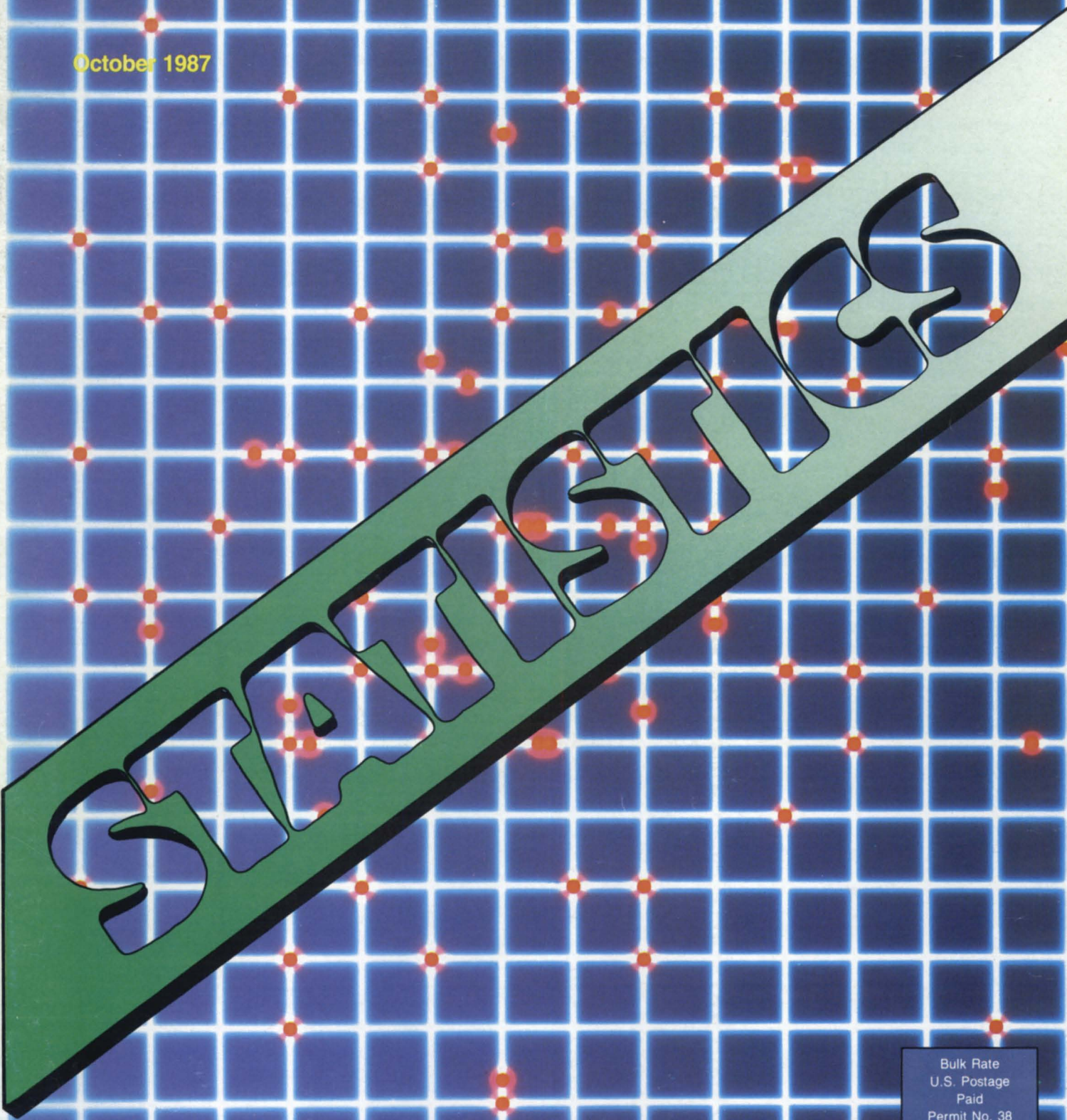


FOCUS

The Magazine of the North American Data General Users Group

October 1987



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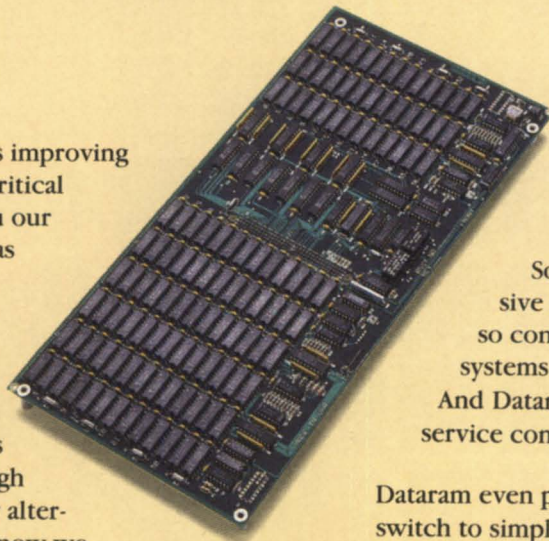
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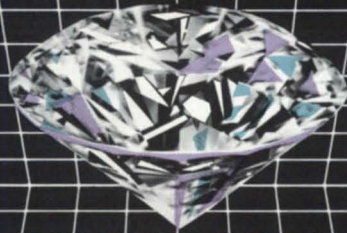
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WordPerfect Corporation (WPCORP) is now offering an annual Software Subscription Service for its products which run on Data General's AOS/VS computers. This service entitles subscribers to ongoing

updates, enhancements, and bug fixes for one charge. It is a particularly good investment in view of WPCORP's focus on product development and support for DG machines.

Update on the way

Arn Perkins, Manager of Product Development for WPCORP's DG division, notes a new version is well underway and is slated for release in September. The 32-bit update will include an extensive thesaurus, as well as on-screen columns, a concordance feature, the ability to add non-printing comments, a document summary, expanded list files capabilities, and substantial improvements in product speed.

But it doesn't pay to wait. DG customers who buy WordPerfect now and sign up for the annual Subscription Service will receive all updates at no extra charge for that year.

Agreement signed

An independent software vendors agreement has recently been

signed between Data General and WPCORP. This agreement applies to DG's AOS/VS operating system for its Eclipse MV minicomputers and also to MS-DOS for its IBM PC-compatible units.

It will not affect any other agreements WPCORP has with its DG OEM resellers.

Growing Popularity

In line with WPCORP's commitment to DG, Guy Pribyl, formerly a regional marketing manager in California, has been transferred to the corporate headquarters as Marketing Manager of WPCORP's DG division.

WordPerfect products have consistently achieved impressive sales performance in the Data General market. Guy attributes a great deal of WPCORP's PC success to the popularity of its products for the DG. WordPerfect now controls 30% of the market share for the IBM PC and compatibles, roughly twice that of its closest competitor.

Sales Manager Judy Hopkins reports that considerable interest on the part of DG resellers has substantially augmented the DG resellers list. WPCORP is still seeking qualified resellers. To sign up, contact Judy at (801) 227-4115.

File Compatibility

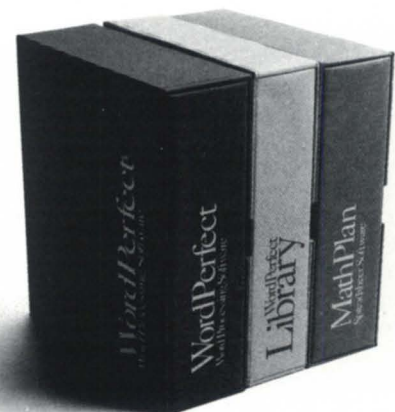
WordPerfect users can transfer WordPerfect files from the PC to a DG computer and back again, with no conversion software

necessary. This cross-over compatibility has led an increasing number of large government and industrial accounts to choose WordPerfect, including EF Hutton, the New York State Assembly, and the Federal Department of Justice.

The Justice Department's Civil Division, which acts as defense counsel for almost 200 federal agencies, has made WordPerfect an integral part of its automated management information system, AMICUS II. This system is comprised of 1,400 work stations consisting of various PCs, printers, and minicomputers, scattered across the United States.

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STRAIGHT TO THE TOP

Discussions with DG's top managers are yielding results

by Calvin Durden
NADGUG President

I just got word from NADGUG's hardworking staff that registrations for Conference 87 are well ahead of what we had expected. You may recall that last year's conference, which was held at Disney World in Orlando, drew the biggest crowd ever to attend a NADGUG event. We've been thinking of that as a tough act to follow, but maybe we were wrong. At the end of August, full-conference registrations were 30 percent ahead of last year's rate.

It's hard to say how much of the increase is due to the lure of Las Vegas. Probably not very much, in my opinion. The people on the Tropicana hotel staff are pretty savvy about these things, and they don't seem to expect many high rollers among Conference 87 attendees. I'm guessing that the two main reasons for the strong registration rate are our membership growth and the strength of this year's program.

It's not too late to register, but you should hurry because the hotel is filling up quickly. If you need more information, call the NADGUG staff at 617/898-4067.

First-time attendees are usually impressed by how much communication goes on at NADGUG conferences—between peers, between customers and vendors, and between users and DG personnel. The conferences are the event of the year, but the communication doesn't stop when people go home. A lot of it is informal, but once a year NADGUG's officers make a special effort to put member concerns in front of DG's top executives.

Our meetings with DG management are fairly well structured by now—we've been doing them for several years. In the spring we poll the RIGs and SIGs to get their lists of problems they've encountered with DG. After all the questionnaires come back, we compile the results into a priority list and schedule a meeting to discuss them

with DG's top managers. Right now I'm getting ready for our annual pilgrimage up to Westboro, and next month I'll be able to report back to you some of the results of our meetings.

Management always seems to appreciate our input, because we've taken the trouble to back up our impressions with statistics. On occasion, they've been surprised when we pointed out a problem they didn't know they had. But our impression has been that they are always responsive—and our priority list statistics bear this out: there's been enough movement in the rankings to convince me that management has taken our concerns seriously, and is working to solve them.

Here are the top three concerns we're going to raise this year:

Support. The number one issue is sales support. Many users, especially those who are not Fortune 1,000 companies or are running systems smaller than an MV/15000, say they feel abandoned. They say their sales rep doesn't return their calls, or won't get them the information they need to make a decision. We think management needs to take immediate steps to make sure customers are never made to feel unimportant, no matter how small they may be.

User Input. This issue was rated more of a problem this year than last, indicating that more users want DG's software developers to pay attention to requests for improvements and enhancements. Users of smaller systems were especially vocal about RDOS, and want to see it run across the entire product line.

Software Quality, Early Warnings. Users want and expect software to be delivered without bugs. They get upset when bugs turn up in a new release—and they get especially upset when they aren't warned of "known bugs," either in the release notice or in some cost-free, follow-up system. Apparently progress is being made with this concern because this year's survey ranked it lower than last year.

Notably absent from this year's list is the Customer Support Center in Atlanta, which was a top concern a few years ago. DG took that problem seriously and did something about it. We feel pretty confident that this year's list will likewise get a favorable hearing. Δ

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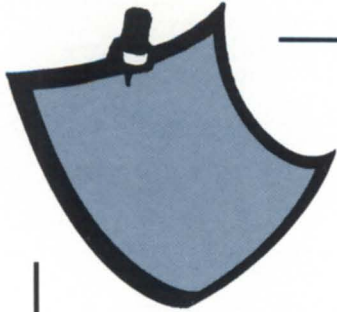
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Post your notes here

You don't have to look for a thumb-tack. You don't have to fight for space amid illegible post-it notes and memos. Your message will never fall off and drop behind somebody's desk. So why haven't you tried it?

There are two electronic bulletin boards available to Data General users—the Rational Data System (RDS) board and Data General's On-line Information Services (OIS) board. Both offer an informal exchange of questions, answers, and ideas among newcomers and experts. If that isn't convincing, here is a smattering of recent board messages to show how easy it is, and perhaps to pique your curiosity:

Msg#: 2476 *DG GOSSIP*

08/07/87 20:35:16

From: DAVE APPEL

To: ALL

Subj: PC-PURSUIT

Yahoo! I finally got PC-Pursuit. Now I can call this board without ringing up huge phone bills to Ma Bell. I have some modem-crazy friends who have more than \$100 in long distance charges a month.

Msg#: 2496 *DG GOSSIP*

08/11/87 18:17:31

From: GEORGE MORRIS

Subj: REPLY TO MSG# 2476 (PC-PURSUIT)

Only a hundred? I am not familiar with PC-Pursuit, how about some specifics? Thanx (GM)

Msg#: 2498 *DG GOSSIP*

08/11/87 19:23:53

From: LON CULBERTSON

To: GEORGE MORRIS (Rcvd)

Subj: REPLY TO MSG# 2496 (PC-PURSUIT)

PC-PURSUIT allows one to call BBSs in 24 metropolitan areas for a flat fee of \$25/month, 6 p.m.—7 a.m. Call their BBS at (800) 835-3001 for info, or (800) 368-4215 (voice)

Msg#: 2486 *AOS/VS*

08/10/87 10:13:14

From: SAM PITTS

To: ALL

Subj: ISAM VS DBAM

What hardware or software issues led some of you to choose ISAM over DBAM or vice versa? Have you found any performance issues that lead you to choose one access method over the other? Thanks for any pointers or tips that you feel should be addressed when gauging the pros and cons of either access method. Thanks again.

Msg#: 2488 *AOS/VS*

08/10/87 12:57:19

From: DAVID DOWN

To: SAM PITTS (Rcvd)

Subj: /REPLY TO MSG# 2486 (ISAM VS DBAM)

Use the simplest INFOS structure that will work. Any extra complexity will only slow down to program bugs. For multiple keys we usually go with 2-level DBAM (using selector keys).

Msg#: 2505 *AOS/VS*

08/12/87 10:24:05

From: GARY SANFORD

To: ALL

Subj: F77 FUNCTIONS

I am involved in a conversion of HP9020 series 500 BASIC to the DG F77. We will be having to create a lot of functions that HP-BASIC has and DG F77 does not have. Is anyone willing to part with a function library that performs string handling, function key reads, and "graphics." We intend on using GKS for most graphics. What experiences do you have with GKS? Especially the speed. I have heard that it is resource intensive and slow. . . . Is that true? If you can help out, just reply on this BBS. Thanks --gs--

Msg#: 2523 *AOS/VS*

08/13/87 11:16:27

From: RICHARD KOUZES

To: GARY SANFORD

Subj: REPLY TO MSG# 2505 (F77 FUNCTIONS)

We use gks some, and find it about as fast as an old assembly+f77 graphics library for tek 40xx graphics. We will be using it more and more for tek applications. I was worried that speed might be a problem, but it seems not to be. What other f77 functions are you looking for?

Δ

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UNITE AND CONQUER

Basic guidelines to help you start an interest group

The June 1986 issue of *Focus* discussed ways Data General and NADGUG help new groups. Undoubtedly, their aid is beneficial, but they are merely the support. The real work comes from the people behind the project. Although, there is not just one way to organize a successful RIG or SIG, some general guidelines have worked for other groups.

Pre-planning

The effort put into planning is the foundation for the future of the group. A committee or board should set some goals, keeping in mind the specific needs of their region or special interest. Ideally, a group should get input from other people, and then plan for the entire year (i.e., assign committees, make arrangements, and publish a calendar of events). Organizers will also need to decide on meeting places, dates, times, programs, announcements, policies and procedures, membership updates, and recruiting.

Establishing a regular time for a planning meeting will usually ensure better attendance and participation.

Initial organizers

It takes leadership from several people to take care of all the tasks required to run a successful user group. A few phone calls may be needed to locate those users who are willing to take an active role in the group, as well as to see what kind of interest is in the area.

Many successful groups have combined the efforts of key organizers and Data General people. The presence of DG people can be a great benefit. This may be the only opportunity members have to get to know their sales representative or service manager. Also, they may hear of new product announcements directly.

The type of cooperation you receive from DG people varies. It may include attending meetings, providing the program, announcing new products, giving demonstrations, handling meeting reservations, helping with memberships and prospecting, and sending out mailings.

In the earliest stages, planners may proceed with the selection of officers and the establishment of bylaws, or they may wait until the first general meeting and open up these decisions to the whole group. The first meeting of a group usually deals with business items such as the election of officers, decisions about meetings, and plans for future agendas.

First mailing

This is how you can initially reach users and interest them in joining the group. A list of prospects can be obtained from local DG sources and from user contacts. Sending out a questionnaire or survey with the mailing is a good way to get feedback from users.

Later, the mailings may expand into a newsletter. Depending on the size, it can include such items as the slate of officers and their phone numbers, news of recent DG installations in the area, news about NADGUG board meetings and conferences, comments about previous meetings, and most importantly,

information about the next meeting.

Regular meetings

Overall attendance improves if members have notice far enough in advance. Try to make the meetings the same day of the week and the same week of the month if possible, but take into consideration the geographic spread of group members. Most groups meet monthly or bimonthly.

Possible meeting locations include user sites, local universities, hotel meeting rooms, or restaurants. In many cases, dinner meetings have worked well, but some groups hold breakfast, lunch, or weekend meetings.

It is important to lead meetings in a friendly atmosphere. If people enjoy a meeting, there is a better chance that they'll return for the next one. Some useful ideas are:

- use name tags
- allot time for mingling
- send invitations
- have greeters
- have a social function
- introduce people with common interests
- seat new members at the head table.

If you need help planning meetings, or if you want to discuss general group development possibilities, there are several places for you to turn. You can contact the RIG/SIG committee for input or suggestions. The chairperson is Paul Duck, 14482 McCormick Dr., Tampa, FL 33626.

Another good contact is NADGUG president Calvin Durden, c/o Tractor and Equipment Company, P.O. Box 2326, 5336 Airport Highway, Birmingham, Alabama 35201. And remember, the NADGUG staff is in Westboro to assist you in any way possible. Δ

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NO ARK FOR ZEBRAS



A disaster success story

by Carolyn Kelly
Focus Staff

According to the Bible, when God flooded the world, he told Noah to round up a pair of each species of animal for backups. But when the Des Plaines River in Illinois flooded in September 1986 during an unusual series of heavy rains, Kevin Close was left with only a couple of Zebras.

Close wasn't worried when the storms began. He had been running his accounting firm, On-Line Business System, problem-free for the past 11 years from the same building located only ¼ mile from the Des Plaines. His Data General S/140 Eclipse operated from the basement of his two-story office building.

However, Close was a little surprised when he found himself standing in five feet of water. "Water was even with the top of the disk drives. It covered about 90 percent," he said.

With the generous help of another accounting firm in the Chicago area and some long hours and overtime put in by the people at Grumman Systems Support Corporation, who were already contracted to provide on-line maintenance service, Close was able to keep his business (with more than 400 clients) running with a minimum of interruption.

By September 30, 1986, it had been raining for days. But this day, flood water approached the building, and all 15 employees, except Close, left early around 3 p.m. "At that point, I wasn't concerned, because we'd never had five feet of water before," said Close.

By 7 p.m., when water reached the 6-inch level, he shut the system down and pulled out the system's two Zebra disk packs. Unfortunately, he did not have time to do a tape backup. According to Larry Schwartz, national tech support for Grumman, "The only thing going for them was that he [Close] had saved the disk packs. If he had backed up the tape, there would have been no problem, but he never thought that the water would get that high."

After pulling the packs, Close called the fire department, hoping they would have water pumps to siphon some of the water out of the basement. They couldn't help him. He then called his brother-in-law. Together, they tried to stop more water damage, but at that point, the water was coming in faster than they could carry it out. Finally, he lifted the computer onto bricks to keep it above the rising water level and tried moving the terminals. When he left at about 3 a.m., there was three feet of

water. By the next morning, it was five feet deep.

Close contacted Grumman Systems Support, and Rick Altosino, senior field engineer/training instructor, and Schwartz began working on the two Zebra disk packs, although disaster recovery was not established in their contract. "I got a call from a customer who was underwater asking if I had a spare system," Schwartz said.

The most difficult task was transferring the packs onto magnetic tape. They had 96 MB and 192 MB. They found another system they could use that already had 96 MB drives, so dealing with the 192 MB was more frustrating. Grumman rented them a couple of Winchester drives, but they had to transfer the pack onto a universal medium, mag tapes, a process that took about 6½ hours. "Rick worked with us moving information off of tapes until 1 a.m.," Close said.

Close was also making arrangements for temporary office space and computer time. Although there was no structural damage to the building, his office building would not be usable for about six weeks while the mess was being cleaned up. They had to excavate river and sewage water and put up new wallpaper and new floors for all 3,000 square feet. Again, he wasn't too worried. Several years earlier, he had made an informal agreement, similar to a reciprocal agreement, with a handful of other accounting firms near Chicago.

On Thursday, October 2, Close attended a tax seminar and ran into Ken Vandenbroucke, an accounting client at one of those firms, CompreData, Inc.

CompreData sells computer time to accountants. Close asked Vandenbroucke if they had any extra space, and Vandenbroucke said they did. CompreData, located in Lombard about 20 miles west of Chicago, also operated from an S/140. They let On-Line work from two extra terminals and use two modem phone lines with 24-hour access.

Despite potential problems, the arrangement was successful. "That

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shocked us. We didn't notice them [On-Line] at all. We didn't notice any speed reduction, and I didn't get any grief from my people," Vandembroucke said.

Close worked out of that location for about a week before moving into a temporary rental space in a shopping mall. They operated out of the mall space for approximately one month.

Meanwhile, Altosino and Schwartz continued to work on the disks. They installed the Winchesters at Compre-Data. Within 72 hours, they had installed On-Line's data base at Compre-Data. "My dad came in the middle of the night and let them in to put in the Winchesters," Vandembroucke said. They arranged for the conversion of software from RDOS ICObOL to AOS COBOL to be done by another client of Grumman's, Jeff Simon with Datamark. That process took another four hours.

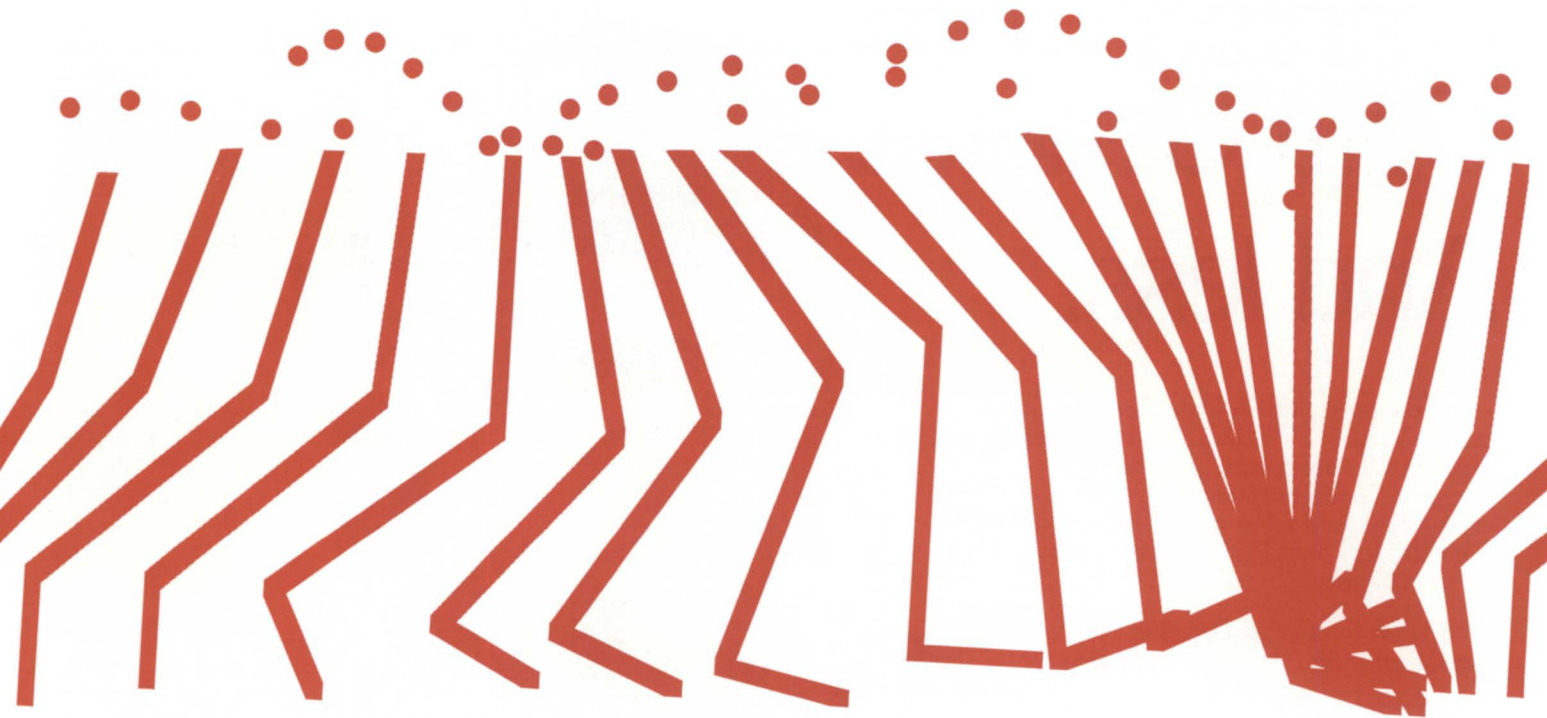
They also arranged for a loaner S/140 and CPU in the rental space. "We ran the cable right on the floor. It wasn't necessarily the cleanest operation, but it was just to keep them running. . . . The machine we lent them was just sitting on the table," said Schwartz. "We tried to do everything possible to keep him up and running. I think we saved him from being out of business for about a month," Altosino said.

According to Close, the accounting business was hardly affected this whole time. Clients were understanding of the few delays that did occur. "The hardest part for business was the physical moving—twice in two months," Close said.

Before moving back to the original site, Close upgraded to an MV/4000, also with Grumman's help. So far, the new system has not had any problems. "I don't think they even had a glitch," said Schwartz.

Close is content with his new system and unphased by the events that inconvenienced him. As of yet, he doesn't plan on making any more formal disaster recovery arrangements for the future.

"It was a 100-year flood. I don't expect it again. . . . We always did back-up off-site, but now with the change of system, we are able to back up while the system is running. We do it a lot more frequently now," Close said. The agreement with the accounting firms in the Chicago area is still in effect. He did make one change, however. He moved the computer upstairs. Δ



Walk, Don't Run

Statistics and DG computers are part of training for the Olympic Games

by John D. Moorhead
Special to Focus

Last June at the women's national race-walking championships in Eugene, Oregon, the judges disqualified almost half of the contestants. According to Leonard Jansen, systems manager of the U.S. Olympic Committee, "There was almost a bloodbath afterward about the judging. The athletes and administrators were saying that the judges did not know what they were doing, and the judges were saying, 'We do, too.'"

Fortunately, there was a way to find out who was right. Race walking is an unusual sport in which participants

walk in a highly formalized way that may look peculiar to the uninitiated. Strict rules govern the sport, forbidding such offenses as "lifting" or "creeping." For instance, both feet cannot be off the ground at the same time (lifting). Also, the knee of the supporting leg must be straight when it's directly under the body; if it's bent, the walker is creeping. For either violation, a walker can be disqualified.

To find out if the disqualifications were on the mark, Jansen analyzed the judging records using SPSS-X statistical software donated by SPSS Inc. The software package is installed on systems donated by Data General to the Olympic Committee's Sports Science Laboratory in Colorado Springs, Colorado. Those systems include an MV/10000, an MV/4000, six Desktops, and 27 DG/Ones.

