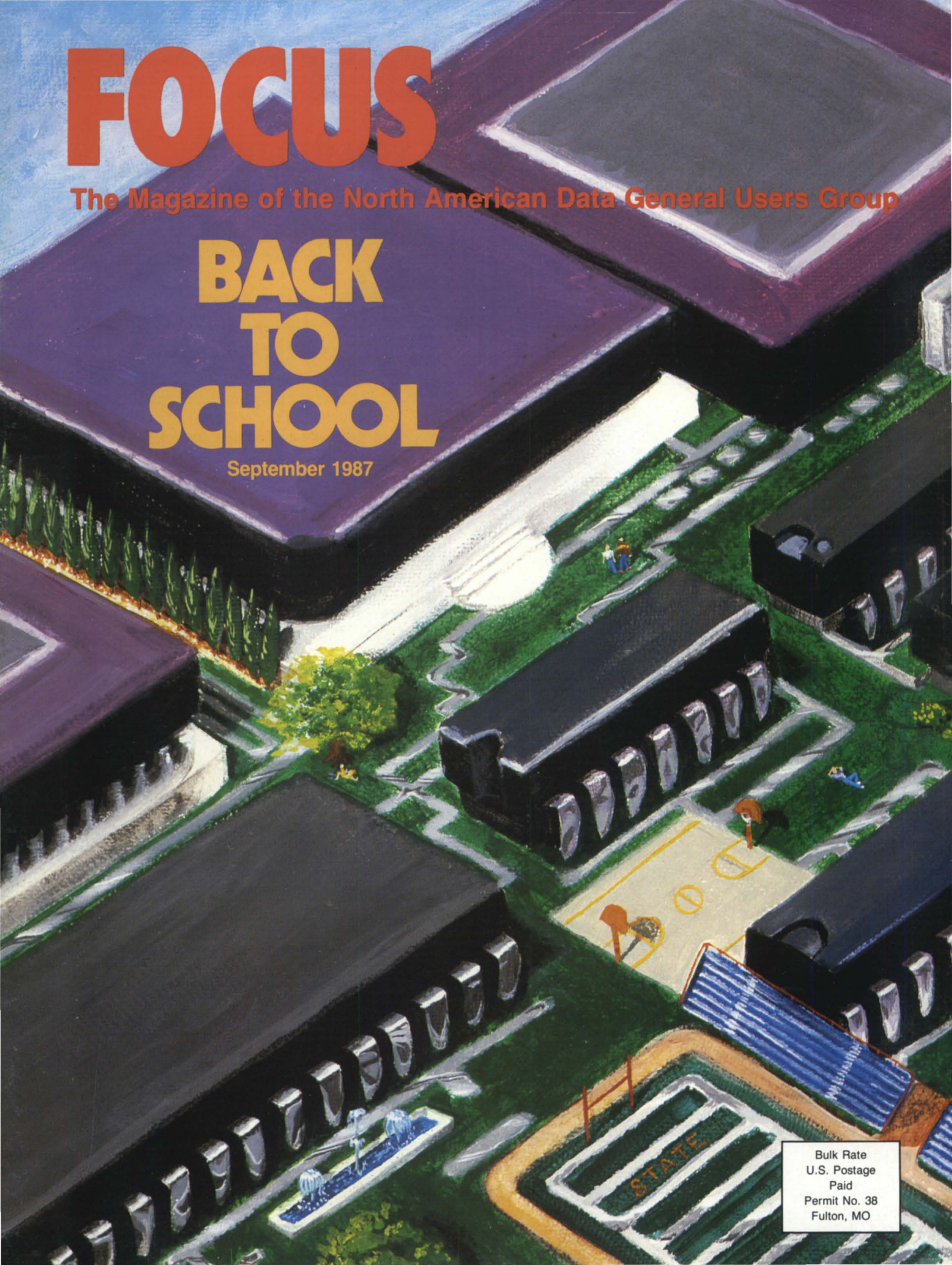
FOCUS

The Magazine of the North American Data General Users Group

BACK TO SCHOOL

September 1987



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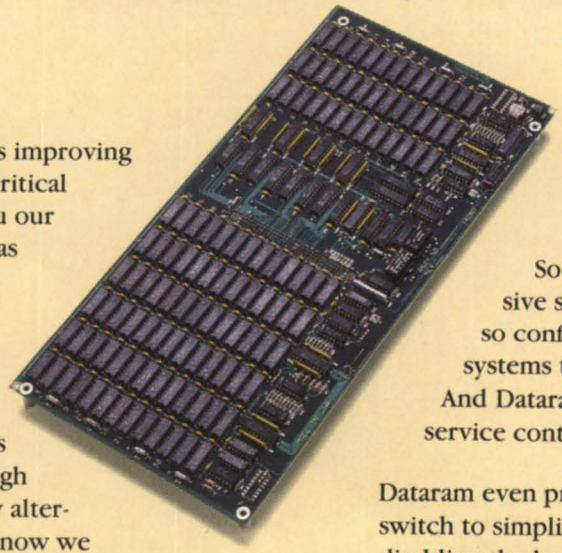

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ECT REPORT WORDPERFECT REPORT

WordPerfect® Software Subscriptions Available

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.

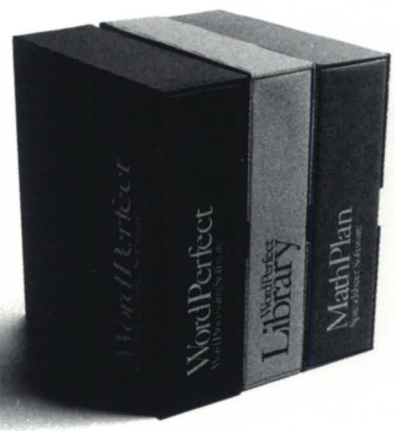
File Compatibility

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.

