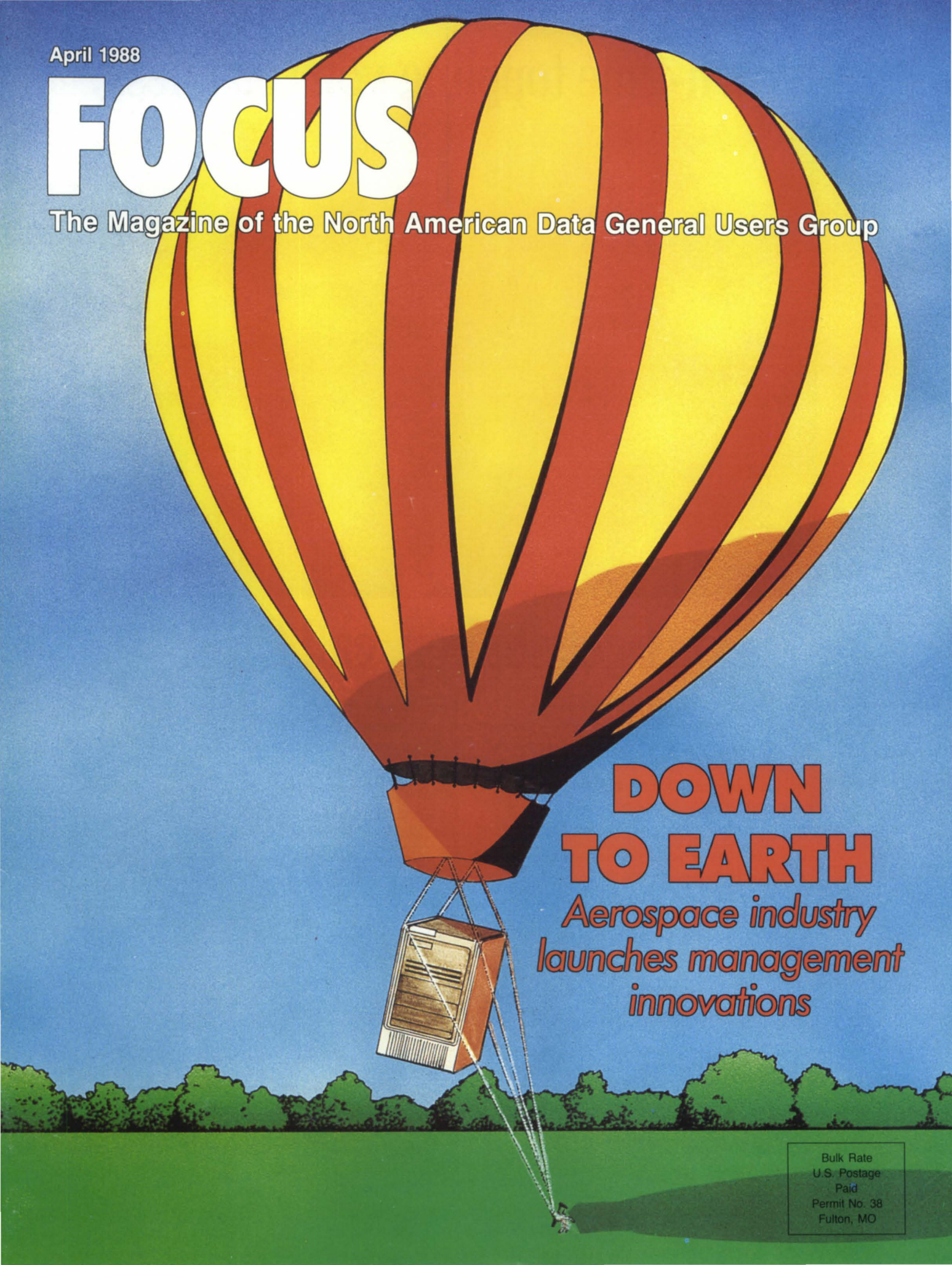
April 1988

FOCUS

The Magazine of the North American Data General Users Group



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The Magazine of the North American Data General Users Group

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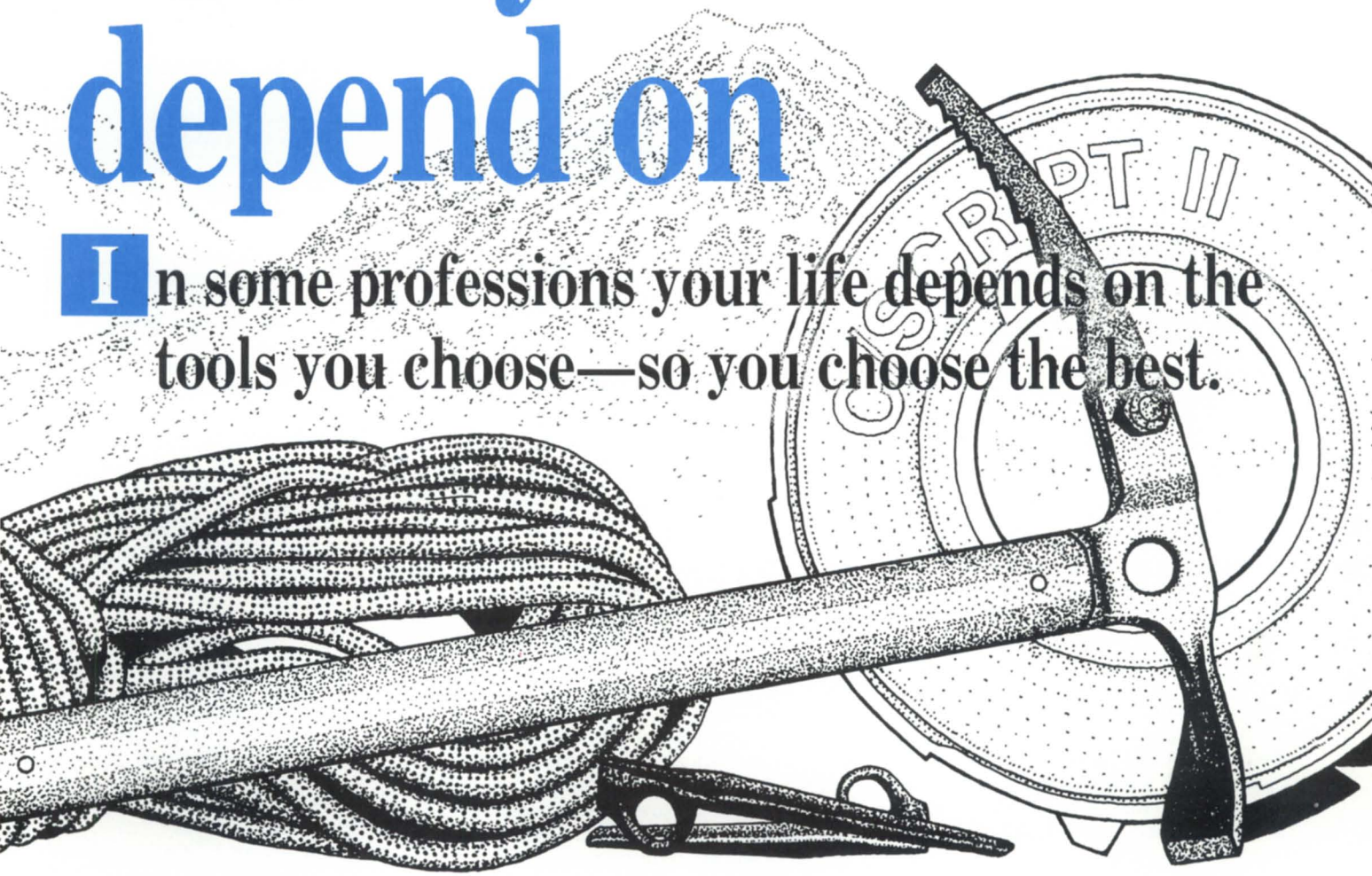

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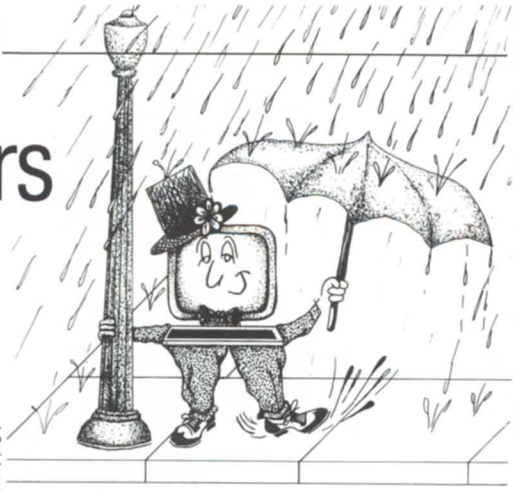
April showers

Spring is a time for growth and renewal

by Joyce Carter
NADGUG president



April is arriving, along with spring flowers and a lot of yard work—or at least it will be by the time you read this. However, as I write, the snow is falling, and the temperatures are subzero.

Composing an article six weeks before publication has been quite a challenge for me. It mixes me up to talk about events as if they have happened in the past, when they really are still to occur in the future. If this confuses you, that makes two of us.

I am attempting to keep each of you up-to-date on NADGUG activities, but unfortunately, *Focus* isn't nearly as timely as CEO communications.

In the next issue, I will tell you about the NADGUG spring Executive Board meeting and the Executive Advisory Board that Rene Dominguez is pulling together. The following issue will include highlights of the United Kingdom Data General Users Conference to be held March 17 and 18 in London.

First time for publication is the announcement that Peter Marx, the attorney retained by NADGUG, and I are hard at work planning a meeting of the heads of all computer users groups. A coalition of users in the computer industry is a worthwhile effort. Each of the users groups can benefit from the experiences, both good and bad, of other groups. Possible topics for discussion include the tax status of users groups, insurance needs and costs, membership types, future legislation and lobby needs, management techniques, and of course, the organization and goals of the group.

As we have talked to these people over the phone, other possibilities are presenting themselves. For one, it is time that *users* set the industry standards, instead of the manufacturers. Another idea is to establish a publicity arm for the users.

I am looking forward to this meeting so that I can learn a lot. I have a tremendous desire for this coalition to be successful. Every users group I have talked to has shown interest in this activity. Peter Marx has sent letters to about 50 groups that we are aware of, and the replies are coming back positive. The meeting is tentatively planned for the latter part of May.

This issue features aerospace, an industry that has directly and indirectly caused great changes in our lives. We are all familiar with how Corning Ware came from space-age technology, and how some freeze-dried instant foods were developed for the astronauts. Many discoveries and advances were also sidelines of aerospace—satellite communications, for one.

Perhaps most important to us is the computer. The aerospace industry is not only a major user of computers, but because of its unique requirements for speed, size, and specialized technology, it has caused them to be improved and enhanced beyond recognition. The aerospace industry has moved us from record unit processing with punch cards and slow, expensive, first-generation computer processing to the on-line, real-time, compact, and speedy equipment we now use. The computer industry hasn't slowed down since the first satellites were launched—nor has the technology been kept solely for space travel.

The airlines have adopted uses for the computer at a breakneck speed. Reservations, ticketing, and seating is done on computers from locations all over the world. Other types of computers are being used to aid pilots in navigation and control of their aircraft. Additionally, many computers are used for safety measures in the air.

As computer professionals, we owe a debt to the aerospace industry. Without the advances made in aerospace and the funds allocated for the research and development for these advances, we might be working as clerks and keypunch operators and using computers that resemble dinosaurs. We would also be living without many of the things we take for granted. Δ

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ECT REPORT WORDPERFECT REPORT

WordPerfect 4.2 for DG Means Quality, Power

WordPerfect 4.2 is now available for Data General Computers. This powerful new release is written in 32-bit assembly language and is fully compatible with WordPerfect 4.2 for the PC—no conversion program is needed.

Features include up to 24 side-by-side Columns, a 115,000-word Speller, and a new Thesaurus with synonyms and antonyms. All registered users who have a software subscription will receive this update at no additional charge. If you are interested in evaluating this new release, please contact Dawna Palmer.

Development Continues

WordPerfect Corporation's commitment to the multi-user environment continues with the development of a CEO-WordPerfect integration. This new product will provide the functionality of WordPerfect 4.2, while taking advantage of the CEO's filing system. Additional features such as status line, calculator, and interrupt will add to its appeal.

GSA Pricing Now Available

WordPerfect Corporation products for Data General are now available to government agencies through a new GSA schedule (A). All GSA pricing reflects a 40-percent discount on an order of 1 to 9 packages. For more information, contact Judy Hopkins.

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With WordPerfect's corporate site licensing, large accounts can now meet all of their software needs. In the site licensing program, each WordPerfect Corporation product is assigned a unit value. By purchasing a certain number of unit values, software for Data General, VAX, UNIX, IBM PC, Amiga, Atari, Macintosh, and Apple IIe/IIc and IIGS computers can be obtained in any combination.

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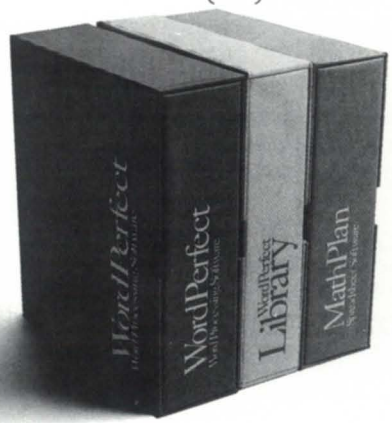

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LETTERS

Convert dumb copy to smart copy

Jim Siegman's discussion of the "dumb" COPY and the "smart" TYPE command (February issue of *Focus*, pages 52–53) reminded me of a similar technique I once used to convert a file from one record type to another. I had a file of variable-length records (VAR), and I needed to convert it to datasensitive records (D-S), so I could edit it with SED or SPEED (neither of which knows about VAR records). The TYPE command is smart enough to be able to read VAR records and display them on the screen, so all I did was redirect the output with a /L switch:

```
) CREATE/TYPE=TXT/DATASENSITIVE
  FILE_OF_DS_RECORDS
) TYPE/L=FILE_OF_DS_RECORDS
  FILE_OF_VAR_RECORDS
```

Unfortunately, you cannot convert the D-S records back to VAR records with this method, because the output from TYPE is always datasensitive, regardless of the record type of the file being TYPEd.

John A. Grant
Geological Survey of Canada
601 Booth St., Room 591
Ottawa, Ontario K1A 0E8

S.O.S. from abroad

We are a site with two MV/10000s and an MV/8000, with a mixed load of on-line transaction processing and batch processing. The majority of the batch processing takes place overnight with operator attendance.

We are looking for a software package that is capable of scheduling and controlling batch tasks, and therefore, would like to get in contact with other DG users and/or vendors who are using such a scheduling tool.

Theo Huppertz
Rank Xerox Manufacturing
Industrieterrein Smakterheide
Maasheseweg 89–91
Venray, Netherlands

Errata

In the "Manufacturing a Strategy" article that appeared in the February 1988 issue of *Focus*, Empire Systems International was mistakenly referred to as Empire International. Also, their product, EMIS, was not included in the chart of CIM solutions given to *Focus* by Data General. Δ

News from NADGUG and its affiliates

OASIS on the beach

by Bobbie Pressman
OASIS president

The seventh Office Automation Special Interest Subcommittee (OASIS) workshop was held February 11–12 in Ft. Lauderdale, Florida. There were 55 in attendance at the workshop that was hosted by Rosalind Miele of Westinghouse Communities (she's also the OASIS vice president). As always, Data General was well represented. The local DG office sponsored a nice cocktail reception on the first evening.

After the initial welcomes, Bob Tway, Data General vice president of Eastern Operations, gave a special address. Afterward, the Thursday sessions included a presentation by Milton Larson of Eagle Software, who described three of their AOS/VS toolbox packages. Doug Tomlinson, CEO support manager at the Atlanta Customer Support Center, talked about the call flow and escalation policies at the center.

Two break-out sessions covered training and data base management. Eric Fredrickson of DMS Systems demonstrated Genisys, their data base management package, and Betty Ann Davis of Data General Education Services handed out a list of training sessions that were developed based on the needs expressed by attendees at the OASIS workshop held last year in Chicago. (See, it pays to attend!)

Laurie McHenry and Skip Richards demonstrated CEO rev 3.0, answering numerous questions regarding the new revision.

DG's Bob Wyld gave the final presentation of the day. He discussed the direction DG is heading toward regarding printers and printer support.

Friday's sessions included a presentation on business graphics by Peter Dunning of Computer Associates. He reviewed a number of case studies on marketing, financial, and scientific uses of business graphics, and included a brief description of his company's line of business graphics products.

The last formal session was given by OASIS member Willie Staggs of Marshall Space Flight Center. He talked about his experiences as a CEO rev 3.0 beta test site. Additionally, Stafford Layne of Data General reviewed some preinstallation considerations for the upcoming CEO rev.

At the traditional open-forum wrap-up session, attendees offered constructive suggestions to Data General and other vendors there. Overall, the comments were very positive about the workshop, such as "I can't believe I learned so much in just two days!"

So ended the seventh successful OASIS workshop. Now, we begin plans for the next workshop, tentatively scheduled for May 19–20 in Washington, D.C. The Federal Special Interest Group (FEDSIG) will be our host. Some agenda items planned include interactive sessions on devising the "ultimate testing checklist" for new software revisions, training, and CEO rev 3.0. Δ

Unix update

by John Huddleston
Unix SIG president

The initial meeting of the Data General Unix Special Interest Group (SIG/UX) was held at the NADGUG conference in Las Vegas. DG representatives Karen Abrams, Andrea Brickman, Mark Harris, and Eve Harris gave talks covering DG/UX, networking, C portability, and

interprocess communications.

The basic idea behind a SIG is the exchange of ideas, information, public domain software that has been ported to Data General Unix systems, and product information among members. Reading a trade journal is helpful, but may not provide the information needed by those people interested in specific applications or machine-dependent programs. Unix circulars offer technical books and materials related to Unix that extend from beginning shell programming, to advanced C programming, to system administration. The Data General monthly newsletter gives details of any newly reported bugs or fixes to DG/UX and MV/UX.

SIG/UX will go one step further by networking people together for the benefit of the whole. In order to provide a medium of exchange, the username SIG/UX and the password NADGUG can be used to get into the shell of our MV/8000. As time permits, I will develop a menu feature for this logon ID, so users unfamiliar with Unix can still communicate. In the meantime, interested users can dial in at 503/221-3748 at 1200 baud. Users can also send mail through the Unix system to my logon name WSFS.JH using the command "mail wsfs.jh." Mail in Unix ends with a period in the first column at the end of the letter.

I work for the USDA Soil Conservation Service. We are considering a move from AOS/VS and MV/UX to DG/UX. SIG/UX would appreciate hearing from anyone who has made this conversion. Julie Stevens from Zetaco in Minnesota called me and said they are going to make the transition, too. We are developing a plan to convert some of the CLI macros into Unix shell scripts and the remainder of the CLI scripts into C programs. A good CLI feature is that one macro can call another without spawning a second process. On the other hand, a Unix shell script will continue to create child processes with each new shell script. Since we service approximately 2,000 logons per month with 90 menu CLI macros and 220 support macros, we anticipate the conversion to Unix shell scripts to be a major task. Any help from those who have made this conversion would be appreciated.

Enough of the sales pitch—on to Unix material. We have non-DG terminals hardwired into our MV/8000. We use Tektronix terminals (with PCT-100s to emulate Dashers) and must set the dialogue area buffer to the screen size and program the function keys before going into the VI or SED editors. The case statement is used to check for the terminal type and perform the appropriate programming. Our sample tvi shell script is shown as follows:

```
case $TERM in
4105)
   cat /usr/bin/tvi5_on
   vi $*
   cat /usr/bin/tvi5_off
   ;;
4105b)
   cat /usr/bin/tvi_on
   vi $*
   cat /usr/bin/tvi_off
   cli d200
   ;;
   cat /usr/bin/tvi7_on
```

```
    vi $*
    cat /usr/bin/tvi7_off
    ;;
*)
    vi $*
    ;;
esac
```

I hope that as more people become interested in sharing their work and innovative ideas, SIG/UX will grow and develop. Only you can make this possible. If you would like to contribute, please use the ID and logon provided, or write me at the address below:

John Huddleston
SIG/UX leader
P.O. Box 4611
Portland, Oregon 97208 Δ

PADGUG meets

The first meeting of the year for the Pittsburgh Area Data General Users Group (PADGUG) brought Allen Hopper, Data General's marketing manager of Packaged Software Services, to discuss system capacity planning, performance crisis prevention, and the AOS/VS performance services available from the Systems Evaluation and Performance Analysis Center (SEPAC).

PADGUG meets on the first Wednesday of alternating months at 4 p.m. So far, the group doesn't have a formal dues-paying membership, but about 90 names are on the mailing list, and an average of 24 people attend the bimonthly meetings. Δ

Members receive one free hour on OIS

by Anna Mae Malozzi
OIS marketing specialist

On-line Information Service (OIS) is now bundled with NADGUG membership. One hour per month of OIS service will be credited to all accounts. OIS is a menu-driven data base of information of specific interest to Data General users as a communication device.

The OIS communications channels (bulletin board, data libraries, conference capabilities, DG talk, and software assistance requests) provide two-way communications among NADGUG members, RIG/SIG group members, and Data General. OIS has also implemented a public domain software library within the data library section of the NADGUG and OIS bulletin boards.

The bulletin boards on OIS help expand a user's information base through easy-to-access user-to-user communications and information exchange. The data library sections allow a user to upload lengthy documents in order to make them available to others and download documents, articles, etc. of interest to others.

We have found that most of our users average about a half an hour per month on the system, so one hour should allow for sufficient access to the bulletin board. We hope you'll take advantage of this offer and increase the activity level of the boards to the point that we'll need several special interest boards. Feel free to give us feedback and any ideas you have for improving or expanding OIS. Δ

NADGUG roster

The current roster of the Executive Board, RIGs, SIGs, and international groups

Several times a year, *Focus* publishes the most up-to-date information about all the users groups for your benefit. The current roster of the North American Data General Users Group includes the Executive Board and all of the regional interest groups, special interest groups, and international groups. This list can be used not only to join a particular group, but also to connect with other Data General users nationwide, as well as internationally.

If you would like to join a group, notify the person listed as the contact. 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 (617/898-4067) about your interest in seeing a new group start up.

Also, if you are aware of any changes or updates that should be made to the roster, please notify the NADGUG staff.