"Using SPSS-X, we measured the reliability of the judging and found that the reliability quotient was 0.85 (an excellent score which is close to a perfect 1.0)," said Jansen. "Maybe the judges

were strict, but there was a high level of agreement on what they were doing." In international competitions, however, "strict but consistent" is not always the rule. Reliability quotients in international race-walking competitions have been as low as 0.25.

Studying judges is only one way that Jansen uses statistical analysis techniques. The Sports Science Laboratory relies heavily on such analyses to gain insight on many different aspects of Olympic competition—from athletic performance to new technologies. In terms of athletic performance, they examine physiological, psychological, and biomechanical factors of competition. Their goal is to help U.S. athletes gain the competitive edge.

Biomechanics

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Research at the laboratory includes studying the oxygen intake or body flexibility of young figure skaters, measuring changes in the strength of high school students in a weight program, and tracking the physical demands of competitive cycling. One of the most important uses of statistical software is to validate studies—to check the statistical consistency of the results. It also allows researchers to sort through large data files from several studies and make meaningful correlations. "For instance," said Jansen, "we can look at 10 strength studies to find a common statistical truth linking them all together."

Another example of the role statistical analysis plays in biomechanics is described by Sarah L. Smith, a professor in biomechanics. "Recently, we have been looking at the long jump performance of decathletes (those who compete in 10 different track-and-field events during a competition) compared with elite long jumpers. It is interesting to see how they differ in all the factors that relate to the projectile performance at takeoff."

Those who specialize in the long jump have superior angles of takeoff, velocity at takeoff, and center-of-gravity position, compared to the less specialized decathletes.

Sound bodies and minds

A recent study analyzed the amount of body fat, as measured by skin folds, for male and female athletes in some 20 different sports. About 700 individuals have been involved in the study. Athletes differ significantly in this measure, depending on what sport they perform. For instance, distance runners and cross-country skiers tend to have significantly thinner layers of body fat than wrestlers or racquetball players.

The performance of cross-country skiers in two long-distance races at Biwabic, Minnesota, and Calgary, Canada, was analyzed in another study. Faster skiers were compared with slower skiers, using some 250 factors per skier, such as average velocity, stride length, stride rate, and body positions.

A study just getting under way uses psychological testing techniques to examine the emotional impact of injuries on athletes. The results of this analysis may play a significant role in the area of sports psychology.

Researchers at the Sports Science Laboratory use several statistical techniques to learn more about athletes.

These include condescriptive routines to find means, standard deviations, and maximum-minimum ranges; ANOVA (analysis of variance) to look at the correlations to measure the strength of relationships between two variables; and multiple regression to examine relationships between independent and dependent variables.

The statistical analysis capabilities at Olympic Committee headquarters are used heavily: approximately 30 of the 40 people in the Sports Science Laboratory use SPSS-X. "A lot of people already have had experience with SPSS in academic settings before they come to us, and they feel comfortable with it," Jansen said.

Analyzing the accuracy of new technologies

Not all studies conducted by the Sports Science Laboratory examine athletic performance directly. One current study looks at acceptable accuracy levels in film versus video digitizing. Digitizing involves graphing athletic action. The body movements of a particular athletic event are carefully analyzed using precisely plotted points of reference. Detailed information about the movement of these points is fed into the data analysis software, which makes sense of the data.

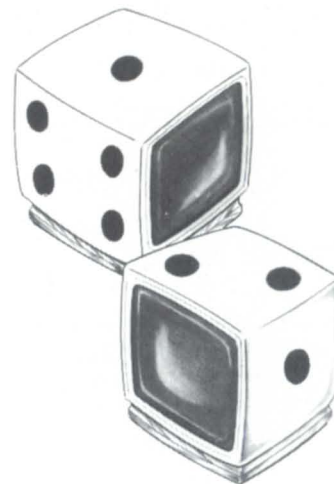
Although film digitizing shows much greater detail, video is much less expensive, easier to use, and can automatically feed reference-point data into the computer. The film system requires data to be plotted manually, using film images projected on an electronic grid.

"Scientists have been taking measurements off film for years," Jansen said. "They know the effects of lens distortion and what certain kinds of film can do. The same level of knowledge does not exist for video." Statistical techniques are being used to keep track of and compare how accurately the same action is measured using three different systems: film digitizing (always a manual operation), manual video digitizing, and automatic video digitizing.

The software takes coordinates and compares each technique. If video digitizing proves sufficiently accurate, it may bring the sophistication of digitizing within reach of high school coaches, or even individual athletes. Δ

John D. Moorhead can be reached at Infoprobe, Inc. at 1 E. Superior, Chicago, IL 60611.

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SPEAKING OF STATISTICS

What six companies say about choosing statistical software

To give prospective buyers of statis-

tical software a starting place for scanning the market, *Focus* asked five vendors three basic questions about their products:

1. What do you recommend to clients who are in the process of evaluating various statistical packages?

2. What are the key differences between your product line and others on the market?

3. What are the most exciting developments on the horizon?

The following are summaries of their responses to these questions.

Minitab, Inc.

The Minitab statistics package was developed at Pennsylvania State University in 1972. The original goal was to support professors who wanted to teach statistics without teaching advanced programming. As with most statistical packages, Minitab moved from the academic arena to the business world, and was incorporated in 1983.

The academic market remains a major focus for Minitab, with 51 percent of their 1986 customer base involved in education. Current licenses number more than 2,500. While academia is a key area, Minitab is taking steps to expand its market share in business and government. According to sales representative Cheryl Ferrin, "Business and government users came to us." In response, they have developed a PC version of Minitab for business users.

"Ease of use," Ferrin said, "is Minitab's key to success." The package uses a straightforward, command-driven user interface of simple English formats. For example, a regression analy-

sis can be executed by simply entering "regression" and then defining the fields. The basic data is stored in a Minitab worksheet, which consists of columns, constants, and matrices; about 180 commands put the data into the worksheet and operate on it while there. An on-line help facility provides information on any of the commands. Little training is required, and virtually no knowledge of statistics is needed to run it.

Minitab is a general-purpose package intended primarily for descriptive statistical operations and some higher level functions. It is available for micros, minis, and mainframes. As a general-purpose package, it doesn't include specific industry or field-related subroutines. However, users can write macros for specific purposes such as statistical process control, exponential smoothing, discriminant analysis, or ridge regression.

Another element in Minitab's marketing strategy is price. "When it comes to convincing customers," Ferrin said, "we compare pricing." Annual non-academic licenses are as follows: DG category C (MV/6000 or above)—\$1,600; category D (MV/4000 or below)—

\$1,400. As many as four linked CPUs can use the software for 1.5 times the annual license fee for a single computer.

No training is offered; however, a 30-day free trial of the software package is possible. Documentation includes a primer, handbook, reference manual, and quick reference card. Technical support specialists are available at Minitab and distributor locations. The Minitab user group meets twice a year, and a newsletter provides details on new releases, problems, and applications.

Minitab will soon introduce a student version that they hope will be purchased as part of introductory statistics courses and then carried with the student into the workplace. New features are added yearly, with ANOVA (advanced analysis of variance) commands being one of the most recent additions. High-resolution graphics capabilities are being added to their micro packages.

Minitab, Inc., 3081 Enterprise Dr., State College, PA 16801; 814/238-3280. Contacts: Claudia J. Hughes, marketing associate and Cheryl Ferrin, sales representative.

P-Stat, Inc.

"We're a well-kept secret," said Sebbie Buhler, marketing manager of P-Stat, Inc., "with a very loyal group of users." P-Stat, in fact, is the second oldest statistical package. It was developed at Princeton by Roald Buhler in the late 1950s as a social science research tool. The first users' manual was printed in 1964, and it entered the commercial market in 1979. As it evolved, the focus shifted from social science to applications such as market research and engineering.

"When people come to us, they normally have a good idea of what they want to do with P-Stat," Buhler said. When working with customers, she

emphasizes its distinguishing features.

"P-Stat is a very interactive package, and has been since the mid-70s." It features a nonprocedural, conversational command language and can be run in either interactive or batch mode from the same module. This allows users to prepare a job interactively using a subset of data, check the results, and then submit the job as a batch process on the full data base. With the interactive capability, it's possible to explore data and change the design and sequence of steps, depending on the results of the previous step. Their interactive editor allows users to correct errors and re-execute commands.

The second feature Buhler emphasized is integration. "Everything is in

one program—data and file management, data display, report writing, cross tabulation, and statistics." Acceptable data types are longer than any other package—up to 999 alphanumeric characters per variable. With its file management features, P-Stat files can be modified or created at any time. For example, the COLLECT command allows groups of related cases to be joined in a single master case for across-case manipulation. New variables can be added onto the records and then included in the data when the file is split apart.

P-Stat supports a user link that allows users to link their own Fortran programs with the P-Stat module. For example, IMSL or BMDP can be inte-

SAS Institute Inc.

The people at SAS tell prospective clients to select a statistical package that will grow as they grow. "Today they may need statistics," said Richard Roach, marketing manager, "but tomorrow they may need graphics, report writing, or spreadsheets." The SAS system addresses this need by offering an integrated system for a wide range of applications.

Base SAS software is the foundation of the entire system, and provides for data management, analysis, and report writing. Once in place, other components can be added to Base SAS. Base SAS is relatively new to the DG environment, having been ported along with SAS/Graph to AOS/VS in 1984.

While SAS is fairly new to the DG marketplace, it certainly isn't new. After making its first installations on academic mainframes in 1970, SAS became incorporated in 1976; the first minicomputer installation was in 1983.

In March 1987, five additional products became available to AOS/VS users under rev 5. The additional products include capabilities for menu-driven applications development, full-screen editing and query, spreadsheets, graphics, financial planning and forecasting, operations research, and interactive matrix programming. All functions can be run in batch or interactive modes.

Included in Base SAS is a library of 37 statistical procedures. It is basically a program designed for statistical-type application solutions. "We really don't

consider our software to be a set of sub-routines," said Roach. "When you invoke our software, you enter an environment that gives a consistent way to do things. Especially in larger data analysis projects, one of the biggest frustrations is getting the data in order so that other programs such as statistics can be used." Base SAS software reads data in any format from any kind of file, and deals flexibly with "messy" data. Users interact with the software using English-like commands.

For higher level statistics, the SAS/IML software module is provided to programmers, statisticians, mathematicians, and researchers. "This package uses a matrix language that allows statisticians to write any type of technique they might want," said Roach.

In addition to Data General minicomputers, the SAS system runs on IBM mainframes and personal computers, as well as Digital and Prime minicomputers. A relatively new product, SAS/Stat, is a full-function statistical package created specifically for the PC, and is compatible with the SAS system on mainframes, minicomputers, and personal computers.

SAS offers a full set of support services, with technical support included in the annual license fee. Training is broad, covering the range from new computer users to sophisticated statistical analysis users who are looking for programming techniques. Courses are provided on-site, at SAS Institute in

North Carolina, and in public facilities around the country. Instructor-, computer-, and video-based training is available.

Base SAS is available for three classes of DG machines for an annual license fee. The following represent the first-year price and the renewal fee for the first CPU: MV/6000-MV/8000—\$5,000/\$2,500; MV/10000-MV/20000—\$8,000/\$4,000. Additional CPUs can be added for a reduced first-year fee and same renewal fee. SAS/IML is available for the first CPU the first year for \$1,000 to \$2,000, depending on machine class. A 30-day free trial is available before signing a license agreement.

Roach sees the most exciting developments on the horizon as those dealing with the user interface. Version 6 for the PC will offer pull-down menus and other features to make the SAS system easier to use. SAS wants to make it easy for users to exchange files between machines—from micros to mainframes. Their current SAS/Stat software is a full-function statistical package for the PC that is compatible across this range of machine types. Version 6.03 of SAS/Stat will be supported on DG/One by the end of this year in cases where the DG/One has a 10 MB hard disk and 512 KB memory.

SAS Institute Inc., Box 8000, SAS Circle, Cary, NC 27511-8000; 919/467-8000. Contact: Richard Roach, marketing manager for minicomputers.

grated with P-Stat. According to Buhler, this is especially useful for some users. "BMDP has some statistical features no one else has, while P-Stat has better data handling and user-friendliness." This flexibility allows P-Stat to meet the needs of low-end users and advanced programmers.

P-Stat is supported on more than 50 different mainframe and minicomputer environments. It is identical on all supported computers—from micro to mainframe. The same documentation, commands, and capabilities are available. Buhler noted that the P-Stat portability techniques are unique. All are developed and updated from a single master source file. A preprocessor generates the correct Fortran source for the

target environment, allowing new releases to be distributed quickly on all supported computers.

Graphics are generally research-oriented, but can be interfaced to more elaborate business graphics packages. Included are a variety of cross tabulation and stub-and-banner display formats and listings. End-user support includes on-site training and consultation in setting up a project, public courses, newsletters, and documentation (users' manual, tutorial, concise guide, on-line help file, on-line news, on-line tutorial). Prices for the MV series range from \$2,000 to \$15,000 for the first-year annual license, with both education and multiple CPU discounts. The PC version, which is identical to the main-

frame package, is available for \$695, with demo copies available for \$95.

New features this year include enhancements to quality control statistical capabilities, forecasting procedures, and 18 new tests for nonparametric statistics. Programmable menus are being developed for the P-Stat command system to allow occasional users to use the program more readily. This should be available for AOS/VS users in the near future. Computer-assisted training is also under development, and should be available in early 1988.

P-Stat, Inc., P.O. Box AH, Princeton, NJ, 98542; 609/924-9100. Contact: Sebbie Buhler, marketing manager.

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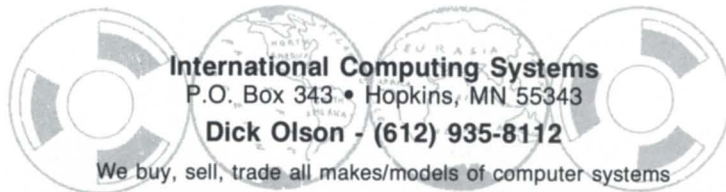
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SPSS, Inc.

"There are about four key parameters we feel customers should look for when they are shopping for a statistical package," said Keith Sours, product manager for SPSS. The first is to find a product and company that have been in business for a long time. "The reason that is important," said Sours, "is that it takes a lot of users throwing things at one of these packages for it to be debugged."

The second factor is comprehensiveness and flexibility in the package. Statistical analysis is iterative in nature, and the results from one stage may not be enough. "You may need to go beyond finding out how many people are in an age category, for example, to finding out how many are males or females. Or maybe you want to go beyond factor analysis to cluster analysis—your software needs to offer the full range of possibilities."

User support is the third factor Sours cites. This should include both software support and statistical assistance. The fourth and final factor in the selection process is portability. Being able to run the software on multiple machine types gives flexibility to the entire organization and preserves the investment in training should machine configurations change.

Not surprisingly, these factors in the selection process are also the areas where SPSS feels they stand out in the marketplace. The software was developed in 1964 by a professor at Stanford University. At the time it was developed, there was no way for college students to do quantitative data analysis—unless they could do Fortran programming. Once developed, SPSS

IMSL, Inc.

"When a customer is looking for a statistical package," said Charles Lansberry, director of marketing services for IMSL, "our first step is to find out about *their* needs—the particular problem they are trying to solve, and who is trying to solve it." Since IMSL is a mathematical and statistical library of Fortran subroutines, customers need to have a Fortran compiler and a programmer to make use of their products. While not every user must be a programmer, a technical contact at the company is necessary.

became known primarily through word-of-mouth. It was finally established as a company in 1976.

Sours said SPSS covers all statistical applications for all computer types except Apple products. They have more than 50 statistical routines in their basic package, SPSS-X. The actual number of routines, however, is not a basis of comparison between companies. "What we define as one routine," said Sours, "others may separate into several subroutines."

The Userproc facility within SPSS-X allows users to expand on available routines by developing in-house, statistical data manipulation and file management facilities. A tables option produces publication-ready stub and banner tables, and a graphics option provides pie, bar, line, map, and text charts.

SPSS concentrates on data analysis rather than expanding into other areas such as data base management or spreadsheets. "We've concentrated on end-user and departmental applications of data analysis," said Sours, "so users can easily access and use data regardless of the data base system or spreadsheet package in place at their company."

In terms of support, SPSS offers documentation, training, a newsletter, and a hot-line service. SPSS documentation uses a "cookbook approach" that explains statistics while it tells the user about the software. Training is tailored to the people taking it—on-site training is frequently offered. There is no user group at this time.

Sours believes the SPSS hot line is an important selling point. "A hot line

isn't helpful," said Sours, "unless the user can access it." With that in mind, SPSS doesn't require that a designated person have sole access. As a result, a great deal of their support staff time is spent on the phone covering software questions and statistical approaches.

First-year license fees for SPSS-X are shown here, followed by the annual renewal fee: MV/2000 DC, MV/4000 DC—\$3,000/\$1,500; MV/4000, MV/6000—\$3,900/\$2,100; MV/7800, MV/8000—\$5,000/\$2,500; MV/100000, MV/20000—\$6,500/\$5,000. The initial license fee for the tables option ranges from \$1,500 to \$2,000. Customers may inquire about a trial of the software.

Looking ahead, SPSS plans to concentrate on user interfaces, data base interfaces, and market-specific applications. SPSS-X will be designed to be an interactive package for a variety of different operating systems. While the first targets will be DEC VAX VMS and IBM VM CMS, they will eventually provide this capability for all machines. To accomplish this goal, they are opening up SPSS and making major changes to the central system. They will also be developing interfaces to major data bases so that there will be direct access, bypassing the need to produce an ASCII file and read it into SPSS.

"We have provided across the board the type of statistics people need. Beyond that, we're looking at specific markets where we can help users such as engineers with the applications that are unique to their field," Sours said.

SPSS Inc., 444 North Michigan Ave., Chicago, IL 60611; 312/329-2400. Contact: Keith Sours, product manager.

IMSL was founded in 1971 when it became clear that there was a need for standardized statistical subroutines. Prior to the development of the IMSL libraries, Fortran programmers had to write their own subroutines to solve problems. With IMSL, they now have an abundance of standardized routines that can be embedded in larger Fortran source-language programs. According to a report on IMSL in March 1987 by Datapro Research Corporation, "The demand for libraries of routines written in the language most understood by

scientists and engineers—Fortran—has steadily reemerged."

The basic IMSL library was divided this year into three separate but coordinated libraries containing 789 subprograms, as well as more than 150 new areas of functionality. The new libraries are Math/Library, SFun/Library, and Stat/Library. The Stat/Library includes 351 subprograms that have been newly organized by function.

Another relatively new development at IMSL is a set of four Protran modules. Protran is a problem-solving sys-

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tem that uses a higher level language. With Stat/Protran, the user defines a problem in end-user terms, and the program generates the required Fortran code. Stat/Protran's capabilities include basic statistics, frequency tables and cross tabulation, correlation, regression analysis, analysis of variance, and random number generation.

IMSL has more than 6,000 licenses worldwide, and is supported on more than 42 CPU environments. The new modular approach, which is used for all systems, allows users of smaller machines and workstations to access required functions without consuming excessive storage space.

IMSL's Stat/Library documentation now includes three loose-leaf binders, as well as a softbound edition and reference cards. The documentation provides examples that include the Fortran code. IMSL offers customer support, but specialized training is not yet available. Customers can try the software for 90 days, and have the right to cancel the license if they aren't satisfied. Various IMSL users have expressed interest in establishing a user group, and IMSL is working with them at this time.

IMSL software products can be acquired on an annual subscription basis. Following the first-year fee, renewal fees of 75 to 85 percent of the initial fee are assessed. Alternatively, a paid-up license provides use for an unlimited time period with an annual support fee.

For example, a customer with a class II machine (MV/20000) could obtain the Stat/Library object code for a paid-up fee of \$18,700 with support renewal of \$600 for one license. Or it could be obtained for the first year for \$3,500 with renewal fees of \$2,500. Academic fees are discounted and other class machine fees are available. IMSL libraries can be obtained in either source or object code.

Lansberry believes the future success of IMSL will be based on the elements that have supported them in the past. "IMSL makes Fortran more useful, and it covers everything. *Datapro* this year (March 87) called us 'one of the pioneers, and still the leader, in the field of Fortran-developed subroutine libraries.'"

IMSL, Inc., Park West Tower One, 2500 City West Blvd., Houston, TX 77042-3020; 713/782-6060 or 1-800/222-IMSL. Contact: Dr. Charles Lansberry, director of marketing services.

‘Many packages provide the basic routines, but they fall short when it comes to the more advanced needs of statisticians and data analysts’

BMDP Statistical Software

Development of BMDP Statistical Software began at UCLA in 1959, and continued there until 1982. User support and R&D is now handled by BMDP Statistical Software, Inc. The initial series of programs were designed to analyze data for biomedical projects. This initial series became the first package of statistical routines for IBM mainframes.

The product now runs on a wide variety of systems, including the Data General MV series. In addition, the target audience is no longer limited to biomedical fields. According to Lynda Glassner, sales and marketing manager, "BMDP is often described as the data analysis package for professional statisticians." The programs are used by researchers and statisticians in universities, medical centers, research institutes, government, business, and industry.

Glassner advises customers to evaluate carefully the data analysis needs of their organization. "Many packages provide the basic routines," she said, "but they fall short when it comes to the more advanced needs of statisticians and data analysts." A full-feature package can provide a wide variety of statistical functions and advanced techniques.

She added that it's also important to choose a package that provides robust statistical methods, and that allows an assessment of results even if classical assumptions are violated (e.g., data is

not normally distributed or group variances are not equal). Similarly, a package should provide flexible methods for handling missing data.

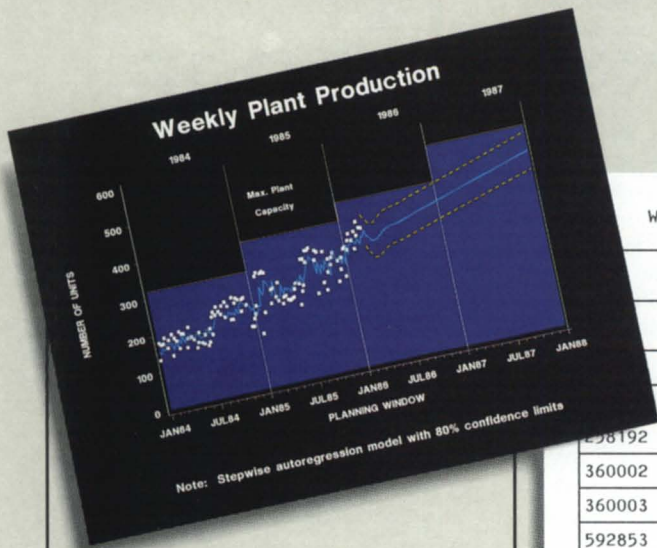
Other items to look for include data screening features, such as simple plots, and graphic displays that will help the user detect errors and outliers in the data prior to analysis. In evaluating ease of use, Glassner points out that many statistical packages are great for "quick and dirty" analysis, but are inflexible when it's time to modify the analysis for specific needs.

Glassner believes there are a number of features that set BMDP apart from other packages in the market. Many of these relate to the depth and quality of their 39 statistical procedures. As an example, Glassner said that most statistical packages provide basic routines for univariate analysis of variance. BMDP also provides multivariate analysis of variance and analysis of variance with repeated measures. Their nonlinear and derivative-free regression programs, as well as other specialized programs (Box Jenkins time series, spectral analysis, etc.), are among their distinctive offerings.

BMDP can handle missing data, as well as provide many flexible options for handling data. If data is missing, a special program displays the pattern of missing values and provides five options for replacing them. Use of BMDP programs does not require programming experience. Commands are speci-

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Production Rate

Production Rate	Lowest	Highest	Mean	Percent
30	4	1	2.5	0
40	6	4	3.5	33
50	6	3	5.5	66
60	6	4	6.5	83
70	7	4	7.0	85

Rejected Lot Statistics

fied in brief, logical sentences that are grouped into paragraphs.

The BMDP package is leased for an annual license fee. At this point, the 1985 release is available for the DG MV series. The minicomputer package includes all BMDP programs, manuals, a users' digest, updates, a complimentary short course, and installation instructions. Fees for commercial installation are \$3,850 per year, with discounts for nonprofit organizations (\$2,950 per year) and colleges (\$1,200 per year). Reduced fees are available for some smaller systems.

IBM PC packages can be ordered in lower cost subsets for a one-time fee starting at \$495. This includes a 30-day trial period. IBM PC-compatibles that include a hard disk, 512 KB, and math co-processor can run BMDP.

Support for all packages includes two-day introductory and advanced short courses; on-site instruction; and phone assistance nine hours a day, five days a week. A trainer's package is now

available to help instructors and consultants teach users how to get maximum benefit from BMDP programs.

Data General users can look forward to the 1987 release late this year. This version includes the Data Manager (DM) system, designed to enable researchers to work out most data-handling problems without special help from a programmer. Its three main functions include: merging files, extracting summary descriptors from sets of records, and restructuring files. DM can merge files side-by-side, end-to-end, or by interleaving records. For example, a sales manager who has collected data on sales people in different files can use DM to combine the data into one file to compare them using another BMDP program. The new release also includes specific statistical program improvements.

BMDP Statistical Software, Inc., 1440 Sepulveda Blvd., Los Angeles, CA 90025; 213/479-7799. Contact: Lynda K. Glassner, sales and marketing manager.

TRY BEFORE YOU BUY

Dr. Paul Velleman, professor of economic and social statistics at Cornell University, has some objective suggestions for selecting a statistical package. Although he isn't involved commercially in one of the specific DG-compatible products, he is a past officer of the American Statistical Association, and has written articles for their journal.

Dr. Velleman said that checklists aren't a useful approach for consumers to make judgments. "The key,"

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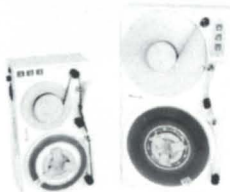
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Velleman said, "is to help people make the selection themselves—and the key to that is 'buyer try it.'"

"You can't choose a package by reading others' evaluations or looking at a table. A table won't tell you whether it will integrate well with the rest of your system." Instead, buyers should look at the overall professionalism of the package in terms of documentation, ease of use, stable algorithms, and support.

A number of the packages have manuals available in bookstores that a buyer can look at to get an overview of the basic environment the package will create. Since the differences in capabilities and features of the mature products are basically esoteric, these "environment" issues may be key. For example, are you comfortable with the language they use? with the interactivity they provide?

"Most of the major packages have good numerical stability, and whereas

20 years ago accuracy was an issue, today the issue is user interface: how does the user tell the program what to do, and how does that program tell the user what they found? Velleman doesn't feel that most packages are doing well in this area.

"Some of the most exciting work in the field," Velleman said, "is in the microcomputer field." He cites graphic manipulation of data as one of the capabilities in this area. With the Macintosh, for example, an array of points can be rotated three-dimensionally. The problem with this level of statistical analysis is the lack of maturity of some of the products. "Good statistics software takes a long time to mature. The data management requirements are as complex as any data management system. Add to that the requirement for good numerical manipulation and graphics, and it takes years to produce a mature product."

With the micros having some of the more exciting user interface capabilities and the older packages having more "maturity," Velleman sees a new trend taking place. "It used to be that people stuck with one package, but now people are using two or three." They may do some highly interactive work on a micro to help them explore their data, and then move to a more advanced minicomputer or mainframe for data crunching.