Give us a call

To learn more about WordPerfect's Software Subscription Service and to sign up for it, call us at (801) 227-4100.



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13 MORE REASONS TO ATTEND

Conference 87's education seminars are an inexpensive learning opportunity

by Calvin Durden
NADGUG President

In recent months I've covered quite a few of the reasons why every DG user should try to attend this year's NADGUG conference in Las Vegas, October 19–22. Well, here's another—you can save a lot of money by attending the management and technical seminars that Data General's Educational Services division developed especially for NADGUG members.

I'm not referring just to the bargain prices for the seminars, although that's certainly something to consider. More importantly, these are the kinds of seminars that will save you money when you get back home and need answers. At our suggestion, Educational Services planned these seminars specifically to address the practical needs of our members.

The education seminar program has been evolving for several years now. It started almost as an afterthought, but has grown and changed along with the group. This year's schedule includes two special management seminars led by Dr. James C. Wetherbe, an author who has earned a lot of respect for his work in system analysis and MIS management. With more top-level managers getting involved in NADGUG activities, we saw a need for seminars on management issues like strategic planning, and Educational Services made the necessary arrangements for us.

Take a good look at the seminar offerings. It's a longer and more varied list than in previous years. I think you'll agree that the seminar program offers 13 more good reasons for coming to Las Vegas.

Managing the Stress of Success. This is a personalized workshop led by Dr. Chris Gundel. The participants will construct "maps" of the major stress areas in their lives, and then create a detailed action plan to address the major stress areas. Dr. Gundel will also demonstrate a series of stress reduction techniques.

Competing With Computing. James C. Wetherbe will investigate the "hows" and "whys" of using computers as a strategic, competitive weapon. Dr. Wetherbe believes that information executives will have to go beyond merely providing economical and efficient applications, or they will be at a severe competitive disadvantage. He will illustrate his point with examples of what is happening in leading companies, and will present frameworks for thinking strategically about using computers in your company.

Planning: A Comprehensive and Practical Approach. Presenting a practical four-stage model for planning (strategic planning, development of a long-range architecture, resource allocation, and project planning), this seminar will clarify planning issues and demonstrate how the model has been applied successfully in a number of organizations. James C. Wetherbe is the leader.

Effective Systems/Project Management. Condensed from it's original two-day format, this seminar is intended for project leaders who have to integrate complex, multidisciplinary systems under demanding cost, schedule, and technical requirements. Hans Thamhain is the leader.

Planning and Installation for CEO Revision 3. Two new features will get special attention: the Name Server Agent that makes differences between hosts in a CEO network transparent to users, and the CEO_OP process that controls individual servers to achieve a more efficient system. Dave Dubois is the leader.

Improving Your AOS/VS System Performance. Galen Bunnell will discuss the use of the performance monitor and benchmarking techniques for capacity planning in a CEO environment, and Chuck McDowell will present "five surefire ways to improve system performance."

Optimizing System Performance with DG/SQL. Ed Hickland will lead an intensive workshop on how to manage and tune a DG/SQL data base to

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Beyond REPORT: Getting More Out of Your SYSLOG. Tom Gutnick will explain how to use the AOS[/VS] system log facility to gather information about users, hardware conditions, network activity, and file usage for the purposes of accounting, capacity planning, or security audits.

Computer Games in Education and Business. Designed for computer professionals, educators, and technical trainers, this seminar will teach participants to create simple games that can be used to enhance learning. Larry Morse is the leader.

X.400—Definitions and Implementation. This seminar will explain DG's implementation of the CCITT X.400 standard, which is unique in the emphasis it puts on human needs for "interpersonal" communication. Leader Marcia Kasilowski planned it for anyone interested in evaluating message delivery products, as well as anyone who may install X.400.

Unix Solutions from Data General. Leader William Moloney will discuss the generic Unix environment in detail, focusing on the types of problems for which Unix is an attractive solution, and comparing the advantages of MV/UX and DG/UX.

XTS—The Data General Communications Platform. Intended for users with a basic communications background, this seminar will provide an overview of the Xodiac Transport System, including the design philosophy, active components, and some of the applications/services that use XTS services.

To get more information or to register for one or more of these seminars, call the Educational Services' central registration desk at 617/366-2900. Space is limited, so be sure to call now. Δ

LETTERS

Unforgettable memory

The increased memory requirement of AOS/VS rev 7.5 is becoming a high-profile problem over here, especially for the systems suppliers. What has the reaction been in the states from DG and from the user group?

Neal Clements
U.K. Data General User Group
BLCMP, Main Library
University of Birmingham
Edgbaston, Birmingham B15 2TT
England

Focus can't answer for either DG or NADGUG, but individual users are welcome to send us their comments, which we will forward to Mr. Clements—ed. Δ

■

Little big letters: have you noticed?

Starting with the July issue of *Focus*, the editorial staff has been experimenting with smaller sized capital letters used when referring to program commands in the text of an article.

There are a couple of reasons for this change—economics and esthetics. First, the smaller letters save room. In a technical article that includes a lot of references to commands, the savings add up to quite a bit of space.

Second, a long series of capital letters stick out on the page, and frankly, it looks ugly. (Turn to page 48 of the May issue if you want to see what I mean.) The smaller letters blend in with the copy, instead of jumping out at you. Of course, this probably bothers editors more than readers; many of you probably haven't noticed or don't care.

Unfortunately, we have run into some snags, and we need some help. We don't want to change *all* the words that are all capital letters. Acronyms such as NADGUG or DG should stay as they were. The rule of thumb so far is to change to the smaller capital letters for commands, such as OPEN, but not for proper nouns that refer to products, such as ICOBOL. This can lead to strange looking text, especially when a word with large caps is next to a word with small caps, which has occasionally happened.