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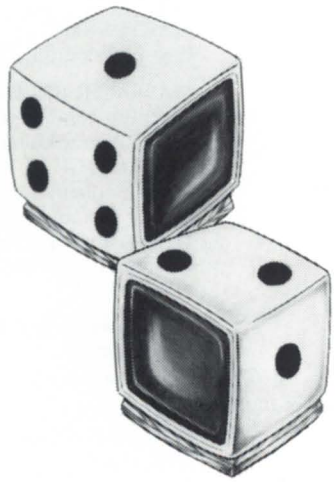

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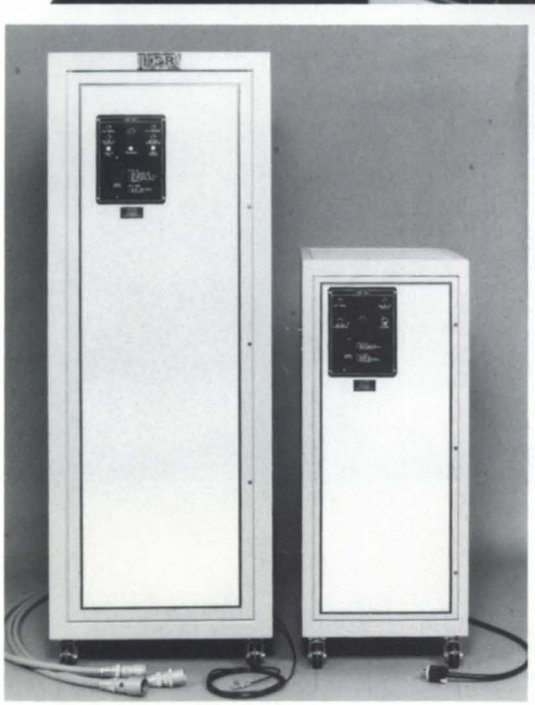

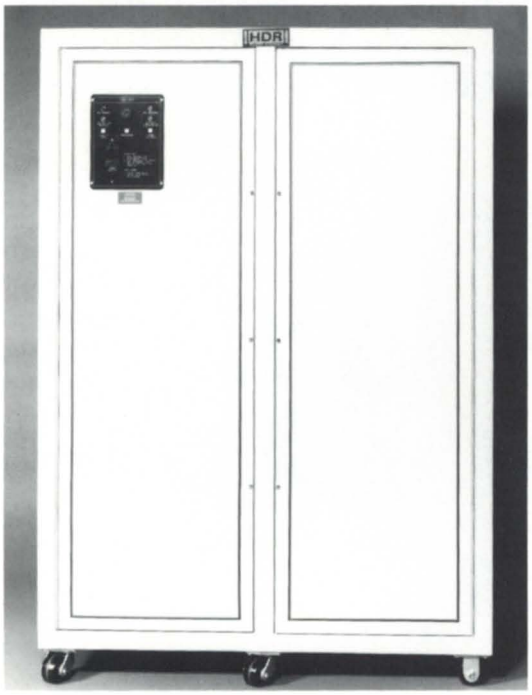

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On the right track

Automated quality control procedures at Martin Marietta Aero and Naval Systems

While the "Right Stuff" astronauts were waiting for a billion dollar firecracker to launch them into orbit, they joked about riding in a rocket built by the lowest bidder. Aerospace is still a risky occupation, and everyone has heard stories about launches that failed because of a tiny component worth only a few cents. While these stories make dramatic reading, they also illustrate a point that is true for the entire aerospace industry: as the systems grow more complex and interdependent, quality control becomes increasingly important–and much more difficult to monitor.

The buyers of these expensive systems–whether it is NASA, the Department of Defense, or an airline company–are trying to protect their investments by imposing stringent specifications covering every conceivable detail of the manufacturing process. For the companies doing the actual manufacturing, conforming to these specifications has become a monumental headache.

At the Baltimore facility of Martin Marietta Aero and Naval Systems, concern for quality has resulted in a high-tech method for tracking a fairly mundane aspect of the manufacturing process–soldering electronic components onto circuit boards.

Military specifications require companies producing systems for the Navy to track and document all printed circuit card defects in "real-time," i.e., immediately when found. This requirement, plus the large number of circuit card assemblies Martin Marietta produces, made it essential for the company to develop an on-line system for processing the quality control data. Given the need to produce the automated quality control system quickly–and to modify it as quickly as the specifications change–this was an obvious application for a fourth-generation language.

"There's a big push for trend analysis with respect to solder," said Greg Miller, senior quality control engineer for Martin Marietta. "The issue is reliability. In recent years, the military has been imposing quality control through their specifications, and the key to it is really process control.

"The new specifications tell you what the environmental controls must be, the level of defects at which you must scrap boards, and they even tell you the number of times you can touch the solder joints before the board is considered scrap. So we were collecting data that could have an impact on both cost and the quality of the project."

Miller, together with programmers Tammy Birkmaier and Kevin Apperson, was given the responsibility of automating a quality control data acquisition and record management system for Martin Marietta Aero and Naval Systems. The size of the job is apparent when you consider that an average printed circuit board might have approximately 1,000 joints, and a relatively simple system such as a missile launcher uses perhaps 150 PC boards. With production runs of several thousand, that adds up to millions of solder joints for even a fairly simple military system–and each joint has to be tracked as a separate entity.

Miller explains that the specifications vary from system to system, but most boards get a visual inspection under a ten-power microscope. If there's a problem with a particular joint, it has to be logged immediately. A normalizing number associated with each PC board is based on the number of joints and wires on the board. "We basically track the defects on each board, and have to keep the defects below a specified threshold with respect to the normalizing number. We have to produce reports for each board we use, as well as daily reports on the process as a whole."

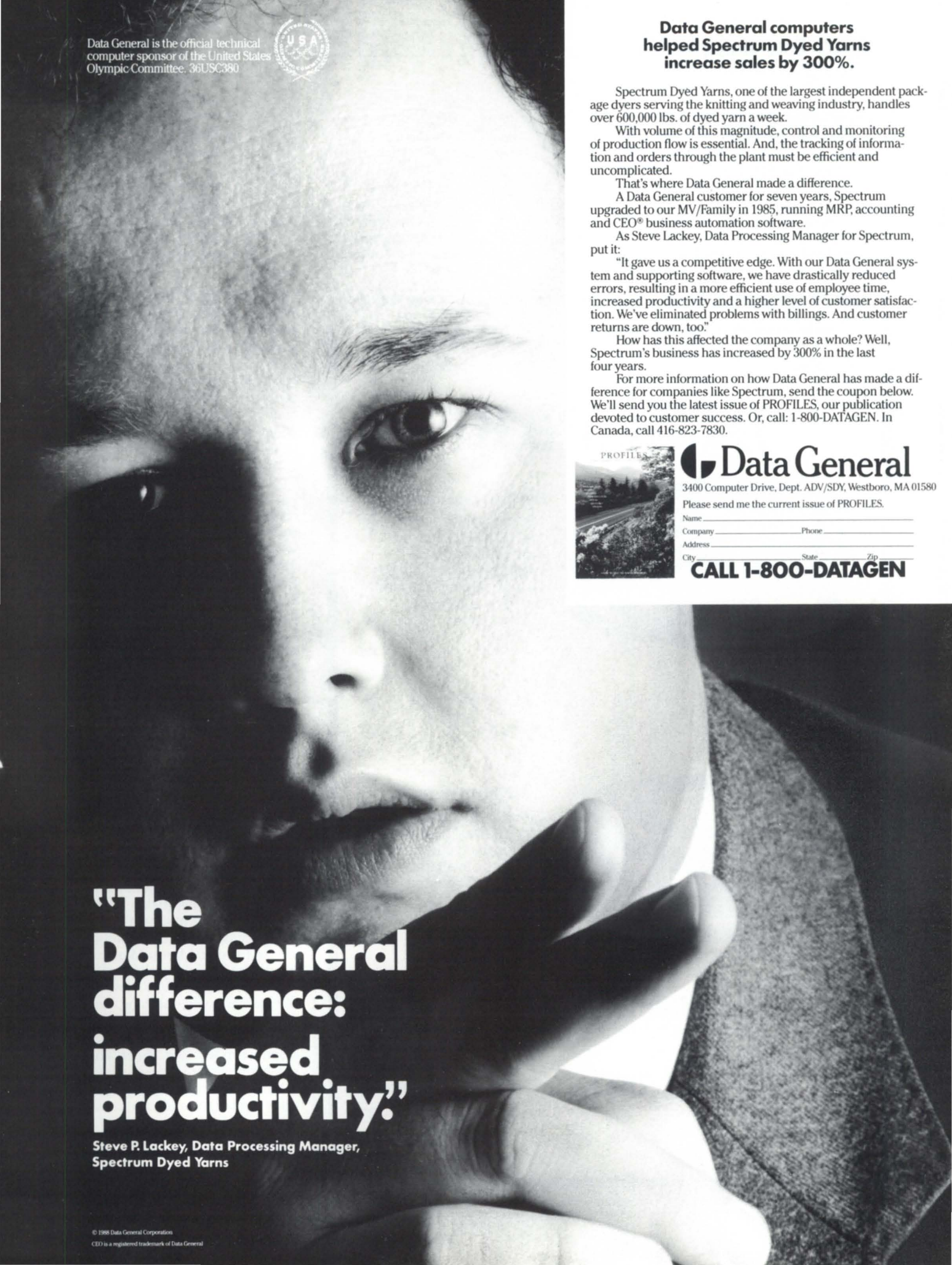
Miller, Birkmaier, and Apperson spent about seven months developing the basic system, and they are now in the process of extending it into a paperless defect recording system that will be implemented throughout the whole Martin Marietta Division in Baltimore.

As they were beginning the project, the specifications were brand new and still changing. Estimating the amount of coding the application would require, as well as the likelihood of major modifications resulting from changes in the specifications, Miller decided that a 4GL was the only logical approach. In the end, they developed the project on a Data General MV/2000 running Cognos Corporation's Powerhouse 4GL.

"We looked at seven or eight 4GL/data bases, and found that with most of them, the problem was speed. I would have preferred to go with a relational data base because of the amount of changes we expected, but I had to go with a hierarchial system for reasons of performance," said Miller.

Another factor Miller weighed in the selection was the data base system the 4GL uses. He found that most 4GLs come with their own proprietary data base software. "Powerhouse is just an applications package that runs on the native machines' data base. We thought there would be more flexibility with that. Also, we weren't sure which machine we would end up putting the finished programs on, but we knew that Powerhouse would run on the Data General, DEC, or HP machines. We have all of those machines here.

"We're still happy with our decision," Miller said. "The finished product might have run a little faster if we had



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done it all with a 3GL, but it would probably have taken three years for a team of programmers to finish it. If we do run into performance problems, we can take specific pieces of the application and hard code it. The report generator, the batch processing modules, and so on are all entities unto themselves. You could actually build the screens or whatever in Fortran or Pascal."

Powerhouse offers menu-driven utilities for the data base manager to create and maintain the record structure and the data dictionary, as well as components for handling screen design and processing, report generation, and off-line batch processing. Developing the quality control system was basically a seven-step process, with the 4GL offering utilities to assist with each step.

1. Create the data dictionary.
2. Create the record structure.
3. Create the elements of each record structure.
4. Create data entry screens.
5. Run the screens to record information into the data base.
6. Run reports from the data base.
7. Perform off-line or batch processing.

Going from a manual recording system to a paperless recording system proved to be a major change. Data entry now begins with a manufacturing worker using a CRT screen to record initial process information for each printed circuit board as its components are inserted. If a defect is found (a bent or broken leg on an integrated circuit, for example), a defect record tracks the part number, the defect location, the defect code, etc.

As the board goes to the wave soldering facility, another data entry screen creates records for each part that is wave soldered. Next, the board goes to a quality inspector, who records each defect and initiates the "real-time" quality control reports required by the specifications. The system checks for defect rates that exceed 3 percent on a board or 3 percent of any one of three types of defects. Defect rates higher than this indicate problems in the manufacturing process.

An inspected board with defects is sent back to manufacturing for a rework of each defect. There, the worker's screen displays the defect codes and the rework instructions for each part. Later, the inspector rechecks each of the reworked parts and either passes the board or redirects it to manufacturing for additional reworking. However, machine-soldered joints can't be reworked a second time, so if a defect remains, a discrepancy report is created, and the board has to be scrapped.

There are also special screens and reports for use by quality engineers and management to maintain data integrity and provide management information.

In the end, Martin Marietta decided to host the finished applications onto DEC VAXes. "Since the MV/2000 was primarily the development machine, we weren't overly concerned with its performance, but it was basically pretty good . . . good response time," said Miller. The DG machine continues to serve as a development machine, as well as handling graphics, documentation, and office automation chores. Since new government specifications now require statistical process control, Miller expects to stay busy with enhancements to the system for a long time. Δ

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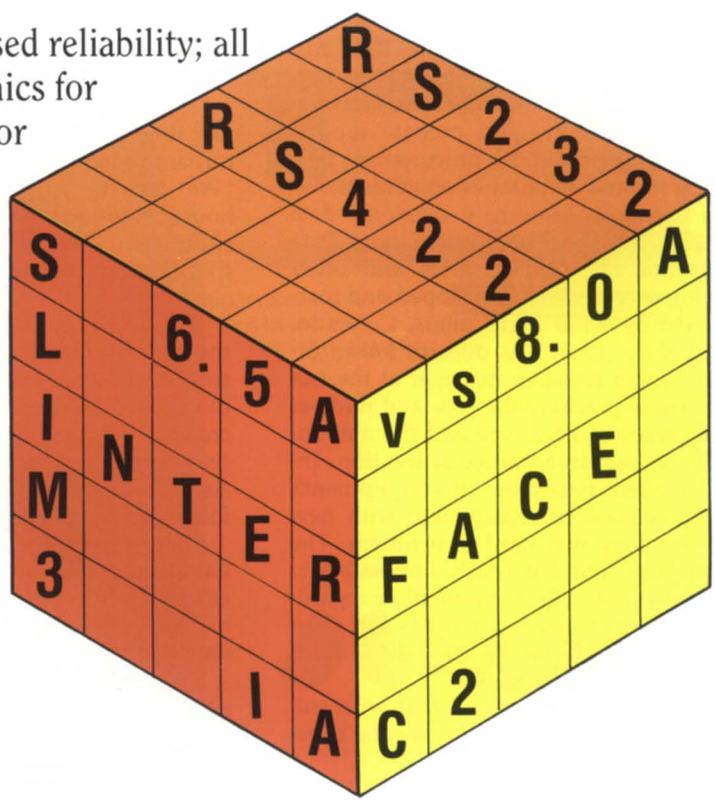

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Airtight control

DG and DBMS help manage FAA personnel and inventory

by Shelly Francis
Special to Focus

Throughout the United States, the Federal Aviation Administration has thousands of mainframes, mini- and microcomputers, terminals, printers, communications devices, and software packages. Each office is required to supply inventory information about its automated data processing (ADP) equipment to other organizations within the FAA, and to other government agencies as well. This may seem mundane, but it serves to point out that even "glamorous" aerospace applications require sound management.

With Data General MV/15000 computers and a relational DBMS, the FAA has found an effective way to manage its ADP inventory information. The FAA uses a system called Systems Inventory Directory (SID) in its offices nationwide to record, store, and prepare reports from initiation of the procurement process to final disposal of equipment. SID is based on Infocen, a relational data base management system for Data General MV Eclipse series and other computer systems, developed and marketed by 3CI of Fort Collins, Colorado.

Before SID, it was difficult for an information resource manager at the FAA to know precisely the type and number of pieces of hardware and the amount of software in a particular location. Information regarding this equipment's depreciation or replacement with new technology was hard to maintain. The FAA also found it nearly impossible to record and collect information regarding maintenance agreements and warranties or maintenance expenditures for the ADP systems.

Now the FAA does all that with SID. The system's query and reporting capabilities help the FAA review equipment trends for establishing agency standards and ensuring optimum usage of ADP systems. On the regional level, managers can use SID to plan technical support, to guard against fraud and waste, and to develop comprehensive maintenance schedules.

According to John Larsen, manager of the FAA Management System division's southern region in East Point, Georgia, "Infocen's Systems Inventory Directory has automated information about the FAA's data processing equipment—information that is vital for the different program offices and information resource managers who plan for the future.

"It provides the maximum practical degree of operation and control at the regional level," he said

Personnel management

Inventory is just one aspect of the FAA's involvement with Data General computers and relational data base management systems. The FAA uses SID's parent system, Infocen, for a number of other applications also.

"With Infocen, we are able for the first time to give users literally one-day turnaround on requests," said Larsen. "We can in many cases deliver in-house solutions with less time and effort than would be required to draft specifications for a contract task the old way."

With nearly 5,000 people working for the Air Traffic division in the FAA's southern region, keeping track of them can get complicated. New positions are created, new people are hired, and current employees change within the FAA. As a government agency, they must follow strict guidelines and procedures.

Infocen helps the Air Traffic division handle the red tape more easily and efficiently. The FAA uses Infocen macros to "jump back and forth" among five data sets, said Larsen.

Since many personnel actions require substantial lead time between approval and completion, there is more time for making a wrong decision. Infocen gives the FAA the ability to look at a proposed action in light of both the current situation and all approved but not yet completed personnel actions.

A crystal ball

Larsen described Infocen as a "crystal ball" that allows decisions to be made based on full knowledge of pending actions and as a "rat system" that keeps the Budget division informed of problems.

"It has allowed much greater control and enforced more separation of duties than was evident in the previous manual environment," he said.

For instance, the Air Traffic division may have 156 planned actions in progress and another 150 relocations pending until money is available for the moves. Every personnel request, keyed in daily, is compared to all other actions affecting the budget number for a certain grade level and job description for each facility location. For its 4,995 employees and 1,737 job descriptions, the Air Traffic division has 975 budget numbers.

Other situations

The FAA employs Infocen macros for a number of other situations in the Air Traffic division. One macro updates the personnel file to identify and delete those planned actions that were implemented as proposed and to identify any proposed actions that did not occur when or as expected. This alerts the FAA to follow up on or amend their personnel plans.

Other macros periodically generate a list of budget numbers when the staffing level has exceeded the authorized level. Whenever this happens, another macro drops into the operating system and transmits a mail message to inform the Budget division of the problem. Δ

Shelly Francis is a technical writer for 3CI, 155 W. Harvard, Fort Collins, CO 80525; 303/223-2722.

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High standards

Getting off the ground with aeronautics means climbing a mountain of information

by Geri Farman
Focus staff

"While many elements of the aerospace industry are similar to other manufacturing," said Bob Kiburz, director of major accounts marketing for DG's North American Sales Division, "there are some key differences. Among these are the emphasis on close data exchange and safety assurance." These needs, largely dictated by military documentation requirements, have spread throughout the industry—affecting all companies that do aerospace business. "Kaiser Aluminum, for example," said Kiburz, "must tag its lots of high-strength aluminum and pass that information on to customers. These customers must, in turn, be able to track that metal as it is used in specific parts."

Extensive documentation is also part of the entire design phase. Kiburz gave the example of the B-1 bomber, which started as a one-binder Request for Information, but became a three-bookcase design and ended with three warehouses full of documentation. "Imagine a design change in one of its subsystems—and having to find your way through this mountain of information. There is a huge data base in each company involved in the design, and they must be able to interact with companies above and below it in the manufacturing process."

The impact of these military and general government requirements on MRP software has been tremendous. Data exchange between companies is increasingly important and, with that, standards for data exchange. The need for streamlined, integrated information puts an emphasis on communications and the ability to transform information formats.

Data General has some clear advantages in these areas. "We participate in the standards bodies," said Kiburz, "and in supplying those standards to vendors." He pointed out that when you look at the size of the companies involved in aeronautics and the geographic spread and information needs they have, wide area networks will be increasingly important. "Our work with NTT will put us in a position to take advantage of those needs."

New publishing and documentation tools, such as those offered by Penta and Ventura, are being beta tested at NASA, and are seen as promising means to address the incredible documentation needs of this industry. Kiburz also noted that one of the key duties of Ward MacKenzie, in his new role as corporate vice president of Marketing, will be working to identify technical requirements in the marketplace and making sure DG is one of the key players.

"DEC and IBM were the early leaders in aeronautics, because initially they were the only ones," said Kiburz. "The history of some of the prime contractors leads them to rely on those companies. But if you look at the suppliers with their complex data tracking needs—we do better. We have good tools and good price/performance."

Taking that message to the public is the joint responsibility of sales and marketing. For marketing purposes, aeronautics falls under Manufacturing Industries Marketing, directed by Terry Bennett. His charter is to cover the entire customer base involved in manufacturing—taking the broader manufacturing and technical strategies and conveying those to sales. The sales programs are then designed to reach specific interested parties. Δ

SCSI, the small computer standard interface, can connect a variety of peripheral devices

by Rod Cleaves and Dick Mooney

When Edson D. de Castro started Data General in April 1968, he did so with the idea that every new computer didn't need to be a technological giant step from previous designs. His goal was to design a computer that would be powerful enough to excite the scientific community, simple enough to maintain and to integrate into existing systems, and elegant enough to maintain its basic architecture through years (or decades) of technological advances. He succeeded.

The Nova was built to take advantage of the newest ALUs. This allowed for the most powerful "bang for the buck" in its day. He also made two far-ranging decisions: the instruction set would be continuously upwardly compatible, and the I/O bus would remain pin-for-pin consistent from one model to the next (something DEC didn't do until six years later with the advent of the Q-Bus.)

A lot of changes have come and gone at DG, but that I/O bus is still with us. It has let us upgrade from one computer to the next by just swapping a few principle boards. The I/O subsystem, the largest part of any computer, just makes a slot-for-slot transfer. The Nova/Eclipse I/O bus has survived all the way to the MV/15000 family and shows no sign of slowing down.

Now there's a new kid on the block. The small computer standard interface (SCSI), pronounced "scuzzy," has been gaining acceptance as a standard for interconnecting intelligent peripheral devices. It offers the same system-to-system compatibility, ease of programming, and accepted standardization that was the goal of the original Nova.

The SCSI bus is designed to be as generic as possible; this allows the bus to operate with a variety of intelligent mass storage devices. This also gives the user the greatest degree of flexibility when configuring a system.

The main advantage of the SCSI bus is that it provides an easily available, low-cost solution for each application. Much of its success can be directly attributed to the flexibility that the interface offers. The CPU designer only needs to worry about implementing one of the many available chips into the new machine's internal bus structure, and the peripheral designer just follows the published standard.

In order to demonstrate the versatility of the SCSI standard, I will describe three distinct examples: single-user/single-job, single-user/multitasking, and multiprocessing systems. These examples represent situations that span a range of computing requirements.

