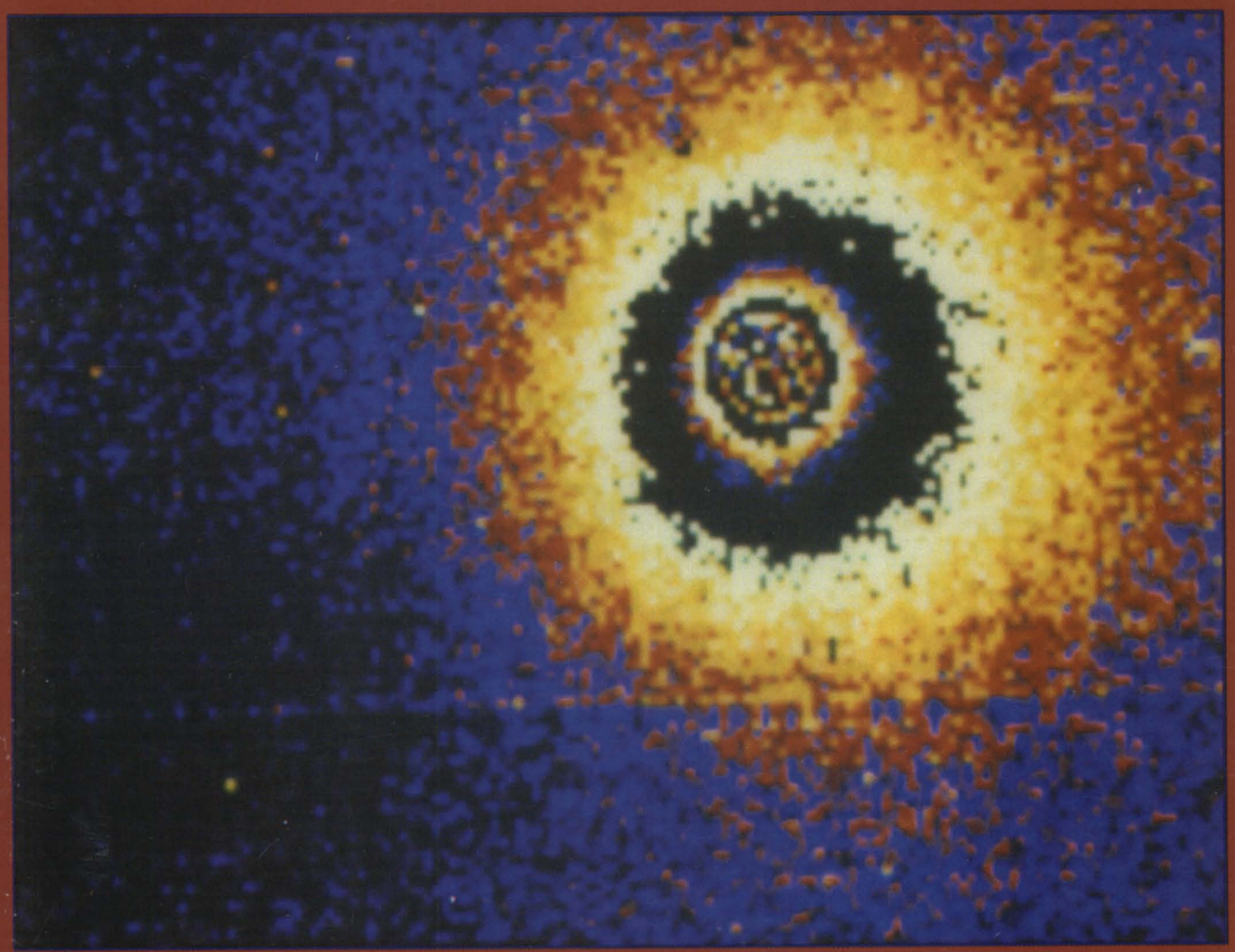
FOCUS

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

New Products Put DG Ahead

January 1986



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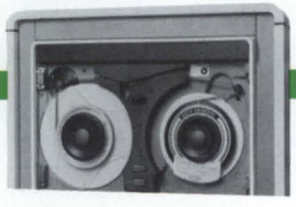

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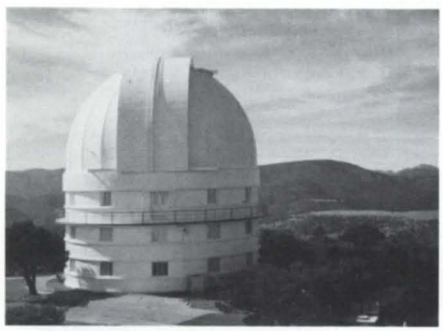

The 82-inch telescope dome at McDonald Observatory. Cover: Charge-couple device frame of Halley's comet, taken through narrow-band interference filter, November 18, 1985. The picture represents approximately 50,000 kilometers of the comet's coma.

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Here for the duration

Tom West is less of a media figure these days. Anybody who read *Soul of a New Machine* will remember him as the central character in that chronicle of the MV/8000. As time has passed, however, our sense of his dramatic presence has faded, along with our memories of the story's details. We have learned to see him as the corporate vice president he now is, rather than as the driven genius portrayed in the book.

Still, there was a noticeable sharpening of attention in the audience when West took the stage on November 18. Reporters for the trade press have notoriously short attention spans, but here they sensed a possible lead for their stories on Data General's new products. They sat with pencils ready, hoping that West would reward them with a meaty quote.

Much of his speech was lost on most of the audience, however. They (myself included) were at sea without a compass when West launched into a description of the gate arrays used in the new machines. His allusions to emitter-coupled logic and Schottky transistor-to-transistor logic seemed to imply that this was good technology. Most of us were ready to take his word for it, but it didn't make much of an impression.

What *did* make an impression was West's aggressive comparison of Data General's machines with Digital Equipment's and IBM's. He began by describing, "The technology we practice, and why we will prevail." He concluded with, "It's time to stop wondering about our technology. We're here for the duration."

That sounded a lot like speeches DG President Edson D. de Castro has been making recently—where he says Data General is going to be one of the few information processing companies to survive into the twenty-first century. Certainly what West was describing is a crucial ingredient in de Castro's recipe for survival: the ability to produce a broad line of high-quality, low-cost products. The rest of the recipe is to develop a discriminating understanding of the needs of the market: what are the customers' problems, and how can the company provide total solutions.

With the new products described in this issue of *Focus*, Data General has positioned itself as the lowest-cost provider of the broadest range of minicomputers anywhere in the industry. I take that as persuasive evidence that DG can deliver the technology-driven ingredients of the recipe. So how is the company doing on the market-driven side?

Until perhaps a year ago I had my doubts. As the company tried to address the needs of end users, it frequently angered and alienated the OEMs who continued to account for a large proportion of DG's sales. Software quality control and support were much criticized. DG seemed to be having trouble making the conversion from iron-pumper to provider-of-solutions.

Although it would be hard to document, I think a lot has changed. I have to fall back on anecdotes such as the following to make my point. Jim Foxworthy, director of DG's Atlanta Customer Support Center, said recently that if somebody without a service contract calls with a problem, the staff will probably advise them anyway. "We may lose a little revenue, but we stand a good chance of turning them into paying customers." It seems to me that this attitude of loyalty *to* the customer begets loyalty *from* the customer.

I don't think I'm alone in concluding that DG has turned the corner in its ability to understand and profitably address the market's needs. It's worth noting that of the computer companies listed recently in *BusinessWeek*'s "Corporate Scoreboard," only Seagate Technology had a higher price/earnings ratio. In other words, despite DG's miserable 1985 profits, investors are paying premium prices for DG's stock—something they wouldn't do if they didn't believe earnings will improve significantly in the near term.

It's always the hardware that gets the attention, and DG's new machines are indeed impressive pieces of hardware. But it's *customers*, not hardware, that will make or break a company's chances at long-term survival. Data General appears to understand this. We, as users of DG equipment, have never been in a better position to make our needs known, because we, too, are here for the duration.Δ

—G.F.

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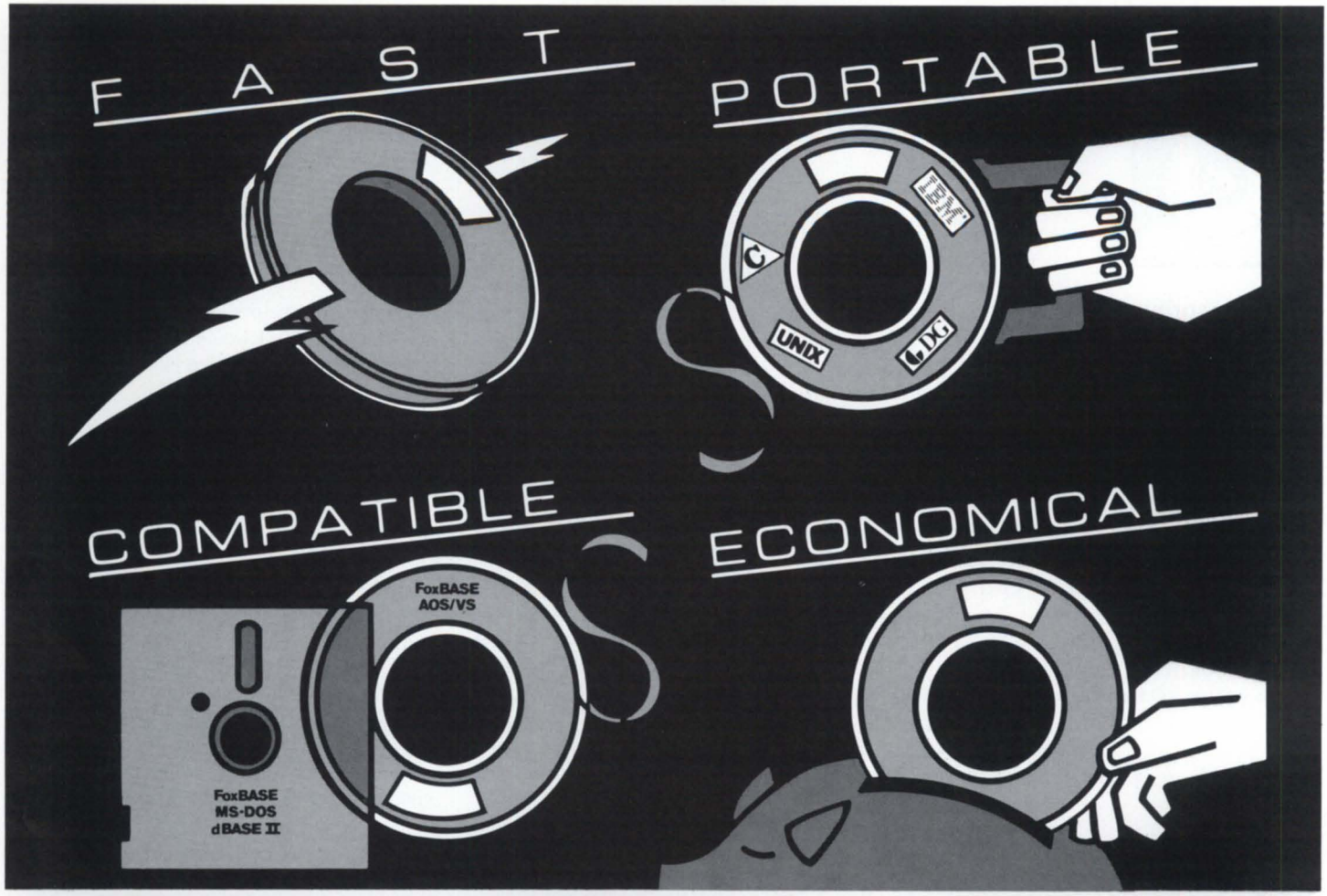

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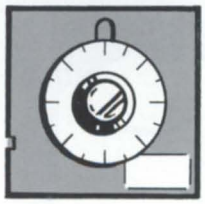

More security suggestions

This is in response to the problem Jim Siegman posed in his article "[!READ] and System (in)Security" in the October 1985 issue of *Focus*.

The problem can be taken care of by replacing the [!READ] with the following:

```
CREATE CLI.PR
CLASS1 IGNORE
STR [!READ Hit <NEW LINE> to continue:]
CLASS1 ERROR
DELETE CLI.PR
```

I hope this will help that kind of situation.

Subhash Bhardwaj
Cabot, Cabot & Forbes
Boston, MA

I feel compelled to reply to Jim Siegman's article in October 1985 of *Focus*. The problem of insulating users from CLI is surely a common one faced by DG users. Here in the laboratory of Holy Cross Hospital we have used a system for several years with great success. I think the problem you keep running into in your article is the difficulty of using CLI to keep a user away from CLI. It also seems unnecessary to have a CLI process running for each user you wish to prevent from using CLI anyway.

Our approach here, for which I must credit my predecessor, Bill Peters (now with DG), is to start each terminal in our application menu system without any log-in. In many environments this would be ill advised, but for many others it can solve many lingering problems. It requires no user/password knowledge on the part of users. Terminals are "fired up" as part of the System UP macro and given a USERNAME that describes the location of the terminal (e.g., OFFICE). Most important, system security is very solid; access is limited according to which application programs each user has the password to use.

The system UP macro PROCs up a "manager" program. This program then reads through an input file (called TUBES), which contains the values for the USERNAME=, NAME=, DIRECTORY=, IOC= switches, and program to PROC up for each terminal. This makes the addition, deletion, or moving of a terminal as simple as editing this all-text input file. If users should terminate their process (by a ^C^B, or fatal error), this is detected by the "manager" program, which then rePROCs them in their initial program. As far as most employees here know, the menu system is the *only* interface to the computer system.

John A. Richter
System Analyst
Holy Cross Hospital
Detroit, MI

While reading the October issue of *Focus*, I came across Jim Siegman's article concerning [!READ] and system security. In response to the problem presented by the STRING [!READ] command being used in macros, I offer this suggestion:

Replace the line containing the STRING [!READ] command with:

```
[!EQUAL, ([!READ Hit <NEW-LINE> to continue. . .]),( ) ]
[!END]
```

This line cannot be interpreted as more than one command since the pseudo-macro [!READ] is contained within an expression. And the [!END] on the next line insures that the rest of the macro will be executed whatever the input is.

I hope this suggestion proves to be a useful solution to this kind of problem for any of your readers experiencing difficulties in CLI macro usage.

Joseph B. Lowe
Programmer/analyst
Allied Administrators
Kansas City, MO

Printronix perplexities

I am a member of NADGUG. Recently our company installed an MV/4000 running under AOS/VS. We installed a P300 Printronix printer we bought used, and we haven't received any manuals as of yet. I am hopeful you might be able to help me find an answer to a question. The printer is controlled by a DCH as an LPT. I would like to know the commands to start and stop elongated printing on the P300.

Randy E. Kreiser
Systems Manager
Sowers Printing Company
Lebanon, PA

Editor's Note: This letter was addressed to Jim Siegman. Here is his reply:

You may have problems sysgenning it as an LPB because it does not have the same VFU control the DG (Data Products) printers have. You need to sysgen it as an LPD. All the commands to control the printer are covered in the Data General manual 093-243 *How to Generate and Run AOS/VS*.

In order to create the printer spooler LPT you would need to execute the following set of commands:

```
CONTROL__ @EXEC CREATE PRINT LPT
CONTROL__ @EXEC OPEN LPT
```

This only needs to be run once (when you rebuild your system disk).

To start the printer when the system is running, execute the following:

```
CONTROL__ @EXEC START LPT @LPD
CONTROL__ @EXEC CONTINUE @LPD
```

This is the minimum required to start the printer. If you are using forms control or other printer management functions, refer to the manual for more details.

To shut it down:

```
CONTROL__ @EXEC STOP @LPD
```

In order to use the special features of Printronix, there are three steps: (1) Obtain a copy of the Printronix manual. (2) Learn how to use SPEED or FED to create forms control files for the Printronix. (3) You'll probably want to write a set of CLI macros to manage the forms control since DG doesn't manage Printronix form controls.

However, if you are going to imbed the forms control and special features control sequences in your reports, you may be able to avoid having to create the form control files and the macros to manage the printer.

I will work on a column to present a case study of an installation, using an L600 Printronix printer on an MV/8000.

Data security on magnetic tape

by Lawrence Feidelman
Special to Focus

Although magnetic tape users are concerned about data security within the data processing installation, they may be unwittingly giving away key company information at little or no cost. Used magnetic tape must be properly erased before it is sold or given away. In fact, a user is probably better off burning the tape media.

When computer magnetic tape is purchased, it may be considered a commodity or a supply item. However, once company data is written onto it, it quickly becomes a valuable company asset. Therefore, it must be guarded like any other asset within an organization. This is true for floppy disks and any other similar media.

Disposal (i.e., selling, giving away, or trashing) of used magnetic tape has recently increased due to magnetic tape transports switching to the IBM 3480. Once data conversion is complete, previous magnetic tape media is no longer needed. There is also an increase in the disposal of floppy disks due to changes from 5.25-inch disk drives to 3.5-inch.

If a data processing manager is viewing used magnetic tape as a *commodity* rather than an *asset*, he may wish to recover some media costs after converting data. Instead of gaining profit, he may actually be giving away critical company information at a ridiculously low price. In effect, he may be giving away information his company has spent hundreds of thousands of dollars to safeguard.

It is similar to a company selling their hard-copy files to a paper dealer and placing *X*'s over the text on each piece of paper. The *X*'s don't really stop anyone from reading the papers.

Proper procedures must be employed to completely erase all data contained on magnetic tape. This data may include company financial information, customer credit information, bank records, or product design information. Improper erasure procedures can result in serious legal and financial problems. Furthermore, by obtaining discarded magnetic tapes, a professional programmer or hacker could extract information from a company's data base much more easily, less expensively, and without any apparent lawbreaking.