"Some of the companies in the arena are having trouble offering the new interactivity because of internal constraints—wanting to remain consistent with their language or user base," he said. Still, he sees interactivity being the most exciting trend for the near future. △

Dr. Velleman can be reached at 358 Ives Hall, Cornell University, Ithaca, NY 14853.

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FINANCIAL RATIOS\$

They're useful tools for turning accounting data into management answers

by Timothy V. Sanders
Special to Focus

Of all the financial management tools available today, one of the least understood is analysis of financial ratios. Financial ratios have always been important to those people who analyze a business from the outside (i.e., stock analysts, bankers, investors, accountants). Until recently, however, little attention has been given to how they can be used by managers inside the business. With the widespread use of computerized accounting systems, financial ratios are much easier to use and, consequently, much more useful. This article will examine the computer-aided use of financial ratios by executives, managers, and controllers.

What are financial ratios?

Financial ratios are simply gauges by which the financial condition of a business is measured. Like other types of gauges, financial ratios don't necessarily tell you what caused a problem, but they can identify symptoms of real or potential problems you might not see otherwise. The ability of ratios to serve as early warning indicators is a major reason they are valuable to managers.

Many different financial ratios can be used, and each of them is designed to measure a certain financial facet of the business. There are four general categories of ratios:

- those that measure liquidity (ability to pay bills)
- those that assess profitability
- those that indicate leverage (debt)
- those that evaluate asset utilization.

To examine all of the commonly used ratios would fill the rest of this article, so instead, let's just look at three of them as examples of the ratio concept. (A complete list of ratios and their purposes can be found in most accounting or finance-related textbooks.)

1. **Current ratio**—one of the best known liquidity ratios. It measures the ability of a company to pay its bills during the next year. It is calculated as:

$$\frac{\text{current assets}}{\text{current liabilities}}$$

where current assets include cash or assets to be turned into cash within one year, and current liabilities are debts to be paid within one year.

2. **Return on equity**—a measure of a company's success as an investment. It is measured by:

$$\frac{\text{net profit}}{\text{net worth}}$$

3. **Inventory turnover**—a measure of the liquidity rate of inventory. It examines the tendency to overstock or understock:

$$\frac{\text{cost of goods sold}}{\text{avg. inventory value}}$$

How can you tell a good ratio from a bad one?

Once you have calculated a ratio, there are two perspectives you can take in evaluating the result—internal and external.

With the external perspective, you are comparing your business to other businesses in the same industry. You would gather industry benchmarks or typical values for the ratio and see if the calculated ratio for your company seems to be in line with these standards. This perspective has limited usefulness because differences in accounting methods and other hidden factors make comparisons risky. For example, two companies with the same current ratio could be in very different financial positions if one's current assets are primarily cash and the other's assets are primarily noncash (inventory).

Once you have calculated a ratio, there are two perspectives you can take in evaluating the result—internal and external

With the internal perspective, you are comparing the current calculated ratio with previous calculations for your company. This is a much more useful test, and it allows you to identify trends and variances for the company.

The analysis of ratios is analogous to the measurement of blood pressure. If you go to a doctor who has never seen you before, the only thing he can tell you about your blood pressure is whether it is in line with typical readings. This is useful if your blood pressure is extremely high or low, but not much help otherwise.

However, if your doctor has been taking readings on you for a long period of time, he can tell you if your blood pressure is going up or down compared to what it has been in the past. This is much more useful in determining whether you need to make changes in your lifestyle. This is the same type of comparative information a business needs in order to monitor its financial health.

Why haven't ratios been used by management in the past?

Ratios have not been widely used by management for several reasons:

1. a lack of easy access to the current data needed

2. a lack of understanding about the use of ratios
3. a lack of time to make all the calculations.

Typically, managers have only dabbled in ratios when the bankers or other outsiders required it of them, and even then, they usually hired an outside accountant to make the calculations.

How can computers help?

Properly designed computer software can completely solve problems 1 and 3, and can help with the education needed to solve problem 2. Computers are wonderful at data gathering and number crunching, and a manager can now buy computer software that automatically provides calculated ratios as a side benefit of automated accounting.

For example, SouthWare's ExecuMate software takes the data stored in SouthWare's accounting packages and calculates several common financial ratios without requiring any user understanding or input. In addition, ExecuMate shows the formulas used, explains the use and purpose of each ratio, and even allows "triggers," which will automatically alert the manager to significant variances.

Conclusion

Computerized accounting software now makes the raw data available for any manager to calculate, and uses the same financial gauges that bankers and analysts have been using on businesses for years. Some software even handles all the calculations for you. By analyzing financial ratios on a regular basis, a manager can quickly identify trends and changes within the business. Although these ratios don't replace management skills or insight, they do help a savvy manager isolate and focus on the areas of business that need attention.

Since computer software has eliminated most of the problems previously associated with the use of financial ratios, these gauges should begin to move from the exclusive realm of financial specialists into the toolbox of the business executive. Δ

Timothy V. Sanders is vice president for market development of SouthWare Innovations, Inc., a business software development and publishing company. Contact him at 555 Stage Rd., P.O. Box 2797, Auburn, AL 36831-2797; 205/821-1108.

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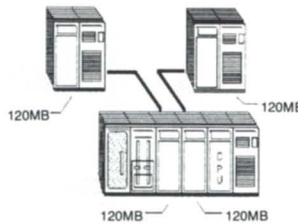
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SOMETHING OLD, SOMETHING NEW

CPD offers advice on used equipment and upgrades

by Geri Farman
Focus staff

End-users don't usually have much contact with Data General's Continuing Products Group, but according to Paul Faria, marketing manager, there's no reason for an arm's length relationship. "People can call us directly for ideas and technical assistance, and we can offer them ballpark figures on the costs of equipment or upgrades." Although customers are welcome to contact them for this type of information, Faria said, "We religiously try to find out if they are a VAR customer. We want them to work through their OEM or VAR since

their particular system may have custom coding or other features that need to be considered."

Explaining where the Continuing Products Group fits into the structure of DG's organizational acronyms is a bit tricky. As part of DG's Continuing Products Division (CPD), CPG is responsible for marketing factory-refurbished products, equipment upgrades, and extended products (discontinued items that are manufactured to order for customers who still require them). Thus, CPG is subdivided into three groups: the Factory-Refurbished Group, the Upgrade Group, and the Extended Product Line. The three Continuing Products Groups, coupled with DG Direct, are under Howard Berg, Continuing Products Division director.

When asked why customers should buy through the Factory-Refurbished Group instead of purchasing new equipment or working with a used equipment dealer, Faria focused on

DG's ability to package their refurbished equipment just like a new product. The refurbished equipment has the exact same model number and includes all attributes of that model number.

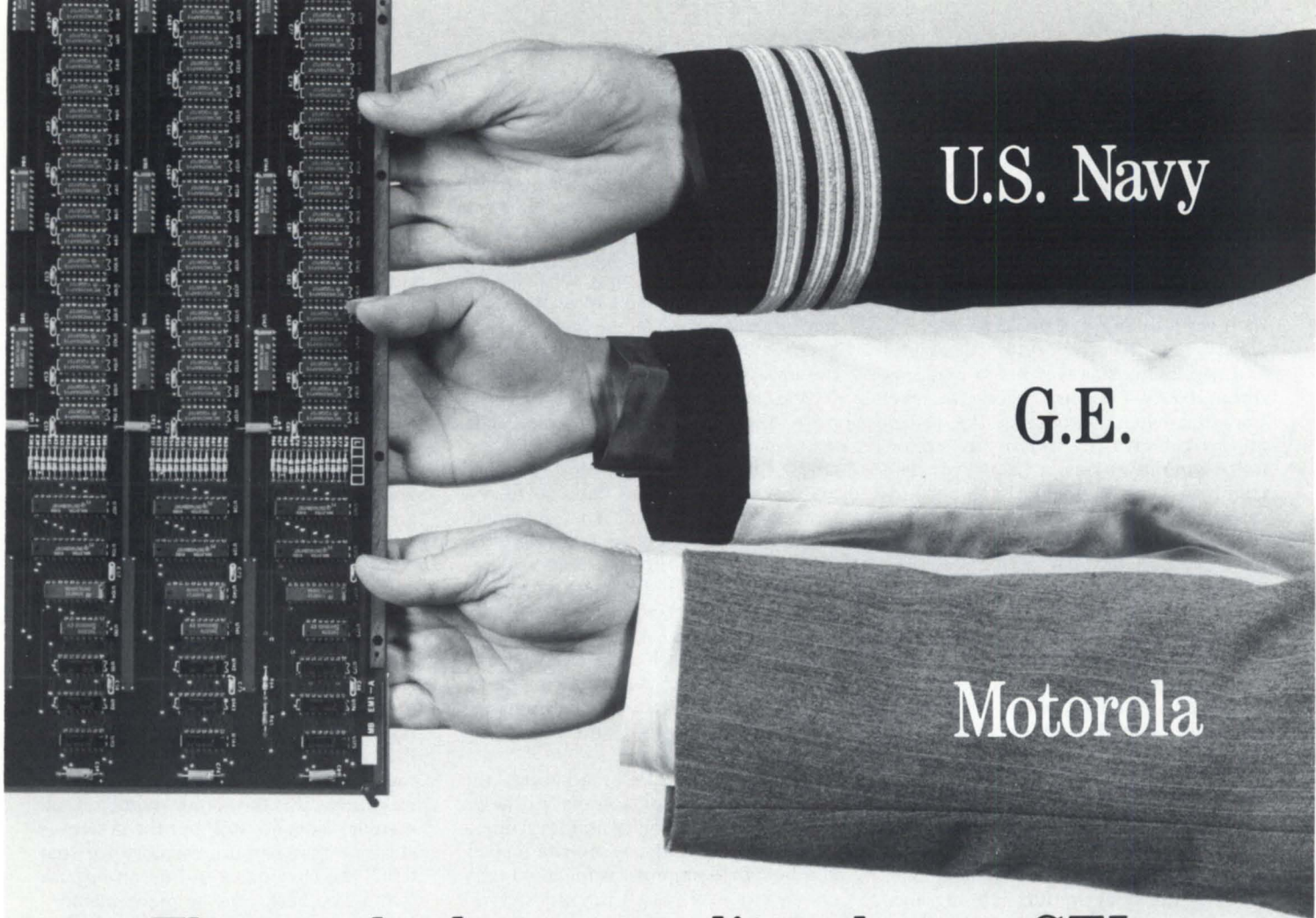
For example, the warranties offered on factory-refurbished products are exactly the same as those offered for the same model when new. If a customer buys an MV/15000 from CPG, they get the same one-year warranty offered for a new one. Similarly, installation may be included if the product offering meets the requirements for installation that applied to a new product.

When customers buy from CPG, a "right to use" license is included for the operating system. "This can be a major benefit," Faria said. "If a person buys AOS/VS, that 'right to use' is worth \$11,000. In itself, that represents a major price advantage if a customer needs AOS/VS."

Data General also guarantees that every product sold through CPG is eli-

Figure 1: Data General 32-bit Eclipse systems

CHARACTERISTICS	MV/2000 DC	MV/4000	MV/7800 C	MV/7800	MV/7800 DC	MV/8000 11	MV/10000	MV/10000 SX	MV/15000 MODEL 8	MV/15000 MODEL 10	MV/15000 MODEL 20	MV/20000 MODEL 1	MV/20000 MODEL 2
Architecture	32-bit	32-bit	32-bit	32-bit	32-bit	32-bit	32-bit	32-bit	32-bit	32-bit	32-bit	32-bit single processor	32-bit dual processor
Whetstones (K Whets)													
Single	958	727	1068	1068	1068	1529	3214	3881	2879	4263	6410	6410	12423
Double	758	543	773	773	773	1299	2672	3060	2568	3554	4940	4940	9719
Machine Cycle Time (ns)	160	200	320	320	320	220	140	140	85	85	85	85	85
I/O Bandwidth (MB/Sec)	8	5.0	10	10	10	18.2	28.6	28.6	16.74	16.74	16.74	35	35
Maximum Memory (MB)	10	8	14	14	14	8	32	32	32	32	32	64	64
Logical Address Space (GB)	4	4	4	4	4	4	4	4	4	4	4	4	4
Cache (Buffer) Size (KB)	NA	NA	NA	NA	NA	16	16	16	20	20	20	20	20 per CPU
Bus Architecture	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Intelligent Asynchronous & Synchronous Controllers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maximum Asynchronous Ports	24	64	128	128	48	128	256	256	432	432	432	1008	1008
Online Storage (Max)	320MB	9.4GB	9.4GB	9.4GB	2.7	14.2GB	27GB	27GB	16.5GB	16.5GB	16.5GB	27GB	27GB
Maximum Tapes	2	8	16	16	9	16	16	16	26	26	26	26	26
BMC Controllers (Max)	NA	4	4	4	1	6	16	16	7	7	7	16	16
Packaging	under the desk	10.5 in. rack-mount	10.5 in. rack-mount	meter-high 10.5 in. rack-mount	under the desk	meter-high	meter-high	meter-high	10.5 in. rack-mount	10.5 in. rack-mount	10.5 in. rack-mount	meter-high	meter-high



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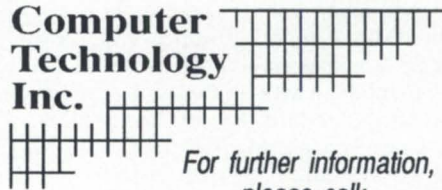
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gible for DG maintenance and includes all of the engineering change orders required to run their latest software. The average delivery time is 30 days; however, if a product is in short supply, they may quote 60-day delivery and then work to improve that date.

Faria emphasized price flexibility and negotiations as benefits in working through DG. "We are willing to take trade-ins when negotiating the price, and we can give any VAR of any size or dollar volume at least a 15 percent discount on items in the VAR 15 percent discount product listing." Price flexibility is greatest with products that have been on the market for a while. "With the newer product offerings, we tend to offer what amounts to the average sales price of the new product. Most VARs can buy these new products cheaper with their volume discounts."

Almost any Data General product is available through the Factory-Refurbished Group. "Obviously, we can't offer the latest product offerings until they become available on the used market," Faria said, "and that could be as long as six months after their release." What often happens is that someone will buy the new product offering and then come to CPD for the peripherals—or vice versa. "We do a lot of mixing and matching with new and used equipment."

Turning to the Upgrade Group, Faria again emphasized the flexibility of their offerings. "Our responsibility is to market comprehensive upgrade packages to our customer base. When we create these upgrade packages, however, we create the baseline upgrade with the intent of customizing." The Upgrade Group support staff works with the sales force, customers, and VARs to choose the appropriate upgrade for their requirements and budget.

Faria pointed out that price/performance and ease of upgrading within the Data General product line offers users an important growth path. "Incremental growth is becoming an important standard for decision-makers who are considering investing in a mid-range system. A growth path is built into each model's architecture."

The baseline or standard upgrades are based on the paths a customer is most likely to pursue. "Since we have such a large selection of base upgrade models to choose from, we've done the planning in advance for the majority of

our customers." For example, a customer with an MV/4000 is likely to upgrade to an MV/7800, 7800 XP, or MV/15000 model 8. However, even using these "likely" upgrades, a customer probably doesn't have the exact same configuration as the base upgrade package. It is these variations that affect the final price.

"We take the median position on price," Faria said, "and then start talking details." With the MV/4000 example, Faria's group would need to know what elements of the present system can be kept and what returned. The basic performance characteristics for DG's 32-bit Eclipse systems are shown in Figure 1. The chart gives customers an idea of what to expect with various upgrades. While these are the basic features, each individual system can have a wide variety of memory, peripheral, and cabinet requirements that affect the design and cost of an upgrade.

Working with CPD marketing, the Data General salesperson or VAR helps decide on the feasibility and implementation of an upgrade. A pre-site inspection by a field engineer is included only on system-level (CPU) upgrades. Field engineers review the customer's site and determine if the space, cooling requirements, interconnection needs, and power concerns are being addressed adequately.

For its own end-users, Data General systems engineers may conduct a performance analysis of the equipment to determine the effect of the upgrade and the software ramifications. This systems engineering performance analysis can be purchased as a separate service.

The upgrade price includes installation, deinstallation, and shipment of returned material back to Data General. Data General's standard warranties are provided, and all of the CPD upgrades are fully discountable under current purchase agreements. Data General also offers a number of upgrade package lease plans for those who wish to optimize their cash flow.

The items that can be used as trade-ins definitely affect the bottom line. "We don't look just at what functionally needs to be returned," Faria said. "Other ancillary products can be considered." For example, a printer might be taken as a trade-in even though it has nothing to do with the upgrade. This offers customers a good chance to unload some items. However, before everyone calls CPD, trade-ins are used

primarily as credit—to stimulate purchases and help a customer with their budget. "VARs that buy every week may be able to just call us to return various items, but if we don't really need an item, we don't take it back."

Data General's *Guide to Upgrades* is a new catalog that should make upgrading easier to understand and to do. The catalog is scheduled for distribution at the NADGUG Conference. One of the special features of the catalog is a worksheet that a customer can complete and give to their salesperson to send in for an upgrade estimate. By using the worksheet, DG will be able to take into consideration all of the elements of a customer's present system when designing and pricing the upgrade.

Faria pointed out the difference between add-ons and upgrades. In the case of an MV/10000 that has 8 MB of memory: if the customer wants 2 MB more of memory, they can simply buy those 2 MB as an *add-on* and insert them in one of the memory slots in the machine. On the other hand, if all memory slots are full, but the system is still not at maximum memory for that CPU, the customer can buy an *upgrade* that takes back one or more memory boards and replaces them with higher density ones. Because this option involves returning equipment, it constitutes an upgrade.

The Upgrade Group can offer either new or used equipment. This allows them to be more flexible in terms of price. The sales force receives the same commission for new or used equipment, so the driving force is to design an upgrade that meets the customer's needs.

Extended Product Line is the marketing group that takes responsibility for older products that are no longer included in the standard product price pages. They arrange to build new units for the dwindling set of customers who still need the discontinued models. For instance, a VAR may have a lot of code in place and not be ready to change to a newer product line. Any product Data General has ever produced may still be available new.

For further information about upgrades, factory-refurbished equipment, or DG's extended product line, customers should contact their local Data General sales representative or VAR, or send their name and mailing address to Data General, Continuing Products Division, 2400 Computer Dr., MS 1-D, Westboro, MA 01580. Δ

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HAPPY ENDING

by Phil Robson and Tony Deakin
Special to Focus

The saga of an MV/7800 upgrade

Rev 7.5x of AOS/VS has inspired a lot of criticism in the U.K. for its increased demands on memory, but we were glad to pay the penalty. Here's the story why:

Brierly-Almond is the largest import merchandiser in the United Kingdom specializing in packaging products for multiple wholesalers. Last year, they turned-over £ 15 million (about \$24 million), on an average stock of £ 500,000 (about \$800,000), due in no small measure to the success of its computer system.

Starting in 1983 with an Eclipse S/130 processor running under RDOS, five D2/D200s, and a B300 printer, the system had expanded to 11 in-house video display units, three remote screens with slave printers in Birmingham, one remote terminal in Manchester, and two system printers. With the processor running its full complement of memory (512 KB) and the number of available communications lines virtually exhausted, there was nowhere left to go with the existing machine. We eventually decided the best upgrade path would be to an MV/7800.

A local VAR provided a Nova 4 for the upgrade, and all engineering work was carried out by the local Data General office at Northenden. New hardware included the MV/7800 CPU, 4 MB of memory, a BMC disk, IACs, and dual density magnetic tape. The total cost of the conversion was about \$50,000.

Shipment of the CPU board set was originally expected early in January 87, but it didn't arrive until the end of February. Unconfirmed rumors were circulating that all MV/7800 board upgrades were on hold pending micro-code cleanup.

When the upgrade finally arrived, we had no trouble loading and patching rev 7.54, building a system, and creating the relevant user directories. Next we installed and genned rev 4.20 Business BASIC to a double precision system using type 6 terminals (later changed to type 8).

We had previously loaded and listed the programs to "prog-name LS" before dumping them to a tape from the S/130. We loaded them onto the MV using the X RDOS-load with the /c

switch to change the occurrence of CR to NL. A macro was written to enter and save the programs, the data, and the index files. After creating the required links, testing could begin.

System integrity was the first problem we encountered. We had globally disabled the IKEY function via "Hello" with the full knowledge that an interrupt could be forced to any job through the "OP CLI." Beware! There is no equivalent command under VS; a process can only be terminated. The performance of these programs under VS was an unknown quantity, so in order to maintain some level of control over the applications, the IKEY function was selectively enabled with a two-character control sequence.

The problems started with system printing. Because of the limitations of RDOS spooling, the nature of the business, and the low priority of writing a spooling suite, the printers were opened exclusively via printing programs using an STMA 18 system call. This call is not available under VS, but after searching, an alternative STMC 40 was found, although coding changes were needed to accommodate it. The "print-using" command with CRs and NLS in string literals is both powerful and flexible under RDOS, but will not perform well with VS because print output will terminate on the first occurrence of CR or NL.

The upshot was that any programs with user-defined print formats needed extensive recoding. This was not a particularly difficult procedure, but it was an irritating one.

The same problem was found in a different guise in text with embedded NLS, and was again cured by recoding. There were many cosmetic differences due to the buffering of data before output, but this was trivial in comparison, and cured easily with a delay 0 or an STM to flush the output buffer. System management from within Business BASIC was seriously affected by the irrelevance of PED's information compared to STAT's, the absence of the "OP CLI," and the unavailability of STMES, but there was usually a workaround. Unfortunately, this was always at the coding level. Other discrepancies were found in program performance, but this was due to functionality changes between revs of Business BASIC.

By this time, feeling more confident

about the system as a whole and being six weeks behind the initial schedule, it was decided to go ahead with the changeover.

On the big day, the S/130 system was closed down at 3:30 p.m., and after a bit of struggle to get the live data off cleanly, it was loaded onto the MV and checked by around 8:00 p.m. The FEs then took over, and by 3:30 a.m., the MV was hooked up and ready to go.

The rest of the early hours were spent frantically recoding and checking the key programs in preparation for the onslaught of hungry users who would be blissfully unaware of the potential hazards.

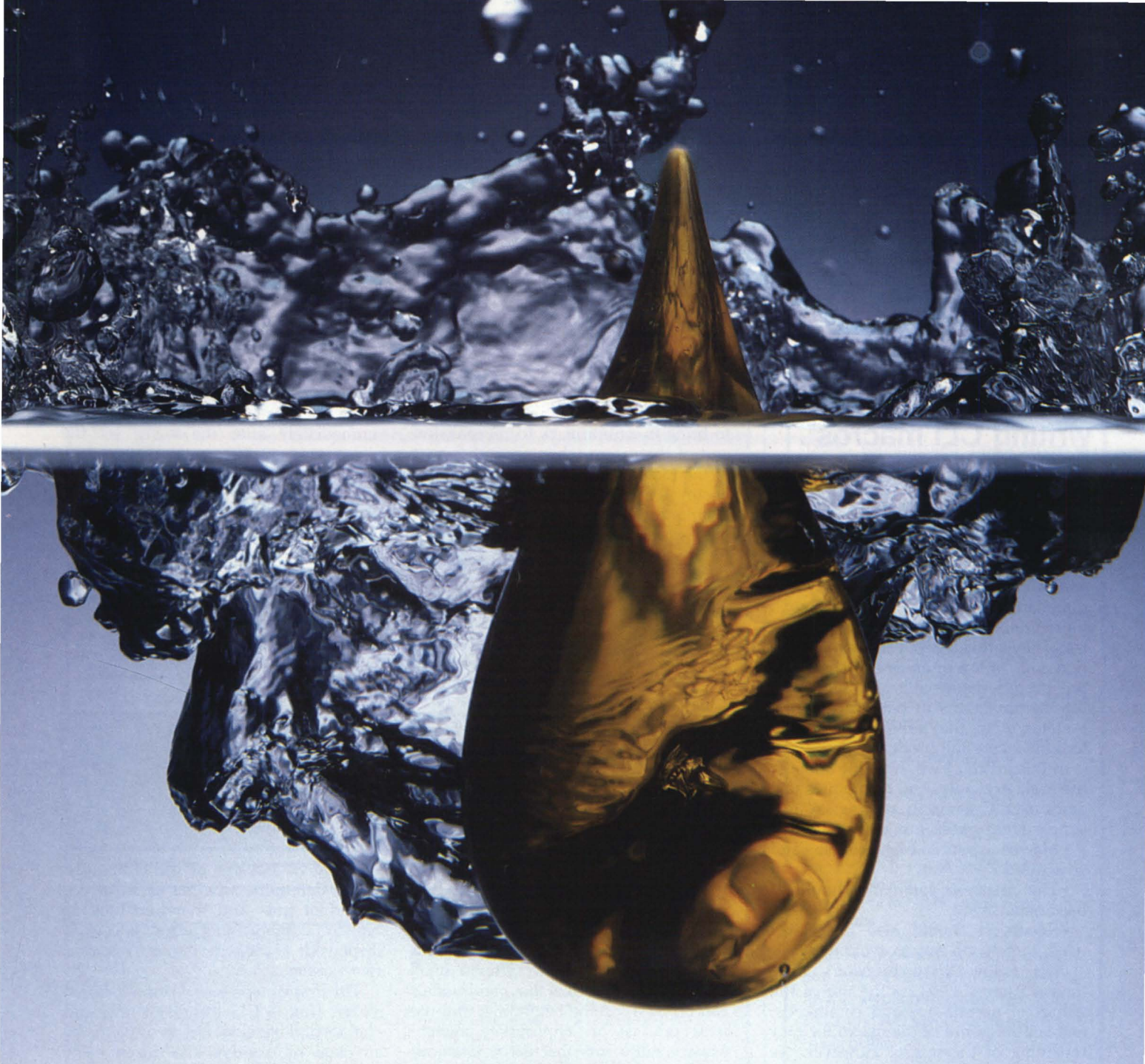
The bottom line was that the users logged off the Eclipse at 3:30 p.m. one day and logged on the MV/7800 at 8:00 a.m. the following morning with virtually no change to their environment. Currently, 23 users are on-line, and the response times are much better than before, even with rev 7.54 of AOS/VS.

There was one amusing incident: A particular month/year-end program (which had always spent a considerable amount of time massaging output before it began printing) caused all of us to groan when the printer burst into life within minutes after the program was invoked. We were sure that the program had blown up until we discovered that the processed report was correct and complete—in 5 minutes compared to the 30 or 40 minutes it had always taken under RDOS.

One final point on the decision to go for a board upgrade to an MV/7800 (even without an upgradable CPU): the obvious software upgrade to revision 8.00 of RDOS BBASIC was rejected because of the restricted 16-bit operating environment and the unattractive, continuing maintenance charges we would have incurred. An MV/2000 DC was not the choice either because of the limited user count, but it may well be the right machine for other users, even if they already have a CPU that could be upgraded to an MV/7800.

If you are contemplating doing something dynamic with your RDOS/AOS system, we would be pleased to bounce some ideas around with you. Δ

Tony Deakin and Phil Robson can be reached at Brierly-Almond Ltd., Lancashire Hill Mill, Manchester Rd., Stockport, SK4 1TW, Cheshire, U.K.