Most personal computers in use today could be characterized as single-user/single-job systems. In these systems, the I/O is performed in a single-threaded manner, i.e., sequentially. For example, if you need to store a file to the disk and then read another, you would wait for the first transfer to complete before going on to the second

Figure 1: Single-user/single-job

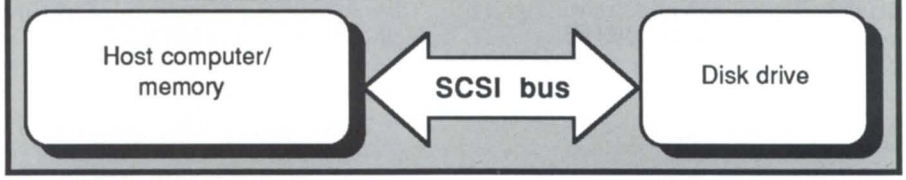
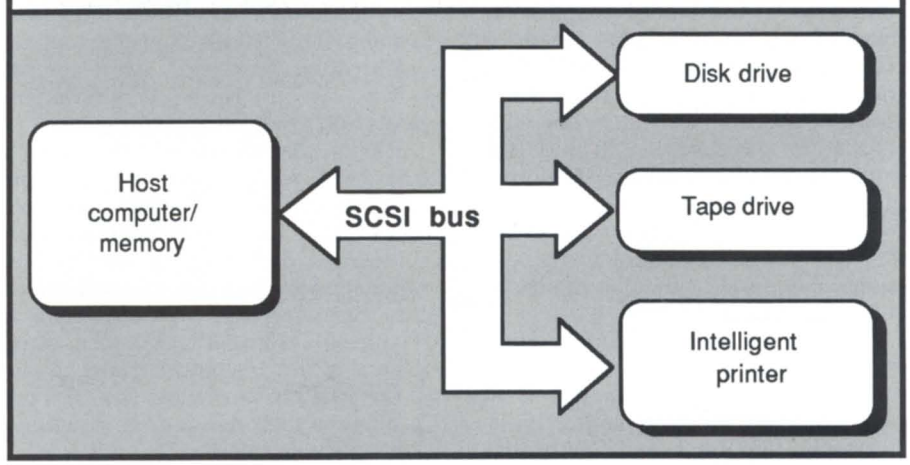


Figure 2: Single-user/multitask



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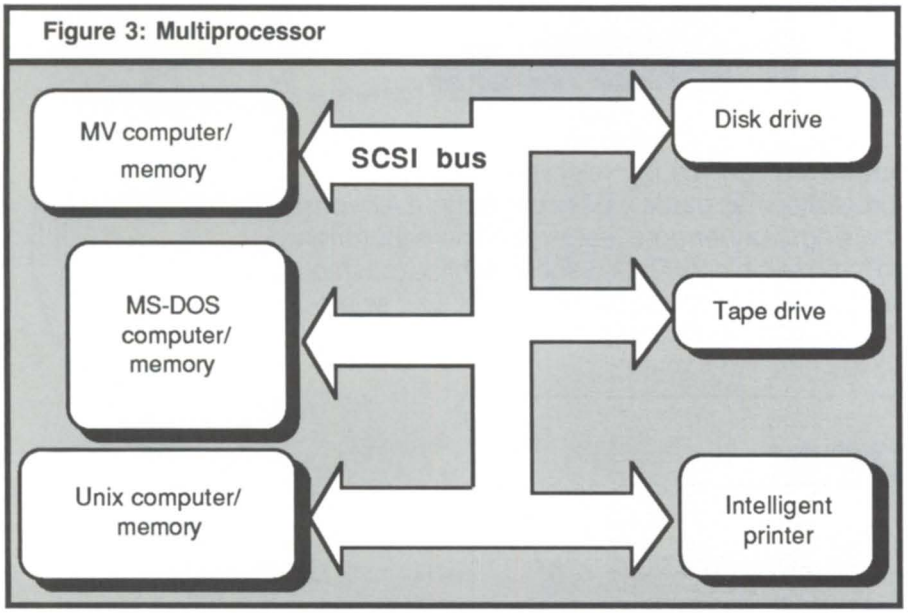
one. The computer completes one job at a time, and there is no bus contention—nor is there a need for any arbitration. Figure 1 shows the likely configuration for this environment.

The down side to the single-user/single-job system is that system performance tends to suffer because of the sequential nature of all I/O operations. Seek and rotational latencies inherent in disk drives may use up to 75 percent of the time needed to access a sector of information.

To take advantage of this "dead time" in a single-user/multitasking system, the SCSI interface allows devices not actively involved in transferring data to logically remove themselves from the bus. This allows other applications to be initiated. This way, multiple disk drives (or tapes, optical disks, etc.) may seek data simultaneously, providing for higher bus usage. The drive that locates its data first reselects the host and completes the transfer. Figure 2 shows a block diagram of such a system. This is the most common SCSI architecture in use today. Since these systems can become more sophisticated, additional devices such as optical disks and tape backup systems can be optionally added by the user. Again, since the SCSI interface supports generic device types, all peripherals can be upgraded to the user's performance and storage needs.

In a multiprocessor environment, the SCSI bus acts like the traditional back-

Figure 3: Multiprocessor



plane of most modern minicomputers. For instance, Data General's Nova and Eclipse computers feature a traditional backplane architecture, which uses a local communication bus with an intelligent peripheral. The SCSI bus provides the same functionality at a low cost.

The SCSI bus also supports multi-host operations, so in addition to file transfers between individual processors and mass storage devices, interprocessor communications can be accomplished across the SCSI interface.

However, since the SCSI bus is limited to directly supporting up to eight bus devices, this may preclude its use in complex, multiprocessing configurations. SCSI/Plus has been developed by Ampro Computers, Inc. to overcome this limitation. It takes advantage of the unused bus phases to provide a binary selection phase. Up to 64 bus devices can be supported with this superset of the standard SCSI bus. Figure 3 is a block diagram showing how a multiprocessing system could be configured.

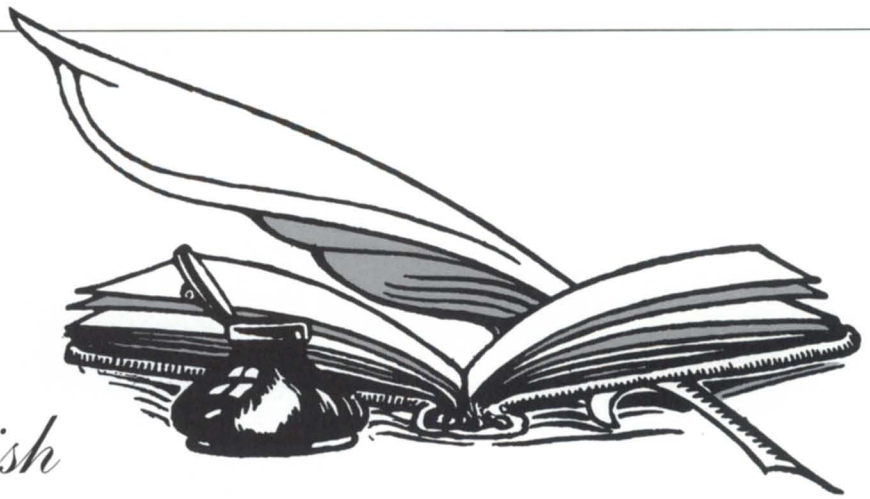
The systems described in this article are a few of the many configurations that could use the SCSI as a backbone of their architectures. The standard offers the flexibility needed to incorporate a range of system requirements.

Data General currently does not support the standard SCSI beyond the inclusion of the hardware into the design of the MV/2000 DC. DG has documented the SCSI fairly well but has not released any hardware or software to implement it as of this writing. However, the second source community has been working to develop peripherals and software for this interface.

When Data General released the Argus disk drive, the controller looked a lot like a SCSI bus in that it used control blocks with a dedicated software interface for local communications between the CPU and device. The basic concept of intelligent peripherals using CBs for control/status/data is not new, but it's gaining wider acceptance.

If Data General should release more processors with the SCSI, then we'll be able to start using the new standard with the old standard. If that happens, I think we will see DG start climbing to the top of the heap again. Δ

Rod Cleaves is an independent consultant in Maynard, MA. He can be reached at 617/897-1845. Dick Mooney provides corporate support for Hanson Data Systems, 60 Brigham St., Marlboro, MA 01752; 617/481-3901.



Publish or perish

Electronic publishing solutions are moving in house

There is a lot of talk today about desktop publishing, or as some prefer to call it, electronic publishing. No matter what it's called, they're talking about producing documents of near-typographic quality, usually printed on a laser printer.

Data General has developed a corporate strategy to fit the needs of all users. They refer to it as "DG Corporate Electronic Publishing Solutions."

The newly announced CEO Desktop Composer is at the low end of DG's strategy. An MS-DOS-based software product that runs in a standalone environment, it is a modified version of Ventura Publishing, a product developed and marketed by Xerox. It runs on a Dasher/286 or IBM PC/XT/AT or compatibles with a compatible DG monochrome graphics display controller/PC and mouse.

CEO Desktop Composer can import text from well-known MS-DOS word processing packages, as well as CEOwrite. It would best be used for correspondence, newsletters, bulletins, etc. However, after viewing the package, I find it difficult to use without a fair amount of typesetting knowledge. It also is a single-user-based system.

The high end of DG's publishing solution is the Penta publishing system, by Penta Systems International. This is a highly sophisticated commercial publishing package used for relatively high-volume production magazines and newspapers. Extensive knowledge of typesetting is required.

Right in the middle of these two extremes is a package marketed by Data General and developed by Intercon Associates called Office/Publisher. This software is fully integrated with CEO. It runs on Data General's MV family of processors under AOS/VS. It accepts CEO documents and composes, paginates, and transmits them to a variety of laser printers and typesetting equipment. Any Data General terminal can be used for editing.

I find this product extremely easy to learn and use. The codes entered into the CEO word processor are relatively simple to remember, because they are based on the function you want to perform. For example, if you want a table to be boxed, the code is TB. If you prefer a table that is ruled, the code is TR.

All editing is done within the CEO word processor. Commands are added by utilizing the text attribute functions. It uses the original document, not a copy, which requires no intermediate files to be maintained.

Once the document is created, it is sent through the Office/Publisher formatter to a batch queue for printing. The original document is still intact and could be sent to the CEO formatter if required.

I was surprised at the difference in output by just running the document through the Office/Publisher software without *any* special commands. Office/Publisher contains a default style sheet that sets predetermined formatting, such as proportional spacing, right margin justification, top/bottom and left/right margins, automatic hyphenation, and use of the default font in the laser printer.

By adding a few simple commands, the look of the document is dramatically changed. This can be used for preparing manuals, reports, proposals, and contracts, as well as day-to-day correspondence.

Office/Publisher supports a variety of laser printers, such as QMS 800, 1200, 2400, Hewlett-Packard LaserJet, LaserJet Plus, Series II and 2000, Data General 4557, 4558, 6454, and APS 55, 5, and Micro-5.

Also included in the package is a preview mode that allows the user to see the page makeup prior to sending the document to the printer. It's not a full WYSIWYG (what you see is what you get), but rumor has it that it's in development at this time.

Office/Publisher also supports the AOS/VS version of Wordperfect, and will support the newest version of CEOwrite. Software maintenance and training are also available.

It has been difficult at times to justify the purchase of a laser printer, especially since CEO can't utilize many of its features. However, purchase of an electronic publishing system adds enough functionality to CEO to overcome this problem. The time and money savings from outside typesetters and print shops is justification alone.

No matter what type of system you choose, be sure to consider your uses and costs per person. Determine what your needs are and who will be using the system. Also, consider the amount of time you will be investing in training. It's important to remember that a system is only as good as the person using it. If all the functionality is not used, it will be wasted. Δ

Charlene Kirian is PC/OA instructor for the Online Computer Library Center, 6565 Frantz Rd., Dublin, OH 43017; 614/764-6435. She also serves as the education director for NADGUG's OASIS (Office Automation Special Interest Group).

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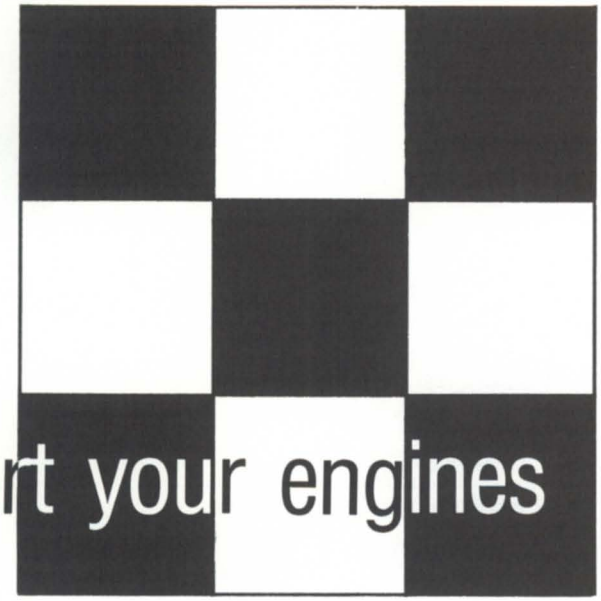
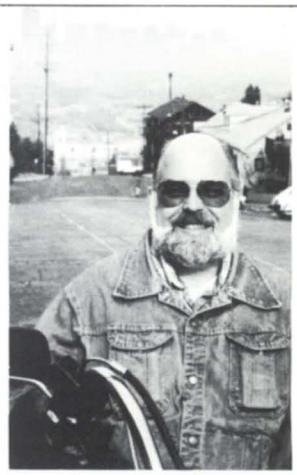


Start your engines



A couple of benchmarks may determine the real winners

:YAPSB

Yet Another Potential Security Breach has been found by one of the tireless loophole sniffers: Felix The Programmer at Bell Fiber Products.

Remember when someone discovered that typing ;XEQ :CLI in response to a !READ pseudo-macro would get you into the CLI? Supposedly, the fix was a /S switch added to !READ in AOS/VS rev 7 (or was it rev 6?). !READ/S causes the CLI to quit accepting text for the !READ as soon as it stumbles upon the semicolon.

Felix's loophole consisted of responding [!ASCII 73]XEQ :CLI instead. Presto, you're in that nasty old CLI.

Footnote: an STR has been generated, and a fix will appear in a future rev.

I don't understand why a /S switch is needed at all? Why not just stop scanning at the first semicolon (plain or pseudo-oped) all the time? Does anybody have a macro that actually wants to allow users to respond to a !READ with something that includes a semicolon?

:FOCUS:FIXUP

Due to some bizarre technical problems at the typesetter last month, the following section on FPU upgrading ended up in @NULL, instead of assuming its rightful place as the second section in last month's column. Get out your scissors and a jar of paste and perform the necessary transplant surgery to last month's issue.

_____cut & paste starts here_____

:TO_FPU_OR_NOT_TO_FPU

One new item, for which the results are not yet completely in, is the addition of a hardware floating-point unit to one of the two CPUs. The net-net effect on AOS/VS and the on-line users is near zero, primarily because AOS/VS uses only a handful of floating-point instructions, and most on-line software is rarely CPU-intensive. The effect on computation-intensive COBOL batch jobs seems to be around 15 percent, tops. This jives with the results obtained from the :SYSMGR benchmark series program, BENCH.FPU.A (available on the :SYSMGR BBS), which predicted a speed increase of 17 percent. The benchmark program measures the speed of a typical ADD 1 TO X sentence in COBOL. The generated code for that statement contains less than 50 percent floating-point instruction content (that's typical).

Still, the effect on the batch jobs was deemed sufficient enough to justify buying an FPU board for our second MV/4000, especially given the low price of used MV/4000 FPU boards these days.

_____cut & paste ends here_____

:PATCH:UPDATE

Last year I published a one-word patch for AOS/VS that dramatically decreased disk I/O under certain conditions, notably during heavy writing of sequential files. The most common cases cited were LOAD or LOAD_II, disk-to-disk MOVEs, and programs that produce large sequential files as output. Except for a small decrease in average seek distance and a small increase in blocks/access, the effect of the patch on normal interactive loads was barely measurable.

Since that patch was published, 20 or 30 systems that I'm directly aware of have been using it with no problems. When originally published, I expressed some reticence about widespread use of it for two reasons: the experimental data was sparse, and I've always had qualms about suggesting that people patch their AOS/VS systems with unofficial patches. However, the apparent lack of significant risk, coupled with the tremendous benefit during the types of load cited above, have changed my mind.

Based on the experience to date, I now strongly recommend this patch to every AOS/VS user.

Consider this: This morning, I received a call from one of the participants in my performance seminar held last month. He reported that their nightly disk-to-disk backup using DUMP_II/BUFF=32768 went from three hours and 46 minutes without the patch to one hour and 10 minutes per disk with the patch, and he backs up two disks this way each night. He went from nearly eight hours to slightly more than two hours. That's a reduction of about 70 percent!

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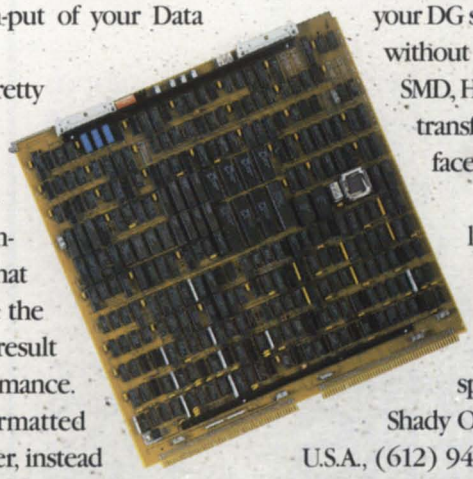

No longer does the drive need to fit a specific head/cylinder/sector configuration to work with your DG system. The ARZ-1 does the work – without patching, without hassle. Any four SMD, HSMD or SMDE disk drives, with data transfer rates up to 3 MB/sec, can interface the ARZ-1 via the high-speed BMC.

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The Link To Tomorrow.

Circle 68 on reader service card.

For those of you who missed it, the AOS/VS patch file looks like this:

```
;Patch AOS/VS 7.5x to eliminate
;unnecessary flushing of RIBs
%SYSTEM
RUNLC1+3605        RELF RELM
;End of patch
```

Assuming you called the patch file 7.50_BJS_PAT, the command to apply it is:

```
*) X PATCH/Y/T=system-pathname.PR/
   P=7.50_BJS_PAT
```

For AOS/VS rev 6, the same patch applies, but the patch location is RUNLC1+3445 instead.

The patch also applies to AOS/VS revs prior to 6, but I haven't had the opportunity to discover the locations. For the more adventurous among you, try using FED/X on your system .PR file to search for all the locations that contain RELF. There should be three of them. The one that has an XJSR WDCBK within the 10 or 20 preceding instructions is the one you want to change to RELM. Send me the label plus offset, and I'll publish any that I get.

A similar patch with similar benefits applies to AOS, but I don't have an AOS system to locate it with. One of you trailblazing AOS people should give me a call, and I'll walk you through finding the patch over the phone.

:CEO_3.00

In case you haven't heard, *buy more memory!* Somebody in the CEO group apparently caught a bad case of global serveritis.

Global servers are a great concept from a software engineering point of view, but most global servers are composed of pages that are effectively unshared (have you ever seen two EXECs?), so the entire ring 4–7 working sets are a giveaway at boot time. Each new global server runs anywhere from 20 KB of unique memory (e.g., a subsequent XLPT) to 700 KB (e.g., EXEC). CEO servers tend more toward the size of EXEC than they do toward the size of XLPT, say about 500 KB. That means that every two global servers consume a megabyte off the top. Ouch.

Funny thing about users/MB numbers: if you look around at the current users/MB numbers in the PC world, you get a bit of a shock. With the advent of the extended memory standards, the average IBM PC is running about 1 user/MB, and OS/2 promises to drag that down to .3 users/MB, which is about what the average Macintosh desktop publishing user has had for a year or two (e.g., typically about 5 MB). All of a sudden, the current average of about 4 users/MB on AOS/VS looks pretty decent.

But memory is cheap, right? I'm getting tired of that old saw. It's true, memory *is* cheap, but as long as the maximum memory limits on the various MVs aren't raised at the same time that per-user consumption is forced upward by new software releases, cheap memory is of little consolation. If your system is currently configured at maximum memory, then your only recourses are to shed part of the load or upgrade.

:MIPS_VS_KIPS_VS_WHETS

I originally started out this month to produce a column on upgrade strategies (at the request of an alumnus of

one of the performance seminars I held for DG). In the process of doing that, I got involved with the complexities of comparing the CPU horsepower of the various MVs. That became the bulk of the discussion, far overshadowing the other upgrade issues.

As a result, I'm going to cover just the processor power issue this month, and leave the upgrade discussion until next month.

:DEFINITIONS

The two most common measures of CPU horsepower are Whetstones and MIPS (millions of instructions per second).

Whetstones are determined using a standardized mix of instructions that defines a macro instruction called, oddly enough, a Whetstone. The speed of the machine is then expressed as so many Whetstones/sec (commonly shortened to just Whetstones). Currently, the slowest DG MV series processor (the MV/4000) is capable of nearly one million Whetstones/sec, so the units typically cited these days are KWhetstones/sec (thousands of Whetstones/sec).

MIPS, another common measure of CPU speed, simply reflects the raw processor power in terms of how many millions of instructions per second it can execute, with no real determination of what an instruction is.

Most manufacturers with optional, hardware-based floating-point accelerators prefer to use KWhetstones, because it reflects the speed of both floating-point and integer arithmetic, and can therefore measure the effect of adding the accelerator hardware.

MIPS are popular with mainframes and with (mini)supercomputers that have hardware-based floating point as standard equipment. Trade journals also prefer to use MIPS when rating processors.

Sounds simple so far, right?

:GOTCHAS:WHETSTONES

One of the unfortunate problems with KWhetstones is that they make a fairly unrealistic assumption about the relative mix of integer versus floating-point instructions. If a processor has an average integer instruction set, but a very fast floating-point hardware accelerator, the KWhetstones tend to misrepresent the processor's ability to handle programs that are primarily integer arithmetic.

The KWhetstones measure of processor speed was developed more than a decade ago when most benchmarks were composed of computation-intensive Fortran or COBOL programs. Benchmarks with a floating-point content of 50 to 90 percent were not uncommon.

However, today's typical instruction mix is integer. Large, complex programs like 4GLs, CEO, and data base systems have little need for floating-point arithmetic.

:GOTCHAS:MIPS

Back in the days when all the instructions on the machine were one word long, when instruction decoding was hardwired, and when the execution time for an instruction was equivalent to the cycle time of the memory on the system, life was easy. The MIPS rating of the processor was simply 1 divided by the memory cycle time, or 2

divided by the memory cycle time if you used memory reference instructions as a base.

With the advent of multiword instructions (some richer than Philadelphia Brand Cream Cheese), high-speed microcode, memory caching, sophisticated address translation units, instruction pipelining, and exotic parallel arithmetic units, the picture has gotten a little cloudy. The real challenge nowadays is to write a benchmark that doesn't inadvertently fall into the loving arms of one of the acceleration schemes, or conversely, one that misses all of the accelerators. Additionally, the subject of instruction frequency has become important now that there's a comparatively large disparity between the execution times of the cheap instructions (e.g., WADD 0,1) and the expensive ones (e.g., WCMP).

:GOTCHAS:BOTH

One of the major problems with both measures of processor speed is that a major consumer of processor time on many systems is the operating system itself. The problem stems from the fact that operating system software tends to be largely integer arithmetic, and operating systems use a very small subset of the instruction set. The most common instructions are call/return, indexed loads/stores, and integer comparisons.

In addition, the nature of most user software has changed over the years from computation-intensive to logic-intensive. In the old days, it was not uncommon for the average process to be largely I/O-bound, between bursts of computation frenzy. Now, the average process consumes far more processor time, and spends relatively less time waiting for I/O. This is due, in part, to the popularity of high-level-language implementations, where the speed of argument passing/accessing is more important than the time it takes to add two numbers, and partly due to an increasing penchant for menu-driven programs with pull-down menus, graphics, and verbose screen I/O. These programs spend the bulk of their time traversing complex subroutine trees to accomplish the program logic.

:REALITY

So what's the real story? How close do KWhetstones reflect the relative performance of the various MVs? The answer is critical if you're trying to determine which processor to upgrade to in the face of a CPU bottleneck.

In order to answer this question, I devised a few quick-and-dirty benchmark programs to gauge the speed of the various MVs in more realistic terms. A complete :SYSMGR benchmark suite is available on the :SYSMGR BBS, but my full results will be available only to those of you who return results for your systems. However, I will tell you that the benchmark suite reports that the MV/20000 is only 3.33 times faster than the MV/4000 on the 16-bit integer test, only 4.03 times faster on the system call test, and only 6.75 times faster on the floating-point test (compared to an MV/4000 without an FPU). Not very encouraging.

For the purposes of this column, I've put together a couple of quick-and-

dirty tests to see if the published KWhetstone numbers are representative of the actual performance of the two MV models. I hope we'll spot a trend.