Simply deleting files before tape disposal is not sufficient. Although the file header changes, the data remains. Also, a direct current erasure (i.e., erasure by passing a file by the tape head) is not sufficient because the data may still be recoverable.

The recommended methods for complete data erasure so that the data signal cannot be recovered are still debatable. They range from bulk demagnetizers to writing random bit patterns to writing a specific set of patterns that would cause two magnetic flux changes in each data block. The federal government has instituted various means of tape erasure, including the following: writing a pattern of all *I*'s followed by all *O*'s for low-level security, bulk erasure with a high-energy field for secret data, and thermal or chemical meltdown for top secret data.

The essential point is that a need exists today within the data processing community to clearly delineate the accepted procedures for magnetic tape erasure before disposal. Since the problem may be growing, it had better be done now. Δ

Lawrence Feidelman is president of Management Information Corporation (MIC), the Cherry Hill, New Jersey, international information service and independent research organization.

Because of the excellent "seeing" conditions and variety of instruments, telescope time at McDonald is highly prized

A night on the mountain

DG equipment helps McDonald Observatory astronomers monitor Halley's comet

by John Hartzell
Focus Staff

Recently I was privileged to spend a night on the mountain, as University of Texas astronomers refer to time passed at McDonald Observatory. It was an experience I will always remember fondly. I got the assignment because we knew that DG equipment was being used extensively to monitor the approach of Halley's comet. Little did I know that the assignment would provide an intense personal experience. It is impossible for a sentient being not to be moved when he stands on a mountain looking at thousands of stars and then sees those stars through a powerful telescope.

The comet. Halley's (pronounced to rhyme with "Sally's") comet is named for Edmund Halley, eminent English astronomer and friend to Sir Isaac Newton. In 1682, Halley had closely observed the comet; in 1704, he predicted that the comet would return in 1759. When it did (17 years after Halley's death), the comet came to be known by his name.

The Chinese reliably recorded Halley's comet as long ago as 240 B.C. Since then, the comet has traversed the solar end of its elliptical orbit every 76 years or so. On this, its 28th definitely recorded visit to the sun, Halley will be scrutinized not only by experts on Earth, but also by spacecraft that will pass close to the heart of the comet in early 1986. Since comets are thought to comprise the primordial stuff of which our solar system was formed 4.5 billion years ago, the event assumes special importance.

On this visit to the central region of the solar system, Halley was spotted first by the huge Mount Palomar telescope on October 16, 1982. At that time too far away from the sun to have a "tail," the comet was still beyond Saturn's orbit. It was as faint as a lighted candle seen from 27,000 miles away. Yet by December of 1985 the comet was barely visible to the naked eye, and in the spring of 1986 it will assume the classic comet configuration in the sky, especially in the southern hemisphere.

On December 1, 1985, Halley's comet was approximately 138 million miles from the Sun and 60 million miles from Earth. Its velocity at that time was −58,230 mph with respect to the Sun and +23,200 mph with respect to Earth. The comet will reach perihelion (nearest proximity to the sun)—55 million miles—on the afternoon of February 9, 1986; it will pass within 40 million miles of Earth on April 11. Halley will be moving rapidly away from Earth in May, its brightness and tail diminishing. By summertime, it will again be invisible to the naked eye.

The observatory. When you look up from the top of the mountain on a moonless night, there are more stars than even a child could imagine. Mt. Locke, on which McDonald Observatory sits, is part of the Davis Mountains of West Texas, an old range whose contours are fantastically eroded. The observatory itself has an interesting history.

In 1927, a prosperous banker named William Johnson McDonald died in Paris, Texas. He bequeathed most of his fortune to the University of Texas and directed that the money be used to build an astronomical observatory. Although McDonald had long had an amateur's interest in science, especially in stargazing, the bequest was challenged by relatives. They claimed he had to have been of unsound mind to have done such a thing. They cited a statement attributed to him that if one had a large enough telescope, one could look through the gates of heaven and see who was there. According to Otto Struve, later to be the first director of the observatory, astronomers gave depositions that "a donation to astronomy does not necessarily imply insanity."

Eventually the case was settled out of court. The University received over $800,000, a hefty sum in those days but still

Halley's comet. Image-tube photograph taken at the 28-meter Cassegrain focus of the McDonald Observatory 82-inch Struve reflector telescope, November 15, 1985

not enough to enable the immediate building of a world-class telescope and facility. Options included constructing a smaller observatory convenient to the Austin campus or waiting until enough interest had accumulated on the principal to allow fulfillment of McDonald's dream (20 or 30 years).

Fortunately, in 1932 the University of Chicago proposed a joint effort: the University of Texas to build the observatory, and the University of Chicago to staff it. (The University of Texas assumed full responsibility for operation in 1962.) After the agreement had been signed, two Chicago astronomers equipped with a 4-inch telescope and a pickup scouted promising locations in Texas. They were searching for a site that had good weather (i.e., clear skies), little light pollution from cities, and minimal atmospheric disturbance (what astronomers refer to as "bad seeing"). Eventually a decision was made to place the observatory on U-Up-and-Down Mountain, near Fort Davis in West Texas. The mountain was later renamed Mt. Locke in honor of the donor of the land.

Construction of the observatory was completed in 1938, and the 82-inch telescope was in place in 1939. The clear nights (two out of every three all year) and uniform air conditions resulting from the 6,800-foot elevation soon proved the wisdom of the choice of site. Even today, McDonald is remote—smog and light pollution are not yet a problem. As a result, other telescopes have been added. In addition to the original 82-inch telescope, there are a 107 inch, a 36 inch, a 30 inch, and a "millimeter" (a telescope that investigates radiation of very short wavelengths). A 300-inch telescope may be built within a few years.

The McDonald facilities and its astronomers have always been among the world's best. Because of the excellent "seeing" conditions and variety of instruments, telescope time at McDonald is highly prized. Astronomers must apply for blocks of viewing time months in advance, and many applications are turned away. Obviously, viewing time during this apparition of Halley's comet is especially at a premium.

A night on the mountain. In early November, the University of Texas Astronomy Department and the McDonald administration graciously granted me permission to visit the observatory to examine firsthand the facility and the efforts to view Halley. I flew out of Austin on November 14. On the same flight were Dr. Ed Barker and astronomy graduate student Jackie Green, both of whom proved to be oracles on comets.

Dr. Barker is intimately involved in International Halley Watch, a worldwide organization of scientists who are bringing to bear as much of modern technology as possible during this pass of Halley. A research astronomer at the University of Texas, he is a recognized authority on comets and spectrometric analysis. Jackie Green is researching the heart of comets, the nucleus. Dr. Barker would be using the 107-inch telescope that night, and Green, the 36-inch. I was to spend most of the night following Dr. Barker and his compatriot, Dr. Chet Opal, also of the University of Texas Astronomy Department.

The drive from Midland, Texas, site of the nearest full-service airport, to the observatory was 183 miles. Dr. Barker and Jackie Green rode with me. We talked about comets (a comet really is sort of a "dirty snowball," although the "snow" comprises numerous frozen gases), about the status of astronomy in general (facts: funding is often difficult to come by; there are only about 6,000 astronomers in the world, half in the United States), and about the disappointment when the U.S. did not send a space probe to Halley.

I learned that comets differ considerably in their composition, a relatively recent discovery that surprised astronomers. Major factors in these differences are where a comet has been (i.e., what it has picked up along the way) and how many times it has been through the solar system (each trip toward the sun causes gases to escape; eventually, the particulate crust of the nucleus begins to leave too).

Although not all the computers are Data General, the Novas are the on-site workhorses

On arrival at the observatory, we checked into the motel-like Transient Quarters, had a good meal (there is a permanent staff at McDonald, from service personnel to technicians), and proceeded to the nearby 107-inch telescope dome (all the domes are clustered near the top of the mountain). Dr. Barker discussed a viewing schedule for the night with a delegation of French astronomers investigating "seeing" problems. The large telescope would have to be shared, according to the best viewing times for targeted items.

If the view of the mountains and valleys from outside the main observatory is impressive—and it is—so is the inside. The main dome is five stories, although the fifth story, where the 107-inch telescope and the control rooms are located, is several stories tall in itself. The telescope gives the impression of being a delicate boxcar. It is huge. Yet it has the capacity to move with the precision of a microsurgical instrument. It has to, in order to follow the slow progression of objects many millions of miles away across the night sky.

After a lengthy calibration period, Dr. Barker began to view a preset schedule of celestial objects, from other comets to standard stars. At this time I learned that as many as 11 comets are currently visible to astronomers, about double the usual number. Throughout the night, the 107-inch eye peered and measured, peered and measured.

From shortly after 1 a.m. until almost dawn, we scrutinized Halley's comet. Dr. Barker alternated between going into the dome, where he moved the overhead observatory slit and altered the celestial coordinates on the main console, and remaining in the control room to monitor Halley's progress across the sky.

Fine-tuning the tracking of the comet was accomplished with a hand-held console. We kept the comet, or portions of the comet, within very precise limits on the VDT screen. Doing so was easier said than done: The comet moves rapidly with respect to the stars, and there is considerable distortion caused by atmospheric turbulence on even the most peaceful nights. Since every few seconds the various instruments took a "snapshot" of the comet, it was imperative to have the telescope pointed at precisely the same spot each time. Otherwise, the data gathered from successive shots would not be comparable. A highlight of the evening was when Dr. Barker and Dr. Opal demonstrated how to use the hand-held console and let me take a turn at operating it.

Occasionally, Barker and other personnel would exit the dome to find the comet with—binoculars! And to try to see it with the naked eye. They agreed that it was of insufficient magnitude to be seen that way, but long minutes were spent dark-adapting and staring in hopes of convincing ourselves that it was there, just below the Pleiades. At other times, Barker checked on Jackie Green's success at the 36-inch dome just down the hill.

The equipment the astronomers use to manipulate the telescopes and to record data ranges from a dry-ice cooling unit to incredibly sophisticated spectrographic instruments, some of which Barker had designed. Spectrographic data enable scientists to determine the chemical composition of celestial objects, including the gases that sparsely fill the solar system and interstellar space. Various instruments sample the entire electromagnetic spectrum, generating huge amounts of data to be stored and analyzed. Obviously, the advent of the computer age greatly enhanced the productivity of astronomers, including those at McDonald.

The computers. Prominent among the equipment at McDonald are the numerous computers assigned to each of the telescopes. According to Dr. Phil Kelton, also of the UT Astronomy Department, there are five Data General Nova 4Xs at the McDonald site proper (two for the "millimeter," the others for the four main telescopes). Nova 2s are in each of the five domes, 8 or 10 in all.

When you first walk into the main control room of the 107-inch dome, you are struck by the NASA-like configuration of VDTs, terminals, oscilloscopes, and Nova computers. Once the lights are turned off, the winking array of LEDs lends beauty to technology. And there, on the VDT in the center, is the current object of observation, whether comet, planet, or star. At the other domes, less extensive but equally sophisticated computer arrays are found. Keeping the telescopes pointed in the right direction requires cooperation between computers and mechanical devices.

Although not all the computers are Data General, the Novas are the on-site workhorses. The Nova 2s are responsible largely for gathering and storing data during observation runs, whereas the Nova 4s provide larger storage and processing capacity. Data analysis can be performed on site, but more often is shifted back to Austin via permanent data-transfer lines.

According to Dr. Kelton, the many software programs needed to run McDonald are developed for the most part in house. A special staff of experts, long familiar with Novas, has the ability to write virtually any program needed, from telescope tracking to data gathering and analysis. With one exception, the Nova 4Xs run RDOS. The Nova 2s all run strictly on machine language; an operating system interface would slow them down too much.

One striking thing about the Novas, in addition to their age (installation occurred in the 1970s and early 1980s), is their toughness under stressful conditions. Even during the summer, it is cold in the mountains at night, and several of the computers operate in open-air arenas. At certain times of the year, wind and dust can be a problem—the DGs still have to work, and they do.

Day after night on the mountain. As dimly visible early morning fog slithers through the valleys below, we close down the telescope. It is time for reflection.

Impressive recollections come to mind: Halley's comet, invisible to the naked eye, yet six inches in diameter on a VDT, like another sun on the screen. The intensity of an inexplicable yearning induced by looking across millions of miles of space at objects that have been where even our children's children may never go. The quiet, quick intelligence of the astronomers and technicians who make McDonald work. The little Novas chugging away in the desert mountains, faithfully storing data and later making sense out of it.

Perhaps astronomy symbolizes best what man and his technology can accomplish. The cooperation of all the intricate parts, from human expertise to huge telescopes to computers, may yet realize Mr. McDonald's dream—to look through the gates of heaven and see who or what is there. Δ

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Up and down the line

The MV/ family bests the competition at both high and low ends

New York—The last several years have seen a high-stakes game of leapfrog between DG and Digital Equipment, with each company rushing to gain the technological lead, only to be overtaken by the next announcement from its rival. Recently, DEC had enjoyed the advantage, because Data General had not produced machines to compete with DEC's high-end VAX 8600 or its low-end MicroVAX II.

That changed abruptly on November 18, when Data General introduced the MV/20000 and the MV/2000 DC. With the announcements, Data General claimed it had established new price/performance standards across the 32-bit line, while achieving breakthroughs in compactness and reliability.

Announced at the same time were a new family of engineering workstations, an upgraded version of the AOS/VS operating system to support transparent distributed data processing, a data dictionary, and integrated design and office automation software. The company also introduced SHARE, a strategy for increasing the availability of system resources.

Lauding DG's rapid development of a broad line of 32-bit products, President Edson D. de Castro said, "How fast we got here tells you where we expect to be tomorrow." Senior Vice President Robert C. Miller added his claim that DG has made five years of progress in three years, and is now three years ahead of the competition.

According to DG's statistics, the company's new top-of-the-line processor, the Eclipse MV/20000, sets the price/performance standard for superminicomputers. The company estimates that the cost per user for MV/20000 systems could be as low as $5,000—the lowest entry-level cost and lowest price per user of any system in its class.

Performance ratings for the MV/20000 are somewhat better than analysts had expected. In its Model 1 configuration, the new machine can perform 5.5 million instructions per second (MIPS), at a cost per MIPS of approximately $42,000. The Model 1 can support up to 1,008 terminal connections, and as many as 160 CEO users.

The MV/20000 will soon be available in a dyadic-processor configuration called the Model 2, which delivers 10 MIPS, at a cost per MIPS of $33,000. A single-processor Model 1 system can be easily upgraded to a Model 2, according to DG. The only change needed is an additional single-board CPU; software and peripherals can remain the same.

The new machine is also available in a rack-mount version called the MV/20000 C. Just 10.5 inches high, the single-processor rack mount can be configured as a compute or file server in a distributed engineering workstation environment. Its cost per MIPS is $36,363.

The DS/7500 (front) and DS/7700 (rear)

Tom West, vice president for systems development, said the MV/20000 accommodates the central processing unit, memory, hardware accelerator, power supply, and I/O controller on only five boards; the comparable functions on DEC's VAX 8600 require 25 boards. West claimed a mean time between failures (MTBF) for the MV/20000 of more than 8,000 hours—almost a year of continuous operation—and a mean repair time of less than 75 minutes. The Model 2 should provide especially good system availability, because users can continue working even if one of its processors fails or is suspended.

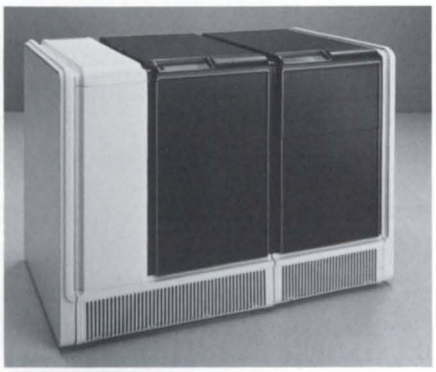
According to DG, each of the Motorola MCA1200ALS ECL/TTL gate arrays used in the MV/20000 integrates more circuitry than the entire original Nova. The 15 gate arrays per board more than double the electronics density of the VAX 8600.

Cycle time for the MV/20000 is 85 nanoseconds. Its memory capacity ranges from 4 MB to 64 MB, in 4 MB and 8 MB increments. Maximum I/O bandwidth is 35 MB per second, and aggregate memory bandwidth is 47 MB per second. It can support up to 27 gigabytes of disk storage, and as many as 28 tape drives. Prices start at $200,000 for a Model C with 4 MB of memory and hardware floating point unit. A Model 1 with 4 MB of memory costs $234,000, and the base Model 2 lists at $337,000.

At the low end, DG introduced the MV/2000 DC. An entry-level system with AOS/VS operating system, 2 MB of memory, four terminal connections, 38 MB disk drive, and 24 MB cartridge tape is priced at only $19,000. Data General says that the MV/2000 DC makes it practical to bring 32-bit power and sophistication to work groups as small as three users, at a cost per user as low as $4,500.

Housed in a compact plastic under-the-desk enclosure, the MV/2000 is quiet and inconspicuous. According to DG, it is user-installable and user-upgradeable. Its operating system and power-up diagnostics are preinstalled on the system disk, and an auto-boot feature provides for automatic system generation. A System Manager Interface includes menu-driven functions, a tutorial, and help function, all designed to free the user from technical details.

The MV/2000's single 15-inch board includes the CPU, a floating point unit, 2 MB of memory, four asynchronous ports, real-time clock, and disk and tape controllers. The MV/2000 DC has no backplane, because half-size option cards and memory expansion modules are designed to connect directly to the



The MV/20000

central unit. The option cards can give the system up to 5 MB of memory, and up to 24 terminal connections. A local-bus LAN controller card and an IEEE 802.3 Ethernet transceiver will allow it to serve as a node in a local area network.