If you have any suggestions, comments, or criticisms, please let us hear from you. Maybe then this issue can be settled once and for all. Δ

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The Magazine of the North American Data General Users Group

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IN YOUR HANDS

Volunteers breathe life into interest groups

As Data General and its user base grow, communication among the users becomes essential. This is the heart of the regional and special interest groups—bringing together users with similar interests in order to promote the free exchange of information. Those involved in the groups find ways to increase efficiency and effectiveness at their job. Currently, there are almost 40 groups, counting both recognized and start-up groups.

In the Data General community, support groups exist on a national and local level. Operating under the umbrella of the national organization, the RIGs and SIGs utilize the resources of NADGUG, while acting as independent organizations. Paul Duck, chairman of the RIG/SIG committee, works in conjunction with the NADGUG staff, making sure that the two layers reinforce and support the same goals, even though they offer different benefits.

One of NADGUG's most important functions is to help groups get started—and continue to help them once they're established. With support from Data General and the strength of more than 3,000 members, NADGUG can offer financial assistance, a membership directory, a subscription to *Focus*, program assistance for group meetings, and an extensive literature package. And as NADGUG grows, support for RIGs and SIGs also increases.

NADGUG promotions are responsible for overwhelming growth in the national group this past year. The biggest campaign started last March when a free six-month national membership was given to those members of recognized RIGs or SIGs who didn't already belong to NADGUG. From that, 748 people received full benefits of NADGUG. At the end of August, renewal rates will indicate the success of the promotion.

Despite rapid growth of the larger organization, it is the RIG and SIG volunteers that do the work and keep the necessary communication flowing among users. Duck calls the volunteers in the interest groups "the backbone of NADGUG." Still, all the groups can use more people.

"I can't imagine a group anywhere turning down a person that is volunteering," Duck said. People are needed to take care of membership statistics and dues, mailings, program coordination, meeting arrangements, newsletter production, and any other special plans.

"We emphasize to start-up groups that a core of at least four or five people is necessary to break down the responsibilities," said Duck. That way, duties can be shared and rotated, and the group can survive if an officer leaves. Some groups fail because the organization depends too heavily on the work of one or two people. When those people leave, the group essentially dies. "Trying to run a group singlehandedly is like taking on a second full-time job. . . . It's nearly impossible," he said.

Of course, the success of a group doesn't depend on numbers alone. The L.A. EDGE, with about 150 paid members, is one of the largest groups. But the Law Enforcement SIG is just as active, with a core of about 20 interested users. The best indication of the success of a group is their ability to communicate—and that takes work.

That's why new and old members are needed to volunteer. The interest groups provide a forum for people to discuss problems and solutions, and NADGUG is available to help, but the volunteers make both work as a healthy and useful support system. It's in your hands. Δ

Educators SIG can help with special problems of academic environment

Though the Educators special interest group is still in its infancy, the group should be standing on two feet after the NADGUG conference this year. A meeting of the group is on the agenda, and at that time, Skip Pomeroy, of Roger Williams College in Rhode Island, wants to take the formal steps to organize the loosely tied members.

Currently, the 36 people who met informally at a start-up meeting at the conference in Orlando last year don't pay dues, don't have a newsletter, and don't have any elected officers. The group hasn't been as cohesive as some would like to see it, and Pomeroy attributes this to the busy schedule of people in the education profession and the inherent problem of keeping a SIG organized across long distances.

One important goal of the group is the establishment of an Information Exchange Center. Pomeroy plans to set up a data base of solutions, workarounds, and ideas for the special applications that arise in schools. A library of tapes would be available to members, and the software would be given to users requesting a solution already in the data base. So far, the software for the library has been purchased, but not set up. The location hasn't been determined either.

Communication among schools using Data General computers is important because a school may be devising a solution that has already been worked out some place else. "There's a lot of homegrown software, but no one knows about it unless they keep in touch," said Pomeroy.

Currently, Pomeroy wants to mail out a list of academic DG users to approximately 100 schools to let them know who is out there to call for help. He is also working on mailing a letter. Then at the conference, he hopes to attract a large group of volunteers. Some of the work has already been done, for instance, the bylaws and an accounting system have already been established.

Anyone interested in joining the Ed SIG or anybody with a question or a solution can contact Skip Pomeroy at Roger Williams College, Academic Computing, Bristol, RI 02809; 401/253-1040 ext. 2170. Δ

The map indicates the location of the 39 Data General regional interest groups, including start-up groups that have not yet received official recognition from NADGUG. If you would like to join a particular group, notify the person listed as the contact. If you do not see a regional group in your area, notify the NADGUG staff in Westboro (617/898-4067) about your interest in seeing a new group start up.

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2. Northern California Frequent Users of Data General Equipment (NO-CAL FUDGE)
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3. San Diego Users Group
Contact: Rich Gruenhagen, 619/543-0348

4. Denver Area Users Group (CODGUG)
Contact: Bruce Cary, 303/755-6300

5. Phoenix (Connecticut)
Contact: Ronald F. Shea, 203/281-1060

6. South Florida Data General Users Group
Contact: Terry Sponaugle, 305/556-3322

7. Atlanta Area Data General Users Group (AADGUG)
Contact: Albert Still, 404/449-7211

8. Boise Area Users of Data General Equipment (BUDGE)
Contact: Roger Bradshaw, 208/334-9458

9. Chicago Area Data General Users Group (CADGUG)
Contact: Art Lewandowski, 312/420-3180

10. Kansas City Area Users Group
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11. New Orleans Users Group
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12. Northern New England (Boston) Data General Users Group (NNEDGUG)
Contact: Alan Sibert, 617/890-0071