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MORE ON MACROS

There is an art to writing CLI macros

by Mark Kratzer
Special to Focus

Although CLI macros aren't considered a major part of the technical work done in most DG shops, they are much more important than many people realize. They provide the proper initialization and startup of on-line systems and the proper sequencing and high-level file manipulations in batch processing systems. Also, they serve as a powerful tool for increasing productivity.

In this article, I will examine some of the basic principles and techniques that guide our CLI macro writing. A few simple ideas guide our macro writing:

- Macros should be readable and structured.

- The COMMENT command should be used extensively.

- Recursion should also be widely used; there is no way to avoid it.

- We follow Brian Johnson's rules (*Focus*, August 1987) on the use of full names of pseudo-ops and commands, and self-reference of the macro for easy renaming of the macro. However, we don't follow his other conventions, such as using Roman numerals to distinguish recursive calls; we prefer to use descriptive names. We also prefer to use a /HELP switch rather than defaulting to a help screen if there are no arguments when a macro requires them.

- General subunits, such as for error handling, can be kept in separate macros; effectively, they are sub-routines. Using some macros as sub-routines of other macros adds structure to the collection of macros and makes them more readable and maintainable—which is our first topic.

Readability and maintainability

Excessive nesting of conditionals is

one of the worst problems that can beset a CLI macro. Nesting is necessary to bring execution back to the physical end of the macro when any other part of the macro doesn't execute. Excessive nesting often comes about because of testing for exceptional conditions. In most cases, it would be simpler to stop the macro at the point of the exception, rather than adding more levels of nesting. Figure 1 shows a macro that will stop execution of any calling CLI macro. If the calling CLI macro calls this macro with an error message, then

you in an unfamiliar environment. Here is a simple protection mechanism: immediately after the PUSH, set the prompt for the new environment to be a POP. No matter when the macro ends, a PROMPT will be executed automatically, and your previous environment will be restored, including the previous prompt. But you can only PUSH once when using this technique.

A second error-handling technique is to set the error class to "warning" and have the error written to a temporary file. The macro can then analyze the

Figure 1

```
COMMENT CLI macro to halt the execution of the invoking CLI macro. An
COMMENT error message passed will be written to the console. The error
COMMENT message is the arguments passed to this macro.
```

```
[!nequal,,%1%]
  write *ERROR*,,%1-%
[!end]
path/1=@null/2=error  !!!!
```

the message is written to the terminal.

The second problem we have encountered is caused by conditionals with too broad a scope: a conditional that spans many lines of CLI code is hard to read and follow. Often a small control structure for the conditionals can be set up at the beginning, and the user can set an appropriate switch. Most conditionals that occur later can simply test the switch and avoid nesting. Figure 2 shows a macro that handles mail. The nesting of conditionals is required in this macro, but the amount of code within each conditional has been minimized, making the macro easier to read and understand.

Improved error handling

Sometimes the environment in which the CLI operates is changed within macros. Some examples include altering the searchlist or the working directory, or modifying the string variable. The standard mechanism used is to PUSH when starting a CLI macro and to POP when exiting. However, the macro may not get to that final POP, leaving

size and/or message of the temporary file to determine whether an error occurred or not—and therefore how to branch. If there is an error, it can be displayed if desired. Figure 3 shows two versions.

The first version was written to be invoked from a CLI command line, and the second version was written to be invoked by another CLI macro. The second version of the macro sets var0 to 0 if the process was unblocked and var0 to 1 if there was an error. The calling macro can then examine var0 and handle a possible error as needed; the temporary file is still available for details about the error. Note that the second macro can't use the PUSH and PROMPT POP used in the first macro because var0 is part of the environment, and on popping, the old value of var0 is restored.

String handling

String-handling facilities are commonly needed in CLI macros that construct and manipulate filenames and pathnames. There are pseudo-macro

Figure 2

```

COMMENT This CLI macro reads and writes mail using the default filename MAILBOX.
var0 1;          COMMENT 1. Initialize the switch to user requests help.
COMMENT Start case selection.
[!equal, %1%]
  [!equal, %0/CREATE%, /CREATE]
    var0 2;      COMMENT 2. Create a mailbox for user.
  [!else]
    var0 1;      COMMENT 1. Initialize the switch to user requests help.
  [!end]
[!else]
  [!equal, %1%, ?]
    [!equal, %2%]
      var0 3;      COMMENT 3. User wants to read his/her mail.
    [!else]
      var0 4;      COMMENT 4. User wants to read someone else's mail.
    [!end]
  [!else]
    [!equal, %0/MESSAGE%]
      var0 5;      COMMENT 5. User wants to mail via a file.
    [!else]
      var0 6;      COMMENT 6. User wants to mail via console.
    [!end]
  [!end]
[!end]

COMMENT Start of Case Statement.
[!equal, [!var0], 1]; COMMENT 1. Write help screen.
  comment details omitted.
[!end]
[!equal, [!var0], 2]; COMMENT 2. Create user mailbox.
  comment details omitted.
[!end]
[!equal, [!var0], 3]; COMMENT 3. User reading his/her mail.
  comment details omitted.
[!end]
[!equal, [!var0], 4]; COMMENT 4. User reading someone else's mail.
  comment details omitted.
[!end]
[!equal, [!var0], 5]; COMMENT 5. Mail via a file.
  comment details omitted.
[!end]
[!equal, [!var0], 6]; COMMENT 6. Mail via console.
  comment details omitted.
[!end]

```

Figure 3

```

COMMENT This macro unblocks a given process and returns a message to the user
COMMENT reporting success or failure. Argument 1 is the process to unblock.

push;          comment Need to use string.
prompt pop;    comment Set to restore prev. env.
string temp_file; comment Name of temporary file.
delete/1=ignore/2=ignore [!string]; comment Make sure it does not exist
create [!string]; comment Create empty temporary file
unblock/1=[!string]/1=warning/2=warning %1%; comment Do the unblock.
[!equal, 0, [!size [!string]]]; comment Test for an error.
  write Process %1% unblocked
[!else]
  write Unblock of %1% failed. The problem is:
  type [!string]
[!end]
delete/1=ignore/2=ignore/1=@null [!string]; comment Get rid of temporary file.

An alternative is:

string temp_file; comment Name of temporary file.
delete/1=ignore/2=ignore [!string]; comment Make sure it does not exist
create [!string]; comment Create empty temporary file
unblock/1=[!string]/1=warning/2=warning %1%; comment Do the unblock.

var0 0;          comment Default: no error.
var0 [!equal, [!size [!string]], 0]1[!end]; comment Error detected.

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Circle 3 on reader service card.

FOCUS ON: MACROS

Figure 4

```
COMMENT CLI macro to create a unique string based on time and pid number.
[!nequal,%0/RECURSIVE%,/RECURSIVE];          comment First pass.
%0%/RECURSIVE [!explode [!time] [!pid]];      comment Recursive call.
[!ise];                                        comment Second call.
STRING %1%2%_%4%5%_%7%8%_%9%10%11%;       comment Create unique string.
[!end]
```

Figure 5

```
comment Macro to write the ASCII symbol for a bell as many times as requested.
comment The number of times the bell is to be rung is the only argument.

var=0 %1%;                                     comment Set loop counter.
[!nequal,0,[!var0]];                          comment Test for end condition.
write [!ec 207 227];                          comment Ring bell once and go up 1 line
%0% [!sub,[!var0],1];                         comment Decrement counter on recursion
[!end]
```

prefixes and suffixes, but you have to be creative to define concatenations, substrings, or other string variables. Concatenation is shown in the following macro:

```
COMMENT Concatenate the two arguments
COMMENT passed, return them in the string var.
STRING %1%%2%
```

Substrings can be created by using the [!EXPLODE] pseudo-macro. EXPLODE takes a string as an argument and returns it after inserting spaces between every two characters of the string. By using EXPLODE as an argument to a macro, a substring consisting of any part of the string can be built. It is easiest to add a one-step recursive CLI macro to this. The macro in Figure 4 creates a unique string that can be used as a substring of a filename.

To use the output from this as a substring, concatenation is used. For example, this macro can generate a substring for a part of a filename to make the filename unique.

Another common string-handling problem is the need for more than one string within one environment. Extra strings can be implemented by use of temporary files. The technique is to write the string into a temporary file. When the string must be used, it is retrieved by using square brackets. For example:

```
WRITE/L==?EXTRA_STRING.1 Text started at
[!time].
```

stores the string in a temporary file. To retrieve the string when needed:

```
WRITE [?EXTRA_STRING.1]
```

Note that a WRITE/L stores a newline after the string in the temporary file. This way, you have as many strings as

you wish, but you must keep track of the temporary files for cleanup.

Loops and list processing

There is no built-in CLI structure or commands for loops. However, a mechanism can be built using recursion and a variable as a loop counter. Figure 5 is an example.

Figure 6 shows a generic DO loop macro. This macro will loop executing any CLI command or macro as many times as the user specifies. It can be used to run the same job at roughly similar time intervals.

There are times when it is necessary to process a variable list of arguments via the CLI in a macro. The technique is to use recursion without a loop counter and to bump off the first argument in each recursive call. The example below contains no specific command to be executed on each element of the list; a command would go immediately after the comment in the macro.

```
[!nequal,,%1%]
comment Process %1% here, then recurse on
comment remainder of list.
%0% %2-%
[!end]
```

Disclaimer

We have used all of the macros in this article and are confident about them, but of course, we can't guarantee a successful application in any other system. Δ

Mark Kratzer is a senior systems analyst specializing in systems design and development at Standard and Poor's Trading Systems, a product group of McGraw-Hill, Inc. in New York City. He can be reached at 11 Broadway, third floor, New York City, NY 10004.

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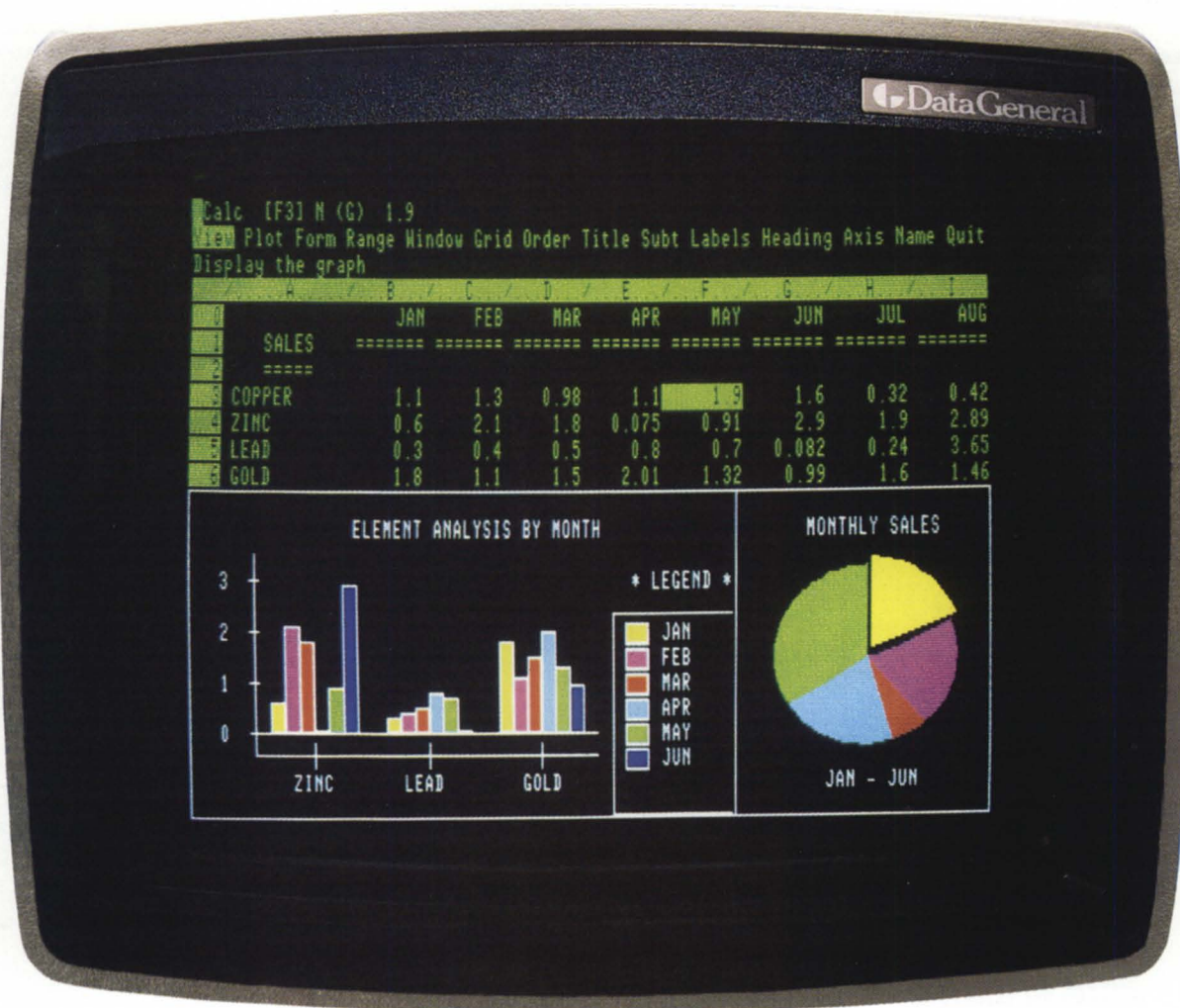
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Figure 6

```

-----
comment
comment 0. If the user requests help then write some information.

[!equal,%0/HELP%,/HELP]

write
write CLI macro to repeat other CLI macros or CLI commands.
write
write Calling sequence:
write ...DO,,NUMBER_OF_REPITIONS,,MACRO_NAME,,MACRO_ARG1,,MACRO_ARG2 ...
write
write Switches available--use these on the DO:
write .../CYC=X,,Cycle time for each iteration. The default is x = 2 secs.
write .../ERASE,,Clear the screen on each iteration. Default is scroll.
write
write Variables used internally by this macro:
write ...var7--temporary variable.
write ...var8--number of iterations remaining.
write ...var9--number of iterations originally requested.
write

[!else]

comment
comment 1. See if we are done looping. If not decrement the counter.

var8 %1%% ; comment number of iterations remaining.

[!eq,0,[!var8]]
write
write %0%\%s looping finished on [!date] at [!time].
write
write var7 999 ; comment Set flag to end macro.
[!else]
var7 0
var8 [!usub,[!var8],1] ; comment Decrement counter by one.
[!end]

[!neq,1,999,[!var7]] ; comment If not done, then continue

comment
comment 2. Handle initial call by setting var9 equal to % of iterations.

[!equal,,%1/NOT_INIT%]
var9 %1%%
[!end]

comment
comment 3. Handle clearing the screen if the user wants it to be cleared.

[!equal,%0/erase%,/erase]
write [!esc 214]

[!end]

comment
comment 4. Write d o l o o p at the terminal so user knows looping is
comment working. Var7 is used to compute the number of this iteration.

var7 [!usub,[!var9],[!var8]]

write
write [!esc 224 234]d,o,,l,o,o,p,[!asc 235],,,,,,iteration number, &
[!var7].of,[!var9],,,,,,[!asc 225 226],[!date],[!time]. &
[!asc 236 202]
write [!esc 202] %2-%
write

comment
comment 5. Do what the user wants.

%2-%

comment
comment 6. Pause before starting next cycle.

[!neq,%0/cyc=%,]
pause %0/cyc=%
[!else]
pause 2
[!end]

comment
comment 7. Recursively cycle, with flag indicating NOT the initial call.

%0% [!var8]/NOT_INIT %2-%

[!end] ; comment Closes conditional of var7 equaling 999 for being done.