A 38 MB disk drive is standard, but the system can be ordered with two drives, in capacities of 38, 70, or 120 MB, up to a total capacity of 240 MB. There are two backup options: either a 737 KB diskette drive or a 24 MB cartridge tape drive. Disk and tape drives are enclosed in the system's housing.

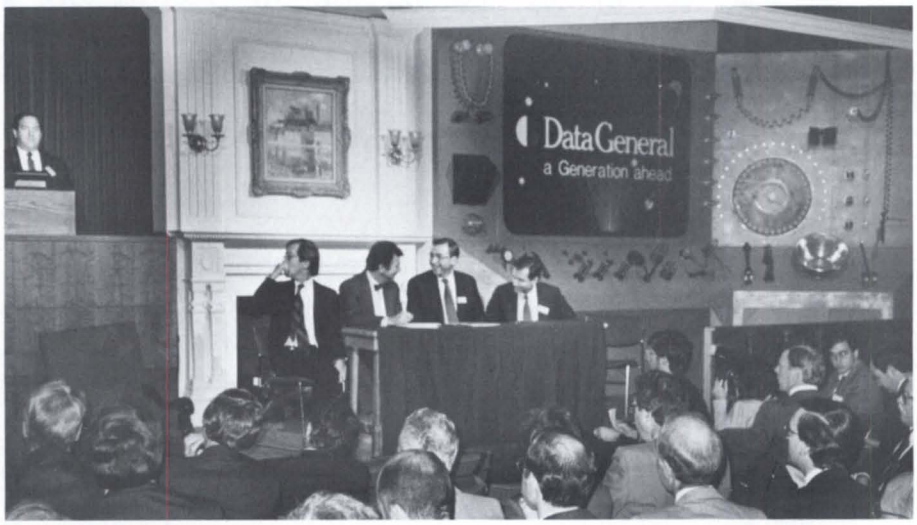
DG also announced a new family of engineering workstations, the DS/7500 series and the DS/7700 series. Both are based on a single system board featuring a 32-bit CPU, floating point unit, 2 MB of memory, four terminal connections, one parallel printer port, peripheral controllers, calendar/clock, and an I/O processor. The main differences between the two series are in the amount of memory they can support, and the display options they provide.

The DS/7700 series also provides a high-speed standard system bus, called the Interprocessor Bus, designed to support parallel processing for CPU-intensive tasks. The I-Bus supports transfer rates of 44.5 megabytes per second. Boards on the bus can be either general purpose, or dedicated to specific applications such as graphics. Data General will make interface specifications and hardware for the I-Bus available to encourage OEMs and end users to connect their own products to the bus.

Prices for the workstations range from $18,600 for a monochrome DS/7500 with a 38 MB disk drive, to $53,000 for a DS/7700 with a 24-bit color display and 70 MB disk.

Pictures at an exhibition

by Greg Farman
Focus Staff



New York—One never knows what to expect when Data General stages a major product introduction. After all, the name of the game is impressing the press, and the payoff is getting enough media coverage to build momentum for the product. Getting ink in *Focus* is easy, because DG users are automatically interested. *The New York Times* is another matter.

Ambience helps. A swank location will bring out more reporters, especially if food and drink are featured prominently in the invitation. In the past, DG has hosted the hordes of the fourth estate to memorable meals at some of New York's best hotels and restaurants. So what in the world were they doing scheduling this introduction at Christie's, the noted gallery and auction house for art and expensive collectables?

As I peered at the paintings and prints displayed outside the exhibit hall, I asked a friend what he thought the angle was. He answered that DG's marketing moguls had made a habit of one-upping themselves. He smiled mysteriously and added, "It was either here or 4400 Computer Drive in Westboro." I got the picture: he wasn't going to give any hints before the show.

I spotted another friend and tried to make a joke about the risks of attending a press conference at an auction house. "Don't raise your hand to ask a question," I warned. "You might end up buying a computer." He must have already heard it.

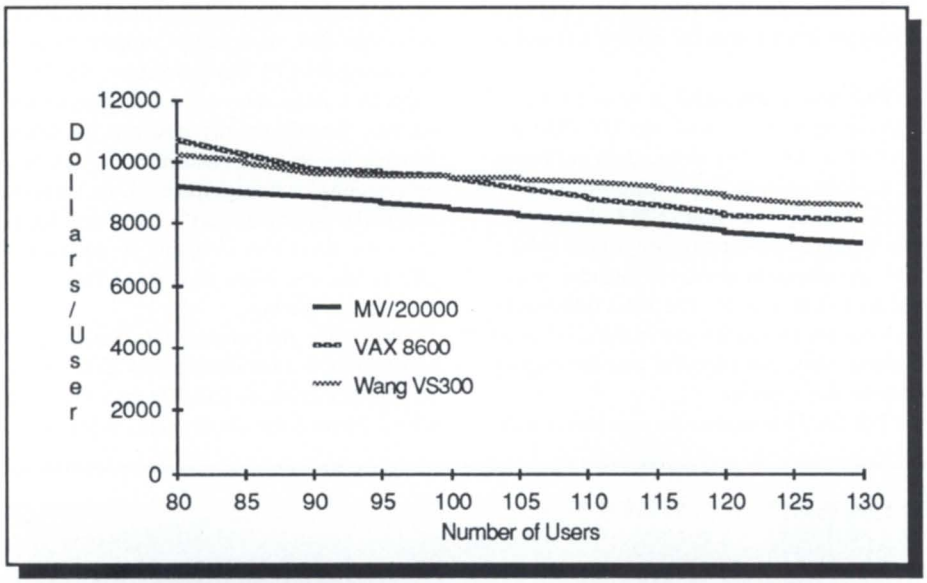
Finally the door opened, and the multitudes filed in. Everything looked pretty conventional, except for the wing-backed chair facing away from the audience. In it sat either a very oddly made-up mannequin or an actor with an advanced case of rigor mortis.

The first hint of impending activity came when Herb Richman, DG's executive vice president, sauntered across the front of the auditorium. A few seconds later the lights went down, the actor sprang from his chair, and the show was under way.

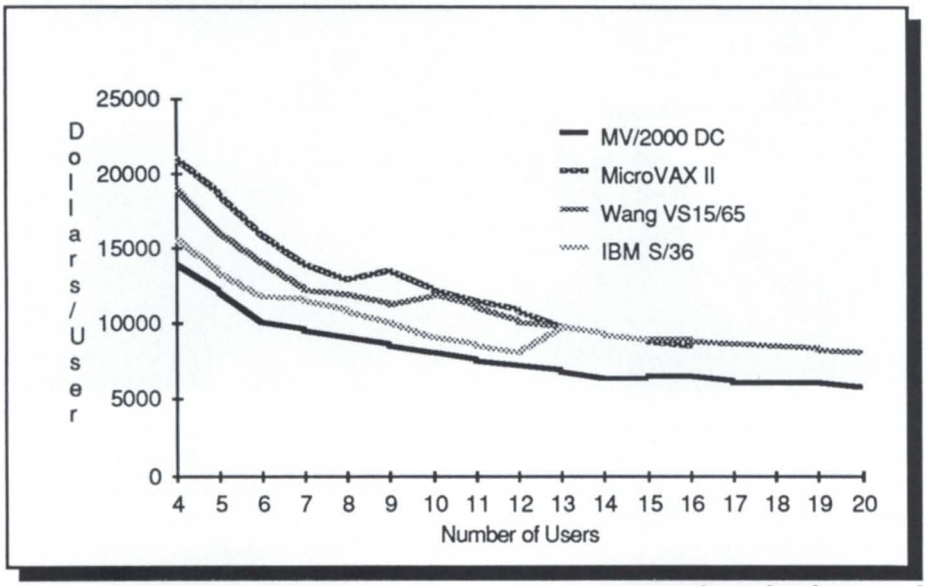
His voice reminded me of Vincent Price's, but it soon became evident that he was supposed to be H.G. Wells. He pulled back a velvet curtain to unveil a "miracle machine"—a contraption of flashing lights, wheels, levers, and curiously enough, a rear-projection screen. "Fear not," he declaimed, "We are about to become time travelers!" So much for verisimilitude.

The screen showed fascinating footage from old newsreels of ENIAC, UNIVAC, and other computing engines of the past. As the ersatz Wells described amazing advances in computer technology, the film jumped ahead to 2001 and HAL of Space Odyssey fame. More monologue, then a question: "How did the mortals of the mid-1980s manage to turn

(continued on page 46)



Per-user cost at the high end. . .



. . . and at the low end

Based on DG's estimates of the cost of providing comparable systems with about 7 MB of disk storage per user, one printer per seven users, workstations, and memory. Prices include operating system, COBOL, communication software, word processing, graphics, spreadsheet, data base query, data management, OA filing, and electronic mail.

Each workstation includes a right-to-use (RTU) license for one of three operating systems: AOS/VS, the new AOS/DVS for distributed environments, or Unix. (Tim Maness describes the new operating system enhancements in his MV/ systems column on page 33.)

Complementing the workstations is DG's Graphics Software library (GSL), a set of tools that includes a window display manager. GSL interfaces directly to DG/STAGE, a standard software package which brings user-definable menus and electronic mail to engineering applications. By adding DG's CEO office automation software to DG/STAGE, workstation users can now have what DG refers to as TEO, the Technical Electronic Office.

Along with the other software products, Data General also introduced DG/Data Dictionary, a data management tool that keeps track of what data exists, its source and structure, and how it is processed and used throughout an organization. By maintaining a data base of entities such as files, programs, reports, sites, and users, DG/Data Dictionary can determine all items that would be affected by a change to a given item.

DG took a major step toward fault-tolerant processing when it announced a strategy for making computer resources available during routine maintenance or component failures. The strategy is called SHARE, for Shared Highly Available Resource Environment. It is based on a combination of alternate path techniques and resource redundancy. The company says it will work toward new products that customers can add as incremental investments to their MV/ systems. The company pledges that the customers won't need to trade performance or software compatibility as they add fault-tolerant capabilities.

The initial steps toward SHARE architecture include:

- Single-processor operation of the Dual-processor MV/20000 Model 2,
- Physical disk mirroring on DG's 354 MB and 592 MB disk subsystems,
- Disk dual porting on 354 MB and 592 MB disk subsystems,
- On-line backup using mirrored disk pairs.

The next phase will be to allow system resources such as terminals, workstations, and processors to be distributed across a company's network of computer systems. In the longer term, the company will provide global hardware and software resource sharing, wide-ranging distribution of additional computer resources, and a shared system environment. Δ

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Last month I invited anybody who wished to be on our mailing list to send a card to the address below. Naturally there was no address below. This was not a subtle hint to our readers. So for any who wish to be on our mailing list, write to 4301 Oak Circle, Unit 11, Boca Raton, FL 33431. That really is our address — honest!

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MV earns top scholastic honors

The evaluation, selection, and operation of computing equipment at Radford University

by Thomas C. McMillan
Special to Focus

In this article I will discuss the approach used at Virginia's Radford University to evaluate, select, and operate computing equipment in support of academic computing. At Radford we were presented with the problem of selecting a computer system to be used solely to support teaching and research. It was not for administrative use. Because there were few programs and data files to be transported to the new system, the cost of porting existing programs had little effect in our deliberations.

In issuing a request for proposals and in evaluating the proposals supplied by various vendors, Radford University had to work within guidelines set forth by the Commonwealth of Virginia. The guidelines did give us considerable flexibility in devising a scoring plan, and the selection committee was able to choose a system that met the current needs of the university and could be upgraded to meet future requirements. The result of the 15-month selection process was the purchase of a Data General MV/10000.

We anticipated that most of the proposals for review would be for systems that are more commonly found in commercial or industrial settings. It turned out that many references were using proposed equipment in an application different from ours. Part of our problem was to evaluate how easily and how well such machines could be adapted to an academic environment.

Characteristics that we feel occur more frequently in academic computing than in commercial computing include: a large number of user accounts, a large number of relatively small jobs and files, most of the time spent in editing and compiling, many recompiles and relinks, few production programs run on a regular basis, and a wider variety of software (including several languages and applications programs).

The request for proposals required each vendor to submit a document describing the particular system being proposed. Accurately evaluating vendor responses proved to be time-consuming. Different types of requirements called for different approaches in the evaluation of vendor responses.

Whether certain specifications were met could be checked by referring to the technical manuals supplied by the vendor. The first pass of the proposals allowed us to eliminate some proposed systems for failure to meet a mandatory requirement. It was more difficult to determine how well a proposed system would meet our unique requirements.

One approach to evaluating a system's performance under a given load is to run a computer simulation of the system under consideration. This approach would have required designing an accurate model for each system and simulating the execution of the model under various system loads. We felt this was not possible given our time frame.

Another approach is to run benchmarks using programs and loads similar to those typically found at the university. This would have involved relying on the vendor to set up the tests. We felt that because so many variables would be controlled by the seller, the results would not be accurate.

In order to determine how well a system would perform with the specified load, we contacted organizations that were using systems similar to the proposed systems. We started by calling references supplied by the vendor. These references were able to give us contacts at other installations using the proposed system and at installations using systems proposed by another vendor. For each of the proposed systems, we telephoned at least four references other than those supplied by the vendor.

We found the telephone calls useful and felt we could accurately determine which machines offered the best performance characteristics for our needs. The calls also provided us with information on the probable quality of vendor support after the sale.

We also had to judge the operational requirements of the proposed systems. We visited installations and observed the equipment in use. This gave us another opportunity to talk to people responsible for running the systems and to gather information on the quality of service.

All the vendors responded with a claim of "easy to use." The best way to judge ease of use is to use the system. After most of the systems had been eliminated for other reasons, we arranged for a hands-on demonstration with each of the systems still under consideration. We made it a point to have a person who was unfamiliar with the system participate and judge how quickly and how easily he could do meaningful work on the system. The demonstration was an important part of the overall evaluation process.

In summary, the most valuable data available to us were obtained from personal and telephone contacts with people who had had experience with a system similar to one being proposed. Site visits were important because they gave us the opportunity to see the operational and environmental requirements. The hands-on demonstration gave us the opportunity to judge for ourselves the manufacturers' claims for ease of use. On the basis of information obtained from the sources discussed here, scores were assigned in each of about 100 categories. The selection process led to a request for two vendors to submit a best and final offer, and the DG offer was chosen.

The system

Initially the MV/10000 was configured with 6 MB of memory, 136 ports, and 700 MB of disk storage on two drives. Each drive has its own controller. There is only one I/O channel. The system has 110 terminals and 7 printers. Normally, there are about 35 terminal sessions, but 70 are not uncommon. There have been as many as 120 PIDs. The most frequently used products are SED, RDS SCRED, Pascal, Fortran 77, COBOL, BASIC, and CEO. One or the other of the data base management systems (DG/DBMS or DG/SQL) is run when required for data base-related courses. MV/UX is also available.

Other applications include GKS (graphics), SLAM (simulation), SAS, SPSSx, and BMDP (statistics). Currently the system is being upgraded to 10 MB of memory and 1,650 MB of disk storage on four drives. The new configuration will have three disk controllers and two I/O channels.

Operation

User accounts. This is an example of the type of situation we had anticipated in the evaluation of systems. In particular, the AOS method of defining users seems suited to a relatively small number of users. Using PREDITOR to define more than 1,200 accounts at the beginning of every semester would be too time consuming. Before considering the approach used at Radford, let me state the goals of the accounting structure:

1. Accounts are to be readily identifiable as either faculty/staff accounts or student accounts (+__+ is a template that matches all faculty/staff accounts; +.+ is a template that matches all student accounts).

2. Student accounts should be associated with a particular faculty member, course, and student's name.

3. Security on files should allow instructors to examine their students' files (e.g., for on-line grading).

Student accounts are created by a macro whose parameters include course name, first serial number, number of accounts to be created, and instructor's name. For each account to be created, the macro does the following:

1. generates a random password
2. installs the password in a master profile created by PREDITOR for this course
3. copies the profile into :UPD
4. produces a hard copy of the account name and password for the instruction and student
5. creates a control point directory for the account in :UDD
6. sets the ACL on the :UDD control point directory to account__name,WARE instructor,OWARE.

The course-specific student profiles are set up so that every student executes a log-on macro specific to the student's course. This log-on macro

The most valuable data available to us were obtained from personal and telephone contacts with people who had had experience with a system similar to one being proposed

1. checks to see whether the student has another terminal session (if so, the current session is terminated immediately with an explanatory message)

2. sets the search list to include the appropriate language processors and/or applications programs (e.g., SEARCH-LIST :F77 :UTIL :)

3. types a system-wide log-on message, if there is one

4. types a message from the student's instructor, if there is one

5. if this is the first log on, the log-on macro asks the student to type in his name and his instructor's name

6. sets the default ACL using DEFACL [!USERNAME],OWARE +__+,OWARE

7. executes the macro LOGON.CLI, if it exists in the student's initial working directory.

Students print their files using the command FPRINT, followed by the file name. This macro prints the file so that the student name is on the header. The name is associated with the account during the initial log on.

Languages and applications programs. Because Radford University has several language processors and applications programs, they are kept in separate directories off the root. For example, :F77 is the directory holding the Fortran 77-related files. This helps to keep :UTIL at a reasonable size. Also, the access control lists on each directory are used to ensure that only authorized users access the particular product. For example, the ACL on :F77 is +__+,RE CS210.+,RE CS4**.+ RE.