13. Detroit Area Users Group
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14. Minnesota Area Data General Users Group
Contact: Jan Grossman, 612/333-5353

15. Mississippi Users Group (MISSUG)
Contact: Ben White, 601/982-8210

16. St. Louis Area Users Group
Contact: Ron Cohen, 314/889-2822

17. Mid-Plains (Nebraska) Data General Users Group (MPUG)
Contact: Tony Caniglia, 402/498-1994

18. New Mexico Regional Interest Users Group
Contact: Joel Johnstone, 505/766-2185

19. CAN-AM RIG (Upstate NY and Ontario)
Contact: Rick Binder, 716/684-0001

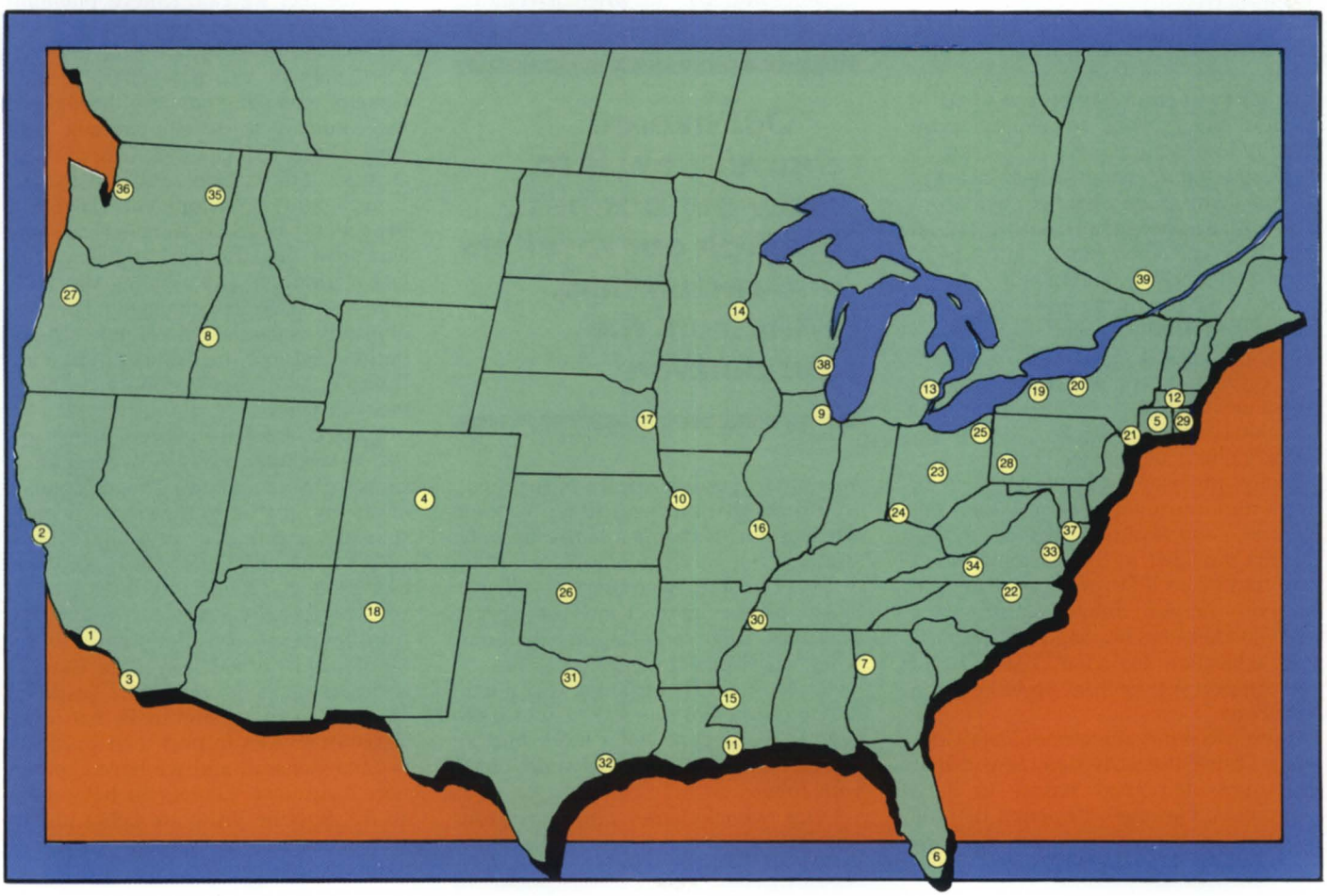
20. Central New York Data General Users Group
Contact: Joanne Terry, 315/422-2131

21. Metropolitan New York Data General Users Group (NYC and NJ)
Contact: Stephen Kern, 201/327-6300

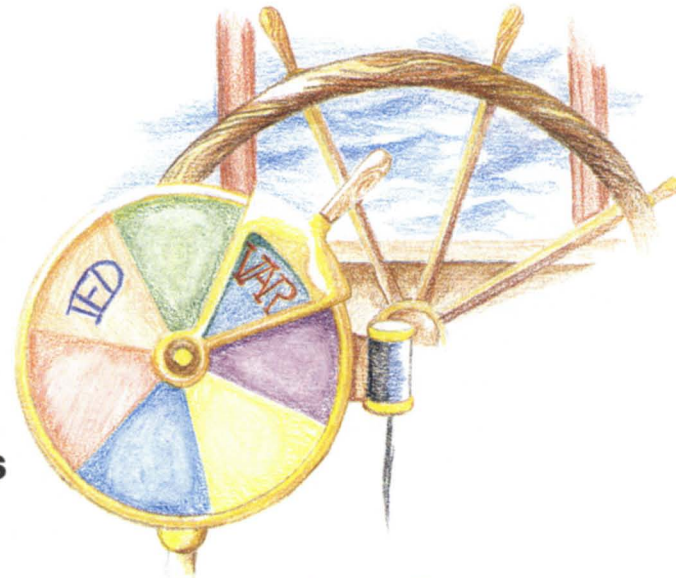
22. Southeast Area (North and South Carolina) Regional Interest Group (SEARIG)
Contact: Andy Wasilewski, 919/829-4215

