG), membership directory, and coffee cup with FEDSIG logo. Send inquiries to FEDSIG membership, c/o Fred Rea, Interfacers, 4400 East-West Hwy., Suite 30, Bethesda, MD 20814.

MEMBER ADS

Member notices are a great way to reach the DG user community concerning new interest groups, seminars, problems, or any other non-commercial subject. Catch readers' attention while their feet are up!

These member-to-member notices are a free service to anyone who joins NADGUG.

If you or your organization would like to communicate with NADGUG members through *Focus* Magazine, contact Sharon Park, sales manager, at 512/345-5316.

SOFTWARE

Although the price of DG's stock has languished this year, analysts are beginning to deliver favorable predictions for 1987. Peter T.T. Lieu, of Furman Selz Mager Dietz & Birney, Inc., had this to say: "We think Data General is an especially cheap stock with minimal downside risk and substantial upside potential." Some of the reasons behind Lieu's favorable prognosis:

- When measured against parameters like revenues, cash flow, R & D expenditures, and service revenues, DG's stock is vastly undervalued in comparison to similar measures for stocks like DEC and Tandem.
- Despite disappointing earnings for the last two years, DG has improved its balance sheet and invested heavily in modernization and R & D. In the last three years the company spent $500 million to modernize manufacturing, while improving its cash position by more than 50 percent—even after paying $50 million to settle the Fairchild antitrust case.
- DG's "very conservative accounting practices and tight operational control" helped generate cash equal to 10 percent of sales. This compares very favorably to the 13 percent generated by DEC.

■

Ira Ellenbogen, RDOS guru and president of Nanosecond Systems, expects to begin shipping a 32-bit version of his "RDOS upgrade" this month. For several years, Ellenbogen has been providing a 16-bit product called Discos, which offers as many as 16 grounds for RDOS users who need more than the standard two grounds in RDOS. He expects the 32-bit version will appeal to many existing RDOS users who would like to move to newer, more powerful DG processors such as the MV/7800. Data General has said it doesn't intend to rewrite RDOS for the MV/7800. Both the 16- bit and the 32-bit products will get a new name: Nanos.

■

Rumors are circulating that DG will introduce a new low-end 32-bit processor—probably called something like MV/1000—before the end of the year.

■

Mort Kahl was NADGUG's president in 1984- 85, but job changes took him outside of the DG community last year. He's back now, working as a consultant/sales manager for Vantage Software in New York. Vantage, a DG authorized system supplier, offers a variety of consulting services, utilities, conversions, and turnkey applications. Get in touch with Mort at 212/302-7711.

■

If you've missed Charlene Kirian's column (OA Today), you may want to send her a get-well greeting. She hasn't been able to work (or write) while recuperating from severe back problems. As president of NADGUG's Office Automation Special Interest Subcommittee, she especially regretted not being able to attend the recent OASIS workshop on CEO (see page 58).

■

Virtual Microsystems, Inc. has merged with Ross Systems to form Ross-Data Corporation. Virtual Micro is the developer of bridge products to allow DEC and DG systems to run popular microcomputer software, and to let PCs run as terminals on the mini systems. Ross Systems develops software for DEC VAX systems. The two companies will retain their individual identities while cooperating on development and marketing.

■

Pepcom Industries of Raleigh, North Carolina, operates nine Pepsi-Cola bottling plants serving the East Coast of the United States. Pepcom has signed a contract to buy a Data General MV/20000 system with accounting and order processing software from MAXON Computer Systems of Toronto. Total value of the hardware and software was $420,000. MAXON, formerly known as MICOM, recently went public; its stock is traded on the Toronto Stock Exchange.

■

WordPerfect Corporation uses nearly identical file formats for its software products, whether they run on a PC or a DG mini. This makes for good compatibility between systems. However, only users of 32-bit DG systems have been able to install WordPerfect Library, a new office automation product that includes electronic mail, calendars, scheduling, a clipboard, and a shell to integrate WordPerfect word processing and MathPlan spreadsheet software.

WordPerfect and Rational Data Systems recently announced plans to make WordPerfect Library available to PC users through Rational's PC/VS micro-mini integration products. The first phase is to use the PC/VS Notifier to deliver mail notifications from the mini to the PC via a high-speed local area network link. Notifier was originally developed to fill a similar function with Data General's CEO office automation software. Other PC/VS functions include disk and print service, high-speed file transfer, remote command execution, remote interprocess communications, and terminal emulation.

■

Todd Woodcock headed DG's development laboratory in Austin until DG closed it down last year. Now he is joining Fujitsu America's storage product division as engineering vice president. During the next several months he will be hiring 10 to 15 engineers to develop products that could include laser printer controllers and disk drive interfaces. This is the first time the Fujitsu division will handle its own development efforts.