I've selected two MVs for these tests: an old reliable MV/4000 with an FPU and a borrowed MV/20000 II. Depending upon whether we use the single- or double-precision KWhetstones, the MV/20000 II is either 17.7 (12,423/702) or 17.8 (9,719/546) times faster than the MV/4000.

But wait. I've just fallen into trap no. 1: when running a single program (like my benchmarks), the MV/20000 II is actually the same speed as an MV/20000 I, because only one job processor can be used to run a process at a time. So the actual ratios I should see based on the MV/20000 I KWhetstone ratings are 9.13 (6,410/702) or 9.05 (4,940/546). Whew.

The first benchmark I selected was the DEMO01A.PR program supplied with DG COBOL. The program runs completely CPU-bound with zero system calls and a handful of floating-point instructions. It took 2.913 seconds on the MV/4000 and 0.650 seconds on the MV/20000, for a ratio of 4.48. Pretty grim compared to 9.13 or 9.05.

The next benchmark I selected was DG's Sort utility. I used the following SPEED macro to create a text file called FOO:

```
!10000VS0$$
!8400(V0\$VI0$I
)$$
!FUH
```

This file was a little small, so I made one five times bigger by doing this:

```
) COPY FOOS FOO FOO FOO FOO FOO
```

Then I sorted it using this command:

```
) SORT INTO ZIPS FROM FOOS
```

The Sort reported 91 CPU-secs on the MV/4000 (67 secs of Sort CPU and 24 secs of Merge CPU), and 35 CPU-secs on the MV/20000 (30 secs of Sort CPU and 5 secs of Merge CPU), or a ratio of 2.6. I suspect this ratio is a little low, because the system calls, which Sort does a bunch of, get undercharged on the MV/4000 much worse than they get undercharged on the MV/20000 (see my *Focus* column, June 1986). Still, nowhere near the expected ratio of around 9.

The next benchmark measured the CPU-time required for SED to search a 450,000-byte (nearly 6,000 lines) text file for a non-existent, six-character string. The result was 22.405 secs on the MV/4000 and 4.049 secs on the MV/20000, for a ratio of 5.53. The system call rate should have been low on this test, minimizing the CPU undercharging problem on the MV/4. We're still a long way from 9 though . . . .

The next benchmark measured the CPU-time required to execute a small subroutine that generates random integers. The MV/4 took 56.879 secs, and the MV/20 took 12.750 secs, for a ratio of 4.46. I would have expected the MV/20 to shine on this test, since the entire program comprised fewer than 100 words of memory, and should have spent its entire lifetime in the hardware cache. Oh well.

The last benchmark is a simplistic attempt to determine the MIPS ratings (actually KIPS, or thousands of instructions per second) for two simple instruc-

Figure 1: Source program and macro

File KIPS1.CLI
Record Format: D-S

```
[!NEQUAL,%/REBUILD%,]
 XEQ MASM/U %\%
 XEQ LINK %\%/LOCAL
[!ELSE]
 XEQ %0-%
[!END]
```

File KIPS1.SR
Record Format: D-S

```
          .TITLE   KIPS1              ;KIPS - single word instruction
          .ENT     KIPS1

          QUANTUM=10000.              ;Size of loop and # of times to run it

          .NREL    6                  ;Unshared data
COUNT:    QUANTUM                     ;No. of times to execute loop
RUNTM:    .BLK     ?GRLTH             ;?RUNTM packet
D1000:    1000.0                      ;1.0D+03
          .BLK     2
MSG:      .TXT     "99999999 KIPS"    ;Termination message

          .NREL    7                  ;Shared code
KIPS1:    LJSR     LOOP               ;Execute group of instructions
          LWDSZ    COUNT              ;Done enuf of them?
          WBR      KIPS1              ;Nope, do it again

          WADC     0,0                ;(-1) indicates me
          WSUB     1,1                ;(0) indicates AC0 is a PID
          LLEF     2,RUNTM            ;Packet address
          ?RUNTM                      ;Get my runtime stats
          WBR      .+1                ;Hmmm
          XWLDA    0,?GRCH,2          ;Get the CPU ms
          WFLAD    0,0                ;Float them
          LFDMD    0,D1000            ;Convert to seconds
          NLDAI    QUANTUM,0          ;Quantum size
          WMUL     0,0                ;Square it
          WFLAD    0,1                ;Float it
          FDD      0,1                ;Instructions/sec
          LFDMD    1,D1000            ;Convert to KIPS

          NLDAI    4B10+7,1           ;CIS attribute
          LLEFB    3,MSG*2            ;BP(termination message)
          WSTI     1                  ;Convert KIPS to ASCII
          WMOV     2,1                ;BP(termination message)

          NLDAI    ?RFCF+13.,2        ;CLI format, len(message)=13.
          ?RETURN                     ;BYE

LOOP:     WSSVR    0                  ;Save the world
          .DO      QUANTUM
          WADD     0,1                ;***VICTIM***
          .ENDC
          WRTN                        ;Return to caller

          .END     KIPS1
```

tions: a single-word, register-to-register ADD and a two-word load-immediate. The actual source program for the single-word version and its companion macro is shown in Figure 1 as KIPS1.CLI and KIPS1.SR. The second program, KIPS2.CLI/.SR can be created from the first program by changing all occurrences of KIPS1 to KIPS2 and the instruction marked ***VICTIM*** from WADD 0,1 to NLDAI 12345,0.

KIPS1 reported 2,233 KIPS on the MV/4 and 9,715 KIPS on the MV/20, or a ratio of 4.35. KIPS2 reported 1,881 KIPS on the MV/4 and 4,881 KIPS on the MV/20, or a ratio of 2.59.

The relatively poor result for KIPS2 leads me to believe that my benchmark may have fallen victim to some accelerator quirk. Obviously, both ratios are a little disappointing compared to the KWhetstones ratios.

:SUMMARY

This was all an April Fools' Day joke, right? Nope.

It should be pretty clear by now that KWhetstones are not only misleading, but fairly optimistic in the case of an MV/4000 versus an MV/20000. What's not clear is whether the MV/4000 KWhetstones are low or whether the MV/20000 KWhetstones are high.

Now you see why a lot of people who "upgraded" from MV/4000s to MV/7800s were less than awestruck by the performance increase (or was it decrease?), in spite of the MV/7800's impressive KWhetstones.

Clearly, we need a better way to measure the relative capability of the MV series processors. I hope the :SYSMGR benchmark suite will eventually provide better data. However, it will always be true that the best measure of how well a different processor will run *your* software is to run *your* software on the other processor.

Next month, when I cover the subject of upgrades, I'll use this benchmark information to more accurately estimate the relative processor speeds, instead of using the published KWhetstone figures. Δ

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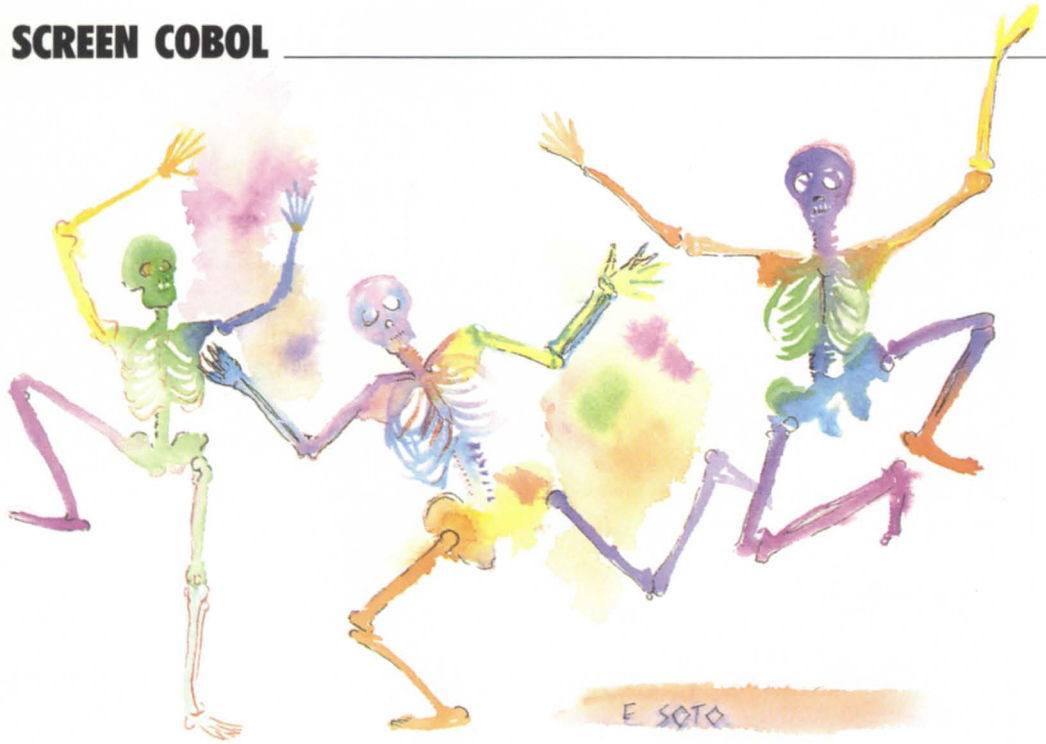


Skeletons in the closet

Until now

by George Burns
Special to Focus

This article is a thinly disguised piece of overdue documentation. The basics of this method of screen handling were designed about eight years ago, but we all know how programmers are about documentation.

I have two self-centered reasons for writing this and any other related articles for the Data General world. First, this method is good, and can be educational for users of Screen COBOL. Second, I want to encourage software developers to use similar methods in their commercial code.

Figure 1: SKELSCRN.CO

```
* SKELSCRN.CO    SKELETON SCREEN I/O
IDENTIFICATION DIVISION.
PROGRAM-ID.      SKELSCRN.
* BY G BURNS
      .    .    .
SPECIAL-NAMES.
      SWITCH "F" ON STATUS IS FIRST-TIME.
      .    .    .
SELECT DBFILE
      ASSIGN TO 'DBFILE'
      ORGANIZATION IS INDEXED
      ACCESS IS DYNAMIC
      RECORD KEY IS DB-KEY.
/
DATA DIVISION.
FILE SECTION.
FD DBFILE.
01 DB-RECORD.
      10 DB-KEY.
            15 DB-COMPANY              PIC XX.
            15 DB-YEAR                 PIC 99.
            15 DB-CUSTOMER             PIC X(20).
            15 DB-EXTENSION            PIC 99.
      10 DB-ADDRESS.
            15 DB-ADDRESS-1.           PIC X(30).
            15 DB-ADDRESS-2            PIC X(30).
            15 DB-ADDRESS-3            PIC X(30).
            15 DB-ADDRESS-4.
                  20 DB-CITY           PIC X(20).
                  20 FILLER            PIC XX.
                  20 DB-STATE          PIC XX.
                  20 FILLER            PIC X(6).
      10 DB-ADDRESS-R REDEFINES DB-ADDRESS.
            15 DB-ADDRESS-TABLE OCCURS 4 TIMES   PIC X(30).
      10 DB-ZIP                        PIC X(10).
      10 DB-COMMENT-1                  PIC X(60).
WORKING-STORAGE SECTION.
01 FUNCTION-KEY-AREA.
      05 FUNCTION-KEYS      PIC XX          VALUE SPACES.
            88 FK-NEW-LINE                  VALUE '00'.
            88 FK-ESC                       VALUE '01'.
            88 FK-END-GROUP                 VALUE '02'.
            88 FK-NEXT                      VALUE '04'.
            88 FK-ADD                       VALUE '05'.
            88 FK-CHANGE                    VALUE '06'.
            88 FK-BACKTAB                   VALUE '09'.
            88 FK-PREV                      VALUE '12'.
            88 FK-EXIT                      VALUE '17'.
            88 FK-DELETE                    VALUE '33'.
      .    .    .    .
01 NXT-ITEM                PIC X.
01 DUP-OK-SW               PIC X.
01 DEL-OK-SW               PIC X.
01 SWITCHES.
      05 RCD-FOUND-SW      PIC X           VALUE 'N'.
            88 RCD-FOUND                    VALUE 'Y'.
      05 CHANGE-NEW-SW     PIC X.
            88 CHANGE                       VALUE 'C'.
            88 NEW                          VALUE 'N'.
SCREEN SECTION.
01 LITERAL-SCREEN.
      05 BLANK SCREEN.
      05 LINE 01 COL 25 "SCREEN HEADING      DB01".
      05 LINE 03 COL 01 "Company: ".
      05 LINE 04 COL 01 "Year: ".
      05 LINE 05 COL 01 "Customer: ".
      05 LINE 07 COL 01 "Cust Address: ".
      .    .    .    .
      05 LINE 12 COL 01 "Comment: ".
      05 LINE 23 COL 01 "NEXT ".
      05 LINE 23 COL 10
```

```
                VALUE " NEXT ITEM PREV ITEM CHANGE OR DELETE".
01 DATA-ACCEPT-SCREEN.
 03 KEY-SCREEN.
      05 COMPANY-SCREEN   LINE 03 COL 10   PIC XX       USING DB-COMPANY.
      05 YEAR-SCREEN      LINE 04 COL 7    PIC 99       USING DB-YEAR.
      05 CUSTOMER-SCREEN LINE 05 COL 12    PIC X(20)    USING DB-CUSTOMER
 03 DATA-SCREEN.

      05 SCR-ADDRESS-1    LINE 07 COL 15  PIC X(30) USING DB-ADDRESS-1.
      05 SCR-ADDRESS-2    LINE 08 COL 15  PIC X(30) USING DB-ADDRESS-2.
      .  .  .  .  .  .  .
      05 SCR-COMMENT-1    LINE 12 COL 10  PIC X(60) USING DB-COMMENT-1.
 03 NEXT-SCREEN       LINE 23 COL 06          PIC X    USING NXT-ITEM.

01 DUP-RECORD-MESSAGE.
      05 LINE 24 COL 01 BLANK LINE BELL VALUE
      "DUP RCD WITH THIS KEY. DO YOU WANT TO ADD ANOTHER? (Y,N)".
      05 LINE 24 COL 58 PIC X USING DUP-OK-SW.

01 ERROR-MESSAGES.
      05 OK-TO-DELETE-MSG.
            10 LINE 24 COL 01 VALUE "OK TO DELETE ".
            10 LINE 24 COL 14 PIC X USING DEL-OK-SW.
      05 EOF-MSG.
            10 LINE 24 COL 60 BLANK LINE BELL VALUE "END OF FILE".
      .  .  .  .  .  .  .
      05 INVALID-FUNKEY.
            10 LINE 24 COL 05 BLANK LINE BELL VALUE
                  "THIS FUNCTION KEY CANNOT BE USED AT THIS TIME".

** THIS MESSAGE IS NEEDED IF DUPLICATE RECORDS ARE NOT ALLOWED **
      05 CANNOT-ADD-MSG.
            10 LINE 24 COL 01 BLANK LINE BELL VALUE
      "CANNOT ADD - A RECORD ALREADY EXISTS WITH THIS KEY".
```

```
PROCEDURE DIVISION.
000-MAIN-ROUTINE SECTION.
            IF FIRST-TIME
                  OPEN OUTPUT DBFILE
                  CLOSE DBFILE.
            OPEN I-O DBFILE.
            MOVE SPACES TO DB-KEY.
            DISPLAY LITERAL-SCREEN.
            PERFORM 400-INIT-DB-REC.
110-GET-COMPANY.
            ACCEPT COMPANY-SCREEN
                  ON ESCAPE ACCEPT FUNCTION-KEYS FROM ESCAPE KEY
                  IF FK-ESC OR FK-EXIT    GO TO 999-END-PROGRAM
                  ELSE  DISPLAY INVALID-FUNKEY
                        GO TO 110-GET-COMPANY.
120-GET-YEAR.
      .  .  .  .  .  .  .  .  .  .  .  .  .
125-GET-CUSTOMER.
            DISPLAY CUSTOMER-SCREEN.
            ACCEPT CUSTOMER-SCREEN
                  ON ESCAPE ACCEPT FUNCTION-KEYS FROM ESCAPE KEY
                  IF FK-ESC OR FK-EXIT    GO TO 999-END-PROGRAM
                  ELSE IF FK-BACKTAB    GO TO 120-GET-YEAR
                  ELSE IF FK-ADD
                        MOVE 00 TO DB-EXTENSION
                        GO TO 155-DB-REC-ADD
                  ELSE DISPLAY INVALID-FUNKEY
                        GO TO 125-GET-CUSTOMER.
150-GET-DB-REC.
            MOVE 00 TO DB-EXTENSION.
            READ DBFILE
                  KEY IS DB-KEY APPROXIMATE
                  AT END DISPLAY EOF-MSG
                        GO TO 125-GET-CUSTOMER.
            DISPLAY KEY-SCREEN.
            DISPLAY DATA-SCREEN.
```

```
            GO TO 160-A-GET-NEXT.
155-DB-REC-ADD.
*       Rather than have INFOS control duplicates, the add record code
*       below checks causes extensions to be written to the record.
*       Note that 00 was moved to DB-EXTENSION before entering this para.
        READ DBFILE RECORD
                INVALID KEY     PERFORM 400-INIT-DB-REC
                                PERFORM 410-WRITE-DB-REC
                                DISPLAY DATA-ACCEPT-SCREEN
                                MOVE 'N' TO CHANGE-NEW-SW
                                GO TO 200-BEGIN-FALL-THROUGH.
        IF DB-EXTENSION = 00
                MOVE 'N' TO DUP-OK-SW
                DISPLAY  DEL-RECORD-MESSAGE
                ACCEPT   DUP-RECORD-MESSAGE
                IF DUP-OK-SW NOT = 'Y'
                                GO TO 125-GET-CUSTOMER.
        ADD 1 TO DB-EXTENSION.

        GO TO 155-DB-REC-ADD.
160-A-GET-NEXT.
        MOVE SPACE TO NXT-ITEM.
        DISPLAY  NEXT-SCREEN.
        ACCEPT   NEXT-SCREEN
                ON ESCAPE ACCEPT FUNCTION-KEYS FROM ESCAPE KEY
                IF FK-EXIT      GO TO 999-END-PROGRAM
                 ELSE IF FK-ESC GO TO 110-GET-COMPANY

                 ELSE IF FK-NEXT GO TO 165-READ-DB-REC-NEXT
                 ELSE IF FK-PREV GO TO 168-READ-DB-REC-PREV
                 ELSE IF FK-CHANGE MOVE 'C' TO CHANGE-NEW-SW
                                GO TO 200-BEGIN-FALL-THROUGH
                 ELSE IF FK-DELETE GO TO 170-DEL-DB-REC
                 ELSE DISPLAY INVALID-FUNKEY
                                GO TO 160-A-GET-NEXT.
        GO TO 160-A-GET-NEXT.
165-READ-DB-REC-NEXT.
        READ DBFILE
                FORWARD
                AT END DISPLAY EOF-MSG.
        DISPLAY DATA-ACCEPT-SCREEN.
        GO TO 160-A-GET-NEXT.
168-READ-DB-REC-PREV.
        READ DBFILE
                BACKWARD
                AT END DISPLAY BOF-MSG.
        DISPLAY DATA-ACCEPT-SCREEN.
        GO TO 160-A-GET-NEXT.
170-DEL-DB-REC.
        MOVE 'N' TO DEL-OK-SW.
        DISPLAY  OK-TO-DELETE-MSG.
        ACCEPT   OK-TO-DELETE-MSG.
        IF DEL-OK-SW = 'Y'
                DELETE DBFILE RECORD
                GO TO 150-GET-DB-REC.
        GO TO 160-A-GET-NEXT.

/
200-BEGIN-FALL-THROUGH.
*
* This fall through logic is used for both ADD and CHANGE functions.
* Sometimes ADD and CHANGE will be different, especially in what
* END-GROUP functions are allowed. Conditional variables are set
* so that IF NEW or IF CHANGE questions may be asked.
*
200-ACCEPT-ADDRESS-1.
        DISPLAY SCR-ADDRESS-1.
        ACCEPT SCR-ADDRESS-1
                ON ESCAPE ACCEPT FUNCTION-KEYS FROM ESCAPE KEY
                IF FK-END-GROUP AND CHANGE
                        GO TO 350-ACCEPT-COMMENT-1
                ELSE DISPLAY INVALID-FUNKEY
                        GO TO 200-ACCEPT-ADDRESS-1.
210-ACCEPT-ADDRESS-2.
        DISPLAY SCR-ADDRESS-2.
        ACCEPT SCR-ADDRESS-2
                ON ESCAPE ACCEPT FUNCTION-KEYS FROM ESCAPE KEY
                IF FK-END-GROUP AND CHANGE
                        GO TO 350-ACCEPT-COMMENT-1
                ELSE IF FK-BACKTAB
                        GO TO 200-ACCEPT-ADDRESS-1
                ELSE DISPLAY INVALID-FUNKEY
                        GO TO 210-ACCEPT-ADDRESS-2.
220-ACCEPT-ADDRESS-3.
                .       .       .       .
                .       .       .       .
370-END-FALL-THROUGH.
        REWRITE DB-RECORD.
        GO TO 160-A-GET-NEXT.
/
** MISCELLANEOUS ROUTINES ***
400-INIT-DB-REC.
        MOVE SPACES TO DB-ADDRESS-1,
                       DB-ADDRESS-2,
                .       .       .
410-WRITE-DB-REC.
        WRITE DB-RECORD
                FIX POSITION
                KEY IS DB-KEY
                        INVALID KEY
                        DISPLAY "PROB WITH WRITE - CALL PROGRAMMER"
                        DISPLAY DB-KEY.
999-END-PROGRAM.
        CLOSE DBFILE.
*       CALL PROGRAM 'DBMENU'.
        STOP RUN.
```

Figure 1 shows the listing of a COBOL screen entry skeleton program that we call SKELSCRN. (It is also included in the NADGUG software library.) SKELSCRN has the necessary logic to do the following:

- create and use INFOS data base
- add records, including program-controlled duplicates and alpha composite keys
- change records
- review—approximate reads, forward, and backward access
- delete records.

That's quite a lot of capability from not much code. The logic skeleton is such that a similar program can be created by editing in the new data requirements and screen format—not new logic.