23. Central Ohio Data General Users Group
Contact: Raymond L. Mills, 614/764-6000

(continued on page 58)



CHANGING CHANNELS



Distribution Division's new VAR strategy signals end to IED contracts

Focus staff

Focus first noticed a change when major Industrial Electronics Distributors (IEDs) suddenly canceled their advertising for fall of 1987. Ed Egan, of Egan Systems, explained that Data General had terminated all IED agreements in order to emphasize the Value-Added Reseller (VAR) channel.

The IEDs were originally chartered to provide new Data General equipment to small VARs that didn't have the business volume to qualify for equipment discounts from Data General. As part of the new distribution program, the discount structure has been revised to permit small VARs to qualify more readily for discounts.

Despite these changes, Egan believes that a distribution channel could continue to deal effectively with a subset of DG's customer base. After eight years of working with Data General people and products, Egan was sorry to see the relationship end. "I really did enjoy it," he said, "and I feel they were an excellent supplier. I encouraged them to change their mind—and I hope they do. I wish them well."

Ira Cohen, of Copley Systems, was equally philosophical. "Data General feels they can offer the same service," he said, "and save the difference in discounts provided to that customer—but can they? The IEDs provided technical support, rapport, immediate attention to deliveries, credit, ongoing support, and education for small VARs. Local DG support just isn't set up to help the small guy."

John McGlone, director of Data General's Distribution Division, agreed that IEDs provided good service to their customers. However, he stated that for the most part they were working with end-users rather than VARs, and much of their business involved doing hardware upgrades for the installed customer base. That represented some conflict with VARs and DG.

McGlone discussed the recent changes in terms of an overall marketing strategy designed to bolster Data General's VAR relationships. "We view our resellers," he said, "as the people who provide our end-users with the ultimate solutions. So when a solution other than pure hardware is required, we expect that business to go through our resellers. If there's a hardware-only situation, we can handle it."

> ***'Our overall charter now is to grow our business through our resellers and recruit new VARs from the competition'***

Data General, for example, will still be the primary contact for Fortune 500 or purely office automation situations where hardware and CEO are the answer. Most VARs, McGlone explained, are not in the Fortune 500 business, except at the departmental level, and at that level the sales reps would work with them.

"Our overall charter now is to grow our business through our resellers and recruit new VARs from the competition," he said. This strategy is the opposite of what DEC is pursuing. According to McGlone, "DEC is reducing the discounts for VARs and basically working to take business away from them in an effort to go head-to-head with IBM. Their investment in a larger sales force will be at the expense of resellers. For a company like IBM, resellers may not be critical, but our VARs are. We feel we can achieve phenomenal growth through them."

As part of the new charter, Data General is making changes throughout the company to develop, recruit, and support the VAR channel. One of those changes is the creation of the VAR Marketing and Development Division, headed by Ward McKenzie. McGlone explained that this new division is in fact a group of five existing divisions whose charter has changed. The five divisions include McGlone's Distribution Division, the Product Marketing Division, and three product development divisions.

Specific implementation plans are being developed by each of these divisions. On the product development level, the goal is to develop industry-standard products specifically for resellers. The emphasis will be on low-end products, some of which may be available in early 1988.

In terms of recruiting new VARs, McGlone described how Data General is "attacking" DEC and IBM. "Basically, we provide conversion tools that make it easy for VARs to port their products to Data General, and we have Conversion Assistance Centers to help them do it." Specific VARs are being identified by various DG divisions such as Industry Marketing. (See article on

education marketing in this issue of *Focus*)

Support for the VARs includes a broad range of marketing and pricing arrangements. "It's a real partnership," said McGlone, "where we get involved with a VAR's key opportunities." With medium-sized VARs, for example, a customer may worry about their longevity. DG becomes involved as a way to show support and backup. "If a VAR feels they need a senior executive from DG to help close a sale—we'll do it!"

That raises another issue from the end-user perspective, i.e., what happens to the user when a VAR goes out of business or is not performing as it should? McGlone said that the industry as a whole has matured, and the turnover in VARs is now less than 1 percent. The small VARs are the ones that may be a problem, and most of these have DG service. As a result, DG can keep up with them and find alternatives for their customers.

According to McGlone, VARs want to know how DG can help them grow their business. Joint trade show appearances, joint advertising in specific industry trade journals, coordinated annual account plans, training, access to the sales force, the latest news on product developments, and the annual resellers conference—all are ways DG works with VARs for their mutual benefit.

In terms of pricing arrangements, Data General has gone to straight dollar volume agreements for both end-users and VARs. The volume totals are based on all purchases from DG. The basic idea is the higher the dollar volume, the higher the discount. There are about seven classes of product categories and 20 levels of dollar commitment/discount arrangements. With the new arrangement, resellers will get a greater discount than end-users, but McGlone believes that the new pricing will still be attractive compared to the competition.

With DG removing the IED channel, the question remains whether they will be able to supply the same level of service to former IED customers. McGlone feels confident they can. "For one thing," he said, "you have to remember that most of their business was with end-users, not VARs. As far as equipment delivery, we're capable of low- and middle-range deliveries within a week or two, and at the higher end, we can ship in 30 days." The new VAR strategy is designed to meet the other areas of service that IEDs provided. Δ

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TRICKS ARE FOR KIDS

University staff learns how to handle student mischief

by Rolland Everitt
Special to Focus

Those who operate computer centers at the college level are familiar with mischief. Students can be expected to pull pranks ranging from the harmless to the criminal. However, the most popular stunts seem to involve abuse of the CLI SEND command.