In the interest of system performance, we found it necessary to rewrite the system macros that call the compilers. We used the same approach with all compilers. Fortran 77 is an example. There are three commands that do F77 compiles: F7 (compile), F77 (compile and link), and F77GO (compile, link, and execute). Since the first two are essentially subsets of the third, we will consider the third in more detail.

F77GO is a macro that requires the source file to be the first parameter in the command line. Optionally, a file to be associated with generic @INPUT can be the second parameter, and file for @OUTPUT can be the third parameter. F77GO does the following:

1. counts the Fortran 77 compile, ''charging'' it to the user who is doing the compile (this is done to keep track of how software resources are being utilized)

2. deletes source.LIST, if it exists

3. QBATCHes a job.

The following is an example of a QBATCH:

• BATCHF77.GO executes the F77 com-

(continued on page 48)

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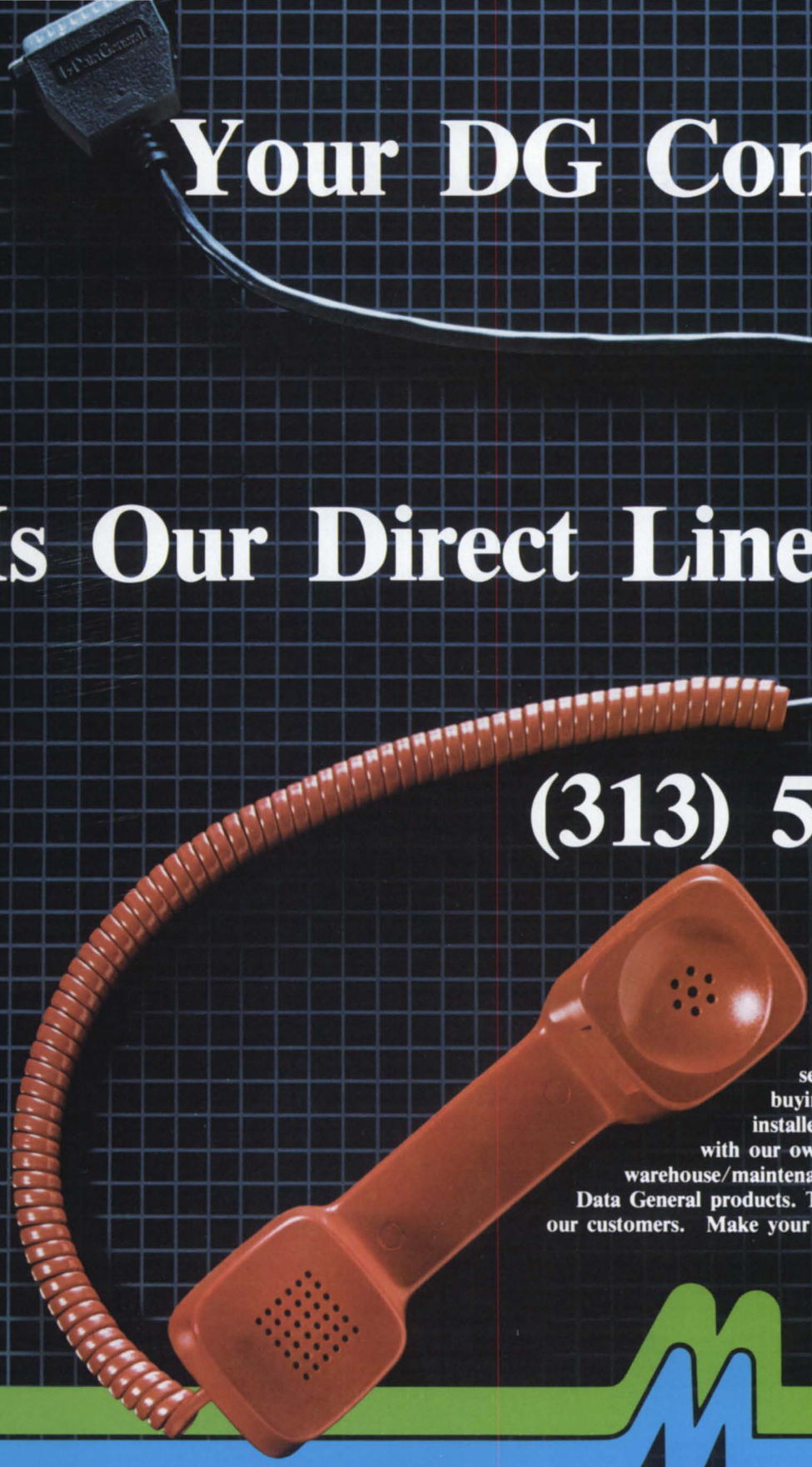

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There are three basic components of a model of academic computing. All three are service-oriented: educational, research, and instructional

Computing for higher education

An academic computing model in a DG environment: The University of San Francisco

by Monny Sklov and Jacqueline M. Dawley
Special to Focus

Offices of academic computing have been established in many universities over the last several years. This is in part due to the increasing demand for student and faculty computing applications (typically, administrative offices within universities have been responsible for computer resource allocation). At the University of San Francisco, an Academic Computing Center was established in July 1984. Data General hardware and software resources were selected.

This article has three objectives: (1) to discuss the evolution of academic computing at the University of San Francisco and how we see that evolution's similarities to that of other universities confronted with similar obstacles and difficulties, (2) to elaborate the issues involved in implementing such a system, with special attention to competing resources and philosophies of administrative computing, and (3) to discuss training and educational modules designed to facilitate computing resource utilization among a university's colleges that have very different computing needs and desires.

The University of San Francisco, a Jesuit institution, was founded in 1855. Its original focus was the liberal arts. The student body includes 5,000 undergraduate students and 2,000 graduate students. Twenty-eight percent of the student body is made up of international students. There are 235 full-time faculty and nearly 500 part-time faculty.

The faculty association at the University, feeling that their computing needs were not being met by the administrative computer or the administrative computing staff, filed a grievance with the faculty union. After arbitration, it was necessary for the University to raise funds for purchasing academic computing equipment that would support full- and part-time staff, and to commit funds for continued support functions, including educational materials and required updates of hardware and software.

The task after the implementation phase was to transfer academic computing to the division of academic affairs. Universities undergoing this same transition may share the perception that typically the administration has access to funding that is not as accessible to the academic division. Certainly after this type of transition is made, problems in financial support include sharing of resources with science departments, in particular, departments of computer science, physics, and engineering.

Computing resources—hardware and facilities

At our university, the hub of the hardware configuration is a Data General MV/10000 with 8 MB of main memory. On-line storage is provided by three 354 MB Winchester disks, and one tape drive provides access to magnetic tape at either 800 or 1,600 bpi. The MV/10000 is connected to an MV/4000 in a point-to-point network. The MV/4000, housed in the same building as the computer science department, is used for upper division classes and research by computer science grad students and faculty.

At present, 72 terminals are connected to the MV/10000, 24 multiplexed and the remaining 48 hard-wired. Two of the hard-wired terminals are IBM PC/XTs, enabling rapid transfer of files between the MV/10000 and floppy disks. Remote access to the computer is achieved by eight 300-baud and eight 1,200-baud modem lines. The computer is available to users 24 hours a day.

In addition to the three student labs with Data General terminals, there are several microcomputer labs equipped with IBM PCs. Two labs with Data General terminals and IBM PCs are reserved exclusively for faculty use.

Printing capabilities are provided by three Data Products band printers, one upper- and lower-case, and two 600 lines/minute upper-case only. Letter-quality printing is available for students from several multifunction dot matrix printers used as slave printers to Dasher D211 and D460 terminals. Graphics applications are supported by the D460 terminals, one G500 color graphics terminal, and a two-pen plotter.

The focus is not on learning to use the computer, but on using the computer as a way to learn

Computing resources—software

A wide variety of software is available on the MV/10000. Most of the popular programming languages are supported, including APL, BASIC, COBOL, C, Fortran 77, Lisp, Pascal,and PL/I. Several Data General software products, such as CEO, DG/DBMS, SQL, and Present, are found on the MV/10000. In addition, we have third-party vendor software, including the Statistical Package for the Social Sciences (SPSSx), Interactive Financial Planning System (IFPS), Time Series Processor (TSP), and Linear, Interactive, Discrete Optimizer (Lindo). Data General's Xodiac system supports the functioning of the network.

An academic computing model

There are three basic components of a model of academic computing. All three are service-oriented: educational, research, and instructional. In educational computing one facet is concept development. Interactive programs are written to describe, for example, a business environment, in which various factors are controlled, such as advertising budgets, pricing, production costs, labor costs, etc. The problem then becomes how to manipulate variables in the business environment to maximize profit by either minimizing cost or maximizing revenue. The particular point in this example is that the student learns applied concepts of finance, accounting, and marketing and not merely the mechanics of programming the computer. In fact, in most applications of this sort, students need to know only the rudiments of computer operations.

Another facet of educational computing is the concept of computer literacy, a concept that has been in and out of favor for several years. Our staff offers seminars in introductions to mainframe and microcomputing systems, but the primary focus of computer literacy is addressed by the computer science department, which offers two courses for credit over a period of one year. A third facet is content assessment, in which students sit at a terminal and take tests; either immediate feedback is given, or additional information is presented and the student is given a second chance to respond. In all the facets of educational computing, the focus is not on learning to use the computer, but on using the computer as a way to learn.

The second component of academic computing involves research support facilities. The primary support service in this area is statistical consulting. We provide a complete service to faculty: We assist them in directing their research and choosing appropriate statistical applications, and if they aren't interested in pursuing computing knowledge, we will complete the process for them.

Another related service is questionnaire development. Researchers often word questionnaire items poorly, or responses may be multiple or difficult to interpret by statistical methods. The final service in research is data processing. This involves entering an investigator's data into the computer and running elementary frequency distributions to isolate data errors.

The third component of the academic computing model is instructional computing. One feature provides an information service to students and faculty. On our campus this includes a bulletin board service, where faculty members may leave and collect assignments from students. Finally, computer-aided instruction is progressing in our college of education. Faculty members learn to construct software that will assist students in activities ranging from spelling to solving calculus problems.

The primary difficulty for academic computing applications is to service all of the colleges with all their different needs. One way we have approached recruiting computer users is by offering a series of seminars and workshops. Another is going to classrooms to offer specific instruction, whether on a particular software product or a particular piece of hardware. There are, however, many problems inherent in offering seminars and workshops to faculty who have quite varied computing skill levels and backgrounds.

Our approach, as it would be in most classroom settings, is at a level of understanding slightly lower than average. Thus, the more experienced person can sharpen skills, and the beginning student won't lag too far behind. We are fortunate in that the faculty who register for our seminars do so out of their own interests and desires, rather than being required by a dean or department chair to attend seminars for faculty development. By having enthusiastic faculty members in seminars and workshops, the element of resistance is virtually eliminated, though computer anxiety is still prevalent. How this anxiety is dealt with is really based on the teaching experience of the seminar leader.

Particular problems we've encountered in our hands-on workshops involve the simultaneous invoking of a software package. For example, when we had 24 faculty members simultaneously submit an SPSSx program, thirteen minutes elapsed before the return of the CLI prompt. Another similar problem occurred with our seminar on the CEO spreadsheet. In this seminar it took only a dozen faculty members to effectively consume the machine's resources.

We haven't abandoned our seminar approach yet, but we expect our population of interested faculty members to diminish considerably over the next few semesters. This is due to the relatively high computing knowledge level of some faculty members and the persistent resistance to moving into the high-tech age by some of the more reluctant. It has worked best for our staff to do spot lectures in various classes for instructors who have not yet gained the requisite skills to teach computer-related applications. Fortunately, our full-time staff has a varied educational background, so content adaptation is easily achieved.

Our involvement in discussions at NADGUG's Conference '85, and our experiences at other universities, suggest that other academic computing staff members encounter similar problems in the implementation of hardware, software, and support services. Our intent was to briefly outline a model to assist administrators in formulating their approach to academic computing services and in understanding and appreciating how academic computing environments in universities are similar. Δ

Monny Sklov and Jacqueline M. Dawley are director and system manager, respectively, of the Academic Computing Center at the University of San Francisco. They can be reached at Academic Computing, University of San Francisco, San Francisco, CA 94117; 415/666-6661.

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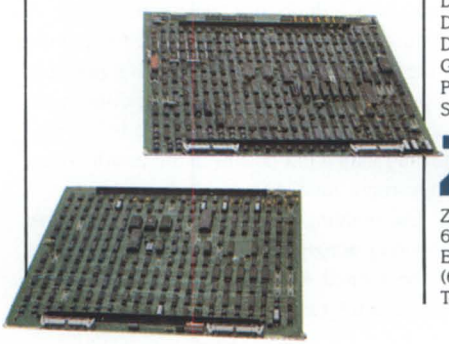

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Circle 12 on reader service card

Our users have been depending on the electronic mail feature as much as they do the telephones on their desks, and probably a little more

It's fast, it's efficient, it's great! What more can I say?

Telephone tag: "You're not it!"

Electronic mail proves a speedy solution for communication woes

by Charlene A. Kirian
Contributing Editor

"I'm sorry, Mr. Bosch is in a meeting. Could I take a message and have him return your call, please?. . .I'm returning Mr. Dali's call. . .OK, could you have him call Mr. Bosch back, please?. . .Mr. Bosch is out of the office at the moment. . ."

Sound familiar? It's happened to everybody, it's irritating, and it wastes a lot of precious time. But with today's technology, "telephone tag" need not happen.

When we first bought Data General's CEO package, one of the the selling points was the electronic mail feature. Many of our staff members felt it was a luxury, and really shouldn't be considered as part of the evaluation criteria. That was 3 years ago. Just try to take that feature away from the staff today! We'd have a mutiny on our hands. Our users now depend on the electronic mail feature as much as they do the telephones on their desks, and probably a little more.

I've found this feature very convenient for communicating with users all over the company, and I don't use the phone nearly as much. At times I even ask people to send me a message instead of calling. This not only allows me the choice of responding to an inquiry in my own time, but also is less disturbing than a phone call in the middle of an impromptu meeting.

Our building has four floors. We also have a building across the street, and remote offices in the United Kingdom. We now have the remote sites tied into our systems, and can communicate easily with them. We can transmit messages to the U.K. and back in a matter of seconds—faster than dialing a telephone and encountering the interference in the lines that so often accompanies the call. We've found it definitely saves time and money.

Another handy feature is the "Mailing List," which allows us to communicate with many users at one time. After you enter users' names in a mailing list, CEO can recognize the list name and send a copy of the message to everybody on the list. It is also very helpful when we need to communicate messages in a hurry. We've created lists of names of users in key areas, and can ask these people to pass the messages on to their staff. We have

interoffice mail deliveries several times during the day, but these don't beat the speed of the electronic process. Our mail department certainly doesn't mind—it saves time spent on hand delivery of items.

Included in the electronic mail features are postings of meetings that were scheduled through the electronic calendar. When someone schedules a meeting and wants me to attend, a message is automatically sent to my inbox telling me the date, time, and place of the meeting. It is then up to me to confirm or decline the meeting in my calendar.

The phone message function under the INTERRUPT function key is another timesaver. This allows a user to take an electronic phone message and send it to a user's account, where it is automatically inserted into their inbox. At first you might still reach for that little phone message pad, but when you get used to it, you just hit INTERRUPT (F5) and start keying in the message. The system automatically inserts the time and date. The secretaries here love it.

I surveyed several executives and managers around the company to find out their thoughts about the electronic mail feature. Here are a few of their comments.

A vice president: "Considering the heavy meeting and travel schedules of managers today, it provides an expedient message access to me that would be delayed via mail channels or telephone. It also provides staff the means for sending 'nice-to-know' information that otherwise would be forgotten if retained for chance meetings in the halls or scheduled meetings."

A department manager: "It eliminates the telephone tag we so often play. I like the certification feature that lets me know if someone has received my message. The only problem I seem to have is the file management."

A vice president: "It saves me time, eliminates telephone tag, tells me (unlike the mail) if my message has been read, and gives me a written record of what I've said (if I want). I've even stopped printing some memoranda . . . . It's fast, it's efficient, it's great! What more can I say?"

A supervisor: "When the printer or system is down, I let my people know so they don't all call the Help Desk. By having a mailing list for our department, we can send important information to everyone in our department at one time."

One of the things I like best about the electronic mail feature is my access to correspondence with other NADGUG officers via the computer in Westboro. We can communicate with each other without endless phone calls and written communications.

I talked with another company that uses CEO and found that their management does not allow them to use CEO's mail feature. One of their reasons is that not everyone has a terminal, and therefore the communications would not be sufficient.

Like many other companies, ours does not have a terminal on every desk. However, to accommodate users without a terminal, we have set up "public access" terminals in certain key areas that may be used by any staff member. We urge all CEO users to look at their electronic inbox several times a day to keep abreast of any new messages.