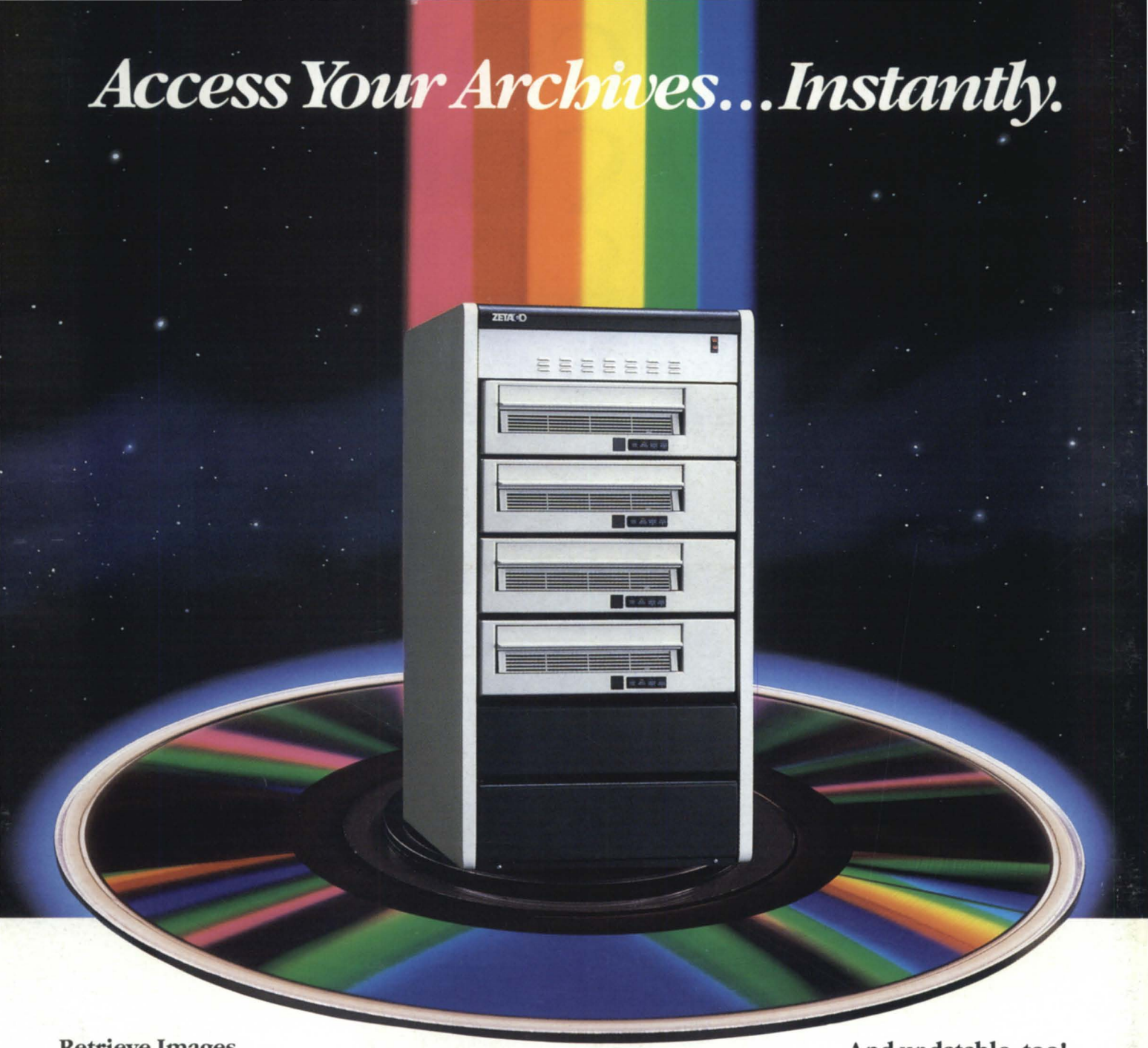
■

Galaxy 2000 is the name of the credit union information system marketed by Citicorp Information Resources. CIR is a wholly owned subsidiary of Citicorp, the largest bank holding company in the United States. DG recently signed a $15 million contract with CIR to make MV/ family computers available with the Galaxy system. Four MV/20000 systems have already been shipped to credit unions in Seattle; San Diego; Troy, Michigan; and Columbia, South Carolina, where they will replace IBM and Burroughs systems. Galaxy 2000 supports automated bill paying, automatic teller machines, and at-home banking using personal computers, as well as audio response and dial-up connections to let credit union members make inquiries and transfer funds.

■

Credit Cognos Corporation with the most compelling news release to cross this desk so far this year. They announced the sale of their PowerHouse 4GL to Warner/Elektra/Atlantic Corporation with—what else—a Madonna album. WEA will use PowerHouse on five MV/20000s and two MV/8000s to computerize its warehousing operations. This is one announcement that's sure to get a lot of play.

Access Your Archives...Instantly.



Retrieve Images in 1 to 2 seconds!

Zetaco's new LRS-10 optical subsystem gives you faster imaging time than any other optical subsystem available in the DG world! Because it runs under a disk emulation, LRS-10 has full random access capability, and approaches mag disk response times. In recent tests, an optical subsystem running as a tape emulation required 10 to 20 seconds to bring an image to the screen; LRS-10 took only 1 to 2 seconds.

The LRS-10 provides 1 GB storage per side of double-sided optical platter for your archived CAD/CAM drawings, customer/patient files, medical scanning images, legal/utilities records, or other large databases. A fully populated system (8 GB capacity; 4 GB on-line at one time) fits compactly into one meter-high cabinet.

Fully DG-compatible, LRS-10 uses standard AOS or AOS/VS, so you can continue using your same applications programs. Zetaco-supplied utility software lets you mount & dismount platters, organize data into sub-directories, archive files from other devices, and get on-screen help.

And updatable, too!

LRS-10 has a unique, built-in feature called scrub/append that allows limited data changes, giving you a chance to update/finalize your files before they are recorded on the write-once-read-many optical unit.

For the full story on how to get on-line access to your archives, write Zetaco, 6850 Shady Oak Road, Eden Prairie, MN 55344 U.S.A., or call (612) 941-9480. Telex 290975. In Europe, 9 High Street, Tring, Hertfordshire HP23 5AH, England, (44)44282-7011 or telex 827557. Zetaco is a subsidiary of the Carlisle Corporation.

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Circle 45 on reader service card