So that you won't think this is too trivial to warrant any more thought,

Figure 2: Screen format

SCREEN HEADING

Company: _____

Year: _____

Customer: _____

Cust Address: _____

Cust Address: _____

Cust Address: _____

City: _____ State: _____ Zip: _____

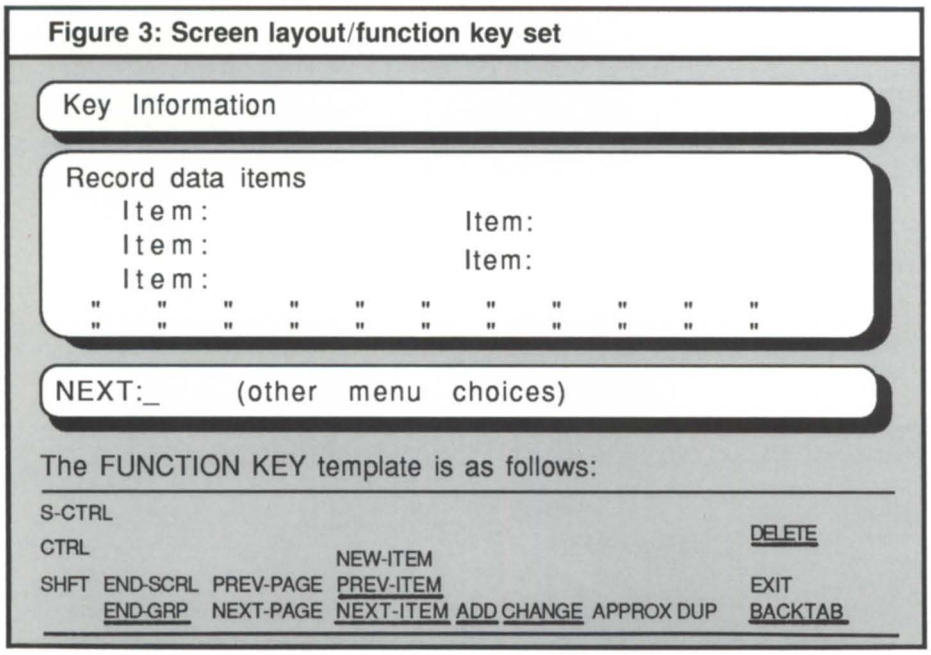
Comments: _____

_____

_____

NEXT _ NEXT ITEM PREV ITEM CHANGE OR DELETE

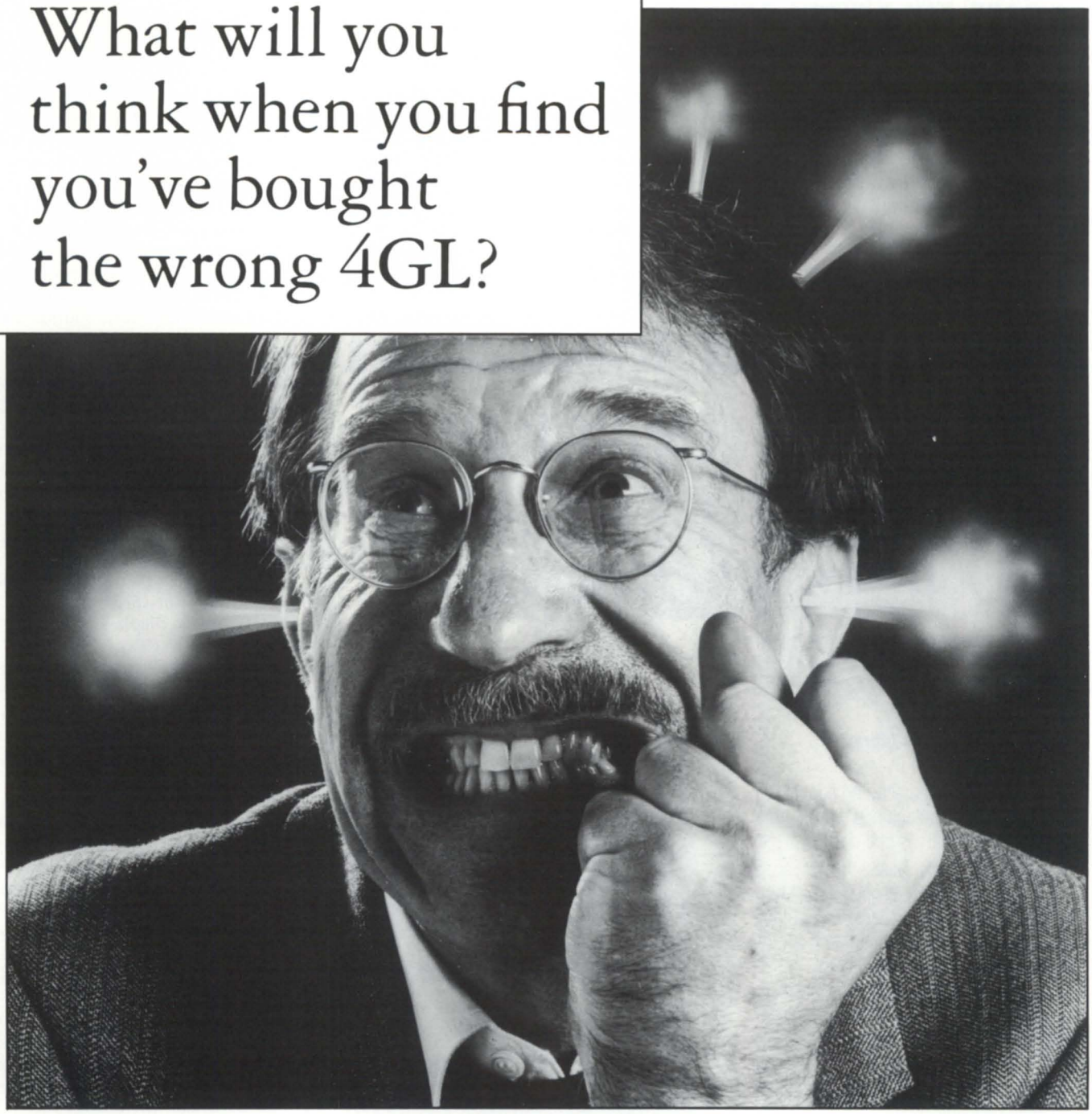
Figure 3: Screen layout/function key set



let's proceed to the underlying theories. I have a saying that "simpler is harder." To do something in the fewest lines of compact code, while keeping it user-friendly, fluid, and structured so it can be easily read, stolen, and modified by any programmer, is very hard.

Therefore, some picky areas should be addressed. First, I designed the program to use function keys for flow control. I haven't found a better way of doing this, but it does take a function key template and at least 10 minutes of training to get a new user into the flavor of the beast. In our DP shop, this isn't a drawback, because the same function keys are used throughout the applications. Also, I don't care if John Doe off the street can run my systems. Accounts payable clerks should understand A/P, bookkeepers should understand general ledger, and the time spent learning this function key system is nothing in comparison.

What will you think when you find you've bought the wrong 4GL?



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Second, there are dastardly GO TO statements all over this code! If you have your world narrowly defined in terms of avoiding GO TOs, you have two options. Quit reading and go to something more interesting, or better yet, show me how this user flow can be achieved with a similar-sized GO TOless program. I'm a proponent of structured coding, but for now, this job is done best in GO TO code.

The overview of the program has a lot to do with the user view. Figure 2 shows the screen format, while Figure 3 is our standard function key set, with the keys of interest to this program underlined.

The user enters the program at the KEY area. At this point, there are two choices:

1. Enter a new key and press the ADD function key. If the record doesn't exist, a blank screen will be presented, and the cursor will go to the first data item. You would be required to fill in the record (more on that later), and the cursor will go to NEXT.

2. You can enter a full or partial key and press NEWLINE. The program will do an INFOS APPROXIMATE read, fill the screen with the record found, and go to NEXT.

NEXT

NEXT is a stopping/control place. Whenever a record is displayed on screen, the control goes to NEXT. The user asks, "What do I wish to do next?" and then looks at the options offered on the function key template. Note that this is similar to the way Wordperfect works. The user requests from the following.

NEXT-ITEM/PREV-ITEM. These cause an INFOS read forward/backward. The record found is displayed, and the cursor goes back to NEXT.

NEXT-PAGE/PREV-PAGE. This function isn't necessary for this program, but in other programs, it would take you to and from NEXT screen(s) of the same record. ESC always brings you back to the first screen.

CHANGE. The cursor goes to the first data item and executes the ADD/CHANGE fall-through code. The cursor then goes to NEXT. Note that the ADD and CHANGE routines present the user with exactly the same view and entry path. Also, since the code is only written once (proper structure), changes can be made without chasing multiple logic areas.

It's comforting to the user to look at the record before changing it. It makes sense that after finding the offending record, a CHANGE key will be the key of choice to initiate the change.

DELETE. Simple. It deletes the record after a warning. Again, it makes sense that pressing the DELETE key while looking at the record to be deleted will cause the desired result.

ESC. This takes the user back to the KEY area. Another ESC from that point exits the program.

EXIT. Exits the program. However, few people use this, as the double ESC is more natural, but it sometimes helps a new user who is frantically trying to find something on the template to kill the program.

NEXT is a good place to put extra help options as well. Some examples include the following:

- P—print related report
- S—screen print
- H—help
- 1—jump to PROGXX (skip menus)
- 2—display subordinates.

ADD/CHANGE fall-through code

The code for entering the data is used by both ADD and CHANGE functions. Unfortunately, this code is time-consuming and monotonous. There are little paragraphs for each data item or group. This is where good editors come in handy. It's important, though, because flow up and down the screen is provided, and editing on the fly is facilitated. This sample doesn't edit the entry items, but the code should be entered after the end of the function key part of the accept statement. It can be as simple or as complicated as needed, but all error conditions should go to the beginning of the paragraph and let the user try again.

The other function keys in this and all screen programs in our shops are the END-GROUP and BACKTAB. These make the screen flow easily forward and backward at the user's whim, and I guarantee their popularity will be second only to the DELETE character key.

All typists and data entry personnel have a common trait. They know immediately after hitting a wrong key that they made a typo. If that was a NEWLINE, and they were running the common brand of fix-it-later screens, they will curse profusely and madly proceed through the remainder of the screen, knowing that their problem is only getting worse. They must go through the fix-it-later routines to get it straight again. This is *not* user-friendly!

Using Data General Screen COBOL makes the remedy so simple that it's sad more software writers don't clean it up. Our solution (stolen from the old IDEA system) is the BACKTAB function key. Just back up onto the data in error and fix it. No wait, no annoyed user, and no extra fix-it-later code in the program.

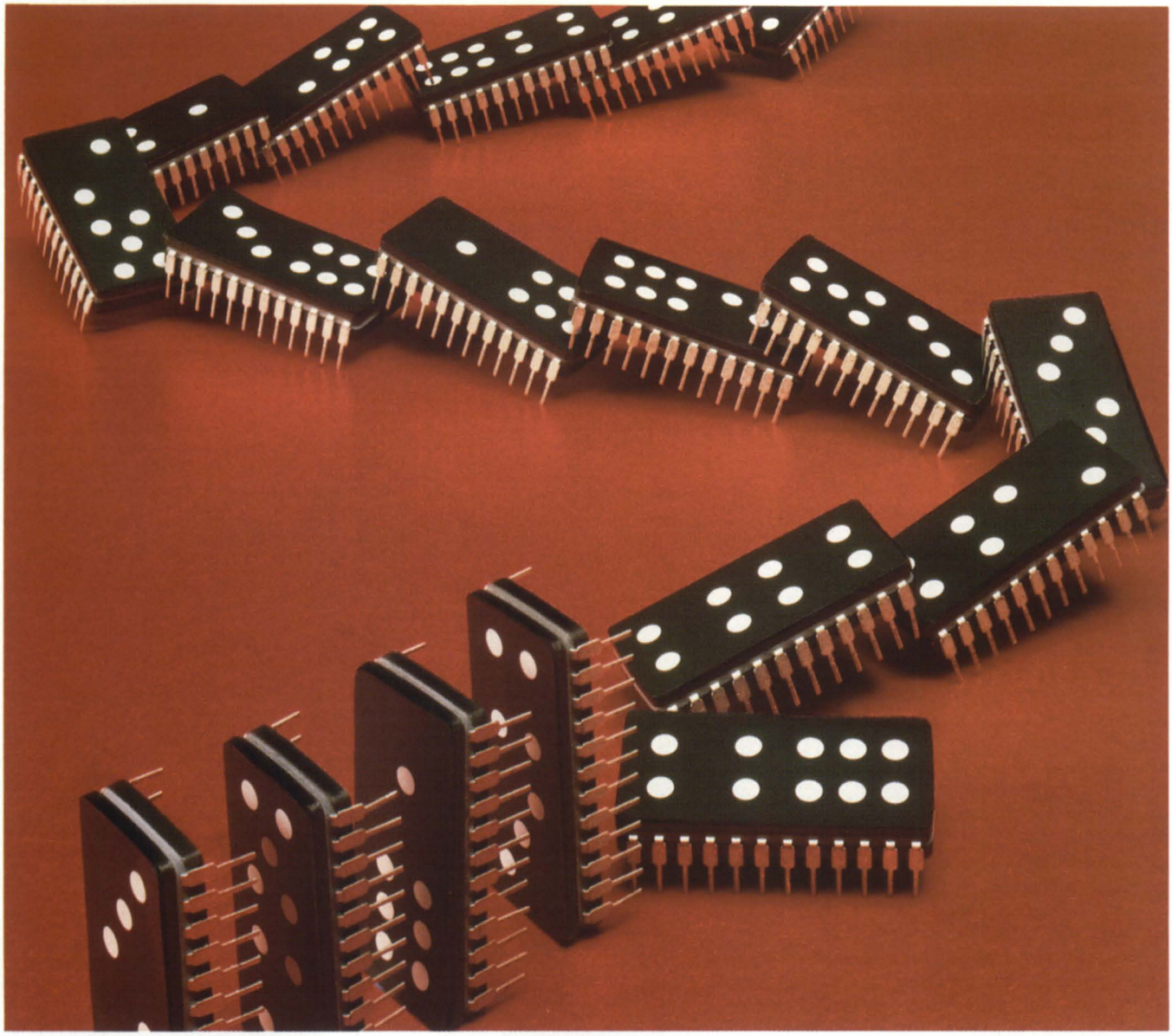
The END-GROUP key is useful when a certain portion of the data will be changed more than others. It allows the user to jump across data items. The programmer can manipulate these until the user is satisfied. Many times this shouldn't be allowed on new records. Also, be sure that the user doesn't END-GROUP around your edits.

The screen doesn't have numbered item descriptions. The numbers don't have anything to do with the data, and they only clutter up the screen.

We use this system for master files, like customer masters, vendor masters, and all kinds of table records. It doesn't lend itself to fast batch data entry and doesn't have good controls for that type of entry, so we have another method for that.

That's it. You should find the code simple enough for even Fortran programmers to follow. If you don't believe that it is easy, just run it. Users like it because it makes them more productive, and programmers like the fill-in-the-blanks skeleton for quick new programs. So try it, you'll like it. Δ

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



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Megatape's MT-750 provides fast, reliable, economical tape storage

This will be a first for me—a hardware review. My favorite editor called me last month and asked if I would review Megatape's MT-750 cartridge tape drive. Is there anything that a true techno-freak enjoys more than getting a new piece of hardware? But reviewing hardware is a completely different animal than reviewing software. Software allows you to ramble on about all of the neat bells and whistles included. With hardware—either it works, or it doesn't. This one works.

If you've read many of my ICOBOL columns, you know what a fanatic about backups I am. More than one of my columns has dealt with the lack of a reliable RDOS backup. I'd love to use DUMP and have a reliable, selectable tape backup, but DUMP's main disadvantage is that it won't handle multivolume tapes. Here's one solution—get a reel of tape that can store 630 MB.

The Megatape Corporation sent me their model MT-750 cartridge tape drive and a Zetaco BMX-2 to hook it into. The MT-750 is 19 inches wide by 8¾ inches tall. The company also makes a half-wide model, the MT-750H, that is 8.4 inches wide, but identical in performance. The unit uses Group Code Recording (GCR) to write a 24-track format at 16,000 bpi, and will hold up to 630 megabytes (formatted) on one cartridge, which makes it ideal for backing up disks like the CDC 9715 or my two 300 MB Fujis. Up to eight drives can be daisy-chained together, for an incredible total system backup capability of 5 GB.

Major gripe #1 on my all-time list is why would *anyone* list the capacity of *anything* unformatted? If it's unformatted, I can't use it, and if I can't use it, I don't care *how* much it can store. Megatape lists on the general specifications "Capacity, unformatted—750 megabytes." Unformatted capacity is like your paycheck before taxes—a completely useless bit of information. Of course, most companies play this game, so I don't mean to single out Megatape, but unformatted capacity is especially silly on a tape drive's specifications. Even formatted capacity on a tape drive is uncertain at best. So please, all of you manufacturers, if your advertising people insist on giving me unformatted capacity, at least limit it to your ads—don't include it in your technical specifications!

OK, down off of my soapbox and back to the tape drive. Installation was extremely simple—quite literally, plug and go. I placed the unit on top of our Eclipse, rather than mounting it inside, so the only installation that I did was to plug the cables from the Zetaco board into the back of the tape drive. The only possible confusion that might arise (and only for someone too dumb to read the manual) is that the A paddleboard cable plugs into connector P2, and the B into P1. I, of course, installed them in the opposite manner. After I reversed them, everything worked fine. Don't try and install it yourself, though—the drive weighs more than 60 pounds!

The MT-750 can be configured to meet your system's needs. The system operates most efficiently in streaming mode, so DIP switches enable you to select the data transfer rate. BURST drives the tape full out, even on the data channel, but DUMP and FDUMP cause a lot of tape repositioning. Cutting the transfer rate down from 250 to 120 KB per second actually will speed up a backup. There is also a switch that will let the cache collect up to 20 records before writing them to tape. This is ideal for backing up a disk like my program disk, which contains thousands of very small files. The only item that I'd put on my wish list is that the configuration switches should be accessible without pulling the drive out and removing the cover.

In my case, one of my disks holds about 3,500 program files in 71 MB. Another holds 22 history files in 78 MB. While the history file disk will run the tape drive flat out, the program disk causes a lot of tape repositioning. If I could easily change the configuration based on which disk I'm backing up, it would be very handy. Of course, as long as I'm wishing, the best way to handle a configuration is the way Zetaco does—no switches at all. Just a tape or standalone program that updates an EEPROM.

Cartridge tape is easier to handle and use than reel-to-reel. There's no tape seal to remove, and nothing to thread (and no door to open, if you're as cramped for space as I am). Just insert the cartridge as you would a VCR. The front panel is simple—membrane switches for on-line, eject, and rewind, and indicators for write enable, tape motion, unit selected, and power on.

The major advantage of the cartridge-based drive is, of course, higher capacity. Where the 100 MB of data on one of my drives took three tapes to back up using BURST, it barely scratched the capacity of the MT-750. In addition, the backup finished in 14 minutes on the Megatape drive, versus 30 minutes on my 1600-bpi drive. This speed difference is due to two factors—a cache buffer on the MT-750, which helps drive the tape in a steady streaming mode, and the absence of rewinding time, which accounts for more than 6½ minutes for two tapes. Even subtracting the rewind time, the MT-750 is still better than 60 percent faster than my CDC tape drive. At that rate, backing up a 300 MB drive would take one cartridge instead of eight tape reels, and finish in 42 minutes, versus 1½ hours.

It doesn't do any good for you to store that data if you can't get it back. The MT-750 has separate erase, read, and write heads, enabling true read-after-write error checking. In order to assure interchangeability of the cartridges, the MT-750 writes a calibration track below Track 0 the first time a cartridge is written to. Then, the next time

the cartridge is used, the head seeks the center of the calibration track and moves upward 26 mils to Track 0. I loaded and unloaded a variety of files on a number of different cartridges and had no problems restoring anything.

Another advantage of the Megatape unit is a cost savings on tapes. At first glance, the $125 price tag on the cartridges looks expensive. On top of that cost, Megatape states that the life expectancy of a cartridge is 100 backups (50 with verify) before they have to be returned to Megatape for a $45 refurbishment. Remember, however, that each one of these cartridges is going to replace 14 or so 2,400-foot tape reels. Since good reels of tape are running about $20 apiece, you'll quickly realize that it's actually much cheaper to use cartridges. In addition to saving money, storage space requirements are drastically reduced. The data cartridge is about 10 inches wide by 6 inches deep by 1¼ inches high. If you are required to keep any kind of archival storage, the MT-750 will probably pay for itself in storage space savings.

The MT-750 is also surprisingly affordable. The complete subsystem, including the Zetaco BMX-2 tape controller, 10 cartridges, slide kit, cleaning kit, FCC compliant cables, and installation (except for travel expenses) comes to $15,250. This is around the price of some of the 6,250-bpi tape subsystems that I've looked at, and yet the cartridge will hold more than four times the data.

Of course, there are drawbacks. The cartridge format is not exactly a popular one, so getting your software on a cartridge is going to be a problem. Even the software needed to set up the Zetaco controller came on a normal tape reel. The unit should be cleaned every eight hours of operation, which can be done either with a kit sold by Megatape, or by a manual method that has so many cautions around it in the manual that I wouldn't even *think* of attempting it.

The bottom line on whether or not you should buy this unit depends on what you want it for. If this is going to be your one and only tape drive, you're going to have problems with media compatibility, and you should look at something else, because basically, this drive is a convenience. And there's nothing wrong with that. Any tape drive is a convenience—after all, I could still be backing up my Fujis to 5 MB cartridges, and the 60 MB drive on my PC to floppies. It's just that I don't have the time to stand around and swap out disks. If you or your operator are spending half the night mounting and dismounting tape reels—or, even worse, not doing daily backups because they're too time-consuming—then the MT-750 may be exactly what you're looking for.

For further information contact:
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Duarte, CA 91010-0317 Δ

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

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Trouble in Florida

A simple solution to a mounting problem

by Bruce Cary
Special to Focus

The June 1987 issue of *Focus* contained two articles of special interest to me, and prompted this small contribution to the DG community. John Grant ("Fast EBCDIC to ASCII Conversion," page 33) and Jim Siegman ("A Report of Sorts," page 39) are to be commended for their fine articles.

The Association of Operating Room Nurses (AORN) is an organization that provides its members with many educational opportunities via local, regional, and national seminars and courses. AORN also holds an annual five-day congress, at which time we provide 60-plus seminars. Home study courses and a tape-of-the-month are some additional offerings. Each educational offering carries with it a Continuing Education Unit (CEU) valid for relicensing.

Each state has its own regulations concerning re-licensing nurses and the recording of the CEUs. The Florida Department of Professional Regulation gave us the choice of continuing to send a monthly hardcopy report, or replacing it with an EBCDIC magtape. Naturally, Florida preferred the magtape. (We had been sending the hardcopy report for a number of years.)

The program changes necessary to accomplish this were minor—just change the output by eliminating headings, etc. and then dump the resulting file to tape instead of to the printer. This was simple, including the conversion from ASCII to EBCDIC.

We made changes and built a Sort utility macro to perform the translation and to copy the data file to tape all in one pass. The trial tape we made and forwarded to Florida for evaluation passed their test, and from that time on, we could submit our data on magtape. Yea, team, we did something right the *first* time.

Problem

After sending the tapes for a couple of months, Florida called to tell us that their machines couldn't read the last tape we sent. Uh oh. We created a duplicate tape and sent it on for processing. All went well, but when the two tapes were returned to us, we wanted to inspect them to find out what had gone wrong with the first tape.

In order to inspect the data on the tape, a copy of the Sort macro was made and edited to reverse the original procedure: read the magtape, translate EBCDIC to ASCII, and then copy to a disk file. This file was then dumped to the printer for inspection. Yes, there was a problem, and it had occurred when creating the original tape.

We would need a verification method when creating the tapes. Because of the way we had analyzed the problem, the solution was already clear. All it would take would be a couple of minor changes to the original calling macro.

Our ME.MAIN.CLI is the master month-end processing macro. It PROCs up a number of COBOL programs, one of which creates the month-end Florida tape file (ME_FL_TAPE).

Our DAILY.CLI macro is the master macro for performing backups and all of our day-end processing. Among other things, this macro checks for the presence of the ME_FL_TAPE data file (see Figure 1). When the file is found, a tape-mount request is issued. After the mount request has been satisfied, a call to the FLORIDA.TAPE.CLI (see Figure 2) is made. Upon completion of the FLORIDA.TAPE.CLI, a dismount request is made, and daily processing continues.