If you don't use the mail feature for any reason, you might reconsider and give it a chance. It will save you many anxious moments in the long run. Δ

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

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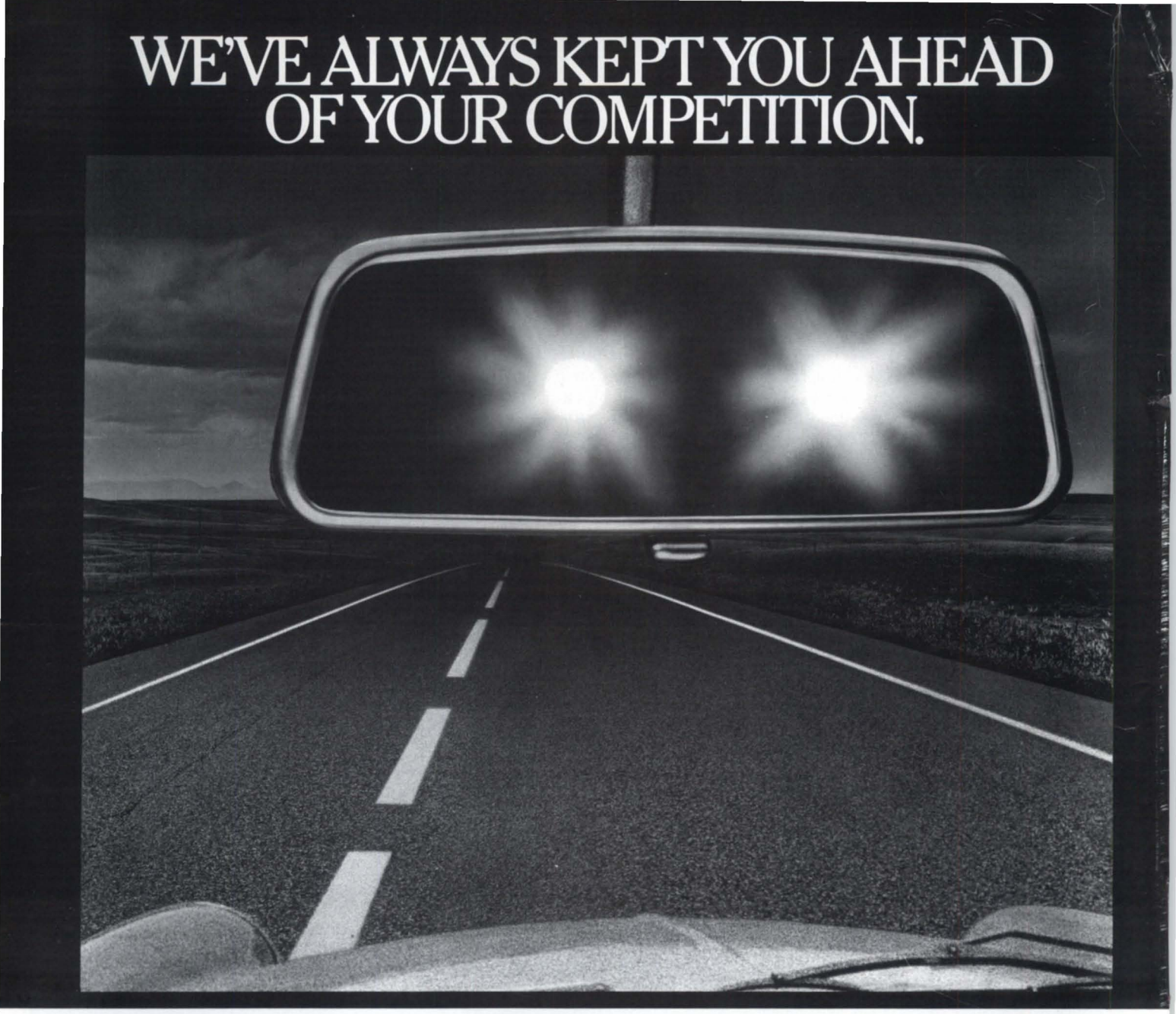

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Sometimes I think there must be a collective consciousness associated with AOS(/VS) users

Getting your priorities straight

The Galloping Gourmet of the DG world serves up more tidbits

by Brian Johnson
Contributing Editor

:ERRATA

As I mentioned last month, I have an aversion to publishing macros because of the inevitable bobbles during typesetting. Well, comments regarding the example UP.CLI in my October column are still coming in: The check for PID 2 should have been a !UEQ instead of a !EQ.

I usually use !UEQ when comparing numeric items, but writing these columns on the back of airline barf bags during all-night flights back from third world countries doesn't promote precise coding.

:ROSICRUCIANS

Sometimes I think there must be a collective consciousness associated with AOS(/VS) users. More often than probability would indicate, at least three or four clients call within days of each other with the same problem.

Last month the problem was poor response time on systems with apparently adequate memory, plenty of idle CPU time, and lightly loaded disks. The symptoms were occasional bouts of erratic keyboard echoing, interactive response times of 5 to 10 seconds, and jerky spooled printer output.

In each case, the problem was traced to a poor choice of process priorities. Usually, the poor system manager was only partly to blame.

:DEFAULTS

Both AOS and AOS/VS start PID 2 at priority 1 SWAPPABLE. Historically, I guess the idea was that if you had a runaway process you could use PID 2 to terminate it as long as it was a swappable runaway. Not real useful. My runaways always seem to be RESIDENT or PREEMPTIBLE.

Unfortunately, this means that any process spawned by PID 2 defaults to priority 1 SWAPPABLE unless you specify the priority and/or process type on the PROC command. This includes EXEC, global INFOS, DBMS, CEO servers, and whatever various and sundry communications servers you happen to have.

A second problem has to do with the default priority for EXEC's cooperative processes (i.e., spoolers). By default, they end up as priority 3 SWAPPABLE. This means that if the aggregate CPU requirements of the higher priority levels ever hit 100 percent, the spoolers will go dead for the duration.

In addition, one of my callers compounded his agony. He uses RCX70 to communicate with an IBM machine over a 9600-baud serial line. On general principles, he PROCed up GSMGR.PR using PROC/RESIDENT without specifying a priority. That resulted in GSMGR running at priority 1 RESIDENT, which in the case of later AOS/VS revisions puts it at a priority higher than the peripheral manager.

So, what's a system manager to do?

:COOKBOOK

In order to save myself another flight to the Middle East just to spend five minutes editing someone's UP macro, I'm gonna make life easy for you. Follow these instructions and you'll be within an RCH of having your priorities optimally set.

- If you're an AOS/VS user, make sure your system is generated for default Group 1, 2, and 3 priority levels.
- Edit your UP macro to add a "PRI 2 2" command before you fire up any servers. You can add a "PRI 2 1" at the end of the UP macro if you want to. I don't.
- Add a CONTROL @EXEC PRIORITY @dev 1 command to the UP logic for each of your printers (more on this later).
- Add a CONTROL @EXEC PRIORITY stream 3 for all batch streams that you intend to CONTINUE.
- Check each and every macro used for firing up servers to make sure that they contain either PROC/PRI=2/SWAP or just plain PROC. The only exceptions to this are items that DG adamantly insists must be PROCed up RESIDENT because of things like device access. In this case, I PROC them as priority 258 RESIDENT (VS only), which in effect makes them behave the same as priority 2 SWAPPABLE as far as the scheduler is concerned.
- Finally, check each user profile to make sure that the priority is set to two.

In summary, *everything* should be at priority 2 SWAPPABLE except for spoolers (high priority) and batch streams (low priority).

Requests to raise the priority of a particular process or some subset of your users should be treated the same way as a request from your daughter that she be allowed to join Twisted Sister on their next road tour.

However, if the request comes from the guy who signs your paycheck, then change

the priorities immediately and edit :UTIL:LOGON.MESSAGE to refer all response-time complaints to him.

If you get fired, call me and I'll place you with an intelligent shop.

:DETAILS

OK, now that we've got a stable starting point, let's take a look at how we got here.

Things that deserve to run at a higher than normal priority should possess *all* the following characteristics:

- Predominantly idle with short spurts of CPU (milliseconds)
- No sustained periods (seconds) of disk I/O
- Annoying behavior if run at default priority two

Spoolers meet all these criteria. You didn't pay big bucks for the 600-lpm printer to have it run at 100 lpm with frequent pauses. Plus it looks bad when the visiting firemen are in town.

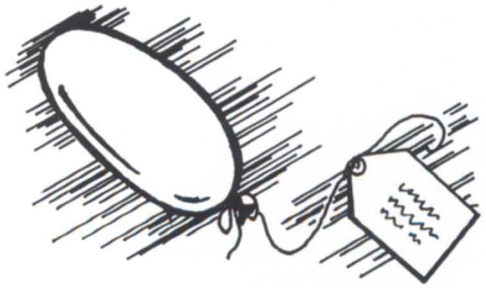
Why all the servers at the same priority as users? Simple. Allowing a user at a low priority to cause a high priority server to execute on his behalf subverts your original decision to assign the user a lower priority, and is unfair to higher priority users of the same server.

Why the default Group 1, 2, and 3 priorities? Well, over the years I've noticed a recurring characteristic of priority-based systems: one of the priority levels ends up with periods of 100 percent CPU usage. This means that lower priority levels are shut out until the situation at the higher level clears up.

I call this level the Response Time Ends Here (RTEH) level. The level below it then becomes the Tough Luck (TL) level. Attempts to move users above the RTEH level simply have the effect of moving the RTEH level up to the higher level and creating a new TL at the old level.

In other words, defining any more than three levels is rarely effective for doing anything other than causing problems at the lower levels. Δ

 B.J. is the president of B.J. Inc., a San Francisco-based consulting practice. He can be reached at 109 Minna St., Suite 215, San Francisco, CA 94105; 415/550-1444.



Trial BBalloons?

Features proposed for RDOS BBASIC suggest RDOS will get a facelift

by George Henne
Contributing Editor

Data General's Business BASIC group in Research Triangle Park has been putting out feelers recently about enhancements they want to add to Business BASIC. One change in particular has them a little worried about how users will react, so they've been doing some informal market research. When they called me recently, I realized that the change in question may be significant for BBASIC, but it probably points toward much bigger changes for RDOS.

The current rev of RDOS BBASIC is unusual because it contains its own code for handling terminal interfaces such as ALMs and USAMs. For BBASIC you don't tell RDOS about the interfaces; instead, you set them up as part of your Business BASIC gen.

The reason for this is mostly historical. When Business BASIC was developed in 1972, the way RDOS handled terminal interfaces was not good enough for business application software. The engineers at Technical Analysis Corporation who developed BBASIC felt they would have more flexibility in putting foreign devices on their systems if they used their own drivers instead of DG's.

The advantages and disadvantages of this approach persist to this day. The main advantage, of course, is that you can use other manufacturers' terminals. We took advantage of this many years ago when we first converted to DG. It made the conversion more economical because we could keep using the old system's Hazeltine terminals until we could justify replacing them with new DG terminals. It was relatively simple because several terminal types come preset within BBASIC, and they can be tailored for other types of CRTs.

On the other hand, BBASIC seizing control of the multiplexor means the mux can't be used for other functions. This makes it more difficult to implement terminal printers, and very impractical to use RDOS's other ground to run something like WordPerfect or Compucalc.

Another disadvantage is that having device drivers in both RDOS and Business BASIC makes it more difficult for the DG development people. They have twice as much code to maintain, and twice as much new code to write if a new device is announced.

When the development people converted BBASIC over to AOS and AOS/VS, they dropped the duplicate code and let the operating system do the work. This simplified Business BASIC, but I hear they had to fight some real battles with the PMGR group to bring the AOS terminal handler up to the standard BBASIC demanded. (In those days the PMGR was commonly called the "P-Mangler!")

The people in RTP are being very careful in introducing a similar change to RDOS BBASIC. In talking to some of the larger users, they've remained open about what they're planning and have tried to discover potential problems ahead of time.

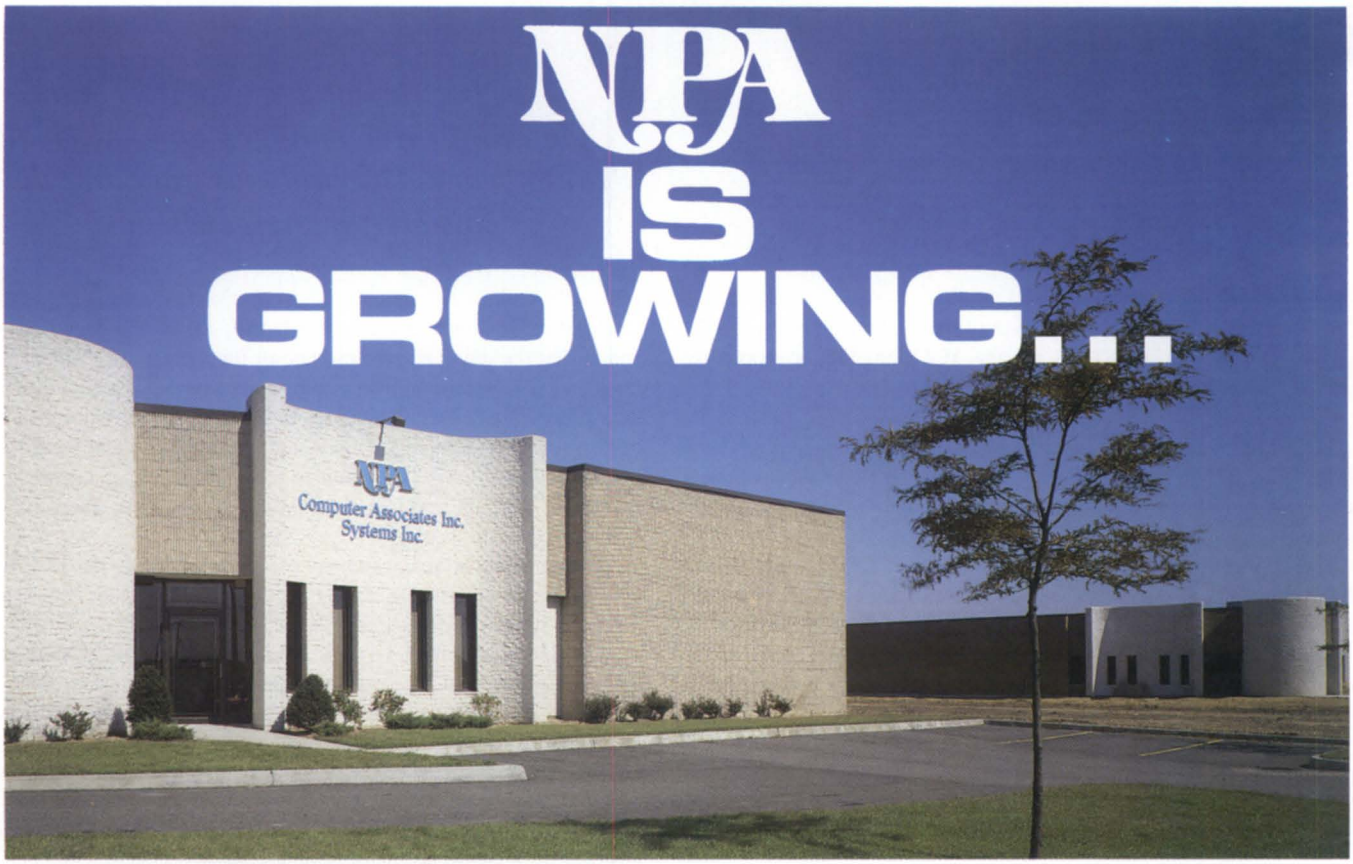
What is most likely to cause a problem is that secondary interrupt keys won't work anymore. In Business BASIC, it is possible to set up your input so that typing either ESC or, say, a backslash ("\") will interrupt your program. We never did anything like that in our own software, so it won't be a problem for us. From the sounds of it, most of the other big users of Business BASIC didn't either. However, it would not be surprising to find there were sites that did take advantage of this feature. Data General wants to hear from you as soon as possible if you think this is going to be a problem.

My biggest concern was foreign terminal support. Only one of our sites would be affected, but it would be a real shock for them if a new revision forced them to buy all new CRTs. Fortunately, DG plans to implement the change in such a way that the terminal types logic can be retained.

After I hung up the phone, I began to wonder why they were planning these changes now, after all these years. DG probably wouldn't do it purely for the aesthetics. In fact, I don't think they would go to that much trouble unless the alternative would be even more work.

It could only be because 32-bit RDOS is coming. To make RDOS work in the 32-bit world, they would want to use all available peripherals and devices. In particular, they would want to use intelligent multiplexors such as the IAC-16, which can offload a great deal of work from the CPU. To write the code to run an IAC is not trivial. To do it twice would be foolish.

With Data General's latest product announcements, a 32-bit version of RDOS is clearly needed if RDOS is to survive. The MV/4000 DC replaced the S/140; the MV/2000 DC replaces the S/20 and S/120. The only 16-bit machines left in the lineup are the Desktop Generation. For Business BASIC users to convert to AOS/VS is not too bad, but DG



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I began to wonder why they were planning these changes now, after all these years. DG probably wouldn't do it purely for the aesthetics

is obviously thinking of all its RDOS customers. (Late note: my sleuthing was confirmed. DG/RDOS for the MV/2000 DC is reportedly planned for spring '86.)

The MV/2000 DC looks like it is going to be a tremendous machine for Business BASIC. To begin with, it will give all of you Nova users a chance to go back to your managers with another upgrade plan if they turned you down when you wanted a 4000 DC.

The smallest practical configuration of the MV/2000 comes with 2 MB of memory, 38 megs of disk, 24 MB cartridge tape for backup, 4 RS-232 ports, and 1 parallel port! Including an AOS/VS license, it costs an unbelievable $19,000! It's also expandable: up to 5 MB of memory (though what BBASIC would do with that much I can't imagine), 240 MB of disk, and 24 ports.

Physically, the machine is very small. In fact, the claims are that it fits under an airplane seat! All the functions in the basic configuration are contained on a single 15-inch by 15-inch board. Optional boards are 7 inches by 15 inches, and plug directly into the motherboard.

What are its limits as a Business BASIC machine? Since it was just announced the day I wrote this, not all the details are available. It is rated at 1 MIPS (million instructions per second), so it could be faster than an MV/4000. On the other hand, it seems the Asynchronous Controllers are not intelligent. This would mean a great deal of additional overhead on the CPU as a result of terminal handling. I would guess that to put a full 24 terminals on it would drive it to its knees if everyone banged away at once.