[!end] ; comment Closes conditional about typing help screen or not.
  
```


TRIALS AND TRIBULATIONS

Real-time system differences between VMS and AOS/VS

by Orval Hart
Special to Focus

Data General computers have always been ideal vehicles for real-time control systems. Back in the days of RDOS/RTOS and Fortran IV/V, it was relatively easy to implement real-time systems. Although AOS was introduced to appeal to a broader market, it offered support for real-time applications with RDOS-like multitasking implemented within AOS multiprocessing. However, the new overhead introduced by AOS made it less suitable for real-time applications (especially for the extremely fast cases that RDOS could handle). If you could pay the overhead penalty, AOS could run many processes, and you might still be able to get by.

With the introduction of AOS/VS, we got another bonus—greater than 32 K-word programs. However, we paid the price of additional overhead to keep track of the extra memory and additional processes—but we also got faster machines.

Is AOS/VS suited to real-time control applications? I will approach the answer in an indirect fashion, by comparing the results of the conversion of a somewhat generic real-time control system from DEC's VAX/VMS to DG's AOS/VS. (This is not to say that VMS is any more ideally suited for real-time applications.) Almost all of the code was written in Fortran 77 (or at least VMS Fortran 77 would compile it, even with many of its leftover Fortran IV features and extensions).

The control system we converted was FLIC (Fortran Language for Industrial Control), developed by Quadrex. This is an extremely extensive control software package that performs:

- data acquisition
- alarming
- historical logging
- data archiving
- display generation and maintenance
- trending (real-time and playback)
- sequential control (PID, feed back,

feed forward, etc.)

- batch control (decision table based with expression blocks)
- report generation (both real-time and playback).

The main features required to support FLIC are:

- shared labeled common
- shared libraries
- multitasking (really multiprocessing) and detached processes
- shared peripherals
- proprietary disk access, i.e., not using the operating system's standard mode of disk access.

To create a truly generic real-time control system, all of these features are desirable, if not necessary. Granted, you can generate real-time control systems without using all of the above features (many people have done it), but it will probably have a very narrow application. I will address the above conversion problems in the order presented.

Shared labeled common

Shared labeled common is used by many programmers to make commonly used data available to multiple programs/processes. In many cases, there must be established procedures for determining whether data is valid or how it is to be updated (possible lock mechanisms during update).

For implementing shared common (or any of these features), it's best if it can be made transparent to the programmer, except possibly at the link level. Under VMS, this is pretty much the case. The code will not look any different than it would if the common was not being shared. However, under VMS, you can install the shared common with VMS, and from then on, the program loader has no problem knowing where to find the shared commons.

Under AOS/VS, you not only have to declare the common as shared in the link line, but also have to make changes in your code in the form of shared opens and reads (?SOPEN and ?SPAGE). For some reason, the shared commons are treated as files, meaning that you have to create and initialize the files; then every program that needs them must read them.

The size of these files must be a multiple of 2,048 bytes, which means the commons must have dummy space declared in them to come out the right size. This makes maintenance harder because when you change the common, you probably have to change the size of the dummy portion. To perform something akin to installing the commons, a process must read them in, wire them (?WIRE), and not go away.

Shared libraries

FLIC makes use of a fair-sized library to maintain control of its proprietary data base and to perform disk access. Most programs use it, so it is a natural candidate for a shared library (this is how it is implemented under VMS). To use shared libraries under VMS in a generic sense, you really go through some contortions. But at least it can be done.

Under AOS/VS, it looks infinitely easier, but there are some hidden pitfalls. The first is that if you have local common in your main program that should match up with local common in the shared library, it isn't going to work. (It links correctly under VMS.) The local common is just that—local to the shared library and local to your program. It works only if the local common reference is passed in the subroutine/function call. However, I had more than a hundred programs to convert, and I didn't want to do any more work than was absolutely necessary.

The second pitfall is that shared libraries will only share common after you have done additional work. The program must first call a subroutine added to the shared library that performs its own SOPEN and SPAGE (in addition to the one in the main program) for all the affected shared commons. This procedure forces everybody's reference to use the same shared common.

This whole approach was unsatisfactory to us. The only saving grace was that the subroutines in this library managed their own race conditions when accessing the shared commons. We just linked the library with every program and ate the cost of more memory.

Multitasking

Under FLIC, there are close to 30 processes that are initiated (known as "established") and left in a dormant state. These are normally real-time processes requiring immediate execution when needed. Nonestablished processes are PROCED up in their normal manner. Under VMS, FLIC PROCs up all processes as dormant. Then, if they are not of the established class, they are immediately awakened (after an appropriate delay to let them actually arrive in memory). As real-time processes are needed, all the task activation subroutine must do is wake them up. In either case, the program itself is never aware of what is going on, and looks just like any other code.

Under AOS/VS, we already know that we first have to do all those SOPENS and SPAGES to get our shared common set up. What then? Well, you have two choices: either you can perform a BLOCK (which works fine unless the process is resident), or you can perform a WTSIG (which works regardless of process type). We currently use the BLOCK technique, but may eventually go to the WTSIG technique.

Our display server is the only process that uses the WTSIG because it is not activated by the task activation subroutine, and it is resident (due to a custom I/O driver). The BLOCK statement is protected by a semaphore that is set to execute the BLOCK statement the first time through. As the process is required, the task activation subroutine unblocks it. When the process completes, it must call an exit permission subroutine (with the BLOCK semaphore under AOS/VS) to determine if someone else has requested the process to operate again.

This was pretty neat under VMS. If a process hadn't been requested again, a system sleep call was made for an established process or a CALL EXIT for a nonestablished process. However, if it had been requested again, a system wake-up call was made for itself and then allowed to fall through to the END statement. VMS must then say, "Hey, this guy is supposed to be awake," and starts it over.

Under AOS/VS, the BLOCK semaphore is set depending on the request state. The subroutine exits, and a hard-coded GOTO takes the program back to the semaphore-guarded BLOCK check. Unfortunately, this leaves a window, which we have yet to address, for a race condition to develop. For example, what if someone activates the process

again after the exit subroutine decides to stop operating but before the process is marked inactive?

Another feature that FLIC depends on is being able to PROC up another process, finish whatever it is doing, and go away. Well, we all know about father-son relationships under AOS/VS: you can't have one without the other. FLIC maintains its own task block

status (through shared common, naturally), so whenever a nonestablished process calls the exit permission subroutine and has nothing else to do, it would normally just quit.

Under AOS/VS, the task monitor subroutine had to be changed to check for outstanding sons. If outstanding sons were detected, the father was forced to wait for 10 seconds. If after 10

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Conference Preview



October 19-22, 1987

Tropicana Hotel, Las Vegas

With the curtain going up on this year's NADGUG conference, there's not much time left to register for what may be the best-attended meeting of DG users ever. Early registrations for Conference 87 are more than 30 percent ahead of last year's figures, and conference organizers now expect as many as 1,000 DG users to attend.

Conference 87 activities will include technical presentations, management sessions, educational seminars, roundtables, exhibits, end-user sessions, social events, and—perhaps most importantly—informal discussions with members of the DG community. The organizers have made a special effort to reduce scheduling conflicts by tracking presentations into divisions for end-users, technical users, and management.

With so much going on, seasoned attendees plan ahead to make sure they get the most from the conference. Here are some of the scheduled highlights:

Data General Educational Services Seminars

Pre-conference activities kick off on Monday, October 19, with a selection of 14 seminars specially developed for NADGUG members by DG's Educational Services. Call 617/366-2900 for last minute information and registrations.

CEO Workshop

Also on Monday, OASIS, the Office Automation Special Interest Subcommittee, will sponsor an all-day workshop covering topics like disaster recovery, training techniques, networking to other products, and voice mail. Separate registration and fees are required.

Exhibit Area

Conference 87 will host the largest exhibit area ever—nearly 50 companies will demonstrate their products and services for the Data General community. In addition, NADGUG will sponsor complimentary coffee breaks inside the exhibit area, as well as a "conference cafe" featuring coffee, soft drinks, snacks, and sandwiches at discount prices.

The following list includes those companies that were scheduled to exhibit by the end of August, along with the products and services they will be displaying. Plan to spend a few hours visiting the vendor exhibits—and don't forget to come to the NADGUG/Focus booth to get a preview of next year's conference!

Exhibitors

3CI
InFoCen—fourth-generation relational data base management system

Access Technology
20/20—integrated spreadsheet

Adida Informatique
RUMS—resource utilization monitoring system for performance and accounting issues

CP International
Status—full text storage and retrieval software

Cognos
PowerHouse—fourth-generation development language

ComDesign
Multiplexors, X.25 PADs, and data PBXs

Computer Associates
Advanced business software for Eclipse MV systems

Computer Engineering Associates
911 emergency call identification and logging system; auto and truck parts inventory package; Petro-Manager—delivery, accounting and inventory control system

Computer Technology
Depot repair service

Concept Automation
MATE—multiple asynchronous terminal emulator; Pipeline—asynchronous mail delivery system; CAI menu

Cybertek Software
CQCS—fourth-generation language

DMS Systems
Genisys I—data base management system; disk backup and recovery system; resource accounting system

Data Assurance
Disaster recovery services

Data Base Publications
Data Base Monthly magazine; Data Store semiannual directory

Data General
A representative sample of DG's hardware, software, and services

Dataproducts
Printer products for Data General systems

Dataram
Dataram*disk—semiconductor-based disk emulator

Datasafe
Disaster recovery services

Delphi Data
Expanded Desktop, Bundy boxes, and disk systems for the Eclipse MV family

Eagle Software
VS Toolbox—performance software for AOS/VS

Fast Track Systems
Disaster recovery services, hot sites, and mobile recovery centers

Grumman
Independent hardware service for Data General and compatible systems

Henco Software
INFO—relational data management system and 4GL

Integrated Computer Systems
TRIM—accounting and management software, including general ledger, accounts payable, accounts receivable, inventory management, and sales processing

Intercon Associates
Office/Publisher—electronic office publishing system

Interface Electronics
SLIM—16-line intelligent multiplexor

Lions Gate Software
Accounting, distribution, retail, and point-of-sale application software

Maxon Computer Systems
MICOM general ledger, accounts payable, and accounts receivable software

MegaTape
High-capacity cartridge tape drives for backing up Winchester disks

NADGUG/Focus
Information about NADGUG membership, Focus Magazine, RIGs and SIGs, and exhibitors; news about Conference 87 and 88

Oracle
Relational data base management system

ORBI
IMPCON—manufacturing-based software package (MRPII)

Peregrine Data Systems
Pereline DG terminal emulator and file transfer software for PCs

Perfect Terminal
Terminals providing emulation of DG models D461, 411, and 215

Precision Methods
Sale, depot repair, and on-site maintenance for removable disk packs/cartridges

Rational Data Systems
PC/VS and PCT—Data General-to-PC interconnect software

SAS Institute
Software for data management, applications development, planning and forecasting, project management, quality control, and statistical analysis

SCIP

RAM cache disks and SCSI bus controllers for disk, tape, and optical storage

Security Computer Sales

Used Data General systems and peripherals

Service and Training

Disk drives and tape controllers

Sigma Data Services

Datalib—software to manage cataloguing, retrieval, acquisitions, accounting, circulation, and serials for special libraries

SIR Division of ISI

SIR—a specialized DBMS for the data analysis and scientific community

Strobe Data

Falcon co-processor board and software for running RDOS on a Dasher/286

Sysgen Recovery Services

Disaster recovery services and planning; hot sites

:Sysmgr

Software for AOS and AOS/VS performance analysis, capacity planning, backup, and recovery

Threshold

C/Script II Plus DBAM and C/Script II Plus ISAM application development systems

U.S. Counseling Services

CHIP—computer hardware insurance program, a cost management system for maintenance of electronic equipment

WordPerfect

WordPerfect word processor, MathPlan spreadsheet, and Library office automation software

Zetaco Div. of Carlisle Corp.

DG-compatible data storage subsystems and peripheral controllers

Preliminary Agenda

Sunday, October 18**9 a.m. - 5 p.m.**

NADGUG Executive Board Meeting (open to officers, standing committee, and RIG/SIG chairpersons)

4 - 8 p.m.

Registration for Educational Services Seminars and CEO Workshop

Monday, October 19**7:45 - 8:45 a.m.**

Registration for Educational Services Seminars and CEO Workshop

9 a.m. - Noon

Educational Services Morning Seminars OASIS-sponsored CEO Workshop

Noon - 1 p.m.

Lunch Break

1 - 6:30 p.m.

Conference Registration Desk Open

1 - 4 p.m.

Educational Services Afternoon Seminars OASIS-sponsored CEO Workshop (continued from morning)

5:30 - 6:30 p.m.

New Member/Conference Orientation

6:30 - 8 p.m.

Welcome Reception (ticket required)

Tuesday, October 20**7:30 - 9 a.m.**

Speakers' Orientation Breakfast (for those giving Tuesday presentations)

8 a.m. - 6 p.m.

Conference Registration Desk Open Exhibits and Exhibit Area Cafe Open Audiotape Sales Open

8:30 a.m. - 5 p.m.

Guest hospitality Suite Open (special guest orientation at 9 a.m.)

9 - 10 a.m.

Special General Session The Future Belongs to the Omnicompetent Christopher Hegarty

10 - 10:15 a.m.

Short Break

10:15 - 11 a.m.

End-User: Electronic Publishing Mark O'Connell, Penta Systems Technical: ICOBOL 1.3 and 1.4 Gerry Manning, Gerry Manning and Assoc. Technical: Creating CEO integrated Applications Paul Rogers, Cybertek Software Management: Employee Motivation Glen Davidson, CMS/Data Corp.

11 - 11:15 a.m.

Short Break

11:15 - Noon

End-User: CPD Overview Howard Berg, Data General Corp. Technical: PC Network Toolkit Doug Kaye, Rational Data Systems Technical: QHELP in AOS/VS John A. Grant, Geological Survey of Canada Management: Shifting Role of MIS/DP Management Robert Ebers, Impletac Mixed: Software Development Alternatives Narendra Patni, Data Conversion

Noon - 1:30 p.m.

Lunch Break for Attendees Lunch Meeting for RIG/SIG Chairpersons

1:30 - 2:15 p.m.

End-User: Spreadsheets as a Productivity Tool Jay Yesselman, Access Technology End-User: Tri-Station Expert System Hideaki Okamoto, Nikon Technical: Implementation of a Code Profiler Diane Denny, SAS Institute Technical: Communications Roundtable (Chair: Kirk Honold, Sage Foods) Mixed: OIS Workshop Anna Mae Malozzi and Mike Curran, Data General

1:30 - 6:30 p.m.

Special Series for Unix Users:
1:30 - 2:30 p.m. DG/UX and
Networking

Andrea Brickman, Data General
2:45 - 3:45 p.m. C Portability
Mark Harris, Data General
4 - 5 p.m. Interprocess

Communications

Eve Harris, Data General
5 - 6:30 p.m. DG/UX SIG

Organizational Meeting

2:15 - 2:30 p.m.

Short Break

2:30 - 3:15 p.m.

End-User: Info Processing in the OA
Environment

Sue Dintelman, DMS Systems

Technical: Intelligent Processing with
CLI

John Huddleston, USDA Soil
Conservation

Technical: Communications Roundtable
(continued)

Management: Strategic IS Planning

Don Bush, Arthur Young and Co.

Mixed: Blackjack on AOS/VS

Kim Medlin, Data General

3:15 - 3:45 p.m.

Complimentary Coffee Break

3:45 - 4:30 p.m.

End-User: Integration of INFO and CEO
Richard Spinello, Henco

Technical: Store-and-Forward Message
Switch

Vasant Acharya, Global Weather
Dynamics

Technical: Large User Counts: COBOL
and PL/I

Karen Finch, Data General

Management: Network for Clinical
Data

Paolo de Caro, GI Settanta

Mixed: AOS/VS New File Description

Dennis Duprey and Tim Reiter, Data
General

4:30 - 5:30 p.m.

SIG Meetings

5:30 - 6:30 p.m.

SIG Meetings

Wednesday, October 21

7:30 - 9 a.m.

Speakers Orientation Breakfast (for
those giving Wednesday presentations)

8 a.m. - 6 p.m.

Conference Registration Desk Open
Exhibits and Exhibit Area Cafe Open
Audiotape Sales Open
Guest Hospitality Open

9 - 10 a.m.

General Session

NADGUG Annual Business Meeting
Chair: Calvin Durden, NADGUG

President

(election of officers and other business;
drawing of special prizes)

10 - 10:30 a.m.

Complimentary Coffee Break

10:30 - 11:30 a.m.

General Session

Address to the Users Group

Edson D. de Castro, Data General
President

11:30 a.m. - 1 p.m.

Lunch Break

1 - 1:45 p.m.

End-User: Company Approach to
Communications

Kirk Honold, Sage Foods

Technical: AOS and AOS/VS

Roundtable

(Chair: David Novy, 3M)

Technical: RDOS Roundtable

(Chair: Dennis Doyle, Bankmatic)

Management: The CEO Experience

Rosalind Miele, Westinghouse

Mixed: DG as an Educational Tool

Dave Kephart, Illinois State
University

1:45 - 2:00 p.m.

Short Break

2 - 2:45 p.m.

End-User: CEO Using 9600 bps Dial-Up
Modems

L.E. Staples, Data Race Inc.

Technical: AOS and AOS/VS

Roundtable (continued)

Technical: RDOS Roundtable

(continued)

Management: OA for the Executive

Debbie Enfinger, Boeing

Mixed: Using Data General ADE

Dean Gonzalez, USAF

2:45 - 3:15 p.m.

Complimentary Coffee Break

3:15 - 4 p.m.

End-User: Desktop vs. Electronic Office
Publishing

Soto Flouris, Intercon Associates

Technical: Disaster Recovery

Roundtable

(Chair: Joseph Cannata, Data General)

Technical: Tools for Data Center

Management

Ron Guzek, Data General

Management: DG as a Corporate

Computer Solution

C.J. Grobler, Middelburg Steel

Mixed: Performing Magic with Special

Systems

Jerry Schiowitz, Data General

7 - 11 p.m.

Cocktail Reception and Banquet
Jack Weyland, Guest Speaker: Physics,
Hollywood Style

Thursday, October 22

7:30 - 9 a.m.

Speakers Orientation Breakfast (for
those giving Thursday
presentations)

8 - 10 a.m.

Conference Registration Desk Open

8 a.m. - 2 p.m.

Exhibits and Exhibit Area Cafe Open
Audiotape Sales Open

9 - 9:45 a.m.

End-User: CEO Roundtable

(Chair: Charlene Kirian, OCLC)

Technical: System Managers' Panel

(Chair: Brian Johnson, BJ, Inc.)

Technical: Networking MVs with
VAXs

Jim Corrigan, Ki Research

Management: System Development Life
Cycle

Eric Greenwood, Cognos

Mixed: B32 - BBASIC

George Henne, Maxon Computer
Systems

9:45 - 10:15 a.m.

Complimentary Coffee Break

10:15 - 11:00 a.m.

End-User: CEO Roundtable (continued)

Technical: System Managers' Panel
(continued)

Technical: Automated Data Base
Design Tools

Pamela Morris, 3CI

Management: Centralized County
Government System

Captain James Sanderson, Sarpy County

Mixed: Computer Security

Tom Gutnick, Data General

11 - 11:15 a.m.

Short Break

11:15 - Noon

End-User: MV/4000 Performance
Through Queuing

Jeff Buckwater, University of San
Francisco

Technical: Database Panel

(Chair: Rene Dominguez, Deutsche
Credit)

Technical: Software Engineering with
Pascal

Ivan Liss, Radford University

Management: Lease Negotiations

Pete Studl, Illinois Capital Group

Mixed: CASE: Vehicle Registration
System

Frank Perry, Rhode Island Department
of Transportation

seconds the father still has any outstanding sons, the task monitor says, "Enough of this," puts out a message on its shared console, and exits anyway. This is only a problem when other people are on the computer doing compiles or links.

Another fallout of this is FLIC activation. Under VMS, after FLIC is started, the operator can sign off and go away.

Under AOS/VS, this is not possible, leaving a possible security problem.

Shared peripherals

A lot of process control systems involve numerous alarm printers. What would be the best way to print on them? In the most transparent way: OPEN and WRITE. Under VMS, this is accomplished by invoking a rather ob-

scure and undocumented feature, port sharing.

Various ports are declared shared at start-up time, not only for printers, but for any other peripherals requiring the shared attribute (i.e., color CRTs and RS-232-driven function push-buttons).

Under AOS/VS, you can declare your own console as shared (courtesy of a CEO requirement), but no other ports. The @CONSOLE sharing under AOS/VS assumes that only one process at a time will ever write to the port. This requirement almost forces one to use a server type relationship. We will probably go to a server relationship eventually, but we are currently using a shared common variable to determine if the port is busy. When it isn't, we perform an OPEN, WRITE, and CLOSE, which AOS/VS will let you get away with (i.e., if the port is closed, anyone can open it and use it). The OPEN and CLOSE are only needed for those processes that are established. Transient processes just need the WRITE (if using a preconnected channel) because they are going away.

Disk access

Nobody likes to use an operating system's normal disk access mechanism for real-time applications because it is considered too slow. VMS and AOS/VS are no exceptions. For the purpose of portability, FLIC performs all of its own caching, unpacking, and packing, so it has no need for the operating system's niceties.

All disk files in FLIC are contiguous, all have known locations on the disk, all access is on a block basis, and all disk access is performed through one subroutine. Under VMS, instead of opening the requested file, a sys*SIGN for the whole disk is performed. Then data offsets are computed using the known offsets of the file within the disk, and a physical block disk access call is made using the VMS QIO call. The sys*SIGN gives the caller access to the disk without the overhead of an OPEN call.

As an additional feature, callers may declare whether or not to wait for the data to arrive before returning, or continue to check for the data arrival event flag. Under AOS/VS, there is no such thing as an event flag, so all disk I/O completes prior to return.

I didn't think I could duplicate the VMS method of disk access. Therefore, I opened individually any of the files required and performed logical block

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I/O, assuming that it would map directly into user space. I have since been told that physical block I/O will allow the program to work exactly like the VMS version (except for the `sys*SIGN` and event flags) if I can determine the physical disk address of a file.

However, all those time-consuming `OPENS` and `CLOSES` are still a problem

(disk access race conditions are taken care of by FLIC). I have been told by my local DG guru that if the file is already open somewhere in the system, then the file `OPEN/CLOSE` overhead is significantly reduced. So, guess what? The process that keeps my shared common installed also opens the five major files used by FLIC and leaves them

open. I have no way of proving that this really helps; however, system response seems reasonable.

Device drivers

One area that has worked out very well under AOS/VS is the Aydin display generator interface. This is a custom I/O DMA interface that we took off of an Eclipse C/330 and plugged into the MV/4000 DC.

On the VAX computer, a DR11W interface board is normally used with `qio` calls for communication. I am not that familiar with this combination, but evidently the `qio` interface doesn't report interrupts to the user so `qio` calls all use time-out values essentially saying, "Return to me after *n* amount of time." This has not always brought the best results on the VAX, but it is far more painful to develop your own I/O driver under VMS.

On the other hand, this has been quite simple under AOS/VS. Using the device enable (`?DEBL`) and interrupt definition (`?IDF`), a driver is implemented painlessly. When the requested action is complete, control is returned to the caller.

Because I couldn't treat this as a shared device *ala* VMS, I decided to give the customer/server implementation a try. At first, this worked very well. A shared common was used to contain device access control parameters and the data to be transmitted or received. The server would wait for a signal (`?WTSIG`) and perform the requested action when signaled. It worked pretty smoothly, but I noticed after a while that I ran out of `PIDs`.

After looking at the documentation, I discovered that when the customer is done, the customer and server must disconnect or `PIDs` will be left hanging. Given no hint by the documentation on whose `PID` to use, and seeing that the customer's `PID` was the one not getting reused, I assumed that customer and server both performed a disconnect using the customer's `PID`. Wrong! After a small test case, I discovered that the customer must use the server's `PID` when disconnecting.

Then I ran into another problem. Rev 6 supplementary documentation claims that, if a customer disconnects or goes away, the server `WTSIG` will fall through with `AC1=-1`. Wrong! Nothing happens. Rev 7 documentation goes back to not mentioning anything. Exasperation was setting in.

I decided to use one of the shared



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common variables to tell the server that the customer is about to retire, and manually signaled it prior to performing the customer ?DCON. Finally, my PIDS were released from bondage!

Conclusion

In practice, the MV/4000 DC is approximately equal to a VAX-750. My initial expectations were that the DC would outperform the 750. The optimizing compiler was considered good, and AOS/VS was supposed to perform real-time functions better.

We've had problems, though. Fortran 77 has had problems in the optimizer for so long I have been afraid to use it. FLIC consists of more than 100 programs and two libraries containing more than 300 subroutines total. Trying to track down optimizer problems in this environment wouldn't be fun. Also, I have run across so many programs/subroutines that take advantage of the fact that variables are initialized to zero or are expected to be the same value as stored the last time that I have been reluctant to perform global compiles without SAVEVARS.

However, we found that the DC is a valid choice for use in a real-time control application if you use front-end processors for data acquisition and are connected by Ethernet. The DC contains a lot of integrated features that can almost be thought of as free, e.g., built-in Ethernet and serial ports. A small price is paid for this integration, however, in the performance of these integrated devices.

On the multifunction I/O controller (MIOC), a Micro Eclipse is used to control the disk, Ethernet, possibly a Micro Eclipse tape unit, and two RS-232 type interfaces. Not one of these devices is going to outperform a dedicated controller, which we have shown in the area of the Ethernet interface. The disadvantage is that, if we decide to "upgrade" to RT-32, we might be out of luck. DG has decided that the DC is not a normal machine, and has not implemented the DC disk driver as a part of RT-32.

While most of the features discussed aren't unique to real-time systems, they can enhance a real-time system's perfor-

mance. While these observations tend to make AOS/VS look less attractive as an operating system, I recognize many areas where it performs very well, e.g., multitasking, re-entrant Fortran, a reasonable disk file access mechanism, and a consistent mechanism for accessing system features.

The main difference between the two

operating systems is that VMS takes more responsibility for performing functions for the user. This gives the user a certain amount of versatility if the features are used appropriately. On the other hand, how would you like to try to convert some highly multitasked, multiprocessed environment to VMS?

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Orval Hart works for the Los Alamos National Laboratory and has been doing real-time control work for more than 20 years. He can be contacted at Los Alamos National Laboratory, Box 1663, MS-1957, Los Alamos, NM 87545; 505/667-9004.

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LOST WEEKEND



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detective
work, but
it led
nowhere**

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As you read this, there's still time to make your reservations for Conference 87 in Las Vegas. I can't think of any year in the past when there were more items of interest to system managers than there are this year. NADGUG's conferences provide the best chance for us and the DG guys responsible for software development to indulge in face-to-face information exchange on the shape, size, and content of new products and new revs of old products.

Not only that, if you don't attend, you'll miss the awarding of the First Annual Red Barn Memorial Trophies. The trophies will be presented to the groups within DG responsible for the most blatantly impressive product announcements and enhancements made during the previous year. Be there to watch history in the making.

CLIP HERE

Clip this section out before passing this copy of *Focus* to your boss. Say it was an octal/hex conversion table.

This year's Fourth Annual Sleaze Tour promises to be better than ever. Look for an announcement of the time/place on the old-style, non-electronic bulletin board at the conference. DG employees are welcome, but you may end up buying a round or two.

CLIP HERE**:OLD.BUSINESS**

The calls have been coming in hot and heavy since my column on statistical muxes that ran in the July issue. Many people wanted to find out the manufacturer and model number of the mux that was the subject of the column. One reader even called back to say that he had bought two replicas and they were working flawlessly.



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The encouraging news is that the majority of the calls have been from DG systems engineers and sales reps. I like that because it means multiple users will benefit from the knowledge.

I'm going to stick my neck out and volunteer to publish a list of multiplexors that work on AOS/[VS]. If you've got one that works with CEO or with WordPerfect (the ultimate mux-busters),

write and let me know. I'll publish the results in a future column.

When you write, please be sure to supply the following information:

1. Make and model number.
2. Does it pass through XON/XOFF and assume that the next character after an XOFF is an XON?
3. Does it support separately selectable flow control for inbound and out-

bound traffic at both the CPU end and the terminal end?

4. Does it work properly with terminals in slow-scroll mode?

5. Does it do any compression over and above start/stop bit stripping (e.g., repeated character or Huffman encoding)?

6. Does it support channel priorities so that printer channels don't adversely affect terminal channels on the same mux?