SEND enables a user to cause a message to appear on another user's terminal. The message is prefaced by the number of the process that sent it. This disclosure usually deters the student from sending obscene or mischievous messages. Most students soon figure out, however, that if they log off immediately after sending a message, they won't get caught. Moreover, that person's PID may be quickly assigned to another user, who may receive a reply to the message (or take the blame for it). What fun!

Next they learn how to include nonprintable characters in the message text, using the !ASCII pseudo-macro. Below is a simple macro called BOTHER.CLI, which can be used to send a message and make it appear that it came from a different PID.

```
SEND %1%
  [!asc,231,231,231,231,231],%2%:,%3-%
```

The first argument is the target console or PID, the second is the PID to be implicated, and the remaining arguments are the message text. The five ASCII 231 (CTRL-Y) characters cause the second argument to overprint the sender's true PID number.

Other fun tricks include sending form feeds or control characters to erase the recipient's screen or turn on programmable terminal features such as underlining, reverse video, etc. A creative prankster can also mimic system error messages, alarming other students.

There are several strategies for dealing with abuse of SEND. The most obvious is to activate the NRM terminal characteristic. The CLI command CHAR/NRM prevents the reception of such messages. Users can be educated on the use of this command, or the system manager can make NRM a default characteristic for user consoles. These measures prevent unwanted messages, but they also deprive management and users of a useful capability.

If there isn't a legitimate need for the SEND command on your system, then alter default terminal characteristics to prevent its use. But if you want to preserve the SEND capability, don't permit students' antics to stand in your way. There are other ways to deal with the problem.

Until Data General redesigns the CLI to prevent abuse of the SEND command, you should consider patching the CLI yourself. The following is a patch that we applied to CLI.PR (rev 6.00):

```
; patch to cli.pr
;
; turn SEND command into SEOD command
;
; location    old     new
;
%USER
;
16535.    20036.    20292.
```

This patch turns the CLI SEND into SEOD. I don't guarantee its usefulness or applicability. It worked for us, and I offer it only as an example. The patch alters one byte in the table of commands. You shouldn't have any difficulty designing your own patch, but be sure that the new command falls alphabetically between SEARCHLIST and SPACE. Also, be sure to retain an unpatched version of CLI.PR.

When we applied this patch to the CLI, the SEND command ceased to exist. The command is now SEOD—a fact we have kept secret from users (at least until now). The next step was creating a SEND macro to take its place. The following is the text of SEND.CLI:

```
x,talk %1-%
```

This macro runs a program called TALK and passes arguments to it. TALK was written in AOS/VS BASIC, but it could easily be implemented in another language.

TALK uses the ?GTMES system call to obtain the arguments passed by SEND.CLI. It receives the arguments as the string variable MESS$. The message string is edited to remove control characters, form feeds, etc. The first argument, which must be the target PID, is stripped off and converted to a numeric variable. The username and PID of the sender are appended to the message. A BEL character (ASCII 207) is included to draw the recipient's attention in case he isn't looking at the terminal when the message appears. Finally, the SEND system call is invoked to send the message. A typical message might appear on the recipient's screen as follows:

```
From Pid 35: Hi, want to join me for coffee?
MESSAGE FROM USER: RDE—REPLY TO PID 23
```

TALK is a "quick and dirty" replacement for the CLI SEND command and doesn't reproduce all of its functionality. Certain improvements to the program have been held back in order to make the new SEND command less convenient, and to discourage its use for long dialogues. TALK won't accept a target console argument, nor will it permit the sending of nonprintable characters. Exception handling is not very user-friendly. An improvement over the CLI SEND is the disclosure of the sender's username.

A user-friendly version of TALK might accept the target console as an argument, report the sender's console, and fully explain exceptions. A secure version might require a password or check the sender's console, restricting its use to management.

A previous incarnation of TALK, implemented after numerous complaints about obscene messages, mimicked the CLI SEND command in all respects but logged messages in a file along with the date, time, and username. Any control characters in the message were represented in the log by mnemonics such as CTRL-Y and ⟨FF⟩. This approach identifies the individual responsible for the messages—and led to the apprehension of several surprised jokers. Log-