Another limit is the backup device. Currently, only the 22-MB cartridge tape is supported. (It's not yet available for other MV systems though!) Standard reel-to-reel tape is not available. I'm not a big fan of cartridge tape: it isn't very fast, especially in START/STOP mode, the tapes don't hold a lot, and they aren't very compatible from system to system. As a backup device they work fine, but for data import/export and software distribution they are inadequate. However, since the 4000 DC was similarly announced with no standard tape backup, there is hope.

Meanwhile, the 4000 DC family continues to grow in response to pressure from DG's customers. Scott Kadlec of CMS/Data told me there is a little-publicized option to put the standard IAC-16 on the machine—for an additional $1,000 you can have RS-232 ports instead of RS-422. All you need to do is add the following line to your purchase order:
CCIS: RS-232 IAC (Model #4368) $1,000

Other recent additions are the 354-MB disk drive, the 800/1600 tape, and an expansion chassis. With these, there is very little you can do with the regular MV/4000 that you can't do with a 4000 DC.

Announced simultaneously with the 2000 DC was the amazing MV/20000. It comes in two models: Model 1 is twice the speed of the MV/10000 and Model 2 is four times as fast. That makes it king of the heap in supermini performance: the Model 2's 10 MIPS puts it solidly into the mainframe arena. The claimed limit on number of terminals is 1,000. A new rev of AOS/VS will be needed to support the number of PIDs this will require.

Also announced was a curious new operating system, AOS/DVS, which has already picked up the nickname "Devious," the deviant operating system. It is supposed to be compatible with AOS/VS, but it adds important capabilities for distributed processing. DVS allows concurrent processing on n-CPUs: an individual user can tap any resource on the network without having to be aware of its location.

There is no reason to think that Business BASIC won't be able to make full use of the facilities provided by the MV/20000 and AOS/DVS.

As a final wrap-up, I should mention that all my outstanding BBASIC STRs have now been closed. The problems have either been fixed already or will be in the next revision. Although it took a long time for them to get through the system, the responses were good when they came. On the whole, I'd say submitting them was worth it: I can only recommend you do the same if you have any problems. Δ

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

In general, programs that have been compiled and linked for use under AOS/VS will run without modification under AOS/DVS

Behind the hardware

Newly announced AOS/DVS makes networks truly transparent

by Tim Maness
Contributing Editor

The November 18 announcement will be history by the time you read this, but it's new news as I'm writing. As usual, hardware stole the show. The MV/20000 Model 2, at around 10 MIPS, should support more than 200 CEO users—if that's what you want to do. At the other end of the spectrum, the MV/2000 DC takes care of a noticeable hole in DG's product line. Between them is the broadest span of the market the MV/ series has ever covered.

The microVAX II was starting to look pretty good to me, so I'm glad to see the MV/2000. It should take care of that awkward break between the Desktop and the MV/4000 DC. The MV/2000 DC will be available with the System Management Interface (in AOS/VS rev 7). SMI provides an easy-to-use menu to protect non-technical users from system level details. From the documentation, it appears to be a good first try. I'd like to talk to some of the first users to see if it does make life easier.

Hardware was only part of the story, though. DG also introduced a new operating system that will run across the full line of MV systems. AOS/DVS (the *D* stands for distributed) is not a replacement for AOS/VS; rather it contains extensions that allow it to support distributed processing transparently.

It looks like it will be much easier to move applications from AOS/VS to AOS/DVS than it was from AOS to AOS/VS. In general, programs that have been compiled and linked for use under AOS/VS will run without recompiling, relinking or other modification. The main exception to this is programs like TPMS that communicate directly with PMGR in AOS/VS, and do their own handling of large numbers of terminals.

The main differences between AOS/VS and AOS/DVS have to do with accessing remote resources. Using XODIAC under AOS/VS, a user can access files that exist on any node within the system network, but it's not transparent: the path name of the file being accessed has to start with :NET:<HOST NAME>. If the physical location of the file changes, the applications that referenced that file would also have to be changed. In addition, remote directories can't be used as working directories or in searchlists.

AOS/DVS will provide transparent access to all files, whether local or remote. This is done by registering the names of files or directories in a Global Name Registry (named ::). The registration process gives the file or directory a unique name and converts it to a global resource, making it available to users of all nodes. ACLs work the same way for registered files as they do under AOS/VS. But because files and directories are not visible to users of other stations in the network until they are registered, users have complete control over who has access to their files, regardless of the ACL restrictions. If you don't want other people to see them, you don't register them. Peripheral devices, such as tape drives and printers, etc., can be registered and made available to the network as a whole.

An even more important enhancement in AOS/DVS is its expanded support of remote processes. XODIAC under AOS/VS provides very limited support of remote processes: RMA can be used to start a remote process, as long as it doesn't require a console, provided the user has a remote user profile identical in name and password to that on his own. If a console is required, the user must use VTA to log onto the other system before starting the process. Local execution of a .PR file on a remote host isn't possible—the file must be copied to the local system, then executed.

AOS/DVS will distribute processes as transparently as it does files. Any combination of local and remote program files is possible, including programs that use consoles, by specifying a destination in the PROCESS command when the program is executed. For example, a program can be executed on one station using files that are located on another station, and the output can be sent to a third station. All of this can be done interactively by a user issuing commands from a fourth station. Very nice!

DVS even eliminates the annoying problem of needing to have a user profile with the same name and password on every host in the network. Once users have logged onto the network, their profiles will be valid on all systems in the community, and no further log-

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Pipes can eliminate large intermediate files, and the process at the end doesn't have to wait for the process at the beginning to finish

ging on or validation will be required.

Providing the illusion of a single computing resource to users and software developers certainly goes a long way toward simplifying life, not to mention the money it will save by allowing expensive devices to be shared. But it poses interesting problems for people who sell software. They don't want to sell a package priced for an MV/2000 DC with two or three users, only to find out it's available to hundreds of other users in the network. I guess the cost will have to be based on the total number of people who will have access to the package, rather than the hardware on which it resides.

We finally found time to install AOS/VS rev 6.02 on our machine. I haven't noticed any problems myself, and only a few things are mentioned on the NADGUG bulletin board (415/924-3652). One is the fact that it is necessary to edit any macros that use pid number in a comparison, so that they either compare the pids numerically or as five-character strings. For example, [!eq,[!pid],002] needs to become [!ueq,[!pid],2], or change the 002 to 00002. This is mentioned in the release notice, and again when you initially boot rev 6. The up macro, CEO macros, up.network, etc., are all affected. The only other comment from the bulletin board was that rev 6 EXEC needs to have IAC's that are current on their ECO's or it can become inconsistent and have to be restarted. I've talked to one person with this problem who went back to rev 5.06.

There are several interesting changes in rev 6 that I'll just comment on briefly:

• New logging options. You can now fill your disk every day with more statistics than you can imagine. You can log every time a file is opened or closed, any time a process loads a program in a ring, any time a file is renamed or has the ACL changed, etc., etc. The new syslog command's /detail=full switch will log just about everything. I wouldn't recommend using this unless you have some special security problem.

• New password encryption. This seems to be a more usable security feature—at least it won't take up lots of disk space. Using the ?PWDCRYP system call allows a text string to be encrypted using the Data Encryption Standard (DES) algorithm proposed by the National Bureau of Standards. This call is not used by AOS/VS, but can be used for adding an extra level of protection in user applications.

• Pipes. Unix fans will love this. A pipe is a way to connect the output of one program to the input of another one, without using temporary files. A pipeline is a connection of two or more programs through pipes. The only limit to the number of programs in a pipeline is the number of concurrent processes your user profile is allowed to have, since the programs in a pipeline run concurrently.

By convention, bytes are written to the tail of a pipe and bytes are read from the head of a pipe. Pipes are opened using the ?OPEN system call. You can open either the head of a pipe or the tail, but not both. Because no new system calls were added to implement pipes, most existing programs can take advantage of them without any changes.

A pipe is created using the CLI CREATE/TYPE=PIP command or using the ?CREATE system call. The default capacity of a pipe is two pages (4,096 bytes), but may be created with 1 to 16 pages using the ?OPEN system call. Pipes are transient files; i.e., they only exist when they are being used. As soon as the reader has taken all the bytes from the pipe and there is no active writer, the pipe will be deleted.

The following macro, called rf77.cli, illustrates the use of pipes to connect the three steps I use to compile my FORTRAN programs. The first step uses the macro processor M4, the second step uses the output from the first and calls the RATFOR preprocessor. The final step uses the preprocessed text and actually calls the compiler.

```
CRE/TYPE=PIP PIPE01
CRE/TYPE=PIP PIPE02
PROC/DEF/IN=@NULL/OUT=@NULL/DATA
    =%1%.R/LIST=PIPE01      M4 %2-%
PROC/DEF/IN=@NULL/OUT=@NULL/DATA
    =PIPE01/LIST=PIPE02     RATFOR
F77/O=%1%.ob PIPE02
```

When this macro is invoked, all three processes are started. When M4 has produced enough output for RATFOR to start, RATFOR becomes active, and when RATFOR has produced enough output, F77 becomes active. Using pipes can eliminate those large intermediate files, and it allows more concurrency because the process at the end doesn't have to wait for the process at the beginning to finish before starting to work.

• Clear device command. If you've ever had to shuffle cables to free up a console line that was hung on a ^S, you'll appreciate the new ?CLRDV system call and the CLI command that uses it, CLEARDEVICE. This handy command lets you receive an XON or transmit a break to an IAC line from a remote device running either PID 2 or as the process that owns the device. As long as rev 6.02 has been running there hasn't been a single occasion when we needed to use this command, but it's only a matter of time.

• Dual-ported disk support. With some limitations, DPJ disk drives can now be connected to two systems. The main limitation is that both systems can't access the dual-ported disk at the same time. In the event the primary system goes up in smoke, the application can be back on line as soon as stand-among fixup has finished running on the backup system.

Although our upgrade went very smoothly, a quick poll of my acquaintances leads me to believe that not very many people are using 6.02 yet. This may just be because of rumors about problems, or maybe there are real problems and I just lead a charmed life. If anyone is having 6.02 problems, leave a message on the bulletin board and let the community know.

In the packet of information I got from DG, there was a flyer that mentioned AOS/VS rev 7 changes. One enhancement will be support for up to 1,008 processes. Can you imagine running PED and seeing 42 screens of process information?! In addition, print queues will be increased from 32 to 48. To make full use of both CPUs in the MV/20000 Model 2, tightly coupled multiprocessor support will allow both processors to share memory, schedule jobs, and handle some system calls. Δ

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

Macro mania

If you're using CRTEDIT only as an editor, you're missing out on most of its potential

by Tim Boyer
Contributing Editor

For the past few months, I've been writing about the new release of ICOBOL, and what to expect in the future from RDOS. Now, I'd like to give you some information that you may not already know about old stuff.

First, a little company background and a plea for help. In 1979, Denman Rubber bought their first computer, a CS/40. At the time, it was a real gutsy decision. The alternatives were IBM and Burroughs, and Data General was virtually unknown at the time. Looking back on it, the fate of the B-800 (remember the lawsuits?) and the System 23 (single user, $39,958—no kidding) make me feel very good about our choice. Six months later, however, our OEM went under.

Since then, I've been wandering in the wilderness, reading every manual TIPS has to offer, attending all of the NADGUG conferences, and playing around with the computer at 7 a.m. In the process I've learned a few things that may help others in the same fix. However, I'm worried that this may be the kind of stuff everybody out there already knows. If this should be the case, *please* write, phone, or get on the bulletin board and tell me so.

Anyway, let's give it a try. Last month, I mentioned CRTEDIT as my favorite editor. While that is true, if you're using it only as an editor, you're missing out on most of its potential.

We do most of our RDOS work at night—compiles, verifying files, REORGing files, etc. All of this is driven by a macro that's set to go off when the runtime system shuts down. Most of the processing would not be possible without CRTEDIT.

One of the annoying things about ISAMVERIFY is its inability to process files from a BUILD. If you type the statements

```
BUILD CHECKFILE -.XD
ISAMVERIFY CHECKFILE
```

you get back UNEXPECTED O.S. CALL (Octal) : 1. (How much trouble would it be to have ISAMVERIFY read CLI.ER and translate that?) ISAMVERIFY doesn't like those trailing .XDs—it sees them as an illegal file name. What you need to do is go into CHECKFILE with an editor and strip them off, or you can let CRTEDIT handle it automatically.

First, set up the following macro (this one checks all files updated today):

```
CRAND PRINTERROR
DELETE TODAYSDATE
ENDLOG
MESSAGE %DATE%''/A''
ENDLOG
RENAME LOG.CM TODAYSDATE
LOG
LIST/A/B/S/K -.NX @TODAYSDATE@
ENDLOG
RENAME LOG.CM FILESTOCHK
```

This will create FILESTOCHK with all files modified today or after. The next step is to invoke CRTEDIT. The /X returns control to the CLI when CRTEDIT is through:

```
CRTEDIT NORMALIZE/X
```

Then, ISAMVERIFY the files:

```
ISAMVERIFY @FILESTOCHK@ RESULTS/A
```

The CRTEDIT file looks like this:

```
OFILESTOCHK$E[C.NX
$,^
$?]$Z-1LC,^$^$W$H$$
```

The dollar signs are, of course, escape codes, and the carriage returns must appear as shown. The E in front of the global change suppresses error messages. This will open the file, change .NX to ',^', remove the comma from the last file, and return control to the CLI—with no operator intervention. Aren't you impressed?

But I'm even lazier than that. Not only don't I want to have to set up the files to be checked, I don't want to have to check to see if there are any errors. So, my next CRTEDIT macro looks like this:

```
ORESULTS$$FILES PROCESSED$ES 0$?$?=0;D;C\CZ$IMES-
    SAGE
ERRORS FOUND ! CALL TIM AT HOME !
$-L$1FAPRINTERROR$W$H\D$W$H$$
```

This macro opens the audit file from ISAMVERIFY, looks for the FILES PROCESSED message, and makes sure there is a zero surrounded by spaces next (this zero is for the ''FILES HAVE ERRORS'' message). If so, it skips to label D and takes a normal return. If not, it puts my message into the file ''PRINTERROR''. Then, typing (DO,PRINT) PRINTERROR will display an error message on the screen and print out a hard copy—only if errors occurred.

With suitable modifications, this will work with any utility. If you're really brave, you can try it with COLLAPSE (though this rev of COLLAPSE seems relatively bug-free—notice that I said ''relatively''). For COLLAPSE, you want to change the .NXs to /D, so the macro would be

```
OFILESTOCHK$E[C.NX
$/D
$?]$Z-1LC,^$^$W$H$$
```

and proceed in the same manner.

Another use for CRTEDIT in my nighttime cleanup is to get rid of null files—those pesky things hanging around your disk that, for some reason or another, have been created but have zero length.

```
DELETE ZEROLEN
ENDLOG;DELETE LOG.CM
LOG;LIST -.-;ENDLOG
CREATE ZEROLEN
```

```
CRTEDIT FINDZERO/X
DO ZEROLEN;DELETE ZEROLEN
```

The CRTEDIT macro looks like this:

```
OLOG.CM$\BES 0 $?$?=0;D$;C\D-L$L$S $-M$Q
$-L$L$IDELETE/V $-L$L$1FAZEROLEN$;B\C$W$H$$
```

This macro opens the log file (listed without switches, it gives only the length of the file) and looks for a zero length. If it finds one, it inserts DELETE/V in front of the name, writes the line out to another file, and searches for another zero length. When the macro doesn't find any more, it takes a normal return and the DO statement deletes the null files (for those of you without the DO facility, write the line out to something with a .MC extension).

I use this one, suitably modified, to find all my null ISAM files (created but not written to). I LIST -.XD, and look for a length of 512 instead of zero. This tells me that the header information for the file has been created, but that no records exist yet. For those of you who have a lot of temporary or transaction files that you re-create each time anyway, this is an easy way of removing some of your disk clutter.

But wait ! There's still more! I realize that from the standpoint of RDOS performance, many directories are a good thing. The suckers tend to proliferate, though (e.g., JUNKPROGS.DR, OLDSYS.DR, etc.), especially on the big disks, One day I found myself wondering where to look for a file that I needed in my thirty-odd directories. I could have looked through each one, but why not let the machine do that for me? My DO macro looked like this:

```
DELETE SEARCHFILE SEARCHLIST
ENDLOG;DELETE LOG.CM
LOG;LIST/B -.DR;ENDLOG
RENAME LOG.CM SEARCHFILE
LOG
MESSAGE %1% %2% %3% %4% %5%
ENDLOG;RENAME LOG.CM SEARCHLIST
CRTEDIT SEARCHCONV/X
MESSAGE SEARCHING MAIN DIRECTORY FOR %1% %2%
%3% %4% %5% ...
DIR %MDIR%;LIST/A/S/E %1% %2% %3% %4% %5%
DO SEARCHFILE
```

This one is only possible with the DO facility. The numbers enclosed in percent signs are the possible arguments that the macro will accept, and can be expanded up to 512 files. As it stands now, it can accept up to five variables, and wildcards can be used.

The CRTEDIT macro SEARCHCONV looks like this:

```
OSEARCHFILE$IMESSAGE
$IDIR $\AES.DR?;C$I;MESSAGE SEARCHING %GDIR%;
LIST/A/S/E $FISEARCHLIST$-2D$I;DIR %MDIR$L$IMESSAGE
(note—the two preceeding lines must be all on one line in CRTEDIT)
$IDIR $;A#\CZ$-L$L$K$W$H$$
```

This will initialize each of your subdirectories and partitions on the main disk, read each one for the files you've selected, and list them. With suitable modifications, you can have the macro search your other disks, or ignore subdirectories you don't care about. For example, instead of the LIST as it appears in the DO macro, mine looks like

```
LIST/B -.DR JUNK-.DR/N OLD-.DR/N
```

and thus doesn't give me any listings from my archive directories.