FLORIDA.TAPE.CLI

The Sort utility is called using a SORT COMMAND file (see Figure 3). This command file translates the disk data file from EBCDIC to ASCII while copying the file to tape. The Sort utility is called again with a different COMMAND file (see Figure 4). This time, the tape is read and translated from ASCII to EBCDIC while being copied to disk.

Now the fun begins. The CLI variable VAR0 is used as an error flag and is set to 1, presuming that we start with an error. (Remember that almost nothing ever works correctly the first time.) Next, the macro compares the sizes of the original data file and the one just created on the tape read-back. If the files aren't the same size, an error has occurred, and the macro skips to part II. If the files are the same size, the next step is to see if their contents are

Figure 1: Macro check

```
[!NEQUAL,[!FILENAMES :WORK:ME_FL_TAPE],]
        MOUNT FLORIDA PLEASE MOUNT THE FLORIDA TAPE
        :MACROS:FLORIDA.TAPE
        DISMOUNT FLORIDA COPY IS COMPLETE
[!END]
```

Figure 2: Call

```
[!EQUAL,COMMENT,]       FLORIDA.TAPE.CLI 10/07/86 BRC

        THIS MACRO IS CALLED FROM DAILY3.CLI. IT CREATES THE EBCDIC FLORIDA
        TAPE FROM THE ASCII FILE :WORK:ME_FL_TAPE. THE FLORIDA EBCDIC TAPE IS
        READ AND CONVERTED TO AN ASCII FILE :WORK:TAPE.TEST.

        :WORK:ME_FL_TAPE AND :WORK:TAPE.TEST ARE THEN COMPARED TO SEE IF
        THEY MATCH. IF THEY DO NOT, THE PROCESS IS TRIED AGAIN. THREE TRIES
        WILL BE MADE BEFORE THE PROCESS IS ABANDONED.

        THE RESULTS OF THIS PROCESS WILL BE WRITTEN TO THE DAILY BATCH
        LISTING. THIS LISTING MUST BE VERIFIED PRIOR TO SENDING OUT THE
        FLORIDA TAPE.
                                [!END]
comment Create EBCDIC tape from ASCII disk data.
SORT/C=:MACROS:FLORIDA.TAPE.SRT

comment Delete the test file.
DEL/2=IGN :WORK:TAPE.TEST

comment Create ASCII disk data from EBCDIC tape.
SORT/C=:MACROS:FLORIDA.TEST.SRT

comment PART i TESTING SECTION & Initialize VAR0 to error
VAR0 1

comment If the files are NOT the same size skip to PART II.
[!UEQ,[!SIZE :WORK:ME_FL_TAPE],[!SIZE :WORK:TAPE.TEST]]
        comment Delete the list file (from a prior test) if it exists and compare the two data files.
        DEL/2=IGN :WORK:TAPETEST
        X FILCOM/L=:WORK:TAPETEST :WORK:ME_FL_TAPE :WORK:TAPE.TEST

        comment If the files compared OK, the list file size is less than 59.
        [!ULE,[!SIZE :WORK:TAPETEST],59]
                WRITE FILE OK

                comment The tape is OK, rename and archive the data file.
                :MACROS:WORK1 [!EXPLODE [!DATE]]
                :MACROS:WORK9 :WORK:ME_FL_TAPE FLORIDA. [:WORK:TODAYS.DATE]

                comment Delete the list and test files.
                DEL/2=IGN :WORK:TAPETEST :WORK:TAPE.TEST

                comment Set VAR0 to no error, STRING to null, the job is finished.
                VAR0 0
                STRING/K
        [!END]
[!END]

comment PART II RECURSIVE SECTION. If VAR0 is 1 at this point we have an error.
[!UEQ,[!VAR0],1]
        WRITE FILE BAD.

        comment If the try switch is not found, this is the first pass.
        [!EQ,&%0/TRY%,]
                WRITE WILL RE-TRY A MAXIMUM OF 3 TIMES.

                comment VAR1 is the display try number
                VAR1 1

                comment Set STRING to RECURSE this macro a maximum of 2 more times.
                STRING %0\%/TRY=2 [!VAR1]
                WRITE TRY [!VAR1]
        [!ELSE]
```

```
        comment This is NOT the first pass, so increment the display try.
        VAR1 [!UADD,%1%,1]

        comment Decrement the number of trys remaining. Set STRING to new values.
        STRING %0\%/TRY=[!USUBTRACT,%0/TRY=%,1] [!VAR1]
        [!UEQ,%0/TRY=%,0]
                comment If tries remaining = 0,  something's wrong. Forget it, set &
                comment STRING to null to end the macro.
                WRITE FORGET IT!
                STRING/K
            [!ELSE]

                comment Display which try we are performing.
                WRITE TRY [!VAR1]
            [!END]
        [!END]
[!END]
comment PART III END OF MACRO

VAR0 0
VAR1 0

Comment At this point STRING will be Null in which case the macro will end, OR &
STRING will be set to recurse this macro with the try switch set to a value and the &
display argument.
[!STRING]

[!EQUAL,COMMENT,]          END OF MACRO                    [!END]
```

Figure 3: Sort Command file

```
%     FLORIDA.TAPE.SRT 06/27/86 BRC
%     ****************************
%     THIS COMMAND FILE IS USED TO CONVERT THE ME  FL  TAPE
%     FILE TO EBCDIC AND CREATE THE TAPE TO SEND TO FLORIDA
%     DEPARTMENT OF PROFESSIONAL REGULATION.
%
INPUT FILE IS ":WORK:ME_FL_TAPE",
RECORDS ARE 133 CHARACTERS.
OUTPUT FILE IS "FLORIDA",
RECORDS ARE 133 CHARACTERS,
BLOCKS ARE 3990 CHARACTERS.
TRANSLATE 1/LAST USING ASCII_TO_EBCDIC.
COPY.
END.
%
%          END OF SORT COMMAND FILE
```

Figure 4: Command file

```
%     FLORIDA.TEST.SRT 10/07/86 BRC
%     ****************************
%     THIS COMMAND FILE IS USED TO CONVERT THE FLORIDA TAPE
%     CREATED BY FLORIDA.TAPE.SRT TO AN ASCII FILE TO BE TESTED
%     BY FLORIDA.TAPE.CLI.
%
%     BOTH FLORIDA.TAPE.SRT AND FLORIDA.TEST.SRT ARE CALLED BY
%     FLORIDA.TAPE.CLI.
%
INPUT FILE IS "FLORIDA",
RECORDS ARE 133 CHARACTERS,
BLOCKS ARE 3990 CHARACTERS.
OUTPUT FILE IS ":WORK:TAPE.TEST",
RECORDS ARE 133 CHARACTERS.
TRANSLATE 1/LAST USING EBCDIC_TO_ASCII.
COPY.
END.
%
%          END OF SORT COMMAND FILE
```

the same. To be safe, the macro deletes the TAPETEST list file, then executes the Filcom utility with a listing file to make a bit-by-bit comparison of both files. If the files compare, the list file will be less than 59 bytes in length, so the macro writes that the file is OK, renames it, and moves the original file to an archive area before deleting the work files, setting VAR0 to 0 (indicating no error), and setting the CLI STRING to null.

At this point, part I of the macro (shown in Figure 2) is completed. If VAR0 is equal to 0, the test is over, and the macro skips to part III. If VAR0 is equal to 1 (preset default), it writes that the file transfer was bad, then checks to see if this was the first pass (the /TRY switch not found) or a recheck (/TRY switch found).

If the /TRY switch is not found, the macro writes that it will try three times, sets VAR1 to 1, sets STRING equal to the macro name with the /TRY switch set to a value and one argument, writes the try number, and goes to part III. If the /TRY switch is found, it increments the display try count, decrements the process try count, and sets STRING to the new values. If the new count is equal to 0, we have tried three times without success, so the macro writes a message to forget it, sets STRING to null, and goes to part III. Otherwise, it just writes the try number and goes to part III.

After resetting VAR0 and VAR1 to 0, the macro executes whatever is in STRING. If STRING is null, the macro will end, and day-end processing will continue. Otherwise, the macro will start again with the new parameters.

It should be pointed out that in the SORT COMMAND files (Figures 3 and 4) the % sign is used to indicate a comment field. Blank lines aren't allowed in these command files, which differs from CLI macros.

This was a quick implementation made necessary by a change in user needs. I'm sure there are other methods of accomplishing the same goal. This method works for us, and it took less time and effort to implement than it took to write this article. Δ

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ICOBOL + COBOL

= best of both

In the November 1987 issue, I wrote about the merits of ICOBOL and 32-bit COBOL. Recently, I have been working on a project that involves the use of both languages and several assembler routines as well. Naturally, this has become a complex and intricate program, but actually, it's working out well. In the May issue, John Grant will discuss calling assembler routines from a high-level language (F77), but his won't be the last column on the subject. I'll take this opportunity to discuss ICOBOL's use of 32-bit COBOL routines, whether it is for simple tasks such as a table lookup, or allowing ICOBOL to access INFOS data bases.

ICOBOL and COBOL get along fine together. You might ask why I would want to use both. Let me suggest a few reasons why you might consider adding the two together.

Possible reason 1: 32-bit COBOL is much faster at data manipulation in memory than ICOBOL (as my CPU-bound benchmarks demonstrated), and you might want to do your number crunching in 32-bit COBOL. (Actually, F77 would be better, but that has its own problems.) Besides, if properly written, all the code could be recompiled later on with ICOBOL if necessary.

Possible reason 2: ICOBOL has an address space limited to about 56 KB of memory. This prohibits the use of large tables. With COBOL, on the other hand, the memory address space can be as large as the size of ring 7, i.e., 512 MB. Therefore, if you wanted to add a large table to your program that ICOBOL won't handle, you could—without making it a data file.

Possible reason 3: If you have both ICOBOL and INFOS applications on the same system, you could write programs that can interactively access both data base systems, eliminating the usual overnight batch jobs or double data processing that take place when trying to keep two sets of data bases synchronized.

Possible reason 4: Perhaps you have already discovered that ICOBOL has subprograms. If you start calling them all over the place, you will soon run into the 16-subprogram limit. With 32-bit COBOL subprograms, there is no limit other than the size of your memory/disk/programming staff.

Possible reason 5: You have decided (or are forced) to migrate from one language to the other, but intend to do it one data base at a time.

Possible reason 6: Because it's there.

Now that we have some motives defined, how do we achieve this? Let's keep it simple for now and assume it's the first reason—speed. The project could be implemented entirely in ICOBOL if we wanted, but we are speed demons, and we must hack every possible millisecond out of the code (perhaps trying to make up for an operating system that is written in a high-level language).

First, write both a program and a subprogram in ICOBOL using the LINKAGE section, as demonstrated in Figure 1. ICOBOL program2 must be called program2.co on disk and compiled into program2.⟨pd dd⟩. You may notice that the parameters I used are defined differently in the two programs. You have the flexibility to do this, providing that you *never* make the data values in the called program longer than in the calling program, and that you make sure the data you pass is valid for both definitions.

Figure 1: Program1/program2

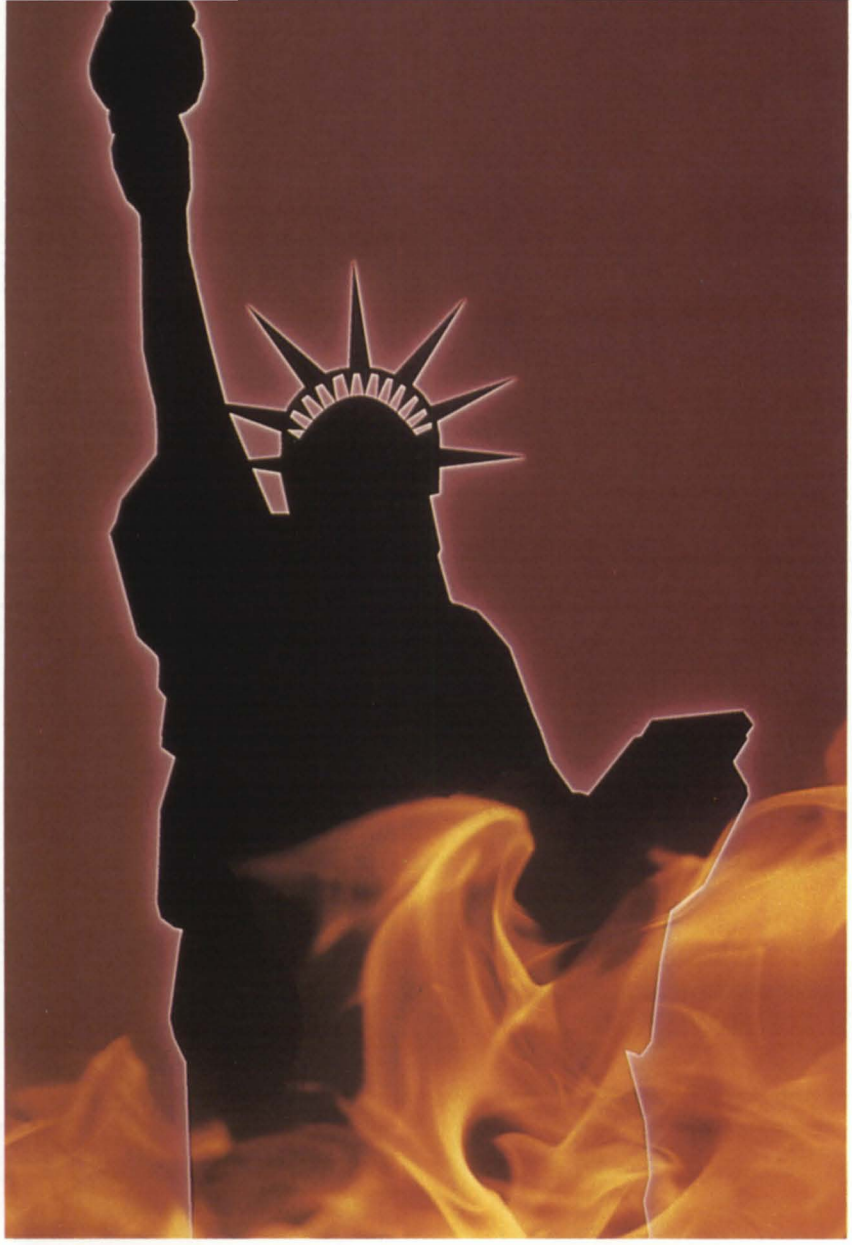
```
PROGRAM-ID. PROGRAM1.
. . .
WORKING-STORAGE SECTION.
01 DATA-FIELD-1 PIC X(256).
01 DATA-FIELD-2 PIC 9999.
. . .
PROCEDURE DIVISION.
. . .
  CALL "PROGRAM2" USING
     DATA-FIELD-2.
     DATA-FIELD-1,
. . .

PROGRAM-ID. PROGRAM2.
. . .
LINKAGE SECTION.
01 FIELD-A                PIC 9999.
01 FIELD-B.
     05 FIELD-B-CHARS   OCCURS 256 TIMES PIC X.
. . .
PROCEDURE DIVISION USING FIELD-A, FIELD-B.
. . .
. . . ⟨PROCESS IT⟩
. . .
     EXIT PROGRAM.
```

Once you have tested and debugged the code, you can bring 32-bit COBOL into the picture. First, rename program2.co to program2.cob and recompile it using 32-bit COBOL. Second, write an assembler program (as in Figure 2) with the program ID from the called module. Normally when you are calling routines in another language, you would simply link all of the object modules together. However, since ICOBOL is not a compiled language, we must use a different method to tell the ICOBOL program how to find the called routine. This is done by supplying ICOBOL with a road map written in assembler, as in Figure 2. Once written, use MASM to make an object file from it.

Now for the tricky part. I would write a macro called PROGRAM1_LINK.CLI that is based on the ICXLINK macro provided in your ICOBOL directory. Then I would change the optional argument(s) to include the object module produced by COBOL and MASM and also the COBOL libraries and INFOS libraries needed for linking. Figure 3 shows what this macro looks like. It actually produces a .PR file to use in place of IC`.PR.

To run your program, you will not type ICX PROGRAM1. You have made a new .PR file, so you will need to make sure the ICOBOL directory is on your searchlist and then type X NEW_ICX PROGRAM1. You now have ICOBOL and COBOL working together.

OK, what's the catch? This time there are several. The most obvious price is the cost of two or more languages instead of just one. However, when new releases of ICOBOL come out,



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you will probably have to relink the NEW_ICX.PR file. There may also be some changes required to the source code if the calling interface is changed. That's not too high a price to pay to be able to write anything you want in an ICOBOL-based system, and it's an inexpensive way to migrate between the two languages. Incidentally, you must be using rev 1.4 or better of ICOBOL.

Hoof in mouth strikes again

In that same COBOL versus ICOBOL column, I concluded that the culprit behind the lack of speed was INFOS. I then made several suggestions to help speed up INFOS. Most of my experience with INFOS was with the AOS version and an early rehosted version under AOS/VS.

I received a letter from a John Farnsworth, a DG employee in Research Triangle Park, explaining that, although I had accurately described the 16-bit version of INFOS, the current 32-bit version incorporates some of my suggestions. So the 32-bit version isn't as inefficient as I might have implied in that column. It's reassuring to know that Data General people read *Focus* and pay attention to what users are saying. That's what the user group is all about, and this month alone, I have received three unsolicited and highly appreciated contacts from DG personnel (that is a record for me). So let me summarize the current state of INFOS as described in the letter.

Figure 2: ICXNAMTB.SR

```
        .TITLE      DEMOTABLE
        .NREL       0
        .ENT        NAMTB

        .EXTL       PROGRAM2

NAMTB:  P2NAME*2                    ; Pointer to the name in ICOBOL
        PROGRAM2                    ; From program id of COBOL routine
        .DWORD      -1

P2NAME: .TXT        "PROGRAM2"      ; This is the name used to call it
        .END
```

Figure 3: NEWICXLINK.CLI

```
PUSH ; PROMPT POP
SEARCHLIST (WHATEVER YOU NEED)

XEQ LINK/STACK=4000/REV=1.XX.00/TASKS=5/PID_SIZE=HYBRID/ &
  KTOP=256&
  .RESERVE/VAL128 MAIN.START ICX.LB&
  PROGRAM2.OB DEMOTABLE.OB &
  COBOL.LB &
  ICALL32.OB &
  MULTITASKING NOQUEUED_TASK_MGR &
  LANG_RT.LB
POP
```

The 32-bit INFOS does have a local server residing in ring 4 of memory, which handles most of the I/O requests for the user and only talks with the global INFOS server to coordinate locks and other activity that requires a process exercising global control. Thus, the local process via ring 4 has more power than I gave it credit for. John added that any design or implementation can be improved upon, and they intend to emphasize performance improvements in upcoming revisions of the product. Thanks, John, and all of the others who keep us honest.

Taking a chance on the soapbox

I want to touch upon a subject of importance to all of us—Data General software support. I don't consider myself the most qualified person to speak on this subject, since I have only solicited support from Atlanta once in the last two years. The questions I had (MV/2000-related) were answered promptly and accurately on that occasion. My comments here are based on a recent discussion on the RDS bulletin board, from which the following three messages came.

Msg#: 3211 *CEO*
>11/4/87 08:47:04
>Subject: CEO index maintenance

I just got off the phone with the support center in Atlanta. I was amazed at what I was told. I'm having a problem with my CEO_INDEX. They said they could dispatch someone to fix it, but they would have to charge me. Earlier this year, I sent a check to DG for a Support Plus agreement. I don't know about everyone else, but I thought that dispatching an SSR was included in the price. The flavor of the conversation with Atlanta was that they generally charge for dispatching to correct CEO_INDEX problems. What in the heck did I do to deserve getting charged a second time? DG's software caused the problem, not me. It stands to reason that when I pay $5,500 for a support agreement, little things like correcting a problem would be included. I don't think DG should charge a customer double for a problem that was caused by their software in the first place. Has anyone else run into this problem?

Msg#: 3212 *CEO*
11/4/87 13:42:56
Subject: Reply to msg# 3211

I have run into some problems with Atlanta in the past. Most of the time, I was dissatisfied with the answers I got from the first-level support people. I think you need to get through to the higher-level support and press them. The only way I could do this was to tell them that I was not satisfied with the answer and to escalate the problem. Good luck!

>Msg#: 3381 *CEO*
12/10/87 10:10:25
Subject: Reply to msg# 3211

Jeff, we are all in the same boat. I have been around the block with DG several times on this issue. They say that the index is the property of the user, and it is the user's responsibility to maintain that index because it is a data base. That is their stand on all data bases. I know this from a senior CEO support person in Atlanta. He has been instructed not to touch any data base. In order to have DG fix one, they have to send out an SSR and charge for it. Our response of course is "I didn't create the data base, I didn't decide how to fill it up, and besides that, DG won't give me the internals to maintain it myself!" Looks like we're backed into a corner. They tell us we have to maintain it, but they don't tell us how. Of course, if you run Inquire on it, they will have a fit! I would talk to your SSR. Ours agreed with us, as did his manager and so on, to the point that they don't seem to charge us very often. This is a good issue for NADGUG to take up, because DG is really stretching this one.

There are several more replies in this chain, but these three give you the essence of the problem and some of the ways that it can be handled. The problem is simply this: the CEO software apparently has one or more bugs in it that can corrupt the CEO_INDEX. DG's official (and legal) stance is that they are not liable for problems caused by reliance on the software, and their disclaimer says this. They do accept liability to fix the bug in accordance with their standard procedures, i.e., maybe the next rev. Therefore, since they aren't liable for the damage caused by the bug, but only the eventual removal thereof, it is reasonable that the customer should pay contract consulting rates or fix it themselves.

Before you think I am blindly defending DG's policy, let me state the same problem in another scenario. If you found a bug in their COBOL, ICOBOL, F77, C, PL/I, etc. compiler, what would you do? You might or might not report the bug, and you'd program around it. In other words, you would figure out how to live with it until it got fixed, possibly years in the future. If a bug in INFOS corrupted a data base, you'd work around it and set up procedures to prevent that from happening again. For these problems, DG's policy is acceptable, or at least tolerable.

However, the situation isn't similar when you consider the other conditions. You are simply using the compiler and utility programs as tools to develop and implement the application, and if there are problems, you have the source code and can change how the system processes the data to work around or avoid the bug. On the other hand, CEO is an application, not a utility or compiler. As with many applications, the source code is not available with it. You have no control over how it processes the data, and you can't fix application code that you don't have.

It doesn't usually matter if a compiler has a known bug; you can just write the application to work around it. It doesn't matter if your file management system, a utility, has a known bug; you just recode the application to work around it. However, if your application has a problem, and you don't have the source, there is no workaround. If the application

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supplier won't supply you a workaround or the information you need to develop your own, then your last resort would be to find a new application supplier.

Before you get to the last resort, let's take a look at other available avenues. First and foremost is the official reporting mechanism. As the author of the second message mentioned, if you are not satisfied with the answer you receive from the first level of support, politely (or at least calmly) tell the support representative that you didn't receive a satisfactory answer and escalate the call. If they refuse, then you have a valid complaint, since the policy is (or at least used to be) that a customer can request escalation of a problem at any time while it is open. If the DG support managers see dozens of calls on the same problem, you can bet that it will become an issue internally.