Note that you must be able to answer yes to at least item two or item three for a mux to be minimally usable with AOS/[VS]. Also, I'm not interested in hearing about muxes that don't work. I'd have to assume that perhaps they weren't set up correctly; most mux manuals are not exactly easy reading.

I'll make the first entry in the list:

1. Micom Model 824.
2. Standard.
3. Optional.
4. Yep.
5. Yep; repeated characters plus a proprietary scheme.
6. Yep.

:TOPIC 1:FULL CIRCLE

Last week I was perusing my copy of *Computer Systems News*, and I ran across the following item:

Fort Lee, N.J.—On-line Software International Inc. has unleashed the first in a series of software tools that translate code written in commercial-transaction-processing fourth-generation languages into the IBM version of COBOL. . . .

The product, which took about two years to develop, is currently available from On-Line at an introductory price of \$40,000 and eventually will cost \$60,000. . . .

Cross Code gives development houses and programmers a way of making applications programs written in a 4GL execute 10 times faster (emphasis mine), according to On-Line.

Pinch me. This must be a bad dream. I called *Computer Systems News* to ask if this was just a late entry for the April Fools' Day issue, but they said, "No, it's for real."

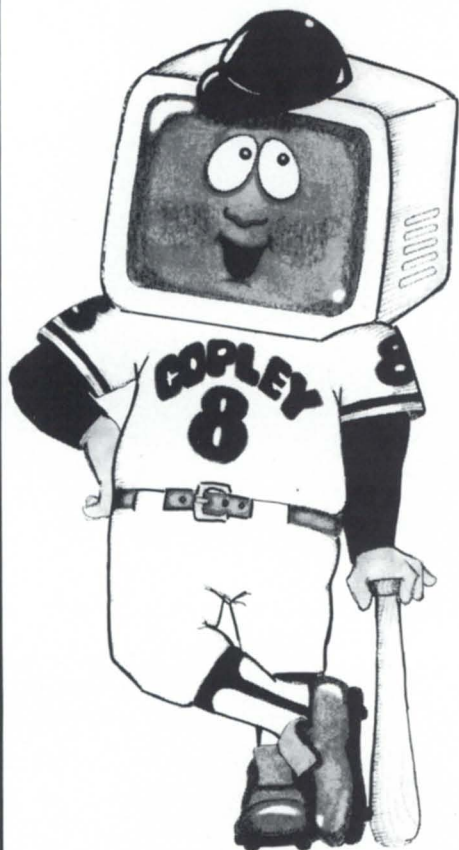
I'm planning to start work next week on a product that will take the COBOL output of this Cross Code thing and convert it to assembler for another 10-fold increase in speed. I'll make a fortune. Wanna invest? Watch your mail for a prospectus.

:TOPIC 2:HISLS

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My Summer Vacation" theme? Well, here's my version of "How I Spent Last Saturday."

A few weeks back, I was watching my performance monitor while I was moving some large files from disk A to disk B, and I noticed something peculiar in the blocks-per-access numbers. The source file had an element size of 16 blocks and so, therefore, did the destination file.

I had specified `MOVE/BUFFER=8192`, so I expected to see 16 blocks per access. And that's what I did see on the source disk unit, but the destination unit was scoring around 8.5 blocks per access.

Perhaps, I postulated, the problem was caused by AOS/VS flushing the modified destination bitmap block to disk each time it allocated a new element? Or maybe it was the modified directory block showing the new length of the destination file? Or maybe it was the freshly updated Random Index Block (RIB) containing the disk address of the newest element. After all, all three of these things are accessed one block at a time, and that would produce an access pattern on the destination drive of 16 blocks, 1 block, 16 blocks, . . . or an average blocks per access of $(16 + 1) \div 2$, or 8.5.

I made a note to investigate the problem the next time the system was available for some dedicated (and risky) research. Then I called one of the more knowledgeable performance guys at DG and described what I had seen. He postulated that the flush was supposed to help give `FIXUP` a good chance of salvaging as much of the data as possible if the system should crash without an ESD (emergency shutdown) during the write and before the RIB or directory block got flushed. OK, but I argued that I'm willing to live with the lost data in most cases. After all, what good is a partially `MOVED` file? I can understand in the case of a flat transaction-logging file how you'd want as many records as possible to survive the crash, but consider that `COMLOG` uses pre-allocated files to avoid such problems, and `INFOS` discards `DVOLS` after a crash. So why bother?

Last Saturday was the magic day. I used `FED` to patch a trap into the disk driver logic of my system `.PR` file so I could capture the I/O (this trick could make a column by itself—but it would probably be banned in Boston). Lo and behold, the extra I/O was a block that looked for all the world like a RIB, usu-

ally the lowest level one.

OK, so it wasn't a bitmap or directory block, it was a freshly updated RIB.

Next, I had to use `FED` on my system `.PR` file to find all the calls to something called `REL` (release and flush system cache buffer). How did I know to look for `REL`? I have to admit that in this case I cheated. I remembered from my

days at DG that the buffer release routines were named `RELX`, so I did an `X DISPLAY/T` on the `.ST` file for my system `.PR` and looked for symbols beginning with `REL`. This bit of work yielded `REL` (release unmodified buffer), `RELM` (release and mark as modified), `RELD` (release and destroy), and `REL`.

`FED` came through as usual, and du-

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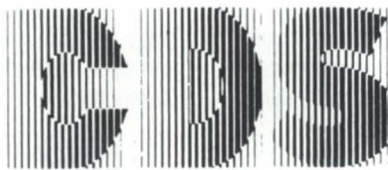
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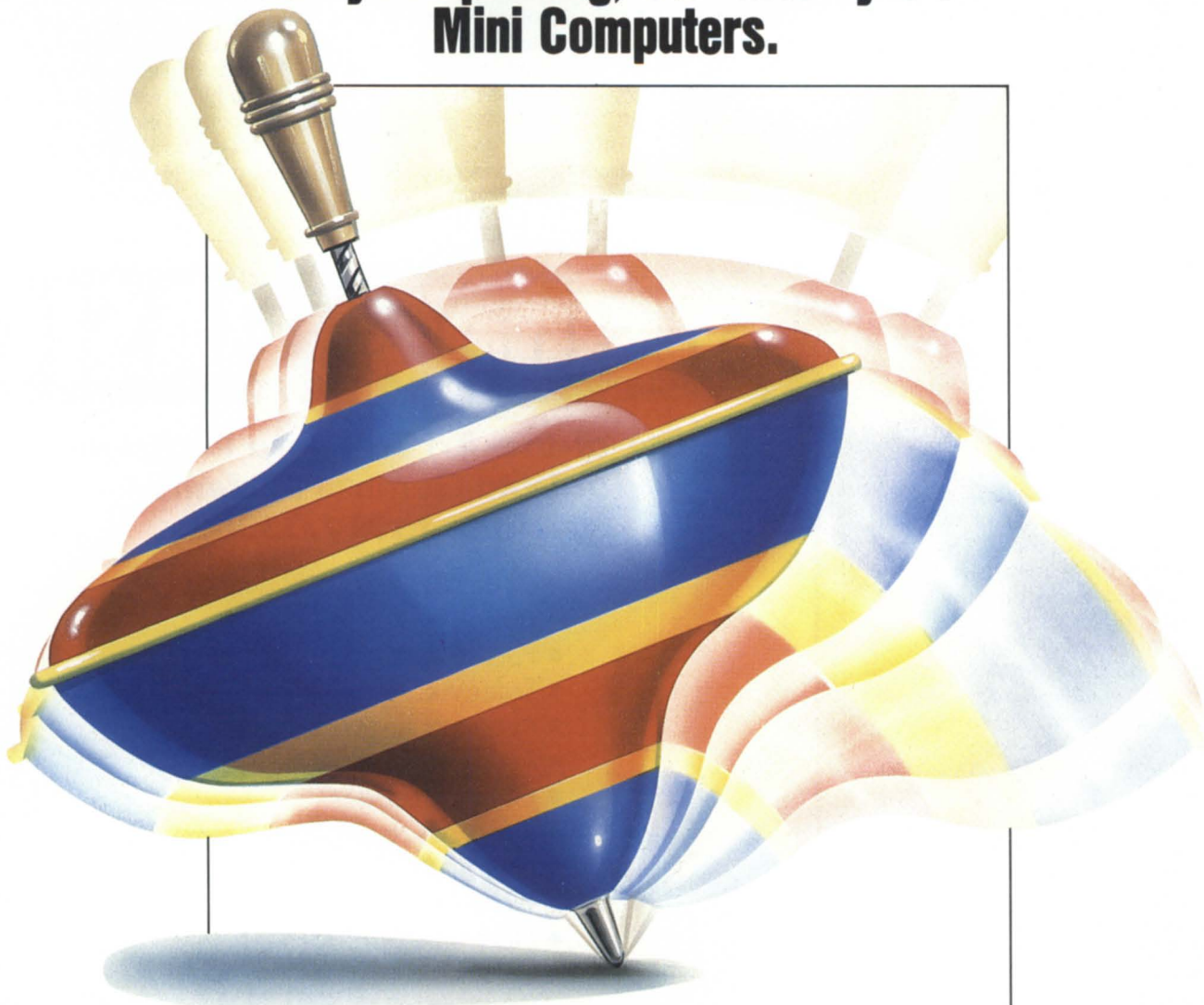
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tifully produced a list of all calls to RELF. Then I proceeded to the tedious business of patching each one in turn from RELF to RELM. After each patch, I rebooted and tested my MOVE command again.

Just like they say, the third time was the charm. Destination disk blocks per access jumped from about 8 to about 16, and average seek distance dropped to nearly zero. The MOVE command completed in about a third the time!

At this point, I was in a pretty good mood. I was standing there staring at a one-word patch that had the potential to dramatically speed up all disk writes. I backed out the first two fruitless patches and rebooted a final time. Being the good performance jock that I am, I figured to spend the rest of the afternoon running a series of tests to demonstrate the dazzling effect my newly discovered patch would have under more realistic conditions.

:BIG.LETDOWN

After running a battery of tests, in-

cluding some bulk MOVES of some large directory structures, the increased speed was barely measurable. Try as I might, I couldn't seem to find a realistic test that produced significant benefits. I even went so far as to patch every single RELF into a RELM instead. Still just noise-level improvements. Sure, my MOVE of a single, large file with a big element size still produced good results, but nothing else seemed to.

What happened? After mulling it over for a while, I think I figured it out. The lack of positive results can be attributed to two things: most systems do a lot more reading than they do writing (run DISCO to see for yourself), and writing large, new elements to a file is a small percentage of the total writes that take place on the average system. Think about it: if all you did was write large blocks all the time, you'd be constantly running out of disk space.

Also, consider this: in almost every test I put together, the effect of properly specifying the element sizes of the files and specifying reasonable (i.e.,

non-default) block sizes yielded better results than applying this patch and using default element sizes and block sizes.

The moral of the story: Maybe the guy who coded the sections of AOS/VS that flush buffers was more clever than I gave him credit for. He seems to have had a better grasp of the grand scheme of things than I do. In fact, I fell right into my own favorite performance trap: Is it faster? Yes. Does it matter? Nope.

I know the phone is going to ring off the hook with calls from the kamikazetypes asking for the patch, so for those of you who like to live on the edge, the AOS/VS 7.5x version of the patch is:

Location	Old	New
RUNLCL1+3605	RELF	RELM

I've been running with this patch for about a week now. It seems innocuous—but then you never know. . . . The only thing I've noticed is a slight increase in average blocks per access, a slight decrease in unit wait percentages (what DISCO calls "disk busy"), and a

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Figure 1

System: MV/8000 model II, 8 MB memory, 147 MB system disk, 354 MB user disk
 Global load: PMGR, EXEC, INFOS, XTS, CEO, SNA, 8 XLPTs
 Base load:
 Memory: 4.4 MB (AOS/VS plus global PIDs, users logged)
 CPU: 11 percent (no users logged on)
 Disk I/O: 0 accesses per second
 Average per-user costs:
 Memory: 280 KB per user
 CPU: 1 percent per user
 Disk I/O: 0.5 accesses per second per user

slight decrease in average seek distance.

Do I have to remind you that using this patch is at your own risk? Consider yourself reminded.

:TOPIC.3:NON-INTUITIVE

I've run across something recently that might be a little surprising to you if your system is primarily subjected to on-line, interactive loads.

I measured the per-user cost of various kinds of on-line, interactive users (casual OA, light WP, heavy WP, data base access/inquiry, and data base update) on a variety of systems. I've measured three per-user costs: memory per PID, percent of CPU per PID, and disk accesses per second per PID.

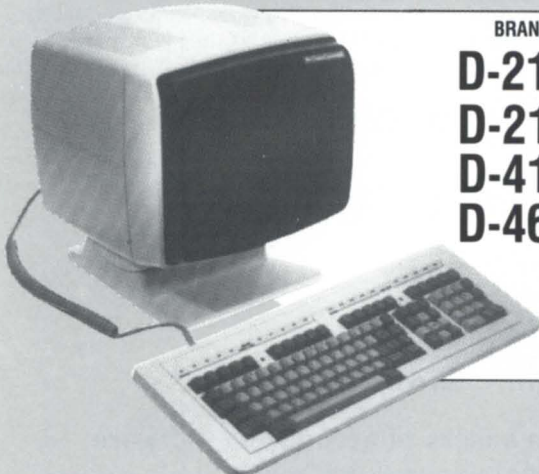
After all the measurements are taken, I keep coming up with strikingly similar results: in many cases, the item that limits the maximum number of users a system under interactive load can support is simply the maximum physical memory. As an example, consider this: the maximum number of on-line, interactive users that an MV/4000 can support is very possibly the same as what an MV/8000 model II can support. Why? Because they both have the same 8 MB maximum memory configuration, and most on-line, interactive applications run out of memory long before they run out of CPU. Running out of disk (I/Os per sec, not MB) is even more difficult, assuming that you have enough money, slots, and +5VDC to keep adding disk controllers and disk units up to the configuration limits.

:COROLLARY.1

The maximum number of on-line, interactive users on memory-limited systems is less than it used to be, and will be even less in the future. End of corollary.

Not a very pleasant thought, eh? This means that if you already have the maximum memory installed, and if your system load is static, then your system performance will degrade with each new revision of the operating system and each new rev of your on-line software (assuming that the operating system and your software adhere to the cosmic trend of getting bigger over time). That is, unless one of three things happens: you choose to freeze your software revisions, DG announces the availability of a higher maximum memory limit for your model CPU, or you drag out that Continuing Products

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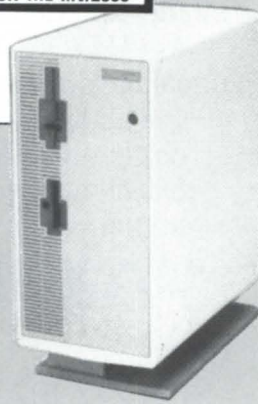
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catalog that's been moldering in the bottom drawer of your desk and start scanning the upgrade/downgrade section.

Wait a second. The downgrade section? Yep. Consider the real system described in Figure 1. See if you can follow the logic as we use these figures to estimate the maximum number of users for various memory configurations.

For the 8 MB system described in Figure 1, there are 3.6 MB available for user processes. Subtracting 0.5 MB for a minimum LRU cache leaves 3.1 MB. Each user consumes 280 KB, so we get a maximum of 11.1 users (call it 11). Eleven users will consume 11 times 1 percent the CPU. Adding the base CPU gives a total of 11 plus 11, or 22 percent of the CPU. Each user consumes 0.5 disk accesses per second so that gives a total of 6.5 disk accesses per second. The 354 MB Argus has an average access time of 28.3 ms, assuming it's nearly full (a good assumption for most of us), giving it a maximum access rate of 1,000 divided by 28.3, or 35 accesses per second. Queuing theory indicates that a maximum unit wait of 35 percent will give good, predictable performance, giving a maximum practical access rate of 0.35×35 , or about 12.25 accesses per second. We only need 6.5 accesses per second, or roughly 50 percent of the capability of one disk unit, to support 11 users.

Using this example, I've estimated the results for a variety of memory configurations. The MV/7800 CPU usage has been estimated using the MIPS rating relative to the MV/8000 (admittedly optimistic). The results are in Figure 2.

Assuming that a practical maximum limit for CPU consumption is about 85 percent, you run out of CPU on the MV/7800 at about 14 MB and on the MV/8000 at about 26 MB. Running out of disk comes much later.

The moral of the story is that the cost-effective upgrade, depending on what your ultimate number of users will be, might just be a downgrade to an MV/7800 simply because it allows more memory.

Bizarre, huh?

Δ

Copyright © 1987 by B.J. Inc. All rights reserved. B.J. is the president of B.J. Inc., a San Francisco-based consultancy specializing in system auditing, system management, and performance analysis. He can be reached at 109 Minna St., Suite 215, San Francisco, CA 94105; 415/550-1444, telex 296544.

Figure 2

Mem size	Max users	MV/3000 CPU	MV/7800 est. CPU	User disks
8 MB:	11	22%	44%	0.5
12 MB:	25	36%	72%	1.1
14 MB:	32	43%	86%	1.4
16 MB:	40	51%	---	1.6
20 MB:	55	61%	---	2.1
24 MB:	70	81%	---	2.7
28 MB:	85	96%	---	3.3

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PIPE DREAM OR PROBABILITY?

How soon—if ever—will we see truly intelligent workstations?

Many of you who read my columns in the June and July issues agree with much (if not all) of what I said about the goals developers should adopt for intelligent workstations. The questions you have been raising include: Who's listening? Is this just your pipe dream, or is there a high probability that vendors will provide the tools for intelligent workstations and hosts to be tightly integrated in a network? Does Data General care? More importantly, what direction is the industry (meaning IBM) taking?

So who's listening?

All of the minicomputer vendors appear concerned about the direction of users' needs with regard to intelligent workstations. Digital, Data General, Wang, and Prime all try, with varying levels of effectiveness, to provide links between intelligent workstations and large host systems. They also are concerned about the evolving standards for integrating these networks.

Data General recently announced DG/PC*I (its personal computer integration platform) as part of their response to these issues, but it isn't the total solution. DG/PC*I is more a set of products that demonstrate DG's commitment to industry and international protocol standards than it is a clearly integrated strategy.

Unfortunately, there doesn't exist a clear-cut *de jure* standard for providing the levels of workstation integration that are necessary. What does exist covers little more than the physical and logical links—the lowest levels of the seven-layer ISO/OSI model. Since IBM still dominates most of the computer industry, the IBM approach will, in many cases, quickly become the *de facto*

standard. This leads to the last question.

What direction is IBM taking?

As usual, IBM doesn't reveal much beyond the public announcements it makes, and I don't have any inside connections that could lift Big Blue's shroud of secrecy. However, we can look at the products IBM has announced and the content of its programming announcements to see what clues are proffered.

By now, you have all been inundated with news about the new generation of IBM intelligent workstations—the PS/2 family and the operating system, OS/2. Although OS/2 is a Microsoft creation that is potentially usable on any AT class machine, it tends to be associated with the PS/2 computers. Taken together with SAA (Systems Application Architecture), a direction begins to appear.

First, all of the PS/2 models are single-user systems. This is largely due to the fact that OS/2 is designed from the inside out to be a single-user, multi-processing, multitasking system. It is inherently incapable of providing full-function support for multiple users. OS/2 does provide a good platform for a single-user intelligent workstation that is an integral part of a distributed processing system.

Second, the OS/2 platform does not directly address the integration issues; however, elements of SAA appear to be headed in that direction. SAA provides for a common data base interface—SQL. It provides standards (APPC) for program-to-program communications between the intelligent workstations and the host computers.

Third, OS/2 Extended Edition will begin to provide support for the inte-

gration elements of SAA. The Standard Edition (also known as OS/2 1.1) only supports the SAA definition of the user interface (Presentation Manager) and the programming interface to the operating system capabilities.

The outcome of this direction is still not clear. Microsoft and IBM appear to be ready to diverge after OS/2 1.1. The only significant difference up until that point was the device drivers. More importantly, the tools being specified are only the simplest primitives needed to achieve the integration required for a truly distributed processing system that takes significant advantage of the intelligent workstations.

Where does this leave us?

By now, you might be getting frustrated. The computer industry is getting closer to the right set of tools and standards, but progress is coming at a snail's pace. Many of the essential standards and tools are not ready yet. Before the full potential of distributed systems that use intelligent workstations can be reached, the vendors will have to provide convenient and relatively simple to use packages to assist us.

In the next column, I plan to take a closer look at DG/PC*I and its potential for allowing the effective use of distributed processing environments. Δ

A consultant with Arthur D. Little, Inc. and a past president of NADGUG, Brad Friedlander specializes in the implementation, operation, and maintenance of mini and microcomputer systems. He is a contributing editor to Focus and serves on the magazine's Editorial Advisory Board. Contact him at Arthur D. Little, Inc., Information and Telecommunications Systems Section, 17 New England Executive Park, Burlington, MA 01803; 617/864-5770.

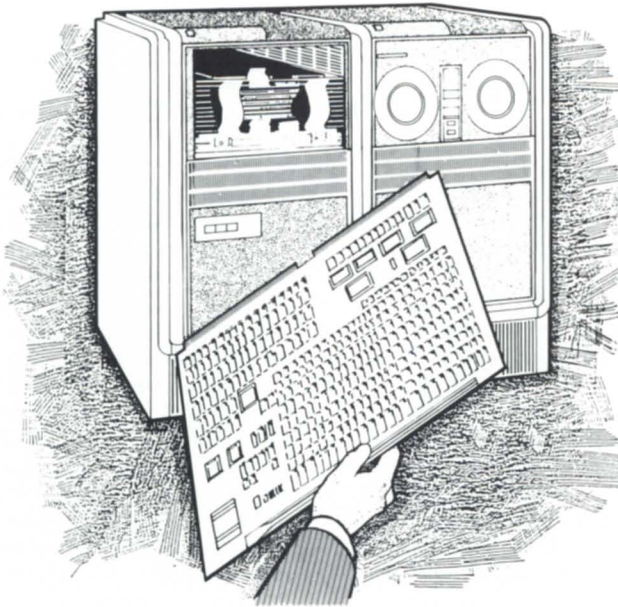


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BITS FROM ALL OVER

Hot dates, Hot Shot, and a hot offer

Bit in the arrears

I'd like to start this column with a minor point about an enhancement to the day-of-week macro, `DOW.CLI`, that appeared in the July issue (page 49). You may remember that I printed Gary Hulme's macro and invited readers to see if they could spot and fix a small flaw.

In the September issue, I listed a few of the correct solutions, and said that John Eymann fixed it to give the new day-of-week values for the next century. It turns out that this isn't correct. Eymann gave the values for the years 2000 through 2099, which includes the last year of the current century and the first 99 years of the next. The 21st century doesn't start until January 1, 2001. That means that many date routines in use won't even serve to the end of this century. That's something to think about for those of you who have never had a date.

Bit by the FCO

Many of you might be interested in the MV/2000 field change order (FCO) that DG is offering (free to customers under a maintenance contract). We recently had two clients go through this upgrade; one of them also added the MTC-style tape drive (nicknamed the "Hot Shot"). The upgrades could have gone more smoothly, but all in all, things weren't too bad—except for one very exciting moment. At one point, we asked the field engineer what was going on, and he said in a matter of fact manner that he was reformatting the hard drive. This caused the first group heart attack known to medical science. Nobody had mentioned a full format before then, and we didn't find out until the next day that the formatting util-

ity reads and retains the existing data. We had (almost) current backups of the data, but not of the applications software.

A bit of forethought

Actually, the formatter the FE was running is rather beneficial. It reads every sector and will report any errors it encounters. If I recall properly, the main goal of this FCO was to add error-correction circuitry to the system. The formatter is truly reformatting the disk by rewriting the sectors with two additional words to store the ECC values in. So it actually ensures that your entire disk is good and that all the data is retrieved properly, then it rewrites it with the new error-checking schemes included. The net result is that your drives will probably be more reliable than ever before and that marginal drives will most likely be discovered and replaced. Not a bad deal at all.

A bit of tape improvement

The FCO also brings some new features to the cartridge tape. To those of you who think the incredible speed (or lack thereof) of the cartridge tape for the MV/2000 is one of the low points of the year, there may not be much hope. From what we were able to find out, the speed will not be affected much. However, if you have been looking for relief from unreadable output tapes, or for a way to reformat and use all those bad tapes that you can't write on, your time has come. The addition of the ECC logic allows you to run the tape formatter on your own drive (the formatter is included with the AOS/VS upgrade that comes with the FCO). It also provides much more thorough error checking, reducing the chances of having bad backups.

Bit by a blocking factor

The new Hot Shot tape drive is

known as `@MTJ10` to the MV/2000 system. We tried an interesting experiment. Since that tape drive appears to be the same MTC drive as on the rest of the MV line, we decided to regen the system and specify a 32 KB block size. No problem. Then we took some backups made with `DUMP_II/BUFF=32768`. . . . Also, no problem. Then we tried to load them with a `LOAD_II/N/BUFF=32768`. . . . No problem. Then, just for the heck of it, we entered `x DISPLAY/H/LAST=0 @MTJ10:0`. This blew up with "ILLEGAL BLOCK SIZE FOR DEVICE." Eeek! Had we trusted `VSGEN` (which always complained about MTB, MTC, or MTD limits), `DUMP_II` (which has always reported errors like this in the past), `LOAD_II` (which I've never really trusted anyway), we would have been bitten very badly by this. As far as I'm concerned, if the hardware limit is 16 KB (which is well-documented), both `VSGEN` and `AOS/VS` should immediately let you know if you are trying to exceed it.

A bit of relief

In all other ways, the Hot Shot drive is a welcome addition. Our clients can now perform backups of their data base in a reasonable amount of time (about one hour instead of four hours), we have a way to get our software to them in great quantities (from our MV/4000 without running hours of BLAST, the media is significantly cheaper (about \$12 per tape instead of \$40 per tape), and the reliability is much better than the cartridge tape—after all, the mag tape technology has at least two decades more development behind it. I think by now you get the idea that we are real happy with the drive as long as we don't try to use a block size larger than 16 KB.

A bit about erasure

One last tidbit about the tape formatting on the cartridge drive: if the utility

runs into trouble and says you have to erase the tape, don't waste time looking for a tape-erasing utility. What it wants you to do is get one of those bulk demagnetizers (from Radio Shack or other sources) and apply it to the tape. I don't have one yet. I get a little nervous when someone waves one around tape racks that hold hundreds of megabytes of software, test data files, notes, games, and other magnetic recordings of dubious worth.

A bit of information

The field engineers have a really informative document that details everything anyone would ever need to know about the changes to a system that result from the FCO, and about compatibility with pre-FCO systems. Make sure your FEs tell you everything they can. It might cost you a half an hour of time, but it will be worth it. Your FE might even let you read it while the formatter is running.

A bit of nothing

There haven't been many Quick Connect cards coming in with questions recently. I hope this is because everything is going smoothly for everyone. Now that summer is over, you may be gearing up to tackle some of the problems you've been avoiding. Drop us a card if there's something any of the *Focus* columnists could help with. Maybe we can't answer everything you throw at us, but at least give us a try.

A bit of review

In the July issue, I mentioned that William Cosby was looking for a tape management system for his library. At the time, I didn't know of anyone who had a small system for his application. The tape system from DG was much more than he wanted or needed, and was really geared towards much larger libraries. Since then, we have decided to develop our own in-house system. It is a fairly simple system, and we are considering making the object code for both ICOBOL and 32-bit COBOL public-domain shareware. (We can't release source due to licensing restrictions for our development package.) If anyone is interested in this, give me a call at 312/673-1700. Δ

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

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TRANSLATION, PLEASE

Portability and productivity for the BBASIC world

Last week, I had an interesting visit from a company named Transoft Limited of Slough, England. The company specializes in developing software portability and productivity tools. They came to demonstrate their first product, Unitran, a Business BASIC translator.

While they were in my offices, they treated me to a demo of the product. Quite bravely, they asked me to give them a set of programs of my own choice to use in the demonstration.

I was tempted to haul out some examples from the BBASIC Hall of Shame, but good manners prevailed,

and I chose a fairly standard customer maintenance program. Putting the programs into LIST format first, we moved them down to an IBM PC using BLAST. We also moved the customer index and data files.

The next step was to convert the programs. Unitran offers two conversion modes: Uni-C and Unicode. Uni-C essentially converts the BBASIC source code to C source code, which can then be compiled using a conventional C compiler.

The C source code that Uni-C produced looks somewhat like the original, but all the keywords have been replaced by subroutine calls to a Uni-C library. These subroutines each perform functions similar to the original BBASIC keywords.

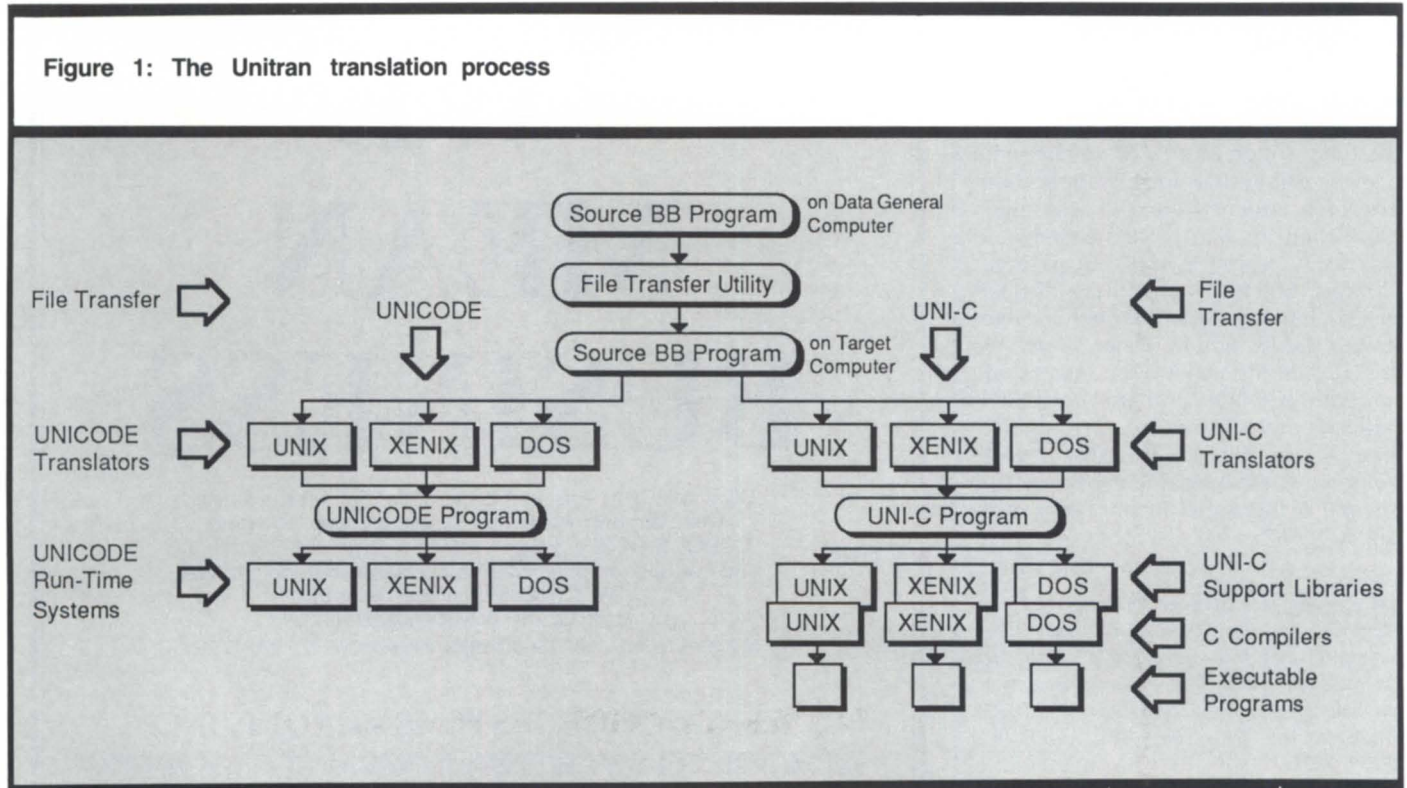
The other conversion mode, Unicode, is more similar in concept to the way Business BASIC works on DG. The

Unicode translator converts the code to an internal format, much like a conventional BBASIC SAVE file. The Unicode Runtime System is then used to execute the SAVE file. No further compilation or conversion is needed.

The primary advantage to the Uni-C approach is that it allows you to modify the C code to add functionality not available under BBASIC. This can be cumbersome because the C code produced by Uni-C isn't designed to be easily read or modified.

On the other hand, the Unicode method has a lot of advantages. Under most conditions, it should execute faster. The Unicode Runtime System probably shares a lot of the code with the Uni-C support library, so it shouldn't be slower: executing an optimized SAVE file should be faster than the large numbers of subroutine calls that the Uni-C approach demands.

Figure 1: The Unitran translation process



In addition, the Unicode method results in much shorter program files. This requires less memory during execution and saves disk space. Avoiding the compile step is also nice. And finally, since modification of the interim code isn't possible, a potential support headache is avoided.

The translators handle the current revisions of BBASIC, AOS/VS 4.20, and RDOS 8.0. Transoft is committed to keeping up with enhancements to the languages. Currently, they are looking at adding the B32 extensions to the language as well.

For obvious reasons, some statements are not supported. These include `STMB`s, which are dependant upon memory locations, and `STME`s, which are dependant upon AOS/VS, `!CLI` programs, and the `ENTER` statement.

We fed our programs to the Unicode translator, and about a minute later, the conversion was complete. This is the acid test of any translator.

Our conversion did not go cleanly. Two statements gave it problems: one, an `STMC 4`, and the other, an `INPUT USING` with a string argument in the first parameter. While in both cases the code could be easily rewritten in a form acceptable to Unitrans, the point is that this shouldn't be required.

Both problems were good examples of the type of thing that has to be overcome. `STMC 4` is used under RDOS to get the name of a file opened on a specific channel. Under AOS/VS, `STME 10` is used to do the same thing, and `STMC 4` is ignored if executed. Unitrans wasn't as tolerant.

As for the other problem, the statement `INPUT USING "A2",A$` is probably not legal according to the manual. The proper form of the first argument is just `" "`. Anything between the quotes is ignored. Unitrans caught this and rejected the statement. This raises an interesting question: if BBASIC performs in a certain manner, but the manual suggests another manner, which one is correct? Because correcting the documentation is easier and not nearly as risky, I'm forced to side with BBASIC.

The conversion to Unicode was done on a Compaq with a 10 MB disk running Xenix, a version of Unix for the IBM-PC. After patching the offending program, we were able to run it using the same index and data files that we had on the Data General. No additional conversion was necessary.

The speed looked good, but just run-

ning a single terminal doing customer maintenance is definitely not a sufficient test of performance.

Transoft has demonstrated their system on PCs (including the Data General Dasher/286) under both MS-DOS and Xenix, Novell Netware, and Unix System V. Within a couple of months, we should be able to get reports from

some actual user installations.

Do I recommend the product? It's still much too new to say, and I certainly haven't done any significant testing. However, the approach seems reasonable, and if they can get the product working completely, it's worth a look.

If you would like more information, you should contact the company di-

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rectly at Michael Edwards Transoft Limited Shear House, Petersfield Ave., Slough, Berkshire SL2 5DQ, England; 011/44-0753-692332.

What basis is there for interest in such a product for Business BASIC users?

For end-users who do their own programming, it's pretty simple. A product

like this is complementary to Data General equipment already in place. Microcomputers are a fact of life, and the ability to run existing BBASIC programs (or even new ones) on PCs can be a great, cost-effective solution for branch offices.

As far as using it for Unix-based, multiuser systems, I think sticking with

DG-based RDOS or AOS/VS systems still makes a lot more sense.

For end-users who don't do their own programming, the technical demands this product makes are probably too much to consider. Assistance from whoever wrote the code in the first place is strongly recommended.

For VARs and software houses, the issues are far more complex. I don't think hosting BBASIC code to PCs is the key to a gold mine. In general, prices for software on PCs are incredibly low and the competition is fierce.

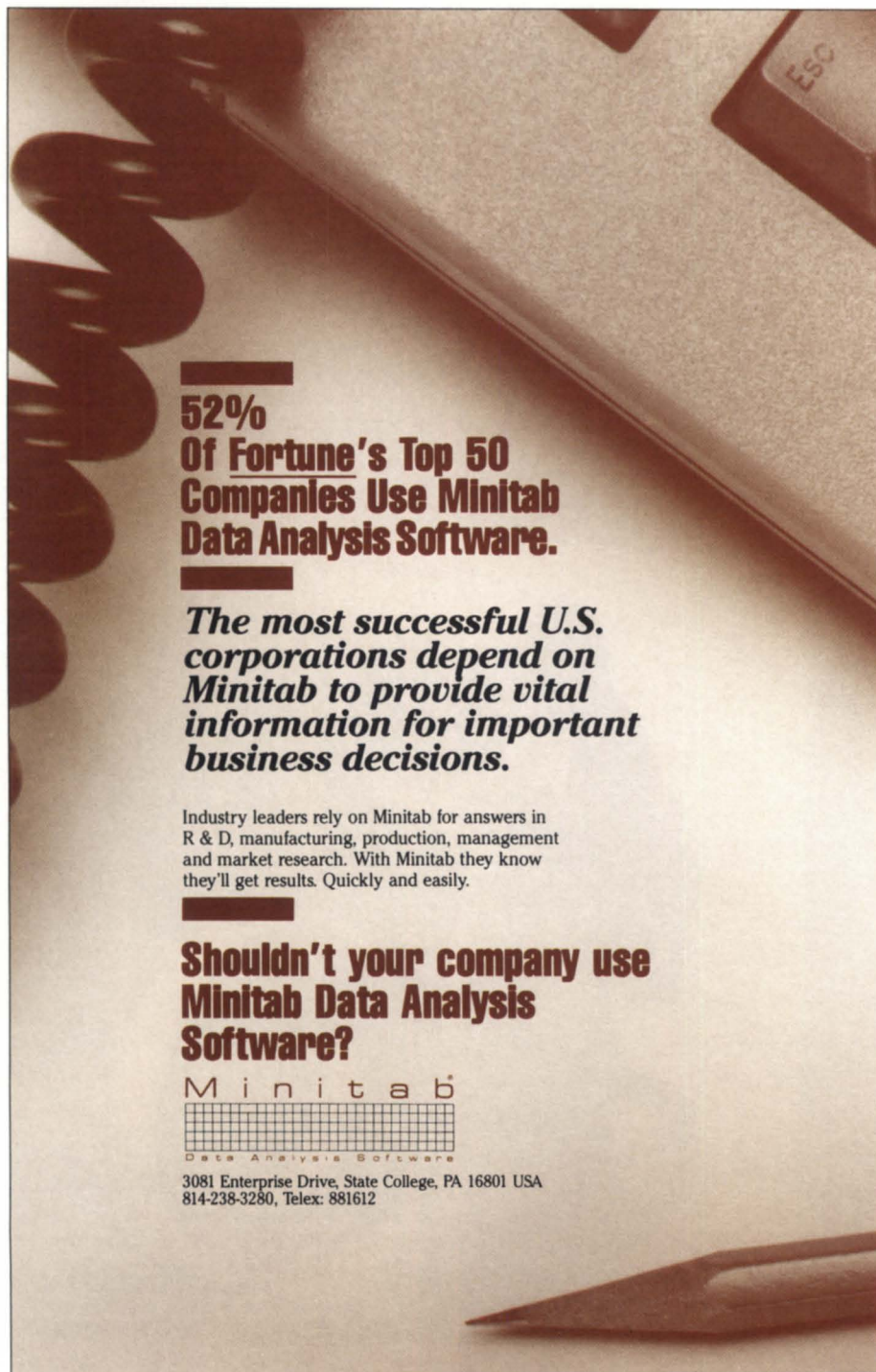
There may be specific exceptions. Software such as this allows BBASIC to run across the entire line, including the Dasher/286 and the portable DG/One. This can provide nice, additional revenue when combined with a central Data General system.

In the long run, software houses have to be concerned that their software runs on appropriate environments. Intel's 386 chip is going to have a major impact on the entire computer industry during the next few years, with its low cost and stunning performance. There is sure to be a major battle between Unix and Microsoft's new OS/2 for preeminence among multiuser operating systems.

Data General's strength traditionally has been on that battleground. How will they react? I think they will try to present the user with the option of using Unix, OS/2, or AOS/VS. It could be a smart decision for systems houses to make sure their software has the flexibility to adapt to the various alternatives as they develop.

■
In other news, I hear a nasty problem has been discovered in Business BASIC index files. Apparently, under certain conditions involving only index files with 2-byte keys, the file structure gets corrupted, causing unpredictable results. The problem has been known for several months; however, as of the time of this writing, no patch has yet been developed. If you suspect you have this problem, the only work-around is to change to a 4-byte key. Δ

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



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SPEED AND STYLE, ALACRITY AND GRACE

Your programs reflect the editor you use— and the way you use it. Part I

First, a correction. I am sure you were all suitably impressed by my F77ALL.CLI macro (top right of page 39 in the September issue). As printed, it did little more than delete a file from a batch queue. It should have read:

```
QBATCH/QOUT=@NULL/QLIST=@NULL&  
/NOTIFY/M  
DELETE/2=IGNORE =F77ERRORS  
F77/E=F77ERRORS (!FILE,+ .F77)  
)
```

Ten lines below that, the line should have read:

```
QBATCH F77/E==F77ERRORS &  
(!FILE,+ .F77)
```

with no space between F77 and ERRORS.

Trying to explain what had happened to my macro, the editor told me how they use a knife and hot sealing wax to get the text down on the page—which makes me grateful he's not my surgeon.

Sometimes it's difficult to decide whether to pursue an idea for an article, because I'm not sure who reads this column or what their level of familiarity with Data General products is. I think that the person who benefits most from this series of articles is an end-user who already knows how to write programs but isn't entirely familiar with AOS[/VS]. All I do is try to provide some insight into the specifics of writing programs on AOS[/VS] systems, taking full advantage of every-

thing this elegant operating system has to offer. This month, I want to depart from that format and touch upon programming style and how it affects or is affected by text editors, specifically SED and SPEED. This is not intended to be a review of all editors available for Data General systems.

My first observation is that most of the people who use SPEED are old Fortran programmers: those who were weaned on C and Pascal usually prefer SED or other full-screen editors. Their abhorrence of SPEED is probably only secondary to their distaste for Fortran. I happen to use both editors equally. SPEED isn't necessarily better than SED, it's just different; each has good and bad points.

An overview

SED is a line-oriented editor that uses SCREENEDIT for edit functions. A page is defined by a form feed or 1,023 lines, whichever comes first: if the file has no form feeds and contains more than 1,023 lines, then SED inserts a form feed every 1,023 lines. SED can handle 256 pages, each of which can be accessed at any time and in any order. SED uses a command line interpreter like the CLI to enter commands.

On the other hand, SPEED is a character-oriented editor with no SCREENEDIT capabilities. A page is defined by a form feed or about 56 KB characters, whichever comes first. Files with multiple pages can only be accessed in forward order: you can't back up to the previous page. SPEED uses a cryptic (to the beginner) but compact single-character command syntax that is fully programmable. SPEED is also faster than SED (partly because the user can choose not to display the text during a global search and replace operation). SPEED doesn't care about the number of lines in a file, so if you have a file of 5,000 lines of 10 characters each, SPEED can

handle it in a single buffer, whereas SED will split it into six pages.

Capabilities

Because SED handles paged files so much better than SPEED, I always use SED for editing paged files. Also, SED is much better for entering new text because it has full-screen cursor control to edit other lines on the screen and SCREENEDIT editing within a line. The SCREENEDIT CTRL-A feature can be used to make a copy of the line just entered (very useful for entering table information). For the purpose of comparing editing techniques, however, let's assume that the file to be edited is a non-paged file with no more than 52 KB characters and no more than 1,023 lines. Each of these editors has good points and bad points that we can consider in the context of some common editing tasks like global search and list, global search and replace, control characters, and conditional editing.

Global search and list. One of the "features" of a language like Fortran is that all subroutines (but not functions) are invoked with the CALL statement. This makes it easy to scan a source file with an editor looking for all of the subroutine calls, perhaps to check their calling sequences or just to list all of the subroutines used. (Just try that in Pascal or C or Ada! What will you use for a search string?) SED is hopeless for such a task: FIND will locate the first one, but then it stops and redraws the current window centered on the line that contains the search string. Another FIND command is required to find the next one. The only way to list in one blast only those lines that contain the text is to use the SUBSTITUTE command:

```
SUB CALL FOR CALL IN ALL
```

This is slow and does unnecessary editing, which is logged in the temporary

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AOS [/VS] TRICKS

.sc and .s2 files used for updating the file. As these files grow, SED slows down. The edit also forces SED to update the file when you exit, even if you didn't really change anything. In addition, unless you specifically use two separate commands:

```
SUB 'call' FOR 'call' IN ALL
SUB 'CALL' FOR 'CALL' IN ALL
```

the edit will actually change the content of the file, and even then, you will miss a mixed case "Call."

On the other hand, SPEED can list only the lines that contain the word "call" (in any case or case combination) without performing any actual changes:

```
J(SCALLS;T)^D
```

You can also enable a "case-sensitive" mode for searches. SPEED searches *very* quickly, and even puts a flashing asterisk beside each occurrence of the string as it lists the line on the screen.

(Note: In the examples, I will use the "\$" character for "escape," "^D" for CTRL-D, and "#" for NEWLINE.)

I don't know if anyone else is infuriated by SED's reluctance to accept some search strings without enclosing them in quotes, but I sure am. Someone at DG has decided that it is OK to search for "?A" or "x1," but not "A?" or "1x" or ".DUSR." You would think the person who designed SED would have been used to searching for strange symbols, but apparently not. Unfortunately, the requirement that "1x" be enclosed in quotes for a FIND or SUBSTITUTE command also forces the case to be significant. Thus, you have to run a SUBSTITUTE command twice, once for "1X," and a second time for "1x." Luckily, SPEED accepts any combination of characters for a search and/or replace string without case dependence. In my opinion, other than for case-specific searches, the only time quotes should be required for search or replace strings is when a significant space or tab is part of the string.

Global search and replace. Simply stated, global search and replace with SED is a drag. In addition to the case-sensitivity problems already discussed, SED has an additional problem in that every single line in which the substitution is made is listed on the screen. There is no way to disable the listing. It is not simply a visual annoyance: the extra screen output significantly slows down the operation. In SPEED, however,

the listing is optional:

```
(CFRED$JOES;T) lists each one
(CFRED$JOES;) lists none
```

This makes SPEED a much better choice for writing "batch" edit macros that will silently edit a file.

Control characters. SED will destroy the contents of a file when a MODIFY command is used to edit a line containing 8-bit or control characters. While SPEED is more forgiving, you should be aware that it will strip all null "(0)" characters from a file. Of course, FED is the better choice for editing such strange files.

Conditional editing. SED has no decision-making capabilities. On the other hand, SPEED is a reasonably complete programming language because it has:

- loops: either open-ended (conditional) or fixed number of iterations
- conditional tests and branching
- labels
- variables
- internal variables for number of lines, current position, etc.
- file and buffer open, close, read, and write operations
- multiple files
- multiple buffers.

I don't have the time or space to describe how to use all of these features: as long as you know the capabilities are there, you can learn them as you need them. The SPEED manual is not as "friendly" as the SED manual, but then neither is the editor. The only way to learn it is to use it. SPEED has so many features that it's difficult to believe that the .PR file is only 32 KB (the program only uses four shared pages—the rest is space for your file!) Ah, the wonders of coding in assembler.

While neither SPEED nor SED supports templates in searches, SPEED has ^\ and ^N, which allows a search for the first occurrence of any of a list of characters. In addition, SPEED can find "white space" (^E) and "white space or no white space" (^P). White space is any combination of spaces and tabs. Since I'm quite rigid in my programming style, and always leave the same number of spaces and/or tabs surrounding operators (=, +, -, *, or /) and parentheses in subroutine calls or array references, I can search for occurrences of:

```
"XYZ(i)"
"X=Y"
"FRED("
```


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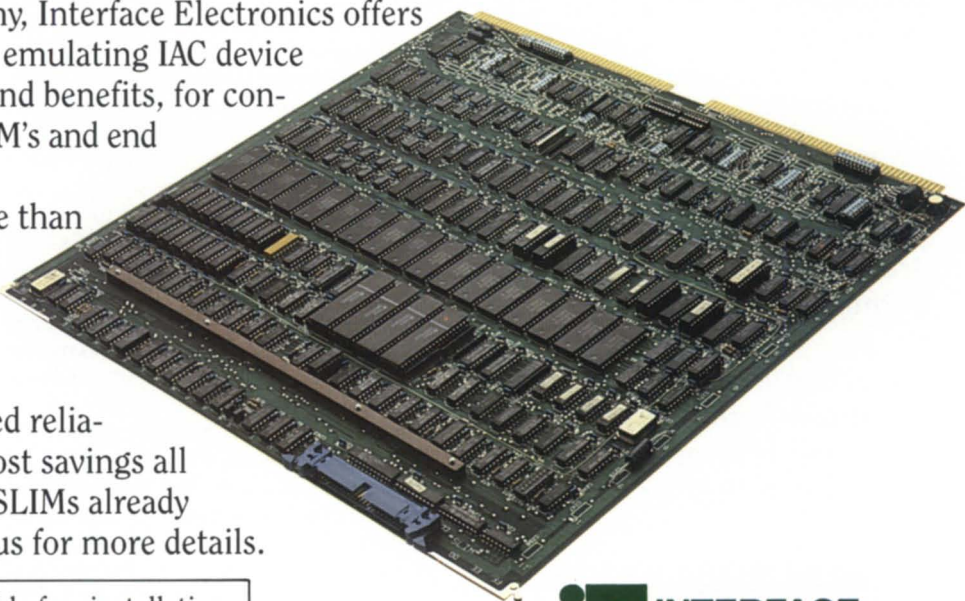


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AOS [/VS] TRICKS

and know that I won't miss any. However, if you are scanning someone else's code, then you should search for:

"XYZ(i)" and "XYZ (i)"
"X=Y" and "X=Y'" and "X=Y'" and "X=Y'"
"FRED(" and "FRED ("

where the spaces may or may not be tabs. SED can't handle this, but SPEED can:

```
(SXYZ^P(i);T)^D
(SX^P=^PY;T)^D
(SFRED^P($;T)^D
```

More tricks

Here's another SPEED trick: if you want to take a file of fixed-length, 128-byte ASCII records and make it a data-sensitive file, then use SPEED to insert a newline every 128 bytes:

```
Z/128(128MI#$)^D
```

Note: # represents newline

after which you may wish to strip all trailing white space from the records:

```
(C^E#$$;)^D
```

Note: # represents newline

The best feature of SPEED is its ability to search for a carriage return or newline. You can do many things with this feature:

- Change all carriage returns to newlines

- Delete all carriage returns in a file, leaving the newline characters—or add a carriage return before each newline.

- If your comments in Fortran all begin in column 1 with a "c," then you can search for all occurrences of "newline-c" and get a list of just the comments in a program. This allows you to get a quick overview of the flow of a program without printing it out.

- Many old-fashioned Fortran programmers insist on putting a "c" to comment a blank line. This just clutters the code and makes it difficult to see the labels. You can eliminate all of these pesky little "c" characters by changing all occurrences of "newline-c-newline" to "newline-newline."

- You can convert a single-spaced file to a double-spaced file by changing all occurrences of "newline" to "newline-newline" or vice versa.

- Suppose you have a large program, and you want to produce a file that just contains the subroutine calls and subroutine declarations. Make a copy of the file(s) and use SPEED to change all "newline" to "newline-zap" or something equally silly. Then go through the entire file and each time you find a

CALL, delete the "zap" string at the start of the line. Do the same for the SUBROUTINE keyword. Now scan the entire file again and delete all lines that still contain the "zap" string. You will be left with the required file:

```
Note: # represents newline
J(C#$#ZAP$;)^D
J(SCALL$;L3D1L)^D
J(SSUBROUTINE$;L3D1L)^D
J(SZAP$;L1K)^D
```

- Imagine you need to quickly scan a large paged file without any intent to edit it. Examples of such files are (PARU SYSD).32.SR and QSYM.F77.IN, release documents (:UTIL:RELEASE.6.00), and manual updates (093.000241.01). Let's say you want to search these documents for a particular reference. If you use SED, you will have to wait until it has read the entire file and built a set of pointers to each page break so it can handle pages as you ask for them. Then, once again you will be forced to enclose your search string in quotes if it contains a strange mixture of characters, making it case-dependent. SPEED is much better—it comes up very quickly, having read in only the first page. You can then use the N command for a quick, nonstop search through the entire file, avoiding the necessity of reading in each page as you work through the file. For example, to find "BUG," simply use:

```
NBUG^D
```

You may have noticed that whenever anyone presents editor macros in *Focus*, they always present SPEED macros, not SED macros. Simply put, you can't do anything really clever with SED. Scan the SPEED manual and look at the examples: you can write SPEED macros to insert number lines on the page, convert a file to lower case or upper case, insert page breaks every 20 lines, remove all page breaks, add an "&" character to the end of each line (useful for CLI macros), and the list goes on and on and on. . . .

Next month, I will continue the discussion of SED and SPEED with respect to programming style. Δ

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



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INSIDE ICOBOL

WILD KINGDOM

DG nomenclature is a zoo

Last month, we finally got in our new disk drives: twin Fuji 2333s with a Zetaco BMX-3 controller.

After the installation was done, our field engineer asked me how I would like them configured. Like a fool, I asked for my choices. "Well," he said, "you can make them twin Vulcans, or four Kismets in RDOS, but only two in AOS[VS], or four Zebras, but the Zebras have to be two 6061s and two 6060s." I looked at him, considered carefully, and replied, "Huh?"

Now that I've been in this business a while, I can SNA, MAP, CAD/CAM, EBCDIC, or ADAPSO with the best of them—either from school or from reading these terms in trade magazines that are kind enough to provide translations. Because I lack interaction with other DG people, I suppose, I've always called my 5-and-5 removable a "5-and-5 removable," my 25 Meg Winchester a "25 Meg Winchester," and so on. This is a definite handicap when I talk to other DG people, who seem to want the disks described by either mythological creatures or part numbers. I think DG has realized that some kind of translation table is necessary—version 7.40 of DKINIT has a help screen that actually tells you what size disk goes with what part number. Unfortunately, it doesn't give you the names of those disks. So I will.

The first DG disk that I ever heard about was the Novadisk, and I thought that was kind of elegant. "What kind of computer do you have?" "A Nova." "What kind of disk does it use?" "A Novadisk." It was easy to remember, and I could see in my mind the coming Eclipsedisk, MVdisk, DasherOnedisk, and DesktopGenerationdisk. Alas, it was not to be. They started getting fancy.

The Phoenix (6045) was the bread-and-butter disk for most ICOBOL users in the last decade. It was a 5 MB fixed disk with a 5 MB removable pack, and was the most reliable thing I've ever

seen. We still have one running on the system, even though it looks kind of funny—two 160 MB CDC drives, two 294 MB Fujitsu drives, and a 10 MB drive that takes up as much room as both of them put together. The step up from the Phoenix was the Gemini (6070), which was a 10 MB fixed and 10 MB removable drive. (Twice as much capacity—Gemini—get it? This is the only drive name I can remember because it makes some sense.)

Stepping upward to the removable pack drives, we had the Zebra. This came in three models—the 6067 (50 MB), 6060 (96 MB), and 6061 (192 MB). The Zebra was a wonderful disk in those pre-Winchester days, and it is still popular as a low-cost, medium-capacity drive. The main disadvantage to the Zebra was its size (it resembles a top-loading washing machine) and its tendency to move around on the floor while operating. I imagine that if you are a good enough programmer, you could choose the direction in which the unit moves, thus creating the first combination robot/disk drive.

Then there is the fairly new Vulcan (6122), which is a 277 MB removable drive. It's the first DG drive that requires a burst multiplexor in order to run.

Next come the Winchester-type drives. The first add-on drive that I got was the 25 MB Echo (6103), which also came in a 12.5 MB version, the 6099. The Kismet comes in two flavors—the 73 MB 6160 and the 147 MB 6161. It also needed a new controller since the drive had 35 sectors per track instead of 24. For some reason, it only allows two disks per controller, even though RDOS, at least, will handle four. (I have the Fuji drives configured as four 6161s, and it runs just fine.) The newest line of DG drives is the Argus (6236 354 MB) and Argus II (6239, 592 MB), which, incidentally, don't work well on RDOS systems.

But disk drives aren't the only things

that have names in the DG world. Perhaps the most famous name for a processor in the history of the industry is the Eagle, the code name for the MV/8000. I think someone wrote a book about it. Just to add to the confusion, Fujitsu calls two of their drives the Eagle and SuperEagle. The code name for the MV/20000 is the Viking, the MV/7800 is the Kite, the MV/15000 is the Scorpio, and the 2000 DC is the Bulldog.

I'm glad I'm not running an S/120 or an S/20, because I wouldn't like to call my machine a Buzzard or a Vulture. On the other hand, I am running an S/140 with the not-so-catchy name of DGC E. The CS/60 must have looked like a nice machine because it was named Emperor, but the CS/50 is nicknamed Orphan. This may influence your next purchasing decision.

Then there are the nicknames that are best forgotten. Most of the above names sound very macho or high tech, something that you would be proud to call your system. I just don't know about the 4535 printer, the Dried Apricot; the 4557/8 laser printer, the Jalapeno; or the 6250 GCR tape, the Anchovy. How would it sound on a tour of the system—"Yes, here is my Viking, with twin Vulcans on it. And over there in the corner is my Dried Apricot and Anchovy." I have no problem with Kite for the MV/7800, but Aardvark for the 4000 DC is a little silly, and Kitevark for the MV/7800 DC is ridiculous.

There should be an award for those nicknames that most accurately describe what the device does. The winner has to be Squirt, the 6298 ink-jet printer. Bandit, the 4373 band printer, would be the runner-up. And Parrot for the 4550 voice mail controller is particularly apt.

The most inappropriate nickname? The prize goes to Groundswell, the Enterprise computer. Finally, there are the complete mysteries. Can anyone tell me why the code name for AOS/VS, XYZZY, is pronounced "magic?"

Odds and Ends Department

I'd like to pass along a word about the RDOS Roundtable at the NADGUG conference. The name should be changed because in the past few years, the RDOS Roundtable has covered ICOBOL, BBASIC, 16-bit Fortran, and just about anything else that is handled by Research Triangle Park. So if you're using any of the above, don't be put off

by the name.

I've got something for you RDOS people to try. From your master directory, do a DIR SYS, and then RELEASE SYS. Then try to type or print something. Surprise! All of your devices are gone. Type LIST/A/S/E \$-., and nothing will be found. Don't worry—they'll be back the next time you boot up.

Why would anyone want to do that? Well, I've got a friend running a serial printer off of one of his QTY lines. It works just fine, but has its drawback: you can't use any of the print spooler features that come with ICOBOL. And if you try to LINK \$LPT1 QTY:3, you are informed that \$LPT1 already exists. However, if you do what I outlined above, \$LPT1 no longer exists, and you can link it to anything you like. The next time you boot, the link remains, and all of your other devices reappear. Now you can go into the spooler, send a file to \$LPT1, and it will print on your serial printer.

I just got back from a meeting of the Northeastern Ohio User Group, and I'd

Can anyone tell me why the code name for AOS/VS, XYZZY, is pronounced 'magic' ?

like to pass along my thanks to DG's Cleveland office. They featured a demonstration of DG's new PC integration product, PC*I. I think I have finally found my reason to move onto an MV.

The file sharing capabilities impressed me the most. You can have files stored on the MV disk that can be used by either the MV or the PC. This means that you can produce a document on your MV machine and edit it or do graphics work on the PC, thus using the things that each machine does the best. By keeping your files on the MV,

your nightly backup will also back up all of the PC files, eliminating the need for cartridge tape drives.

One of the statements made that night was that if you were careful to write your programs in a portable language like C, you could actually take your programs and run them either on the PC or the MV and maximize your resources. I thought about that on my way home. Sure, C is highly transportable, but right now there is only one language in the world that produces object code that will run on both an MV and a PC—ICOBOL. If I heard right, it sounds like you ought to be able to keep the ICOBOL files on the MV and execute them on the PC, and your data files could be anywhere you like.

Maybe I'm closer to the leading edge than I realized! 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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PRODUCT SPOTLIGHT

DG offers new low-end computer

Westboro—Data General has announced the MV/1400 DC, a 32-bit, one MIP computer. The \$9,995 system includes the central processing unit, 4 MB of main memory, office packaging, a 38 MB Winchester disk, and a floppy diskette. The high-end system package combines the same 4 MB of memory on the system board with a 160 MB Winchester disk and a 21 MB cartridge tape. The I/O bandwidth is 8 MB per second. A one-year warranty on parts and labor is also included. The computer comes in an under-the-desk, pedestal package with removable side panels.

The MV/1400 DC can be configured to act as a low-end file server in the DG/PC*I environment, as well as a protocol converter in a multivendor communications environment.

The base system board features a CMOS gate-array, 32-bit CPU. The system board holds a central processor with a performance rating of 958 single-precision KWhetstones, a floating-point unit, Winchester disk, diskette, cartridge tape interfaces, 4 MB of memory, two RS-232 modem control ports, eight RS-232/RS-422 selectable ports, and a parallel printer port.

Expansion memory modules of 2 and

4 MB are available for a total of 8 MB, in addition to the following local bus cards: synchronous controller, LAN controller, and DG/StarLAN controller.

A wide variety of proprietary and industry-standard operating systems are supported. The customer can select one operating system option as part of the base price. Among those offered are AOS/VS, DG/UX, and AOS/RT32.

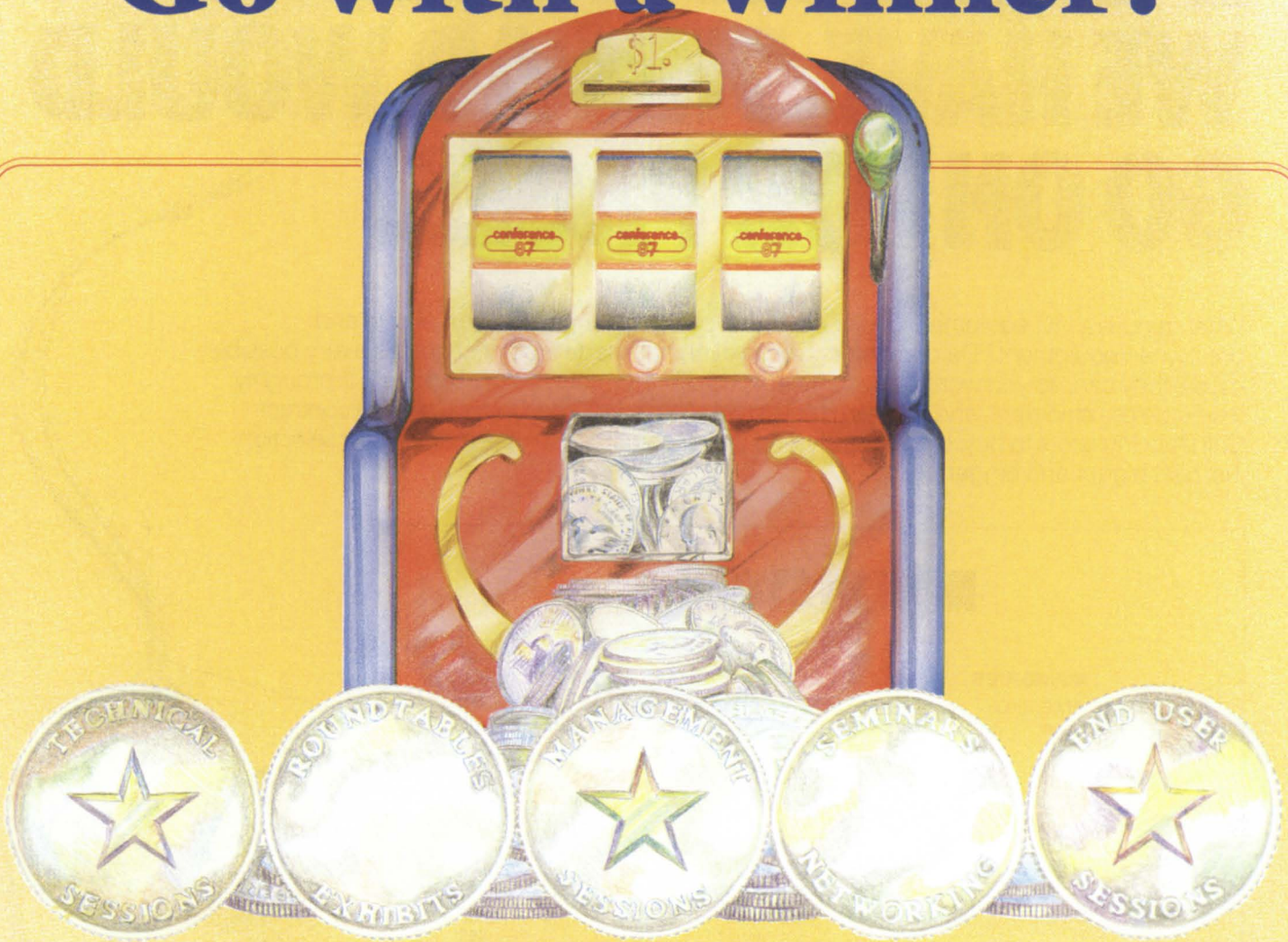
According to J. David Lyons, vice president of Group Marketing, "Due to the ease in upgrading the MV/1400 DC from the Desktop Generation product line, its higher level of system performance, and a variety of operating system right-to-use licenses from which to choose, this product presents an especially significant announcement for the Data General reseller community. Upgrades from the MV/1400 DC to the MV/2000 DC are also available to provide customers with a cost-effective growth path. In addition, the MV/1400 DC can compete with many of the high-end PC/LAN-based systems and the 32-bit supermicros.

So far, the MV/1400 DC has been installed at two customer sites: Agency Datasystems, an authorized system distributor, and Beneficial Corporation.

Data General also announced enhancements to the MV/2000 DC and the DS/7500 graphic workstation that include double the base memory on the system board from 2 MB to 4 MB,



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There's a \$75 late fee for registrations received after September 11, and the Tropicana Hotel can't guarantee reservations after this date. **If you need more information, contact the NADGUG staff at 617/898-4067.**

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allowing a maximum of 12 MB. The new system boards on the MV/1400 DC, the DS/7500, and the MV/2000 DC now use 1 megabit DRAMs. The DS/7500 is available with 10 asynchronous ports capable of connecting to a variety of serial devices (including plotters and printers).

Hardware service offerings for the MV/1400 DC and the newly enhanced MV/2000 DC and DS/7500 workstation include on-site repair services and core-incident diagnostics software.

Both the MV/1400 DC systems and the enhanced MV/2000 DC are available with immediate delivery. The DS/7500 with enhancements is available within 30 days. Δ

DG introduces Rugged and Tempest computers

Washington, D.C.—Data General introduced two new computers, the

MV/15000 Rugged and Tempest, at the 41st Annual Armed Forces Communications and Electronics Exposition.

Both machines are capable of processing more than six MIPS with their most powerful version, according to Data General. Based on the MV/15000, which was introduced just seven months ago, the series includes three models—the model 8, model 10, and the model 20.

Prices for typical configurations of the systems range from \$117,500 to \$284,000 for the Rugged version and from \$177,000 to \$299,000 for the Tempest version. All systems have a one-year warranty.

The MV/15000 R computer series has been designed to meet military standards, withstanding vibration, shock, extreme temperatures, humidity, and poor air quality. The computer comes close to satisfying many MIL-Spec standards.

Data General also introduced a new Tempest terminal (the Dasher D461T), a Rugged 234 MB removable disk sub-

system, fiber optics communications capabilities, and a marketing agreement with Mitek for marketing a Tempest-qualified laser printer.

The CPUs for the units are built on two 15-inch square printed circuit boards. The systems can store up to 32-million characters in main memory. All three models of the MV/15000 R series are available in standard 19-inch rack-mounted chassis, and both the Rugged and Tempest series can support up to 16 of the new removable disk subsystems, giving up to 3.7 gigabytes of storage.

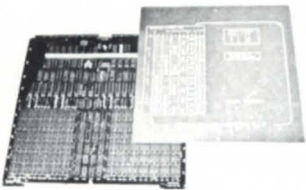
Shipments will begin in the fall of 1987. Δ

DG offers new mid-range systems

Westboro—Data General enhanced the MV/7800 series of mid-range superminicomputers with the MV/7800 XP computer. The new rack-mount system

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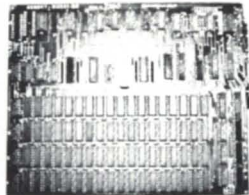
**MV410-4MB
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**NOVA 4 &
ECLIPSE S140**



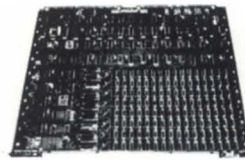
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\$1990**

**DESKTOP &
ECLIPSE S20**



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offers up to 40 percent better performance and provides up to 40 percent more I/O bandwidth than the original MV/7800. An office-packaged system, the MV/7800 DCX, has also been announced. Both systems include a one-year, on-site warranty for the hardware and expansion memory.

The MV/7800 XP is an enhanced

single-board implementation of the MV/7800. Improvements include an advanced microMV chip set, faster memory, and a faster processor cycle time.

Both machines run at 1.6 single-precision MWhetstones. They can be configured with up to 14 MB of main memory. The MV/7800 XP provides 14 general-use I/O slots, which can sup-

port up to 9.4 GB of disk storage and as many as 128 asynchronous connections.

DG offers several service programs for the MV/7800 XP and MV/7800 DCX. Among the offerings are On-call Hardware Services (including on-site repair services), remote diagnostics, and coresident diagnostics software. Also available are the Support Plus software services including telephone support, on-site support, and both software and documentation updates.

Prices for the MV/7800 XP begin at \$23,000 for a 2 MB, 16-slot rack-mount system with operating system license. The 4 MB expansion memory module is available for \$5,000, and the 10 MB expansion memory module is \$12,500. Prices for the MV/7800 DCX begin at \$33,300 for a system with a 70 MB integral disk, 2 MB memory, and seven-slot chassis.

For customers migrating from a 16-bit environment, an easy growth path is available through board-level and system-level upgrades. A board-level upgrade program is also available for customers with an MV/7800.

The MV/7800 XP base system is available immediately. The MV/7800 DCX base system is available within 30 days after receipt of the order. Δ

DG introduces COBOL/SMART software

Westboro—DG has introduced COBOL/SMART software to provide COBOL programmers and users access to the CEO environment. Supported by the Eclipse MV family, COBOL/SMART (Screen Management at Runtime for COBOL programs), is intended for AOS/VS COBOL installations that need to integrate their applications with CEO software.

The software uses standard commands and does not require users to modify existing applications or do major recoding. It gives users access to CEO electronic mail, calendar, calculator, and word processing functions. Users can also alternate between COBOL applications and CEO.


COBOL/SMART is available immediately. Prices range from \$2,000 to \$10,000, depending on the processor. The software is supported by the Software Products and Services Division (SPSD). Δ

PERFORMANCE RESULTS
DISK REORGANIZATION UTILITY

	BEFORE REORG	AFTER REORG
TEST 1 (F/AS/L=NULL #)	2.7	2.5
PERCENT OF REQUESTS BUSY	0.02	0.4
AVERAGE QUEUE LENGTH	94.4	14.9
AVERAGE SEEK DISTANCE	36.2	0.007
PERCENT OF UTILIZATION	0.022	0.007
AVERAGE SERVICE TIME	0.023	2:18
AVERAGE RESPONSE TIME	3:18	
TOTAL ELAPSED TIME		

	BEFORE REORG	AFTER REORG
TEST 2 (DUMP_II=NULL #)	33.2	33.8
PERCENT OF REQUESTS BUSY	0.45	0.48
AVERAGE QUEUE LENGTH	165.1	85.6
AVERAGE SEEK DISTANCE	86.2	0.023
PERCENT OF UTILIZATION	0.034	0.034
AVERAGE SERVICE TIME	0.049	24:05
AVERAGE RESPONSE TIME	33:23	
TOTAL ELAPSED TIME		

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CST offers DataProbe

Germantown, MD—The CST DataProbe I is a portable, battery-operated data line monitor. The book-sized, four-pound unit features data rates up to 19,200 bps, multiple trigger types, capture of up to 5,000 bytes of data, and capture/redisplay of RS-232 signal lead status. It can also automatically determine link configuration including baud rate, frame size, and parity.



The DataProbe is available with asynchronous and optional synchronous protocols, including BSC, SDLC, HDLC, X.25, and SNA. DataProbe prices range from \$1,195 to \$1,495, depending on options. Availability is from stock to two weeks.

Control Systems Technology, Inc., 19045 Cherry Bend Dr., Germantown, MD 20874; 301/540-8614. △

New communications software allows exchange of data between DG and DEC

Columbia, MD—Ki Research has developed a Phase IV DECnet endnode-compatible network communications software product for Data General MV series computers. Ki's DEKnet product provides for cooperating tasks to exchange data between Data General MVs and DEC VAXes, using the DECnet protocol suite.

The programmatic interface allows DG programmers to make connections and to exchange data with DECnet network applications running on the VAX. This product is suited for users with specific data transfer needs such as process control information, simulation data, and manufacturing data. A file transfer program is distributed with the DEKnet product.

The DEKnet is user-installable and has a menu-driven network configuration program called PCONFIG, which allows the MV to be defined as a Phase IV DECnet endnode. In addition,

PCONFIG may accept or generate command file input that contains network configuration information.

The maintenance support package includes bug fixes; a 1-800 bulletin board for filing software performance reports; on-site support; two seminars; and Ki's on-line, menu-driven LAN diagnostic program for the Data General Intelligent LAN Controller (ILC) and

Logical LAN Controller (LLC). LANDIAG provides the means for invoking the ILC and LLC internal diagnostics; displaying the board's network counters; testing connectivity with other ILCs, LLCs, and DEC's LAN controllers using the Ethernet 9000 protocol; viewing the network with a software scope, and displaying on a time domain reflectometer the distance in

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Ki Research, Inc., 11990-I Little Patuxent Pkwy., Columbia, MD 21044; 301/7300-0675. Δ

Computer Technology announces new magnetic tape coupler

Orange, CA—Computer Technology Inc. has announced the development of the MTC1, a magnetic tape coupler designed for use with any industry standard Cipher/Pertec formatted tape drive. The coupler is software-compatible with RDOS, AOS, IRIS, BLIS, and BITS operating systems. The MTC1 emulates Data General's 6021 and 6125 subsystem controllers.

The design supports up to eight separate tape drives. The board plugs directly into any I/O slot in the CPU, and

the customer can choose where to attach the cables. The MTC1 also features six LEDs that indicate the status of the board.

OEM volume discounts are available. It comes with a two-year warranty, including a 24-hour replacement policy if repair is needed and a 1-800 customer service hot line.

Computer Technology Inc., 1442 W. Collins Ave., Unit B, Orange, CA 92667; 714/538-2344. Δ

Teleray introduces rack-mount terminals

Minneapolis, MN—Teleray announces a family of fully enclosed rack-mount terminals that are approved by the Underwriter's Laboratory (UL) and have a one-third larger display than earlier units with the same panel size. All Teleray models are optionally available in this standard RS310C configuration.

Each terminal has a display/logic unit and a keyboard assembly. The display

features a 14-inch, green, amber, or white CRT.

Models available in the style include the 20-DDG (Data General D/210/211 and DEC VT220 compatible).

The rack-mount option costs \$400. Quantity and OEM discounts apply. Delivery takes four to six weeks.

Teleray, P.O. Box 24064, Minneapolis, MN 55424; 612/941-3300. Δ

Orbi announces latest rev of manufacturing system

Tampa, FL—Orbi Inc. has released rev 2.3 of its IMPCON manufacturing system for Data General hardware. Rev 2.3 provides advanced system security, quality control reporting/tracking, enhanced sales order processing and order analysis, and enhanced shop-floor control for the process industry.

Rev 2.4, which should be released by October 1987, provides integrated time

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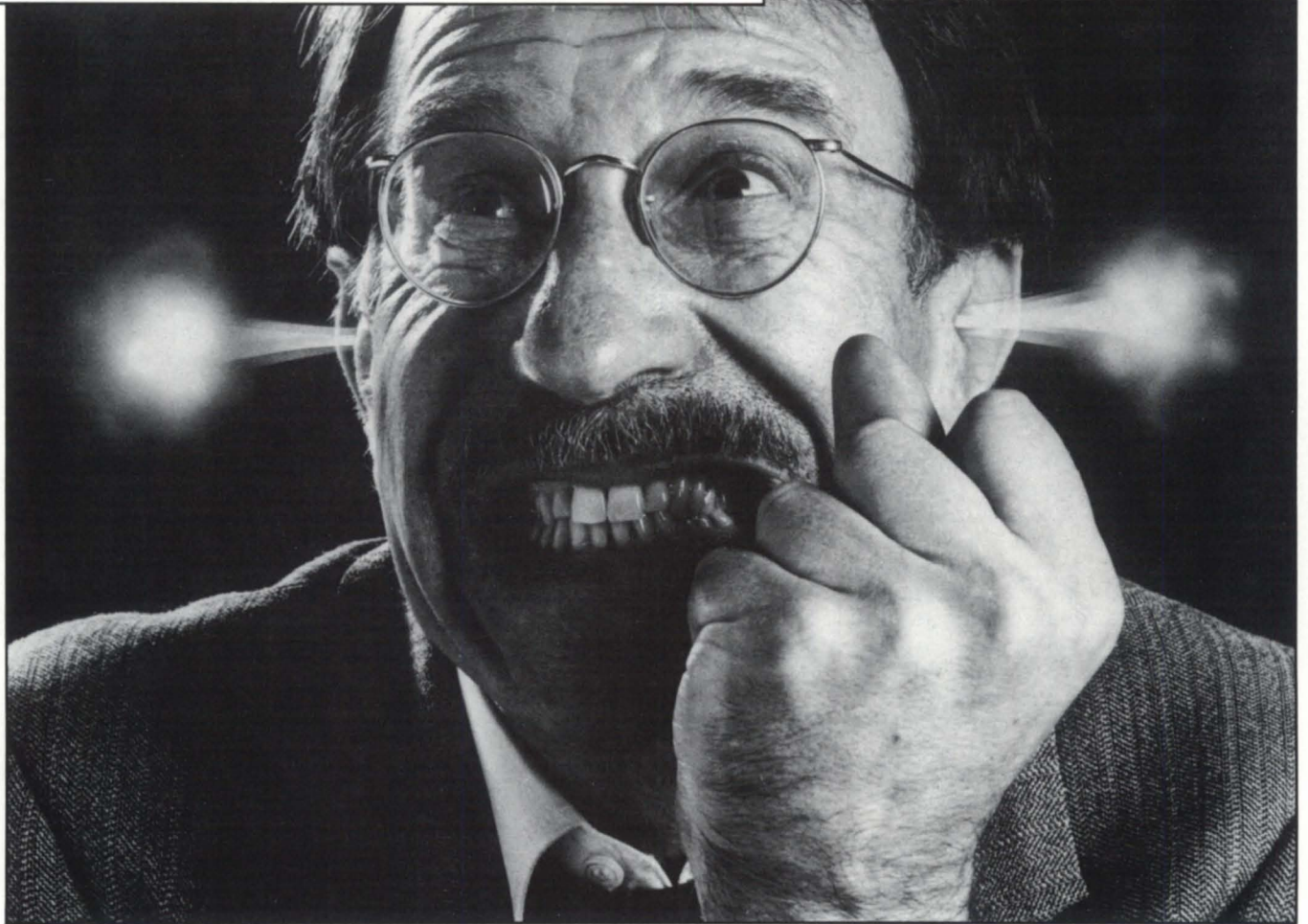
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Orbi Inc., 14482 McCormick Dr., Tampa, FL 33626; 813/855-2615. Δ

3CI releases rev 7.1

Fort Collins, CO—3CI Inc. has released InFoCen rev 7.1, which includes several enhancements on rev 6.3. This rev improves the speed and functionality of InFoCen's Structured Query Language (ISQL), Report Writer, and macro 4GL.

InFoCen is a relational DBMS and 4GL application development system that is compatible with DEC, DG, Honeywell, and other computer systems. Rev 7.1 was available as of July 1, 1987.

Rev 7.1 introduces new capabilities of Report Writer including painting functionality and flexible production of customized output. Users can design on screen what they will see on the printed page. It also provides computational capabilities for macro functions and user-defined calculations.

A search command can find a text string or a number of lines within variable-length scan items. The search command also locates a text string based on its proximity to specified words, lines, sentences, or paragraphs.

Rev 7.1 provides greater security by giving superusers the power to define "Begin/End macros," and automatically running a macro at execution time.

3CI Inc., 155 W. Harvard, Fort Collins, CO 80525; 303/223-2722. Δ

Zetaco introduces DG-compatible add-on memory and high-capacity tape subsystem

Minneapolis, MN—Zetaco has introduced three add-on memory modules designed for Data General's MV/4000, MV/10000, and S/280 processors.

The 15-inch by 15-inch printed circuit boards install in the DG chassis. They are available in three capacities: Model MZ-412 adds 2 MB of memory; Model MZ-414 adds 4 MB of memory; and Model MZ-418 adds 8 MB of memory.

The three high-performance memory modules support 7-bit on-board error correction code and use a powerful 256 KB, 150 nanosecond DRAM. High-speed Schottky components ensure reliability and durability. Configuration is done via one 4-switch DIP. Each module carries a two-year warranty.

The MZ-41X memory series is in stock at Zetaco's authorized stocking distributors or is available directly from Zetaco in OEM quantities, 30 days ARO. Quantity one prices: MZ-412, \$3,995; MZ-414, \$7,495; MZ-418, \$12,495. OEM/VAR volume discounts are available.

Zetaco has also announced a small, high-capacity mag tape subsystem designed to work with DG Nova and MV processors.

The subsystem, Model ZIP-12, employs a cartridge tape drive that holds 630 MB of data when formatted under DG 4307 software parameters.

The capacity of the ZIP-12 is large enough to back up an entire Argus/592 MB disk on one tape cartridge, but the physical space only requires 8.75 vertical inches in a standard 19-inch rack.

Depending on the system configuration, ZIP-12 backs up about 10 MB of data per minute using standard DG backup utilities. It can be pre-set to do a backup anytime of the day or night without an operator present because there's no need to change reels.

ZIP-12 is fully compatible with DG, and it is supplied with tape drive configured controller, interconnect cabling, mounting hardware for a 19-inch rack, reliability and diagnostic software, and one 1/2-inch cartridge tape.

ZIP-12 runs under DG's AOS/V5 operating system, emulating a 4307 tape subsystem. It interfaces to the computer via DG's high-speed burst multiplexor channel. The drive uses a 24-track serpentine recording format with a recording density of 16,000 bpi. Average data transfer rate is 250 KB per second.

The subsystem is available from Zetaco 30 days ARO or from an authorized stocking distributor. It is priced at \$15,395 with OEM and VAR volume discounts available.

Zetaco, 6850 Shady Oak Rd., Eden Prairie, MN 55344; 612/941-9480 or telex 290975. Δ

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You can't keep a good company down. When the going gets tough, the tough get going. We shall overcome. Damn the torpedoes, full speed ahead. Data General's public relations staff is taking its mottoes seriously since the company delivered its disappointing third-quarter financial report. Despite plant closings and staff cutbacks in production, PR has found a lot to be excited about. In fact, they're pumping out news releases faster than Ollie North could shred them. For instance:

- The new MV/15000 Rugged and Tempest, based on the still new MV/15000, were introduced recently. Designed for military and federal government use, both are capable of processing more than six MIPS. In addition, DG introduced a new Tempest terminal, a Rugged 234 MB removable disk subsystem, and fiber optics communications capabilities for the systems.

- More recently, DG has enhanced its MV/7800 line with the new MV/7800 XP computer, along with an office-packaged system called the MV/7800 DCX. Faster memory and a faster processor cycle time are two of the improvements.

- The official announcement of the much-rumored, low-end MV/1400 mini-computer happened.

The company has been equally busy making business deals, having entered several high-dollar VAR agreements. A \$3.5 million contract was signed with a major authorized system distributor, Southern States Cooperative. Southern States' purchase includes installation of the Eclipse MV/2000 DC at each of their 246 retail farm outlets. Also included is the MV/15000 model 10 and CEO.

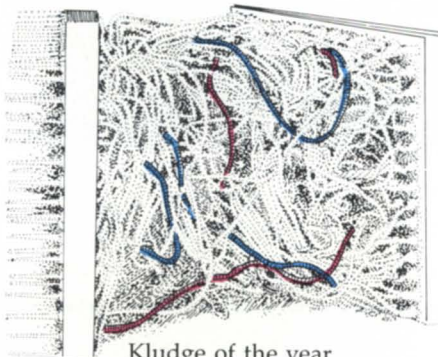
Comtech, a newly recruited VAR, will also purchase \$3.4 million in equipment, specifically 46 MV processors ranging from the MV/2000 to the MV/7800.

DG has also announced an alliance with Bridge Communications of Mountain View, California, for marketing and joint product development of local area networking (LAN) equipment for Data General systems.

Under the agreement, Bridge becomes an independent hardware vendor (IHV).

Of course, there is always a place for improvement. As David Novy succinctly put it in the newsletter *AOS & VS Notes*: "I think DG top management

would benefit . . . if they were willing to take some heat and listen to the concerns of their users. There has been precious little solid contact between high-level DG executives and the DG user community. The only way that DG top-level executives can really learn if the information regarding user concerns being provided to them is accurate is for them occasionally to go out and personally meet their users." All the more reason for users to join forces via RIGs and SIGs in order to get their message across.



Kludge of the year

You can't buy it, so it won't be a best-seller. Nonetheless, you'll want to get a look at *A Year in Development*. Created by Data General's corporate publications department, it's an anthology of stories told by about 50 members of DG's research and development community. Each story represents a unique (and in some cases eccentric) point of view about what it takes to bring new products to market. It's a lavish publication, with more than 100 oversized pages with lots of color photos and humorous touches (check out the "kludge of the year" entries on page 76 for a good chuckle). DG sales reps should be able to show you a copy—and if they don't know anything about it, tell them they ought to stay better informed. Its ordering number is 012-003165-00.

Fast Track Systems has launched a time-sharing service for Data General users. The service provides organizations with off-site computer resources for occasions when additional power is needed for peak loads. Services are backed by an MV/10000 processor through dial-up access at 1200 to 9600 baud. A typical configuration includes a minimum of 16 MB of memory, 16 to 64 access ports, multiple 592 MB disk drives, and either 1600 or 6250 bpi tape

drive. Fast Track provides all the modems and multiplexors, and they have more than 2,500 telephone lines currently installed, with access to leased lines from cities such as Los Angeles, San Francisco, and Boston.

Users can contract for the service on either a dedicated or shared access basis. All information is kept confidential, with operators available 24 hours per day, seven days a week.

For more information, contact Burt Hochstein at 61 Broadway, New York, NY 10006; 212/422-9880.

An impeccable source reports that one of Data General's biggest customers in the United Kingdom is the world's largest meat packer. "So which salesman did DG assign to them?" our impeccable source asks. "Why their only vegetarian, that's who. He lasted about six weeks—but the swap for a fresh rep had nothing to do with his bunny-like eating habits," OIS says.

The Chicago Area Data General User Group (CADGUG) has scheduled its annual dinner meeting for November 11 at the Terrace Restaurant in Lombard. Brad Friedlander, now a consultant with Arthur D. Little Information Systems, will speak on a number of topics—including his term as president of NADGUG (an administration remembered as Bradgug). Tickets are \$25 for members and \$30 for nonmembers. For more information, contact John Eymann at 312/948-7272 or Jim Siegman at 312/673-1700.

A Master Training Plan implemented by Data General now offers a flexible annual training program. Customers can purchase a number of training units (\$1,000 each with discounts of up to 15 percent for purchase of multiple units) equal to their yearly training needs, without being forced to decide immediately on the training formats to be utilized.

For more information, contact Data General's Educational Services at 617/366-2900.

John Caruso is now DG's director of Technology and Corporate Quality leaving his position as director of Manufacturing within the Volume Products Division. His new duties include planning manufacturing processes. He has been with Data General for nine years.

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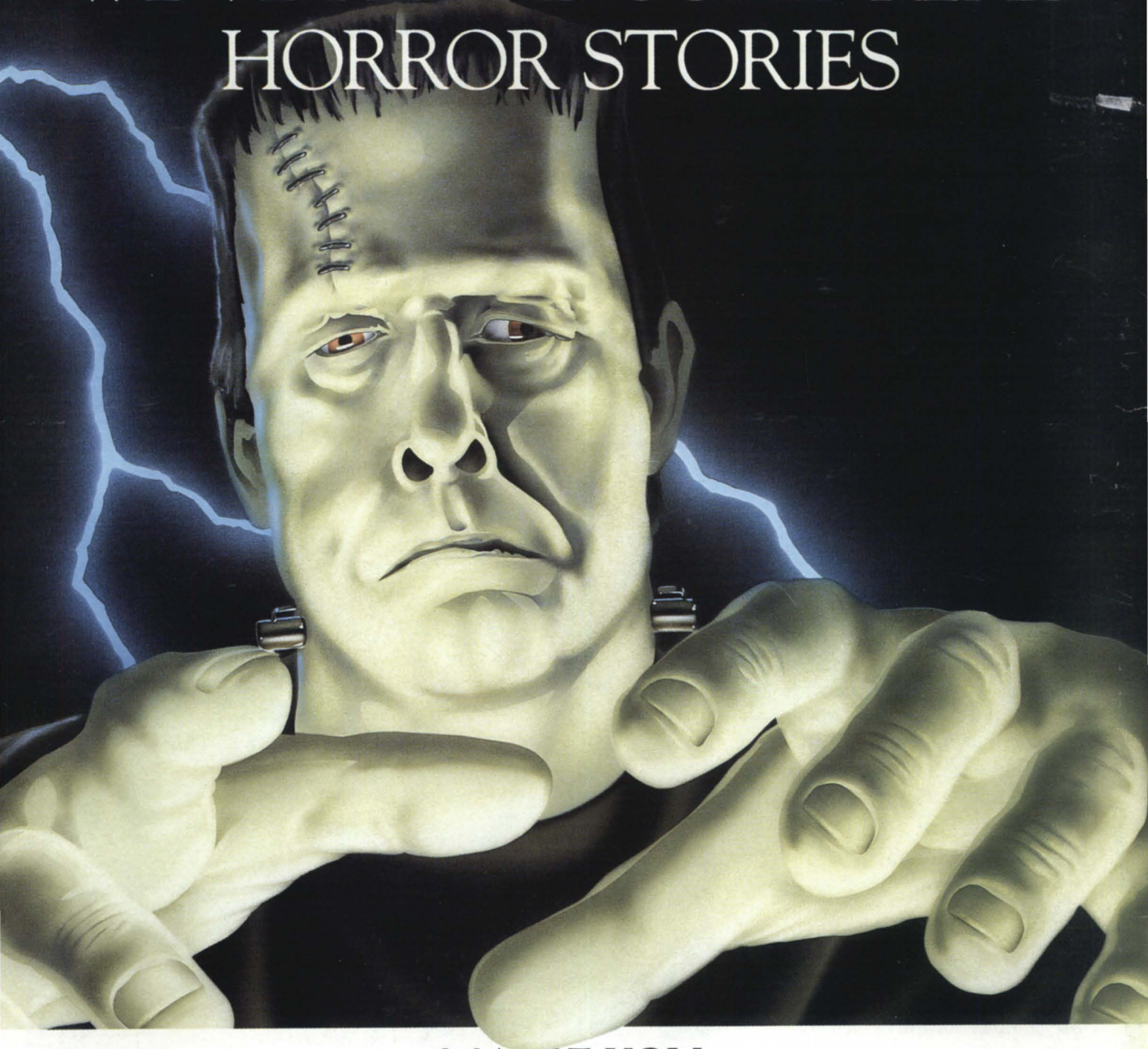
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