Here's another one for those of you who don't document the way you should. Things finally got so bad here we hired someone to document the 600-odd programs I've written. (''But gee, boss, COBOL is self-documenting!'') Until she gets finished, this macro will be very useful.

Something was messing up my item file. A value in one of the files was getting changed by small amounts, and I had no idea which of the 200-odd programs that used the item file was doing it. Print out 600 programs and read them all? Heaven forbid. Instead, I wrote a macro called FINDIT:

```
DELETE FILELIST DUMMY FOUNDLIST
CREATE FOUNDLIST
ENDLOG;DELETE LOG.CM
LOG;LIST/B %1% %2% %3% %4% %5%
ENDLOG;RENAME LOG.CM FILELIST
DO FIND
```

All this does is accept a list of files you want to look at (in my case, -.CO), puts them into the file FILELIST, and invokes the macro FIND. FIND looks like this:

```
CRTEDIT FINDSTRING/X
CRTEDIT FINDSTR1/X
DELETE DUMMY
DO FIND
```

It simply calls two CRTEDIT macros that look for what you want, and calls itself to get the next file to be searched. The CRTEDIT macros are not as sophisticated as I would have liked (you have to edit them to insert the string you are looking for), but I didn't want to make this too complicated.

The first macro is FINDSTRING. (Both of these macros should be typed on one line—no CR)

```
OFILELIST$1FODUMMY$B$K$W$$OFINDSTR1$
QESstring to find$IO$FIDUMMY$-D$27I$
W$$H$$
```

This will open the list of files, output the first file to a dummy file and delete it from your file list, then insert the program name into the second CRTEDIT macro

```
ESstring to find$?=0;A$;B$\A$GX$
FIDUMMY$FAFOUNDLIST$H$\BGX$H$$
```

This one searches for your string. If it finds the string, it writes the file name into FOUNDLIST.

The way the routine ends is not very friendly. When all of your files have been searched, the message ILLEGAL FILENAME appears. Type CR, and GX$H$$ to get out of CRTEDIT. When the screen blanks, type Control-A. FOUNDLIST will contain the list of files that contained your string. As I said it's not very pretty, and not very fast, but it beats the heck out of reading 600 program listings!

Finally, how about a lower-to-upper (or upper-to-lower) case conversion routine? The line looks like this:

```
@T<96;B$\A@T-32I$D$-M$\B$M$$
```

All this does is look at the current character. If its ASCII value is greater than 96 (lower-case), it subtracts 32 from the value (converting it to upper-case) and writes the new value in its place.

Like I said, CRTEDIT is a useful utility. It's a shame to waste it by just using it as an editor! Δ

Tim Boyer is EDP manager at Denman Rubber Mfg. Co. He's getting embarrassed saying that he's president of the Northern Ohio Data General Users Association, since they haven't met in a year. Tim may still be reached at P.O. Box 951, Warren, OH 44482; 216/898-2711.

A new kind of expert

Software development—the next step after fourth generation languages

by Rodger Nixon
Special to Focus

The state of the art in corporate processing is chaos. The all-too-familiar problems of the 1970s persist well into the 80s. In the 70s, we believed the problems of high development costs, growing application backlogs, slow manual development, systems full of errors, implementation trauma, excessive or inadequate documentation, lack of integration, lack of flexibility, high maintenance costs, and the inability to quickly access data were all temporary. Courses in project management and analysis techniques abounded, and their advocates drew disciples to their temples in vast numbers. Nevertheless, today, as any survey of major organizations will reveal, the promised land is as distant as ever.

What went wrong? I believe that we have looked in the wrong direction. Unfortunately, the man in the street equates software development with programming. In reality, however, software development is a combination of the creative, intellectual tasks of analysis and design, the tedious, mechanical task of programming, and a host of other activities. Yet today's "leading solutions," including program generators and procedural and nonprocedural fourth generation languages (4GLs), focus on programming as though it were equivalent to the automation of systems development. It is not, particularly with large, sophisticated systems.

It is an interesting quirk that the obvious self-interest that clearly motivates the programming profession's fight against 4GLs may have saved management from yet another disappointment.

Software development is essentially an analysis-driven process. Definition of needs is the critical input into the development process. Possibly this is not apparent because most established data processing shops spend over 80 percent of their time on maintenance programming and just 20 percent on analysis and development of new systems, according

The systems analyst is the unknown soldier of data processing

to many industry analysts.

The systems analyst is the unknown soldier of data processing. A truly competent one is worth his/her weight in gold (many users might also add that that is already what system analysts are being paid). Even the most advanced 4GLs require analysts to personally obtain an end user's needs. This interrogation process is more an art than a science.

If the analysis yields incomplete or inaccurate information, even error-free programming will not produce the desired result. The end-user/analyst communication is as flawed as any dialogue between individuals with very different areas of expertise. As a result, at implementation, the typical application system may only faintly resemble what the end user was looking for. Clearly, just automating the programming task is of little benefit.

The fact that communication is a significant problem has long been recognized. In a recent survey of the top 100 organizations in New Zealand, for example, all the end users and all the data processors acknowledged problems, ranging from minor to major.

Based on artificial intelligence research, numerous products that have mainstream data processing applications, as well as specific applications for system development, are emerging. Termed expert systems, these computer systems are programmed with the knowledge and skill of human experts in a given field and are capable of performing the functions of those experts. Just as robots automate physical activities, expert systems automate intellectual activities; they thus have the potential to highly automate the critical analysis and design phases of application development.

The "domain of knowledge" of such an expert system would be derived from formal techniques of systems analysis and design. The literature of expert systems development paints a rosy picture of wise gray beards unstintingly pouring their accumulated wisdom into the mind of a grateful machine. One can only conjecture what sort of system would result from the contributions of the advocates of structured analysis, data flow diagrams, and information engineering, but it would be decidedly schizophrenic.

Organizations that recognize the key role of analysis in the development process have begun to use formalized analysis techniques. Data-driven development is gaining favor among organizations seeking to establish information centers where common data

would be shared among a number of users. True data base systems for information centers that share data would make an expert system with expertise in data analysis widely useful.

So much for part one of the analysis problem. Such an expert system can theoretically help define what exists in the organizations, but, like data analysis itself, it leaves unresolved the issue of what the user wants (the system) to do with what exists.

A number of organizations have attacked this problem through prototyping. Prototyping is an iterative, interactive process in which the user not only assists in the definition of needs, but also helps design the look and feel of the system, the menus and screens. Prototyping generates models of the organization's desired system, or portions of it. These models are then translated into code through the tedious process of programming. In addition, prototyping often does not eliminate documentation requirements. The archiving of prototypes to document the system is a concept that has yet to be widely adopted.

The introduction of the expert system into the analysis phase of development, in place of the flawed end-user/analyst communication, has the potential to ensure that the analysis will be very disciplined. The expert system asks, in plain English, the same questions an expert human analyst would and uses the information it acquires to construct a system model. Whereas a human analyst is easily overwhelmed by the sheer volume of data to be integrated in the development of a large system, the expert system is a tireless interrogator and organizer.

The combination of an expert-analyst system with a prototyping tool that uses the information gained in the analysis would have obvious benefits. But this still would require the translation of the model into a system by tedious programming or through the use of a fourth generation language. The problem with prototyping is that it is a means to an end, not an end in itself. Although there may be fewer communication problems, and hence greater user acceptability at implementation, there is resistance to a concept that appears to be duplication of effort.

Some development techniques, however, have evolved to a level at which there is no need for translation of the model into code. These techniques are embodied in at least one development system, EXSYS, which we believe to be the first of its kind.

The key to the elimination of a programming or coding stage is the level of detail to which the analysis is taken and is embodied in the model. Integrating the power of the

computer into the analysis and modeling phases makes the development process truly dynamic. The result is so exact that the model can serve as the system.

An intelligent run-time system that can operate *directly* off the model complements the development process. The entire process, from analysis to implementation, is conducted using only plain English (exactly as it would be if the sessions were with a human analyst). The use of English as the means of development, a significant breakthrough in its own right, further reduces communication problems. Users can truly understand and deeply involve themselves in the development process.

Held in a relational data base, the model becomes the system through a technique of storing all information contained in the model as data items. Data, procedures, conditions, business rules, etc., are all converted to data items. The process of software development and maintenance becomes data base updating. The operation of the software becomes table manipulation. Just as it was difficult to deny flight was possible when the Wright brothers were 200 feet in the air, it is difficult to deny this concept works when one sees sophisticated information systems running, developed without a program in sight.

This is only one methodology employed not just to eliminate programs and programming, but to completely alter conventional development from a slow, tedious process to a highly automated, dynamic process. At the same time, it promises a substantially and consistently higher quality result than is possible with "conventional" development systems. It represents the next step in software development after high-level fourth generation languages. Δ

Rodger Nixon is president of EXSYS, Inc., Tower 56, 126 East 56th Street, New York, NY 10022; 212/752-2112.

ICOBOL-to-ASCII facility introduced

Atlanta—Creative Synergy Corporation has announced a facility in its "Creativity"

report writer that will enable data extraction from ICOBOL files into ASCII format. ICOBOL users will be able to use their data with many PC software packages, including Lotus 1-2-3.

By responding to menu prompts from Creativity, users will produce an ICOBOL program that will read their files and write the requested fields in columns, including commas and quotes, in a file that can be transferred to a PC for use by most PC software. No compilation is required. Δ

Creative Synergy Corporation, 2839 Paces Ferry Road NW, Atlanta, GA 30339; 404/438-0033.

Desktop point-of-sale for auto parts dealers

Maitland, FL—Armor Systems, Inc., has announced The Winner's Edge point-of-sale package for auto parts dealers. It is designed to work with most hard disk computers, including DG's Desktop Generation Model 10 with MS-DOS. It may also be used with light pens, credit card verifiers, and POS printers.

Tasks performed by the package include the following: core pricing, automatic price updates from outside sources, cash drawer reconciliation by multiple clerks, automatic sale pricing on sale items, inventory control of items with a variety of sizes and types, price adjustment for sale items with automatic pricing for a period of time, and automatic charging of finance charge on past-due balance.

The Winner's Edge includes the following business applications: point-of-sale, inventory control, accounts receivable, purchase orders, billing, order entry, and customer information/database management. The reference guide shows counterpeople how to use the system, and describes the types of reports that can be created.

The software has multiple levels of password protection, and features a help screen in every program. It requires at least a 10-MB hard disk and 128 KB of memory. Δ

Armor Systems, Inc., 324 N. Orlando Ave., Maitland, FL 32751; 305/629-0753.

Travel agency system geared for growth

Dallas—American Airlines has announced ADS/32, a travel agency automation product designed to respond to the industry's growing need for information management. It utilizes Data General's 32-bit superminicomputers.

ADS is a computerized information and accounting system for travel agents. It performs office tasks for agencies and produces travel documents for their clients, including tickets and boarding passes.

ADS/32 was developed in response to the need of agencies for more computer power to deal with their growing information management needs.

Like the current ADS system, ADS/32 will interface with major airline reservations systems to create a variety of reports and documentation. It will perform accounting functions such as accounts payable and receivable, general ledger, word processing, and mailing lists.

The new system will operate faster, store more data, permit more terminals to be connected to each central processor, and allow communication with any standard computer system.

According to American Airlines, ADS/32 employs an open systems architecture to let each agency tailor the system to its unique needs.

The airline has announced two other enhancements to the ADS product line. ADS/PC allows any ADS system to transmit data to a PC, giving agents the ability to manage information with their own PCs or send it directly to their clients' PCs. ADS/COM gives ADS systems the ability to communicate with each other over telephone lines and consolidate information for improved customer reporting services. Δ

American Airlines, Mail Drop 1366, P.O. Box 61916, DFW Airport, TX 75261-9616; 817/540-6530.

NADGUG Roster

Here is the current roster of the North American Data General Users Group's Executive Board, and of Data General's support staff, regional interest groups, special interest groups.

If you would like to join a particular group, notify the person listed. If you do not see a regional group in your area or a special interest group that would serve you, notify the NADGUG staff in Westboro about your interest in seeing a new group start up. If you are aware of any changes or updates that should be made to listed contacts, please notify the NADGUG staff.

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617/366-8911

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CALIFORNIA

South Bay Users Group
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514/843-5730

CONNECTICUT

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GEORGIA

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MARYLAND

(See Washington, D.C ., Area)

MASSACHUSETTS

Northern New England Data General Users Group (NNEDGUG)
Status: Recognized, starting
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Arthur D. Little Inc.
Information Systems Section
17 New England Executive Park
Burlington, MA 01803
617/864-5770

S.E. New England Users Group

(See Rhode Island)

MICHIGAN

Detroit Area Users Group

Status: Recognized, active
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Comprehensive Health Services of Detroit, Inc.
6500 John C. Lodge
Detroit, MI 48202
313/875-4200

MISSISSIPPI

Mississippi Users Group (MISSUG)
Status: Unrecognized, starting
Contact: Jim Phillips
Cities Service Oil and Gas Company
Box 12026
Jackson, MS 39211
601/961-5594

NEBRASKA

Mid-Plains Data General Users Group (MPUG)
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Father Flanagan's Boys' Home
Youth Care Administration Bldg.
Boys Town, NE 68010
402/498-1344

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New Mexico Regional Interest Users Group
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Albuquerque, NM 87112
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NORTH CAROLINA

Southeast Area Regional Interest Group (SEARIG)
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School of Veterinary Medicine
North Carolina State University
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Raleigh, NC 27606
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OHIO

Northeast Ohio MV Users Group
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Westlake, OH 44124
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Northern Ohio Data General Users Association
Status: Recognized, active
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Denman Rubber Co.
P.O. Box 951
Warren, OH 44482
216/898-2711

OKLAHOMA
Oklahoma Data General Users Group
Status: Recognized, active
Contact: Ray Busick, President
University of Oklahoma Health Sciences Center
P.O. Box 26901
CHB Room 115
Oklahoma City, OK 73190
405/271-2202

RHODE ISLAND

S.E. New England Users Group
Status: Recognized, active
Contact: Frank Perry
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338 State Office Building
Providence, RI 02903
401/277-2558

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Southeast Area Regional Interest Group (SEARIG)
(see North Carolina)

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Houston Area Users Group
Status: Recognized, active
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VIRGINIA
Richmond Virginia Users Group
Status: Unrecognized, starting
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7814 Carousel Lane
Richmond, VA 23261
804/747-7100

Southwest Virginia Data General Users Group
Status: Recognized, active
Contact: Betsy Wolfe
Medico Security Locks, Inc.
P.O. Box 1075
Salem, VA 24153
703/387-0481

WASHINGTON STATE
Inland Empire Data General User Group
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Contact: Ed Stohler
Jensen Byrd Company, Inc.
310-324 Riverside Ave.
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Spokane, WA 99220
509/624-1321

WASHINGTON D.C. AREA & MARYLAND
Potomac Users of Data General Equipment (PUDGE)
Status: Recognized, active
Contact: Jess Brown
Techno-Dynamics, Inc.
P.O. Box 765
Bowie, MD 20715
301/464-8044
301/390-6331

Special Interest Groups

AOS & AOS/VS Special Interest Group
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Building 260-6A-08 3M Center
St. Paul, MN 55144
612/733-3320

Business BASIC Special Interest Group (BB SIG)
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Evans Products—Paint Division
P.O. Box 4093
Roanoke, VA 24015
703/343-1521

Communications Special Interest Group (COMMSIG)
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Des Plaines, IL 60018
312/827-0066

IRDOS Users Group
Status: Recognized, active
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Pretty Neat
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Pompano Beach, FL 33069
305/973-9700

INFOS II Users Group
Status: Unrecognized, starting
Contact: Tom Duell
EAGLE Software, Inc.
P.O. Box 26
Salina, KS 67401
913/823-7257

Law Enforcement Users Special Interest Group
Status: Recognized, starting
Contact: Lieutenant John Myers
c/o Black Hawk County Sherrif Dept.
316 E. Fifth St.
Waterloo, IA 50703
319/291-2557

MP/OS
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Contact: Al Hillman
American Computer Technology (ACT)
22 Longmeadow Road
Norfolk, MA 02056
617/528-4391

OASIS (Office Automation/CEO Special Interest Group)
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On-Line Computer Library (OCLC)
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614/764-6435

Society of (University of) Michigan Users of Data General Equipment (SMUDGE)
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U-M Transportation Research Institute
c/o F.M. Remley
Michigan Media
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Ann Arbor, MI 48109
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OEM
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Computer Application Specialists (CAS)
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Austin, TX 78766
512/453-3900

TPMS
Status: Unrecognized, starting
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National Safety Council
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Chicago, IL 60611
312/527-4800

Uniproducts Special Interest Group (UNISIG)
Status: Unrecognized, starting
Contact: Peter Mimeault
Data General Corporation
4400 Computer Dr., MS A-121
Westboro, MA 01580
617/366-8911, ext. 6389

(from page 13)

those primitive early computers into the amazing machines of the future?''

Enter DG President Edson D. de Castro, followed by a handful of vice presidents.

The speeches were better than usual, despite a malfunctioning microphone. De Castro developed his claim that DG will be one of the few computer companies to survive into the next century. In passing, he noted that office automation now accounts for 50 percent of DG's sales—enough to rank in the Fortune 500 if listed separately. Speeches by Robert Miller, Dave Lyons, and Don McDougal served mainly to introduce and position the new products. Tom West's dissertation on the technology made it pointless for reporters to try to impress one another with their ability to ask technical-sounding questions. That was a blessing.