The author of the third message mentioned the next best source of assistance: your user groups. NADGUG and the affiliated RIGs and SIGs provide several means to pursue both a resolution to the problem and communication of user concerns to upper management. Recent issues of the OASIS newsletter have had tips on how to fix certain problems with the CEO_INDEX. (By the way, there was an error in the September 1987 issue; see the December 1987 issue for details.)

Also, OASIS has been one of the most effective lobbying groups to get problems fixed, priorities set, and policies discussed. NADGUG officers meet regularly with DG management to discuss issues of the NADGUG user community. Surveys are collected through a number of channels to get input for this meeting. Local RIGs and SIGs are encouraged to submit their survey results to NADGUG as well. If problems like the CEO_INDEX concern you, let your user group representatives know, so they can take the issue to DG management.

The bulletin boards are another source of information. The RDS board has always been a popular forum for problem discussions, and frequently, solutions are available. The only cost of access on this board is the phone call. OIS has had its share of start-up problems, but it offers another vehicle to communicate both with other users and with DG about these issues. Now that all paid-up NADGUG members get an hour of free time each month on the OIS board, I expect to see it become a more useful resource for problem reconciliation. There are several other bulletin boards in various phases of operation, including Brian Johnson's system, HADGUG's DG-HAUS in Houston, CADGUG's system in Chicago, and others, all of which have a slightly different view of the DG world.

There are no easy and immediate solutions to all problems. There are, however, many avenues available to users to seek resolutions and/or make concerns known to Data General in a way that may also help other users. Δ

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

Risky business

History of BBASIC isn't finished

I came back from vacation, all tanned and well rested, only to get a call from my trusty editor. "It's time to write another column," he said. And I thought I'd just written one. Vacations are like that.

Business BASIC has been around for a long time. I thought it might be fun to trace its history in order to better understand the product and its strengths.

It's clear from the current product that BBASIC isn't the result of a long, patient, well-planned development effort. Instead, its development took place in a series of spasmodic leaps and twitches until it got to where it is today.

The first user of Business BASIC is, I'm happy to report, still a happy user. In 1974, Calvin Durden (yes, *that* Calvin Durden) of Tractor and Equipment Company in Birmingham, Alabama, contracted a small software firm in Atlanta called Technical Analysis Corporation (TAC) for a system to replace his old Univac.

TAC decided to do the job in DG's Extended BASIC. Calvin was a demanding sort (he only wanted a system that worked, after all), and TAC was soon forced to start modifying the source code of Extended BASIC to get the job done. People who worked on the project in its early stages included Jim Evans (who probably did most of the actual code), Ed Camp (who did the utilities), Andy Meakowa, James Tyzzy, Frank Vanick, and Tom Walker.

In those days, documentation was usually handwritten on notebook paper, if it existed at all. The KADD routines were written in BASIC, and were GOSUBed to. I don't think TAC really thought about developing Business BASIC as a product in those days; they just did what they had to for their customers.

Around that time, an interesting quirk was introduced. The universal password DE2LA6 was put in, because Jim Evans apparently had that password at his university, and he saw no reason to change it.

TAC was a somewhat relaxed place to work. Friday afternoons were reserved for beer busts and bull sessions at the office. Someone would go down to the store and bring back a few six packs. If there were customers up front, the beer was smuggled through the window of Frank Vanick's office.

Somehow, OEMs found out about the product and started to buy it. (I was asked to evaluate it for an OEM I was working for in 1976; as I recall, I recommended against it.) It filled a real need in the marketplace: a commercial language, designed for use by OEMs. After all, wasn't TAC one themselves?

Data General bought the right to sell the product in the late seventies. It was, they claimed, an interim step until they could come out with their real solution for an OEM development language—ICOBOL. Even then, the precedent was established: don't do much for BBASIC, after all, people will buy it regardless.

TAC wasted little time before coming out with a new product to compete with Data General's Business BASIC. They called the new product BB II, and started to sell significant quantities of it. Data General also had success with it. In 1978, our company started using it exclusively as well.

Compusource, founded by Hal Tilbury and based in California, was another early user. The company produced a set of accounting programs that was later sold to EDS for a reputed potful of money. Hal then became the driving force in Bluebird Systems, a company that is very much alive today.

Data General was now stuck in a quandary that was to become familiar: should they upgrade their version or buy TAC's new one? James Tyzzy, now working for DG, was sent to TAC to look at BB II. His report was apparently not to buy it, but do development in house.

During this period, two competing groups were enhancing the product. Nice features would appear in one or the other, or maybe both, but with minor variations. It became clear that while DG could easily do small changes, TAC was better equipped to do the serious stuff.

Aside: the password used to get into some of the utilities of DG's version was TAC's phone number.

A colorful character of this period was Henry Steinberg. Anxious to please the user community, he made many promises about what Data General would do to enhance BBASIC before he found out what was really possible.

In early 1983, the user community became convinced that the only way to improve BBASIC performance was to do a compiler. Two projects were initiated: within DG, the approach was to convert the BBASIC source to Fortran, then compile it. TAC's approach was to write the compiler in Business BASIC itself.

Data General's project never saw the light of day, but TAC's got far enough along to be advertised for sale. It resulted in a doubling in speed over AOS BBASIC 2.0, but was cumbersome to use.

In July of that year, rumors surfaced that TAC and DG were talking again, and about to come out with a rev 3 that would unite the two worlds. There were a few snickers when this in fact happened, and TAC got away with selling Business BASIC to Data General again.

TAC may have been interested in more than just making the sale. In the back room, a few of the guys playing with early PCs had invented a board that could be substituted for more expensive IBM 3270 terminals. The product, called IRMA, sold like mad.

By providing its BB II users with an upgrade path that was supported by DG, TAC was able to get rid of its al-

batross—support for a lot of BB II customers. Soon thereafter, TAC was bought by DCA, an Atlanta-based company that sells communications equipment, and probably had no interest whatsoever in BBASIC. Many pots of money were involved.

Incidentally, all this explains why BBASIC today has both a VAL and VALUE function of nearly (but not quite) identical operation. VAL was the work of DG during the schism, while VALUE was TAC's construct. For upward compatibility, both had to be provided.

Meanwhile, a new gadfly came on the scene, astride a small growing magazine called *Data Base Monthly*. Writing a question-and-answer column named "Business BASIC Blues," Mike Johnson become the unofficial spokesman for BB users. Now it can be revealed: talented Mike wrote not only the answers, but the questions, too.

AOS and AOS/VS were still very new. While BBASIC was available under those operating systems, RDOS was preferred. What was Mike's advice to those contemplating switching? "My gut reaction is to tell you to stay away from the business. AOS/VS is light years away from RDOS, and few OEMs are equipped to financially and technically support systems of this magnitude with acceptable degrees of risk." (*DBM*, Sept 1982)

He also commented on BBASIC rev 3: "Much of the garbage of the internals is still there; same old scrawny code with a new nameplate." However, it was also noted to be 40 percent faster.

Some of the worst code ever written in BBASIC is in the utilities, the programs in $SYSLIB. How did it get to be so bad? One explanation (offered seriously by an old-timer) was that it was intentionally written that way to make it difficult to understand and fiddle with. This sounds like a weak justification long after the fact to me.

More likely, programs were never written this poorly to start with. The original programs had to make do with a lot of code in BBASIC that was later replaced by STMA, B, and C statements. The utilities were simply modified to use the new statements as they came along when they should have been rewritten.

In June of 1984, Mike Johnson wrote, " . . . something very nice is about to happen to AOS and AOS/VS Business BASIC users." Mike's company, Majiq, managed to sell the idea of rewriting much of Business BASIC for more performance to Data General. Once again, they bought Business BASIC, and released this version as rev 4.00.

This time, performance doubled, and a lot of new functionality came with it. Note that this latest speed improvement, coupled with the 40 percent improvement in the previous revision, pushed BBASIC performance beyond the speeds achieved by the compilers.

Since then, only a couple of minor revisions have been made to Business BASIC by Data General. The enhancements in rev 4 were also brought into the RDOS world as RDOS Business BASIC revision 8.0, released in late 1984. This is certain to be the last RDOS Business BASIC release.

The history shows one thing: whenever Data General has stopped enhancing Business BASIC, someone else has taken up the role. This time, the challenge was taken up by Murray Haszard of B32, Ltd. He recoded the entire product (the first time this had ever been done) using the AOS/VS 32-bit instruction set. This resulted in better than doubling of performance. The product was released in 1986, and has been significantly enhanced since.

Will Data General buy Business BASIC for a fourth time? B32 is selling very well, with more than 100 installations in the first year, and it will be tough for Data General to come up with enough money to swing a deal.

Where are they now? Calvin Durden is still wondering whether to switch to AOS/VS. Jim Evans and Andy Meakowa recently started a new company in Atlanta. Frank Vanick is working for Educational Management, with a chain of 10 MV/7800s to look after. Tom Walker has his own company in Atlanta. Ed Camp works for DCA. Mike Johnson stopped consulting and became a value-added reseller for Stratus. And me? I'll be back here next month.

By the way, the sources for this story are by no means guaranteed to be completely accurate. If you have anything to add or correct, please drop me a line. Also, I wish I could have named more of the personalities that made a difference to Business BASIC over the years, but space is finite. Please accept my apologies if I didn't get to you. Δ

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

Long, long, wide load

Assembly language for the beginner. Part IV of V

In the first three articles of this series, I presented an overview of the structure of an AOS[/VS] .PR file and summarized the essential elements of an assembly language program, including the basic MV instruction set and system calls. In this article, I will show how a simple assembly language program can be used where a CLI macro would be difficult to write.

A practical example

The CLI doesn't have pseudo-macros corresponding to the CPUID or PRIORITY CLI commands, i.e., [!CPUID] and [!PRIORITY], but simple macros can be written to redirect the output of the corresponding CLI commands to a temporary file and to pick it up with [!STRING]. For example, macro GET_CPUID.CLI will put the CPUID in [!STRING]:

```
comment—macro GET_CPUID.CLI
[!EQUAL,%0/2%,]
   DELETE/2=IGNORE =?[!PID].TMP
   CPUID/L==?[!PID].TMP
   %0\%/2 [=?[!PID].TMP]
   DELETE =?[!PID].TMP
[!ELSE]
   STRING %2%
[!END]
```

That's too easy. Let's consider something more difficult. Wouldn't it be nice if CLI pseudo-macro [!PID] accepted an argument to look up a PID for a particular username, i.e., [!PID,SMITH], or if the CLI SEND command accepted a username as a destination in addition to the current PID or console name?

```
) SEND 5         HELLO
) SEND @CON23 HELLO
) SEND SMITH     HELLO
```

Suppose you submit a batch job (i.e., QBATCH/AFTER= . . .) to send a message to your console at a certain time (perhaps a wake-up call). If you use a PID, i.e., SEND 12 . . . , then you must not log off and on again; you might not get the same PID, and your message will go to someone else who has been assigned that PID. If you use a console name, i.e., SEND @CON23 . . . , then you will receive the message even if you log on and off and get a different PID. But if you log off and log on to another console, you will not get the message. You want AOS[/VS] to hunt you down by username wherever you are and then send you the message.

It isn't a trivial exercise to write a CLI macro to do this (some wise guy will probably trash my logic by writing a five-line macro to do it!), so the obvious solution is to write a program. If you write a program in a high-level language like Fortran, then F77LINK will build a large .PR file containing all sorts of library routines to support the rather exotic F77 runtime environment. The overhead to load the program will be more than for a simple assembly language program.

The program is quite simple.

1. Retrieve the required username from command line argument.
2. Scan all valid PIDs looking for username.
3. Convert the PID number to a string and return to CLI where it can be picked up with XEQ/S.

Then write a macro called USEND.CLI that accepts a username and invokes program GETPID to find the matching PID, which is then used by the CLI SEND command:

```
push; prompt pop
XEQ/S GETPID %1%
var0 0                      ;comm—clear var0
var0/1=ig/2=ig [!string]  ;comm—try & get it
[!equal,[!var0],0]
   write [!string]          ;comm—err message
[!else]
   send%0/% [!var0] %2-%
[!end]
pop
```

If the only output from the program is a single string or number, then assembly language is the perfect medium, because you can return it to the CLI via the XEQ/S mechanism (system call ?RETURN will do this for you). On the other hand, if you want to read/write from/to a file or the console, considerably more effort is required (especially if there are a lot of numbers to be FORMATted). In this case, use a high-level language to preserve your sanity.

In Figure 1, MXSPID is the maximum length of the PID number expressed as a character string. The buffer area to receive the CLI argument is 200 characters long, just in case the user is being silly and leans on the repeat key (the maximum username length is ?MXUN=15 characters). Most of the integer variables are stored as 16-bit integers in this example, but generally I keep everything simple by using 32-bit integers for everything (equivalent to /INTEGER=4 on the F77 compiler).

If the CLI argument is missing, ?GTMES will return the error code ERNAG ('NO SUCH ARGUMENT'), which is not particularly descriptive. If the error is ERNAG, I print my own message; otherwise, I let CLI look it up when the program terminates.

The program checks every PID from 1 to MXPID and assumes that an error on ?GUNM means the PID is not in use. This is not very efficient; if the user is not logged on, the program will run for about 2 seconds (on an idle MV/4000), making 1,024

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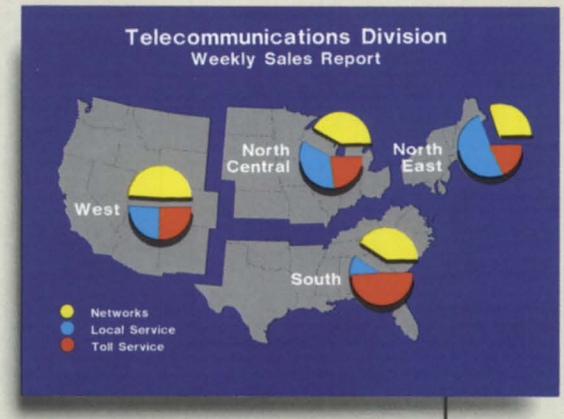

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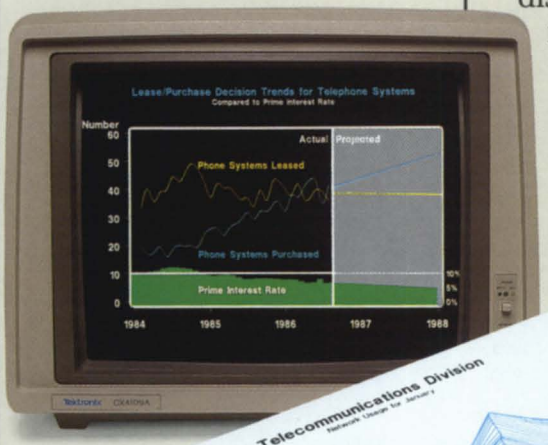

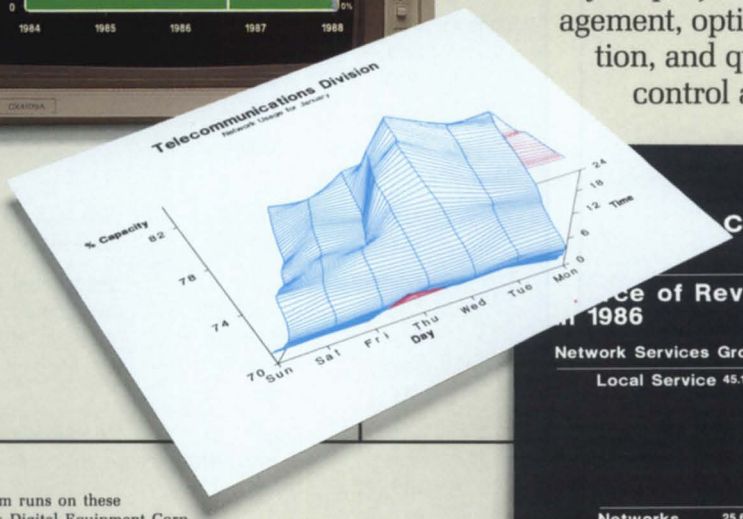

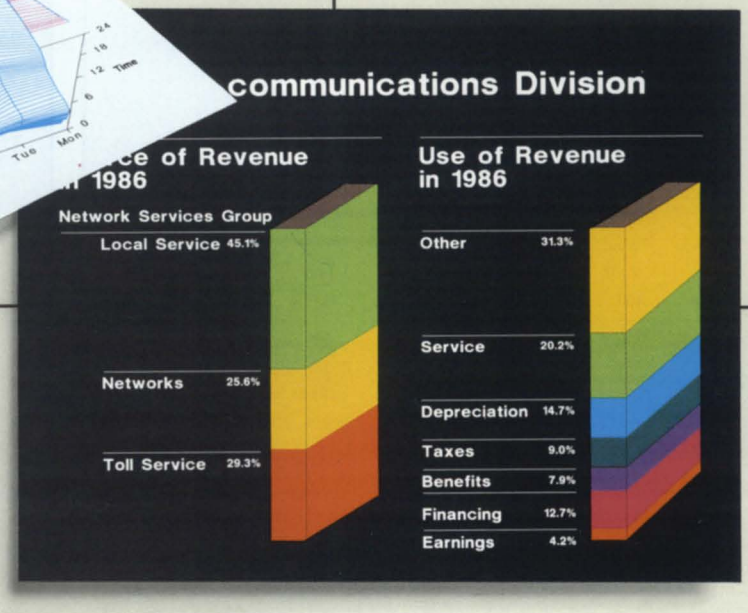

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The SAS System runs on these minicomputers: Digital Equipment Corp. VAX™ 8xxx and 11/7xx series under VMS;™ and MicroVAX II™ under MicroVMS™; Prime Computer, Inc. Prime 50 series under PRIMOS®; and Data General Corp. ECLIPSE® MV series under AOS/VS.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

?GUNM system calls before giving up. I used this method for illustration purposes only; a better method is to use the ?GPID system call to obtain a list of current PIDs and check only those PIDs.

While you are at it, you could also have the program do the ?SEND system call by retrieving the message as arguments

Figure 1: Assembly program GETPID

```
            .title getpid
            .ent z1,z2,z3,z4,z5,z6          ;for debugging only
            .ent ruser,xuser,pid            ;for debugging only

;)))))))   constants
            .nrel 1                         ;shared
            mxpid=1024.                     ;max no. of PIDs!
            mxspid=5                        ;i.e. i5

delim:      .dword 1s0                      ;"<0>" is a delimiter
            .do 7
               .dword 0
            .endc

;)))))))   variables
            .nrel 0                         ;unshared

;→         packet for ?gtmes
gpkt:       .blk ?gtln
            .loc gpkt+?greq
              .word ?garg                   ;'get argument'
            .loc gpkt+?gnum
              .word 1                       ;get arg 1
            .loc gpkt+?gsw
              .dword 0                      ;no switch test
            .loc gpkt+?gres
              .dword ruser*2                ;put arg 1 here
            .loc gpkt+?gtln

;→         buffer areas
; . . . . . cli argument 1
ruser:      .blk 200./2             ;?mxun  ;200 bytes in case silly
l.ruser:    .blk 1                          ;actual length of arg

; . . . . . each pid/username
pid:        .blk 1                          ;counter
xuser:      .blk ?mxun/2
l.xuser:    .blk 1

; . . . . .
final pid as character string
spid:       .blk (mxspid+1)/2

;)))))))   begin
            .nrel 1                         ;shared code

;→         get argument 1
getpid:     wsub        0,0                 ;reserved
            wsub        1,1                 ;reserved
            ?gtmes      gpkt                ;get arg 1
            wbr         oops                ;oops—missing arg?
z1:         lnsta       0,l.ruser           ;save length (bytes)

;→         check all pids until this username is found
            wsub        0,0
            lnsta       0,pid               ;pid=0
            fss         0,0                 ;fpac0=0.0

nextpid:    lnlda       0,pid               ;get last pid checked
            wldai       mxpid,1             ;get highest possible pid
            wsne        0,1                 ;pid=1024?
            wbr         done                ;yes, all done: not found

            winc        0,0                 ;pid=pid+1


z2:
            wsub        1,1                 ;ac0 contains pid
            llefb       2,xuser*2
            ?gunm
            wbr         nextpid             ;ignore error
z3:
; . . . . . get length of username (look for null)
            llef        0,delim             ;address of delim table
            wldai       ?mxun,1             ;no. of bytes to scan
            wmov        1,2                 ;save for after wcst
            llefb       3,xuser*2           ;byte address of start
            wcst                            ;scan for "<0>"
            wsub        1,2                 ;ac2=length of username
z4:         lnsta       2,l.xuser           ;save it

; . . . . . compare username & required username
            lnlda       0,l.xuser           ;length of string 2
            lnlda       1,l.ruser           ;length of string 1
            llefb       2,xuser*2           ;byte address of string 2
            llefb       3,ruser*2           ;byte address of string 1
            wcmp

z5:         wseq        1,1                 ;equal?
            wbr         nextpid             ;no

            lnlda       0,pid               ;yes;get pid we scored on
            wflad       0,0                 ;and float to fpac0

;→         convert pid in fpac0 to a string
done:       wldai       4s26+mxspid-1,1 ;unsigned, 5 digits
            llefb       3,spid*2            ;destination buffer
            wsti        0                   ;convert fpac0 to string
z6:

;→         now return with pid
goodbye:    wsub        0,0                 ;no error code
            llefb       1,spid*2            ;byte pointer to message
            wldai       mxspid,2            ;message length (bytes)

bye:        ?return
            wbr         badbye

;)))))))   error handlers
oops:       wseqi       ernag,0             ;"no such argument"?
            wbr         badbye              ;no—something else

            wsub        0,0                 ;yes no error code
            llefb       1,noarg*2           ;byte address of message
            lnlda       2,l.noarg           ;message length (bytes)
            wiori       ?rfcf,2             ;add flag
            wbr         bye

badbye:     wsub        1,1                 ;no message
            wldai       ?rfer+?rfcf+?rfec,2 ;error code in ac0
            wbr         bye

noarg:      .txt "Error: argument 1 must be a USERNAME"
l.noarg:    .word (.-noarg)*2

            .end getpid
```

%2-% from the CLI command line. This would replace the CLI SEND command in macro USEND.CLI. I didn't do this because the CLI SEND command accepts /1=, /2=, /L[=], /Q, /I, and /M switches, and they are difficult to implement in program GETPID. Use the CLI to do what it is good at and supplement its capabilities with programs and/or CLI macros.

The size of GETPID.PR is 22 KB, and PED shows one page each in the shared (SH7) and unshared (US7) partitions. The exact same program written in F77 and linked with F77LINK/KTOP=35 has an 80 KB .PR file, and PED shows 26 pages shared (SH7) and 9 pages unshared (US7)! The assembly language program uses considerably less memory, and the .PR file is one-fifth the size (not counting the 8 KB preamble present in both PR files). On an idle MV/4000, the assembly language version executes 50 times in 52 seconds, while the F77 version requires 82 seconds:

```
) X/S GETPID GRANT(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,)
```

Since the code is essentially the same in both programs, they should run at the same speed once loaded. Therefore, the extra 0.5 second for the F77 version probably represents additional time to load the program and perform the F77 initialization. This may not seem significant, but the interval will be larger on a more heavily loaded system, and after all, we want the program to execute as quickly as possible to preserve the illusion that the USEND.CLI macro is simply a CLI command, and not a program. If GETPID.SR is written using only 16-bit Eclipse instructions and LINKed with /SYS=VS16 so it runs as a 16-bit process, I suspect it will load even faster, but the MV instructions have made me lazy.