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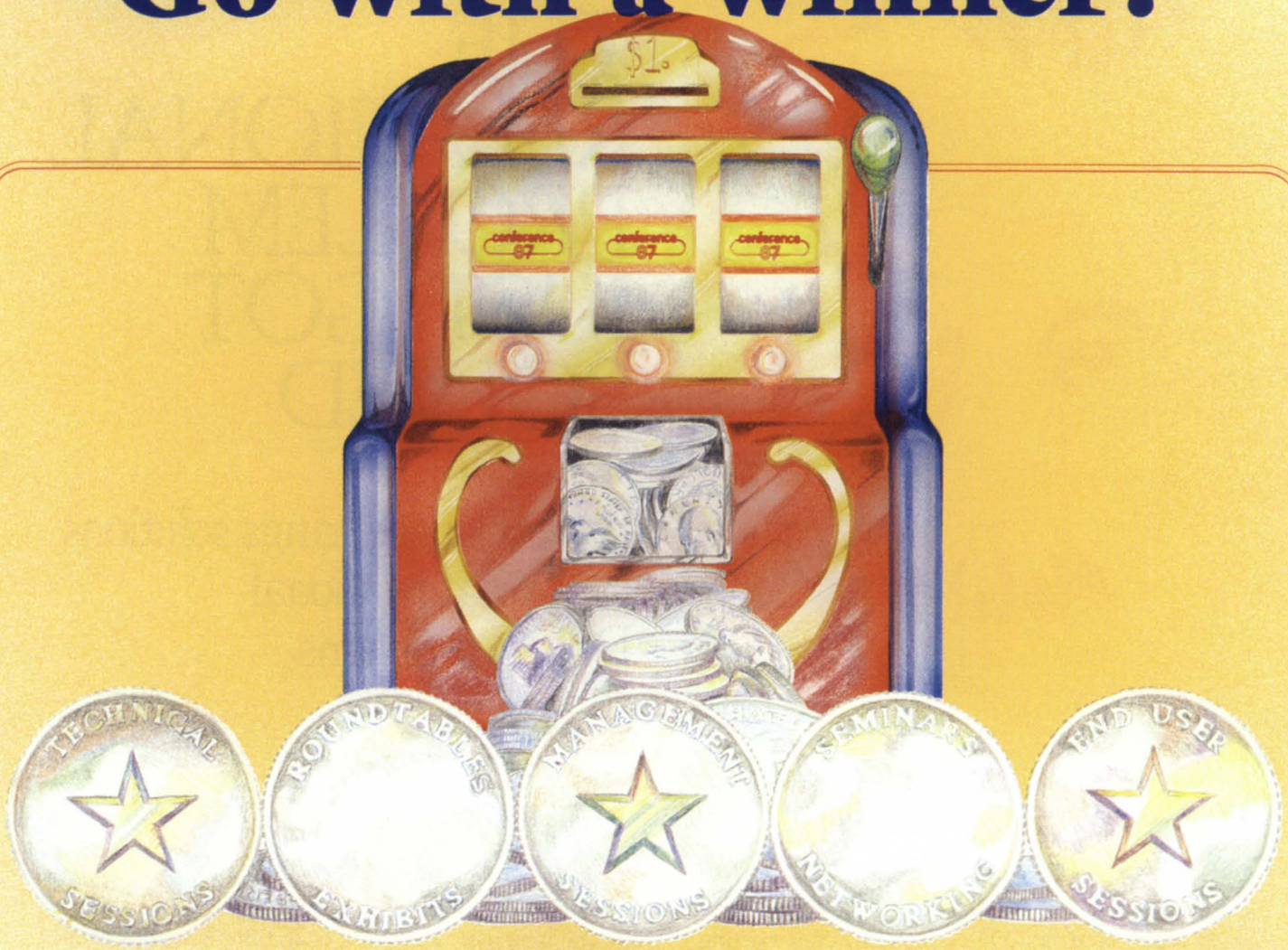

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ging messages was discontinued because it was seen as an invasion of privacy and because of the incredible volume of messages being sent.

Unfortunately, I recently made the alarming discovery that the AOS/VS HELP command betrays the new identity of SEND. HELP gets the text for most of its topics from files in :HELP, however, in the case of topic *COMMANDS, the text comes from its internal table of commands—the same table that my patch modified. So entering HELP,*COMMANDS reveals the new SEOD command. Fortunately, this is easily fixed.

The following is a patch to CLI.OL that prevents HELP from referencing the internal command table and causes it to look for a text file in :HELP instead:

```
;
; patch to disable HELP, *COMMANDS
;
%USER
; location    old    new
;
; 6F8H    2A43H    2643H
```

Again, note that this patch applies to rev 6 of CLI.OL. There is no guarantee of its applicability for your purposes. It worked for us.

Before applying the above patches, create a text file using the following command:

```
HELP/L=CLI.TPC.COMMANDS,*COMMANDS
```

This file should be given an ACL of +,RE and moved into :HELP. It can be edited to remove reference to SEND or any other commands that you prefer not to advertise.

Another important concern in the academic arena is security. Most security problems are the result of clumsy attempts by a novice user to steal someone else's work. These are easily thwarted. But in most college computer centers, there is usually a clique of advanced "computer jocks" who see system security as a challenge. Consider the following scenario:

Once, a student employed by the computer center learned the password of a superuser and logged on using the privileged username. He ran PREDITOR against his own user profile and gave himself every available privilege. The student copied the PREDITOR program into his own directory, renamed it, and reset the ACL. Now logging on under his own username, he could run PREDITOR without being noticed. He could give his friends privileges. He could give privileges to other student usernames, use DISPLAY against their user profiles to determine their passwords, and then use their newly privileged usernames without their knowledge or consent. He could have even created new privileged usernames at will.

Does this sound farfetched? I would have thought so until it happened to us. We were fortunate that the small group of students in on the conspiracy didn't do any real damage. It is hard to detect such activities. We were lucky. A system programmer visiting from another school happened to overhear an indiscrete conversation and reported it. Even with this tipoff, several weeks passed before we understood the scope of what had been going on, and several months later we were still finding surprises. We discovered that certain files in :HELP had been replaced with poetry.

After completely rebuilding our system, I vowed that never again would hackers tunnel so far under the wall. We re-examined system security and took certain measures. The most obvious precaution was safeguarding passwords. A system is only as safe as the passwords of its privileged users. We also renamed PREDITOR and moved it to another directory. This can cause slight inconvenience at AOS/VS update time, but it's worth the trouble. We redesigned our homegrown system usage reporting utility (which we used instead of REPORT). It now reports connect time for *all* usernames, not just for a list of *known* users. We also wrote a utility called SCANNER that produces a report of user privileges.

The SCANNER utility is invoked by a macro, SCANNER.CLI, which is usually submitted as a batch job. SCANNER.CLI uses the CLI FILESTATUS command to create a file called USER_INDEX, containing a list of all user profiles. SCANNER then reads this file and extracts the usernames. It reads each user profile and analyzes the user privileges, which are reported in a tabular format. The output file is called SCANNER_REPORT. In addition to maintaining security, SCANNER_REPORT is valuable as a ready reference when diagnosing user complaints that may be privilege-related.