Herb Richman provided the proof of the pudding, though. Wearing bow tie and distinctly rose-colored glasses, he was able to turn the reading of a list into a major event. The list consisted of customers who have committed to buy the new machines. It included Beneficial Corporation, HBO & Company, Levelor Lorentzen, Inc., the General Electric Company, Lasercomb America, Inc., Genuine Parts, American Medical International, Control Data Corporation, Monarch Life, Texaco—and Christie's, our host for the day.

Next came questions and answers, and then lunch. The prime rib was excellent. Perhaps coincidentally, the new products got good media exposure in the days that followed. Were they good enough to get attention without a splashy introduction? We'll never know. Δ

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Circle 33 on reader service card

We found it necessary to rewrite the system macros that call the compilers

(from page 18)

piler, with options appropriate for student users (e.g., sending the listing to source.LIST and allowing the run-time checks that aid students in debugging code)

- writes an explanatory message and stops if the compiler is unsuccessful
- otherwise, executes F77LINK
- deletes source.OB and source.ST
- executes the student's program (If parameters 2 and 3 are present, then associate them with generic @INPUT and generic @OUTPUT. If the user does not specify an output file, then output is sent to source.LIST. If there is a file source.DATA, then associate it with generic @DATA. Switches can be used to further control @DATA and @LIST.)

Notice that the files source.F77, source.LIST, and source.DATA (if present) will be used automatically if the user does not specify other files. BATCHF77GO will not work if executed from an interactive session. It is QBATCHed with a limit on CPU time and at the maximum possible queue priority for students. The /NOTIFY switch is used so that students know when the source.LIST file is ready. The compiles are done in two batch streams as swappable processes at priority three. This seems to provide reasonable response time. Indeed, most students think that it is all done interactively. When the batch input queue backs up, we have found that it can be cleared out relatively quickly by opening all four batch streams as (swappable,2). This has little noticeable effect on other users on the system.

The decision to do the compiles in the batch streams was made in part because of the recommendation given by telephone references. We also ran an experiment in which 15 compiles were done simultaneously. Response time for other users degraded to an unacceptable level, and the terminals at which the compiles were requested were unusable for an extended period of time. By doing the compiles in the batch streams, we have been able to keep response time well within the limits specified in the RFP. Responses to simple CLI and editing commands rarely require more than 3 seconds, and the results of compilation/execution requests are available in a reasonable amount of time—usually under 2 minutes. On the night before a program is due, students may have to wait as long as an hour for the result of a compilation request.

The student population. Certain problems stem from the fact that we have a large user population, and most of the users are students doing relatively small jobs. There is a great deal of activity on the system, including interactive and batch job creation and print requests. This causes the SYSLOG file to grow in a relatively short period of time to the point where it cannot be handled by REPORT. The first time we used REPORT, we had to split SYSLOG into 14 different files of roughly equal size and apply REPORT to each one. This clearly would not be an acceptable way to generate monthly reports, so we designed our own report-writing system, which monitors use of system resources by the general population, by faculty, and by students. The report-writing system also generates statistics on the use of the various software products.

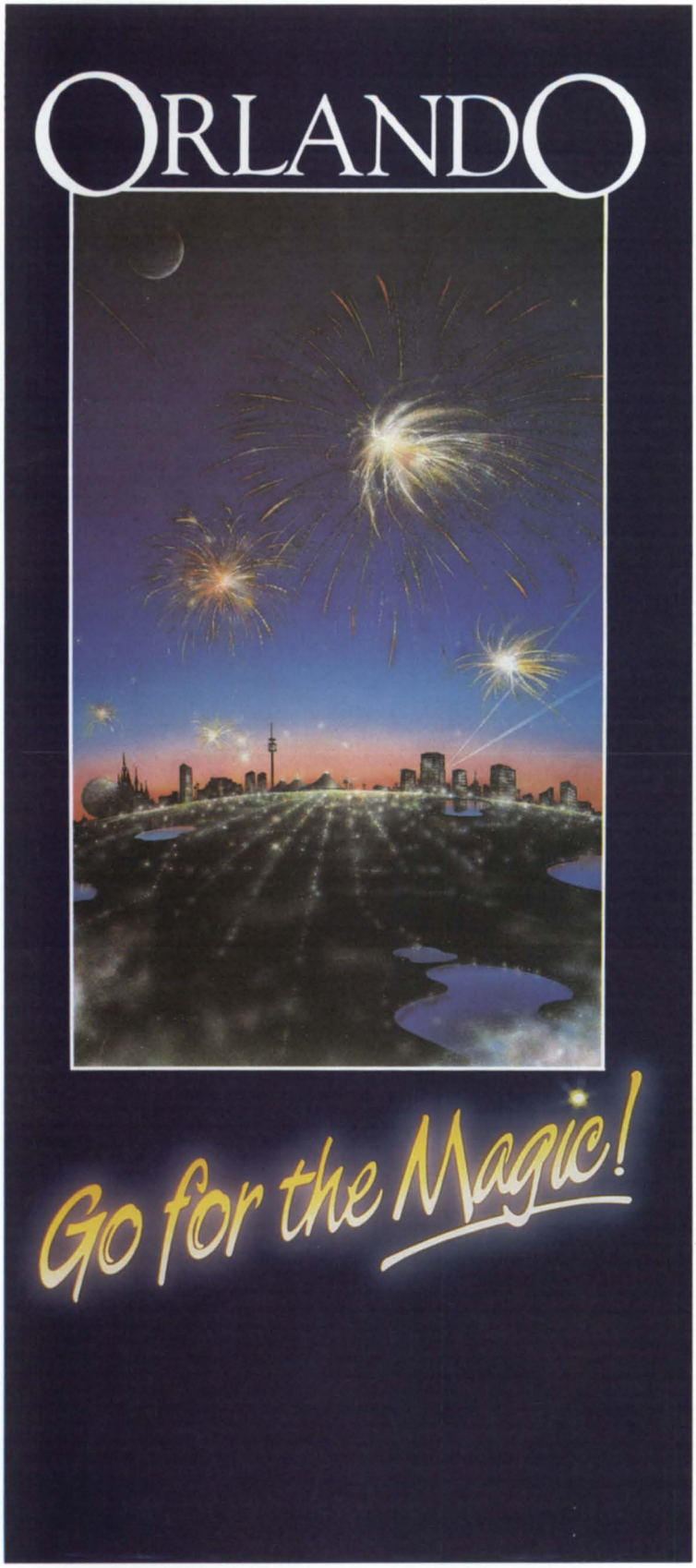
Because of the large number of accounts, the default hashframe size is definitely not appropriate for :UPD and :UDD. The default is 7, but on our system 37 is a more appropriate hashframe size. Also, since student directories have relatively few files, a smaller hashframe size is appropriate for those directories.

The default number of 512-byte buffers used in the cache of I/O buffers is 128. We have found that if the cache of I/O buffers is to 512 512-byte blocks, the disk I/O cache hit ratio is 96 percent. If the default of 128 is used, the ratio is only 82 percent.

Conclusion

We at Radford University feel that the MV/10000 does an excellent job in serving the academic community. That it has performed well and has met our needs over the last 15 months is testimony to the success of the selection process. There have been few surprises and relatively few and minor complaints regarding local service. The system has proved to be very reliable, and was adapted easily to our particular requirements. Δ

Thomas C. McMillan is director of Academic Computing at Radford University, Radford, VA 21142; 703/731-5107.



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Fujitsu M2351A "Eagle" 474MB Drive	5,995
SPECTRALOGIC 20 disk/tape controllers	2,600

TAPE DRIVES for DG

6021 800BPI Tape S/S (new style)	$1,500
CIPHER 80640-90-375 1600BPI Tape	1,500
6026 800/1600 BPI Tape S/S	7,300
6125 1600 BPI streaming tape S/S	2,750
TANBERG 800/1600BPI Tape, S/S (6026 Emul.)	3,000

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CDC 300LPM Band printer	$1,950
DG 4215 600LPM Drum	2,450
DG 4356 300CPS DCH	2,495
DG 6041, 60CPS	100
DG 6042, 30CPS w/Keyboard	300
DG 6074 180CPS	350
DG 6077 180CPS	1,400
Dataproducts M120	950
DATAPRODUCTS B600	4,250
DATAPRODUCTS B900	6,000
Okidata SL 160, 160LPM	795
Printronix P150	1,475
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DG 6053 CRT	395
DG 6108 D-200 CRT	485
Emulog 53 CRTs	250

KIMTRON KT-7 CRTs

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Standard 11" screen	$650
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S280 Hardware Floating Point Unit	$2,800
S140 Hardware Floating Point Unit	2,200
NOVA 3 Hardware Floating Point Unit (8539)	1,500
S140 ERCC	1,000
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NOVA/ECL 5 SL Chassis	495
DG 8537 Exp. Chassis (Nova S130 C150)	395

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Circle 35 on reader service card

The improved price and performance of the 32-bit machines DG introduced in November raise interesting questions about existing products. Certainly the aggressive pricing of the MV/2000 DC will make 16-bit machines less attractive, but what about current members of the MV/ family? DG has cut prices on the MV/10000 and MV/10000 SX by $30,000—nearly 18 percent—to bring them closer to the price/performance line anchored at the high and low ends by the new machines. Company officials say they plan no price cuts for the MV/4000 or MV/8000 II, which probably means these machines will be less attractive to buyers. Since the new machines offer better margins, phasing out the older models would make sense to DG.

Meanwhile, the company announced price cuts ranging from 15 to 20 percent on disk and memory products for MV/ systems. Customers with orders that have not yet been shipped will not get the reduced prices on their order, but will receive a credit against additional purchases.

■

Data General donated the computer and scoreboard used recently at the international equestrian show-jumping competition at Toronto's Royal Winter Fair. DG's Herb Richman, reportedly a horse lover, was there in a tuxedo—just to make sure everything was done right.

■

Two correspondents sent *Focus* their copies of a satirical product announcement making the rounds within Data General. One of them admitted he was fooled by the purported announcement of a reduced instruction set (RISC) computer—which sounds suspiciously like a Nova 800—until he got to the following line: "In keeping with the Spartan philosophy of the RISC design, the presentation and briefing was held in the Shrewsbury High School gymnasium. . . . The school band played the theme from *Back to the Future*, while company wives served finger sandwiches and Coke."

■

According to another source, the estimates that RDOS wizards at Research Triangle Park will have a 32-bit version ready this spring are wildly optimistic. Because of the extensive interrelationships between RDOS and Business BASIC, an enormous amount of code will have to be rewritten and debugged. On the other hand, the developers at RTP haven't had to spend much time on fixes or enhancements recently.

■

Wall Street analysts expect that DG's new products will spark an upturn in earnings, although it might take a while. DG's fourth-quarter profit was only two cents a share, but some analysts think earnings were depressed because customers were waiting to see the new products. Edson de Castro says he thinks the company can do very well next year—given a decent economic environment.

Most of the rest of the industry continues to worry about the future. There were 200 fewer companies represented at this year's COMDEX show, and those who did attend were somber. In his keynote address, Hewlett-Packard's President John Young chastised vendors for too many "unmet expectations, Chapter 11s and layoffs, fallings-out, recriminations and lawsuits. And we wonder why consumers lack confidence."

However, there are some bright signs. Both Atari and Convergent Technologies have managed to turn their situations around, and are now operating profitably. And although chip manufacturers continue to hurt, some analysts say the supposedly huge chip inventories are mainly in the hands of one manufacturer—IBM—which is hording them in anticipation of a surge in sales of its Sierra line. Otherwise, according to the analysts, chip inventories are about where they were at the start of the last boom, in the early eighties.

■

LEDGUG sends this announcement: The Law Enforcement Data General Training Seminar/User Meeting will be held April 14-16, 1986, in Dallas, Texas, for all law enforcement or criminal justice agencies running data processing functions on Data General equipment. Topics to be covered include system training, performance considerations, security techniques, law enforcement applications, hardware, and software products. For more information contact Lieutenant John Myers, Black Hawk County Sheriff's Department, 316 East 5th Street, Waterloo, IA 50703; 319/291-2557 or 319/291-6585.

■

Jim Siegman, NADGUG's Publications Committee chairman, says copies of the videotapes of selected sessions from Conference '85 are now ready for distribution. Regional Interest Groups who want to use the videos for their meetings can contact Jim for details. Write to him at 548 Walnut, Elmhurst, IL 60126-1848, or call 312/941-8214.

■

MICOM Computer Systems won recognition for its accounts payable, general ledger, and payroll software recently. This is the second year in a row that MICOM has received awards in the McLean Hunter Publications survey of user satisfaction. Surveying users of computer hardware from all manufacturers, McLean Hunter tabulates users' ratings of the software's reliability, ease of use, efficiency, documentation, and vendor support. Congratulations to MICOM.

■

Leonora Isaak is compiling "colorful tales surrounding Data General" as part of a project on contemporary urban folklore. She recently sent a letter to members of the "Gray Eagles," a semiunderground semiorganization of DG folk heros, to ask them for their recollections. Anybody else want to contribute? Write to her at 78 Maple Street, Northboro, MA 01532.

■

With the November issue, *Focus* began running a reader service card that included a line for readers to check off their favorite articles. The idea was to give the editors a better idea of what readers want. The first card to come back listed Tim Boyer's "Poor Man's Gerry Manning" as a favorite. The card was sent by Tim Boyer.

■

Although DG lost when Fairchild's antitrust suit went to the Supreme Court, the legal maneuvering continues. The damages phase of the trial is now proceeding in Oakland's federal court, with Fairchild claiming lost sales of 80 million. A Fairchild lawyer reportedly contacted a noted RDOS guru and asked him to see if DG would let him buy a single copy of RDOS without buying the minimum equipment configuration—this is the issue that spawned the case in the first place. DG's policy apparently has not changed. They shrewdly said that if the request were put in writing, they would respond in writing.

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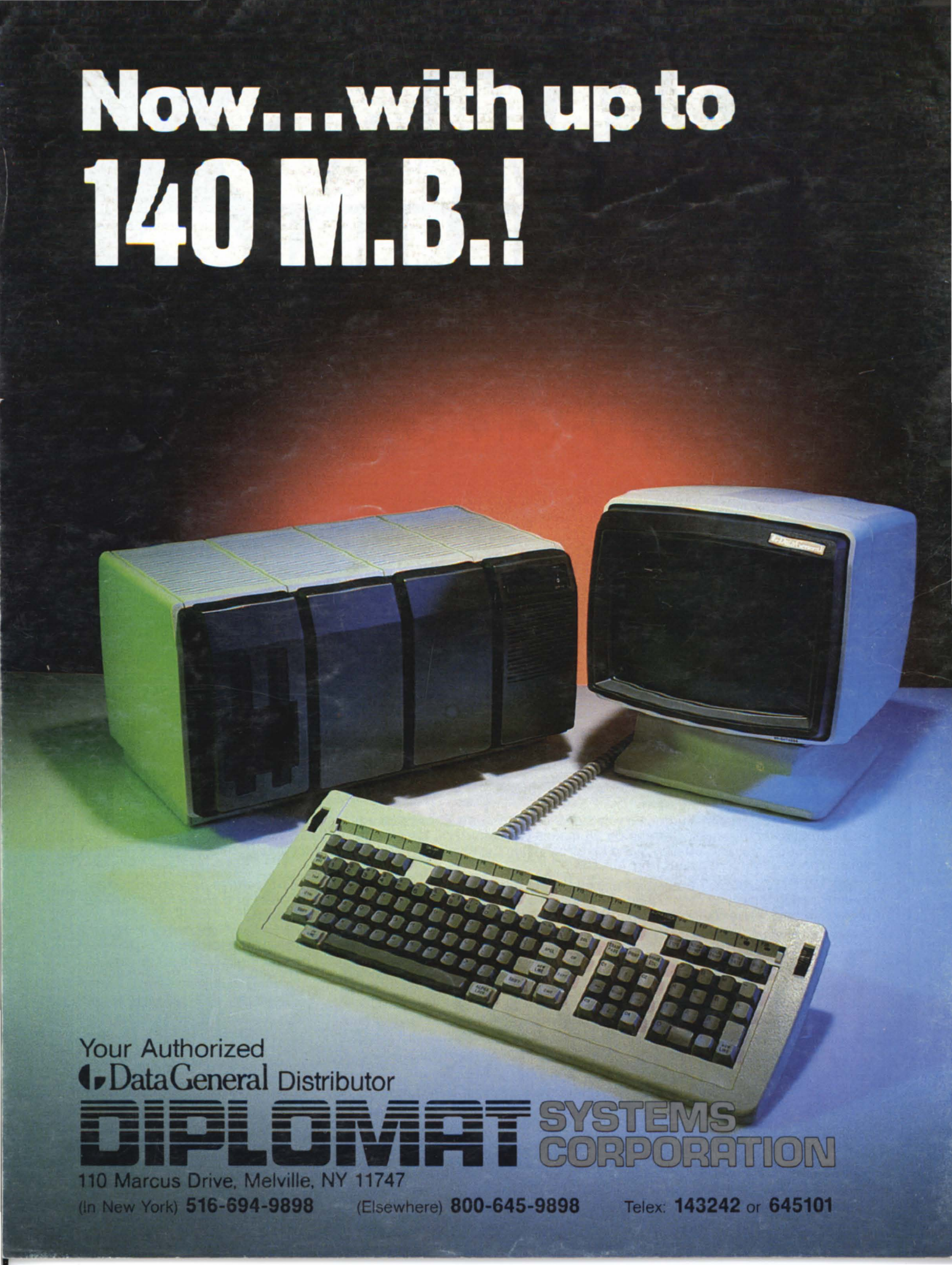

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