Debugging assembly language programs

If you write programs in high-level languages, then you can use the high-level language debugger SWAT, but if you write in assembler, you must use the CLI DEBUG or PROCESS/DEBUG command to invoke the low-level AOS[/VS] debugger (which shares many commands with the FED editor). The DEBUG (and FED) prompt is "!". At this prompt, you can enter various commands, most of which contain ⟨esc⟩. The main commands I use are as follows:

⟨esc⟩T3	set display mode: instructions
⟨esc⟩T7	set display mode: characters
⟨esc⟩T1	set display mode: numbers
⟨esc⟩A	display contents of accumulators
⟨esc⟩F	display contents of floating-point accumulators
XX⟨esc⟩B	set a breakpoint at location 'XX'
⟨esc⟩R	start the program
⟨esc⟩P	continue from current breakpoint
⟨esc⟩C	pop out to the CLI

Debugging GETPID

I will illustrate the general procedure of DEBUGging by referring to program GETPID. In order to debug an assembly language program, you must define some symbols that you can reference with DEBUG. Since DEBUG only knows about symbols that are in the .ST file created by LINK, you must define symbols in GETPID.SR. MASM places these symbol definitions in the

.OB file, and LINK pulls them out and puts them in the .ST file. For this purpose, I defined labels Z1-Z6 and made them visible with the .ENT declarations (see the listing of GETPID.SR). First, I assembled and LINKed the program:

```
) X MASM GETPID
) X LINK GETPID
```

Here's where you start seeing the difference between assembly language and a high-level language like Fortran. MASM and LINK only take 1 or 2 seconds, while the equivalent F77 and F77LINK may take considerably longer, especially if your F77 program INCLUDEs the long QSYM.F77.IN file of PARAMETERs!

I DEBUGged the GETPID program first with a valid username and then with a username that wasn't logged on:

```
) DEBUG/S GETPID GRANT
) DEBUG/S GETPID SMITH
```

By the way, it helps to have a hard copy of the source file beside your console.

First, I set break points at Z1-Z6:

```
Z1⟨esc⟩B
. . .
Z6⟨esc⟩B
```

and then used ⟨esc⟩R to start the program. When it stopped at Z1, I checked the contents of accumulator 0 and memory location RUSR to ensure they contained 5 and GRANT, respectively. I then continued the program with ⟨esc⟩P, and it entered the NEXTPID loop.

Each time it stopped at Z2, I checked the value of PID to ensure that it was incrementing properly and that accumulator 0 contained the value of PID before the ?GUNM system call. At Z3, I checked the contents of XUSER and verified this username by popping out to the CLI with ⟨esc⟩C and using the WHO command.

At Z4, I verified that accumulator 2 contained the correct number of bytes for the length of XUSER. At Z5, I checked the contents of accumulator 1 to ensure that the WCMP comparison had worked (I already knew whether the contents of RUSER and XUSER matched).

Finally, on PID=8 (GRANT), the program jumped out of the loop and stopped at Z6. I checked the contents of SPID to make sure it was 00008, and when I continued with ⟨esc⟩P, it terminated through BYE, and the CLI STRING variable contained 00008. Now if you think it all worked the first time through for me, I have some land in Uruguay you might be interested in . . . .

Next month in the final article of this series, I will discuss assembly language subroutines that can be called from high-level languages. Δ

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DG enhances AOS/VS CEO Page Reader

Westboro—Data General has enhanced AOS/VS CEO Page Reader software by introducing support for CEO rev 3.0, CEOwrite, and Wordperfect software. AOS/VS Page Reader allows documents scanned by an optical character recognition (OCR) device to be directly input into an Eclipse MV family computer. By automatically reformatting data and text into CEO, CEOwrite, or Wordperfect formats, CEO Page Reader eliminates rekeying.

Users can directly access CEO Page Reader from the CEO utility menu. Once documents are input, they can be edited, reformatted, viewed, mailed, filed, or printed.

The cost for the AOS/VS CEO Page Reader ranges from $1,100 to $3,850, depending on the processor. Delivery is 30 days after receipt of order. Δ

New DG mass storage subsystems announced

Westboro—Data General has introduced a new family of mass storage subsystems that combines both cartridge tapes and disks into a single package. The subsystems are designed for the midrange and high end of the MV 32-bit superminicomputers running under AOS/VS.

A cartridge tape drive for these minicomputers is available in a standalone package. DG has also introduced a high-capacity disk drive that increases maximum disk storage for the midrange and high end of the MV family. The new storage devices include a one-year warranty.

The Combined Storage Subsystem (CSS) supports up to seven mass storage devices in a compact rack-mount chassis. It packs system and user disk, tape backup, and interchange media into a single unit.

Mass storage devices supported by the CSS include new 234 MB, 5½-inch Winchester disk drives that lower the cost per MB of storage. Peripherals include a 21 MB, .15-inch streaming cartridge tape drive that provides convenient media interchange compatibility with the 21 MB cartridge tape drive available on low-end MV systems.

Data General also announced a high-capacity, fast-access, 14-inch, 862 MB Winchester fixed-disk drive designed for multiuser, interactive, and large system environments.

The price for the Combined Storage Subsystem begins at $10,200. The standalone 21 MB cartridge tape drive is priced at $8,500, and the price of the fixed-disk subsystem, including controller, begins at $34,700.

The Combined Storage Subsystem is available 30 days after the order is received. The standalone tape drive is available 60 days after receipt of order, and the 862 MB Winchester disk is available immediately. Δ

New performance offering from DG

Westboro—Data General has announced VSPAC, a performance offering that enables Eclipse MV family users to establish their own in-house AOS/VS performance analysis center. Targeted at large MV installations, VSPAC provides system performance data collection, reporting, and interactive analysis. VSPAC is available through Data General's Systems Evaluation and Performance Analysis Center (SEPAC) based in Atlanta.

VSPAC allows users to establish and track utilization trends, identifying specific areas that need attention. VSPAC can help users prevent performance crises and optimize their hardware or software configurations.

VSPAC can gather a comprehensive set of operational statistics, automatically generating standard reports and graphs. An interactive analysis program lets users examine system, process, disk, memory, communications, and other collected data items for any specific time period. This function helps to quickly identify bottlenecks. Users can then identify what programs consume excessive amounts of system resources.

Installation options for VSPAC include on-site analysis, implementation assistance and phone support by SEPAC performance analysts, and consulting service packages.

The initial VSPAC data analysis software license is priced at $60,000. Δ

DG offers new CEO Desktop Composer

Westboro—Data General has introduced a PC-based CEO Desktop Composer, a composition system with mouse, menu, and icon interfaces. The product is a version of the Xerox Ventura Publisher 1.1 software, customized by Data General for its systems.

The system allows users to combine word processing with graphics, such as charts, tables, headlines, and drawings. It integrates with CEO office automation software, and through the use of DG/PC*I, PC users can connect to each other and to the mainframe.

Additional features include compatibility with CEO software, advanced document composition functions for layout and design, the acceptance of text from several different word processing packages such as CEOwrite and Wordperfect, acceptance of graphics from CEO Drawing Board and Trendview and other scanned images and compatible CAD files, support for WYSIWYG functionality, and output capability to several different printers.

Data General is offering the CEO Desktop Composer in three packages: the workstation, the peripherals, and the software packages.

For $6,460, the workstation package comes with a DG Dasher/286 computer with 640 KB of memory, a 20 MB hard disk, a 15-inch monochrome monitor, a mouse, CEO Desktop Composer, MS-DOS CEOwrite, and CEO Connection.

For $3,090, the peripherals package includes the same CEO software as the workstation package, the mouse, and the monochrome display.

For users with existing PC hardware, the software package is available separately. It includes CEO Desktop Composer, MS-DOS CEOwrite, and CEO Connection for $1,640.

A single version of CEO Desktop Composer costs $895. Δ

Bottom Line software announced

Yorktown Heights, NY—MOR Systems, a software developer for minicomputers and mainframes, has announced its Bottom Line software series. For medium to large computers, the series will run on virtually any minicomputer or mainframe, regardless of manufacturer. Each release includes source programs. Based on standard COBOL, the first of the Bottom Line series is a sales analysis program for distributors, rack jobbers, and retail chains. It measures and analyzes sales by foot of allocated rack or shelf space. The module sells for $1,500.

MOR Systems, P.O. Box 456, Yorktown Heights, NY 10598; 914/739-1033. Δ

Dataram extends DG memory line

Princeton, NJ—Dataram's new DR-1520 memory for high-end DG computers extends flexibility in applications and number of users supported, and is priced 25 percent lower than comparable DG products.

The DR-1520 memory for MV/15000 and MV/20000 processors offers upgrade flexibility through four capacity options: 4 MB, 8 MB, 16 MB, and 32 MB. Fully compatible with all models in these two MV series, all four add-on boards will operate with or in place of the DG memory module.

The DR-1520's 4 MB and 8 MB memories are based on 256 Kbit DRAMs, and the 16 MB and 32 MB memories are based on 1 Mbit DRAMs.

A user-accessible enable/disable switch, which takes the board off line without having to remove it physically, eases troubleshooting and allows DG diagnostic programs to be run as if the board were not present in the system.

Support for the DR-1520 includes an express spares program, a service call reimbursement policy, a trial period, and a lifetime warranty.

The DR-1520 memory is available for delivery within 30 days after receipt of order.

Dataram Corp., P.O. Box 7528, Princeton, NJ 08543–7528; 800/822-0071 or 609/799-0071. Δ

Circle 13 on reader service card.

Circle 57 on reader service card.

New DG laptop options available

Westboro—Data General has announced two new options for the DG/One model 2T laptop computer. The laptop now offers a new backlit, blue, supertwist LCD screen and an internal Hayes-compatible, 2400-bps modem. The blue LCD screen operates with internal battery power or AC power.

The blue screen is optimized for constant backlighting. It uses a transmissive type of LCD technology that permits the light produced by backlighting to brighten the LCD screen to eliminate reflection.

The laptop also offers a light-emitting electroluminescent screen with CRT-quality resolution. The screens are full size, displaying 25 lines by 80 characters with a two to one aspect ratio and 640 by 200 pixel resolution.

The new direct-connect, Hayes-compatible internal 2400/1200/300-bps modem offers CCITT V.22 bis and Bell 103/212A standards for domestic and international transmissions. Other features supported by the modem include a telephone directory, the ability to store and recall user configuration profiles, a power switch to disable power when the modem isn't in use, adaptive equalization for improved telephone line performance, and call progress monitoring.

The 2400-bps modem offers Microcom Network Protocol (MNP) error correcting. It enhances the modem transmission to provide error-free communications. The MNP can also be enabled by the user with any other modem supporting MNP. The model 2T laptop has a dedicated slot accessible from the outside of the unit for the user-installable modem.

Prices for the backlit, blue LCD systems with a 20 MB hard disk and a 3½-inch diskette drive start at $3,195. A system with two 3½-inch diskette drives starts at $1,995. Each system configuration includes 512 KB RAM; universal AC adapter; an internal, removable battery pack; serial and parallel ports; four expansion slots; MS-DOS rev 3.2; and a one-year warranty.

The 2400-bps modem with MNP is priced at $500.

Delivery takes 30 days after receipt of order for the blue screen and 90 days for the modem. Δ

New DG terminal emulator for IBM micros

Columbia, MD—Rhintek has announced EMU/470, a D470C color graphics terminal emulator that runs on IBM personal computers, IBM PS/2s, and 100 percent compatibles. EMU/470 is compatible with Data General programs that use the features of any of the DG terminals including the D214, D215, D220, D411, and D461, as well as the D470C terminal. EMU/470 can drive any PC-compatible printer and support any Microsoft mouse-compatible pointing device. The DG Dasher D470C terminal provides downward compatibility with the other DG terminals, plus color graphics dis-

play and mouse support.

The EMU/470 uses a multitiered menu system, providing the user with comprehensive control and functionality without interfering with keyboard emulation. The program has more than 70 macro-programmable keys, plus automatic dialing and log-on functions. File transfer of either text or binary files is included, as well as an unlimited choice of configuration files. The individual configuration files can be activated at startup to select different log-on sequences, color schemes, macro-programmable keys, etc. Once the communication parameters are defined and saved, the user types D470 at the DOS prompt to be on line as a Data General terminal. The emulator also runs as an emulator under CEO Connection.

A comprehensive manual is included. EMU/470 is copyrighted and licensed for a single system; however, it isn't copy protected. The EMU/470 is executable from a LAN server; files can be accessed on local disk drives, as well as any LAN server disk drive. Baud rates from 300 to 19,200 are selectable.

EMU/470 is available for $195 with purchase order, discounted to $175 for prepaying customers. Outside of the U.S., the price is $229.

Rhintek Inc., P.O. Box 220, Columbia, MD 21045; 301/730-2575. Δ

Egan introduces IChost

Hauppauge, NY—IChost is a software and hardware addition for the IBM PC, XT, AT, and 386-type machines and compatibles that extends to them ICOBOL functionality in a multiuser environment. Depending on the configuration, up to four IChost boards can be added to provide up to 33 simultaneous COBOL users. IChost boards are available in either four or eight port configurations. IChost provides multiterminal capability for ICOBOL on MS-DOS in a manner similar to that provided by ICOBOL on RDOS.

Included with IChost is a DG D200 terminal emulator called Hostterm to provide screen save and restore features that the user can push off to MS-DOS and perform any MS-DOS function, command, or program. When returning to Hostterm, the screen is restored as the user left it.

Additionally, IChost has enhanced execution performance. Each IChost board, which can support up to eight terminals, adds an additional 512 KB of memory and a processor with approximately three times the performance of the original IBM PC. Each board has the processing power close to that of a DG S/140.

IChost supports the Pass printer spooling system and up to four printers that can be accessed from Pass.

IChostsu is a software-only product that allows a single user to have the same functionality as multiuser IChost users.

Egan Systems, 255 Oser Ave., Hauppauge, NY 11788; 516/231-7730 or 800/645-9898. Δ

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RIG/SIG ANNOUNCEMENTS

ATTENTION DATA GENERAL CRIMINAL JUSTICE AGENCY USERS

For the past four years, the Law Enforcement Data General Users Group (LEDGUG) has provided a forum for law enforcement, corrections, intelligence, and other criminal justice agencies running a variety of applications software on Data General hardware. Applications used by member agencies included records management, computer aided dispatch, intelligence, jail management, personnel, and crime analysis. Hardware utilization ranges from DG PCs to MV20000 machines, with users supporting a variety of DG languages and operating systems.

Each spring, the LEDGUG hosts an annual conference/training session. The 1988 conference is to be held in Richmond, Virginia, May 8–11 at the Sheraton Airport Hotel, with the theme of "Where do we go from here?"

For additional information on the LEDGUG, contact:

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Beneficial Corporation, a financial service company, bought $35 million worth of computers from Data General to be used in its loan office processing network. They now use 220 MV/2000 DC systems in their 1,150 offices nationwide. Additional purchases for the system are expected to bring the total investment to approximately $60 million by 1990. The systems will run a DG-based loan office accounting system called Bencom III.

Data General and Standard & Poor have entered an independent software vendor agreement to market S&P Stockmate on Data General systems. S&P Stockmate, a real-time market quotation and information system for retail brokers, allows brokerage firms to own rather than lease their stock quotation delivery systems.

According to S&P senior director of business development Martin Marion, the relationship between the two companies was strengthened by Data General's performance on Black Monday when S&P's Ticker III, a digital, consolidated market data broadcast, and DG computers handled the crisis smoothly. "More than 2.7 million messages came across the Ticker III broadcast with no down time or delay. The Data General equipment handled the incredible work load without skipping a beat," Marion said.

Agreements with six new added resellers represent approximately $8 million to Data General in the next year. The VARs include First Data Systems of Nashville, Tennessee, $1.5 million; Orbi of Tampa, Florida, $1.5 million; Health Data Network of Louisville, Kentucky, $1 million; Financial Information Network of Van Nuys, California, $1 million; FIPSCO of Park Ridge, Illinois, $1.5 million; and Exsys, New York, New York, $1.5 million.

Three of the VARs crossed over to Data General from other computer suppliers.

In an effort to pursue the European marketplace and to consolidate Data General's overall marketing strategy, Ward MacKenzie, formerly the head of VAR Marketing and Development, has been appointed vice president of Corporate Marketing, and J. David Lyons, formerly the vice president of Group Marketing, has been appointed as vice president and general manager of European Operations.

"Solutions through connectivity and compatibility" was Data General's theme at Uniforum 88, Dallas, Texas, February 9–11, where DG showcased current Unix offerings, including the latest revision of DG/UX. Demonstrations featured third-party applications that run on Data General systems, including WordMarc from Marc Software International, a company that recently signed a license agreement to make their word processing package available on the full range of DG/UX-based systems and Data General's personal and portable workstations.

Other software applications demonstrated were Informix, Unify, Blast, BBx Progression/2, Sceptre Synchrony, and Softronics Softerm PC.

Grumman Systems Support, an independent third-party computer maintenance company based in Woodbury, New York, has recently opened 10 new offices across the country. They are located in Sacramento; Salt Lake City; Detroit; Omaha; Dallas; Austin, Texas; Chattanooga, Tennessee; Birmingham; and Fayetteville, North Carolina. With the new openings, Grumman now has offices in 55 cities with more than 100 locations.

Robert Snyder has been named vice president of Software Development at Penta Systems International. In the newly created position, Snyder will oversee the development of new products, the enhancement of existing products, and quality assurance.

Your membership dollars at work: At last fall's Executive Board meeting, NADGUG approved funds for enhancing the electronic bulletin board system that Rational Data Systems sponsors for NADGUG members. Those enhancements are now in effect, and the RDS BBS is now running on faster modems and multiple phone lines with upload and download capabilities.

RDS president Doug Kaye reports that Randy Berndt, the NADGUG software librarian, is putting some of NADGUG's shorter public domain programs onto the bulletin board, and is waiting for users to begin uploading their favorite macros and programs onto the system. The RDS bulletin board now supports line speeds up to 9600 baud with a pair of US Robotics Courier HST modems.

Doug Kaye adds that he is starting to collect names for users who are interested in forming a PC Integration Special Interest Group. If you're interested, call him at 415/924-0840—or on the RDS BBS, 415/924-3652.

Data General recently added $12.3 million to its earnings this year through the sale of its vacant development and manufacturing plant in Austin, Texas, to the University of Texas. Resulting from the sale, DG will gain $5.9 million in the second fiscal quarter of this year. The university bought the facility as part of state and local officials' plans to attract Sematech, a $250 million research lab, to the city.

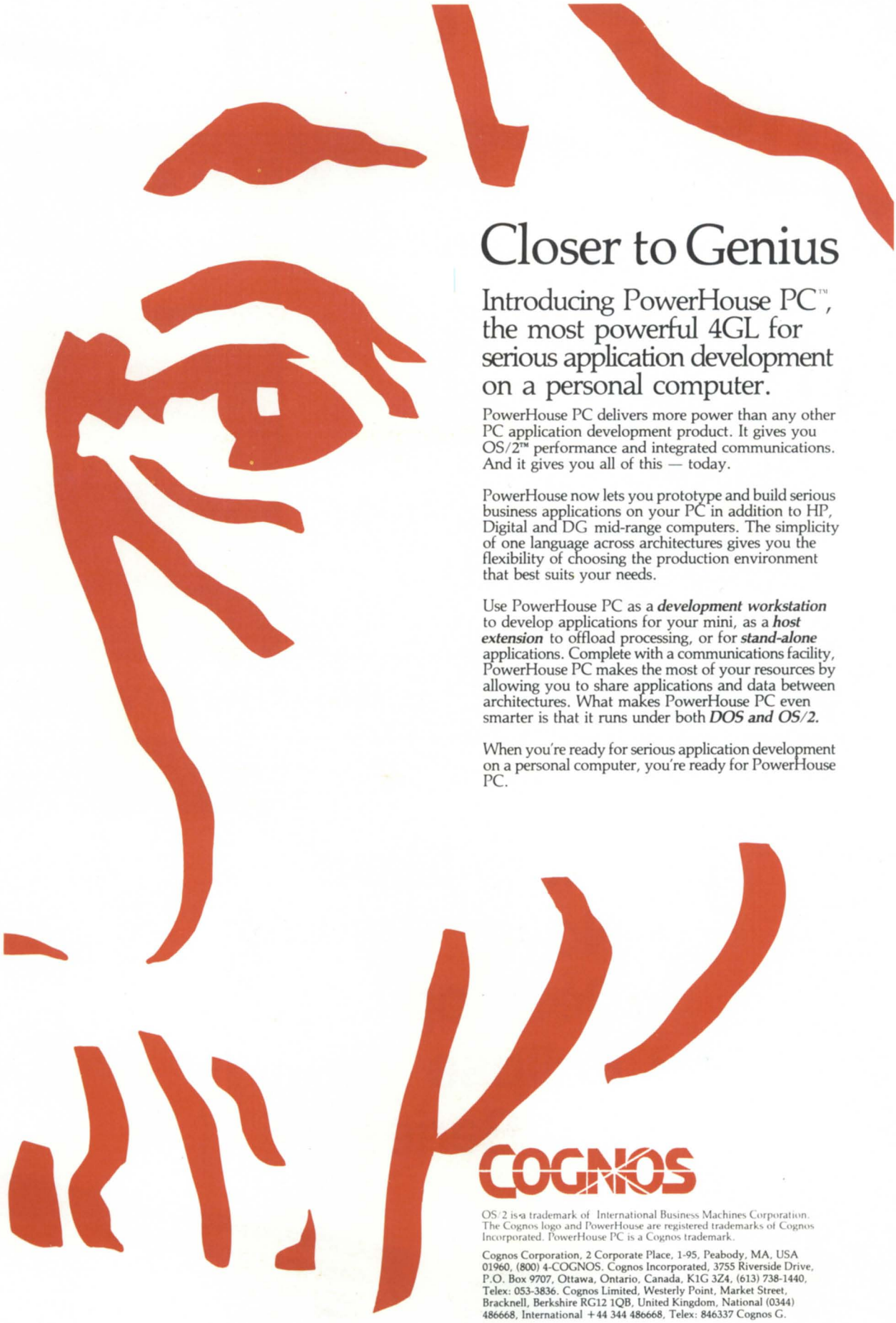
Concept Automation has been awarded two new contracts. The Naval Air Development Center in Pennsylvania has purchased two MV/15000 model 10s, and the NASA Marshall Space Flight Center contract includes the installation of three MV/20000 model Is.

As the "Official Technical Computer Sponsor of the 1988 U.S. Olympic Committee (USOC) and the 1988 U.S. Olympic Team," Data General and USOC will implement a nationwide sports science computer network called the Training Management System (TMS). TMS will link computers at USOC headquarters in Colorado Springs, Colorado, to other universities across the country.

The network is designed to give trainers and coaches two-way access to USOC's computers in its Sports Medicine and Science division.

To implement the system, Data General has donated an MV/10000 to be used for data storage, statistical computing, and graphics. Additionally, DG has donated an MV/4000, Dasher/286 PCs, DG/Ones, and a DS/7500 graphics workstation.

OASIS president Bobbie Pressman has started her own CEO consulting service, RJP Automation Consulting. Services include remote, dial-up CEO management; a general CEO system review; and short/long-term CEO project management and support. Δ



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