The perpetrators of all this trouble received the sternest punishment short of expulsion, and they have since graduated. Δ

Rolland Everitt can be reached at Roger Williams College, Academic Computing, Bristol, RI 02809; 401/253-1040 ext. 2170.

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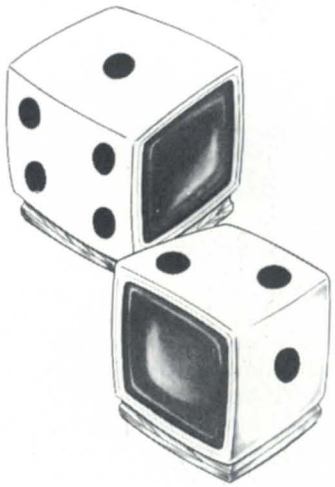

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SCHOOL OF THOUGHT

DG's new marketing strategy directed at education

by Geri Farman
Focus staff

In the August issue of *Focus*, Terry Bennett, director of Manufacturing Industries Marketing for Data General, described how DG is targeting specific industry areas in its effort to develop "solutions" marketing. One of those key areas is the field of education. This month *Focus* visited with Joel Wachtler, education marketing manager, and Dave Dimmick, donations administrator, to explore the overall strategy and specific solutions Data General is pursuing in this field.

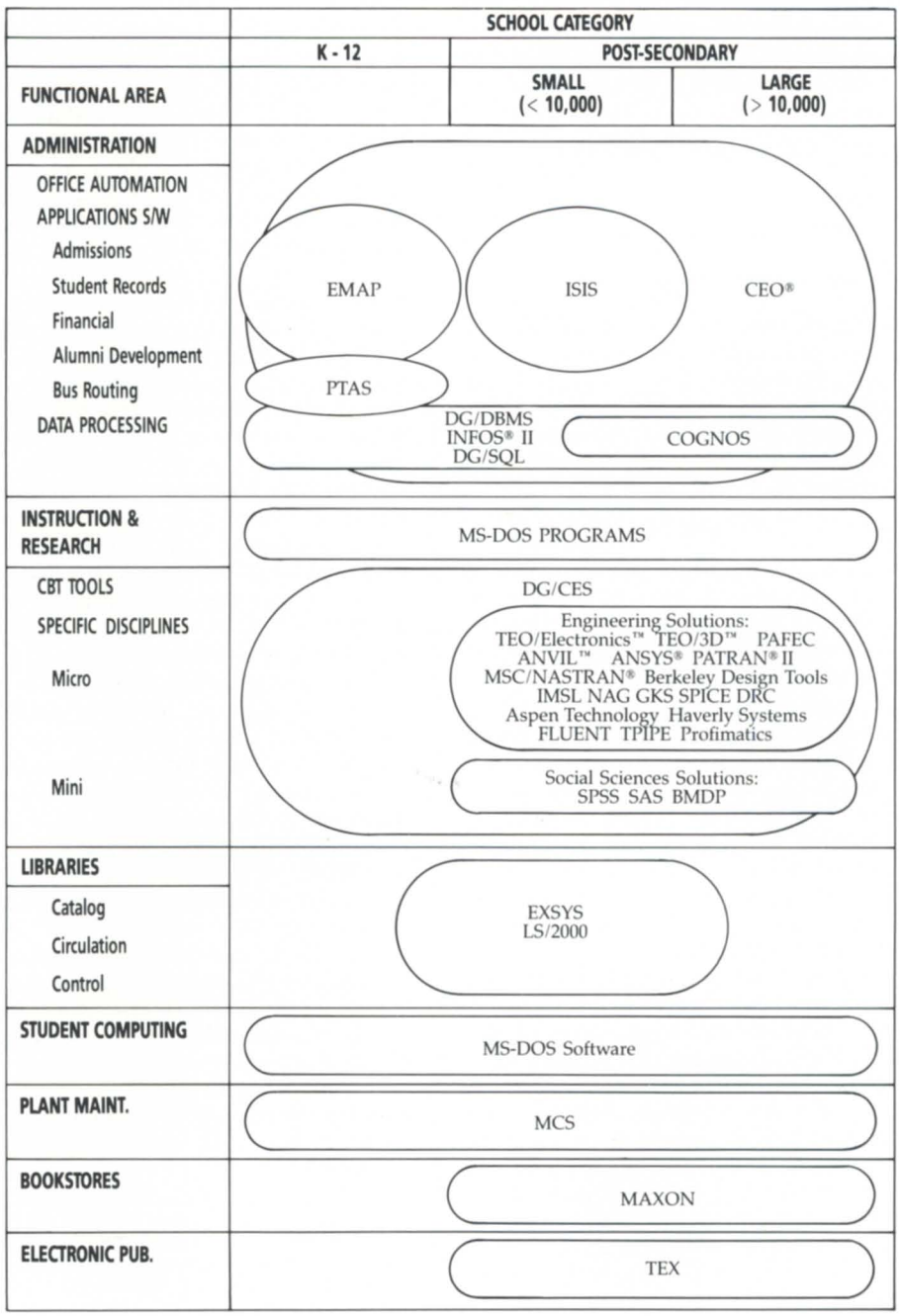
"Our basic philosophy in marketing," Wachtler said, "is to segment the market into components and identify the specific product and sales requirements necessary for both solutions and customer awareness." The work that has been done to date is summarized in Figure 1. Wachtler emphasizes that this chart of education market segments and ISV/OEM solutions is "a snapshot" of their work in the field. "Updates are always happening," he said, "and as we gather new information about the market, we seek continually to form new relationships with specific software vendors."

The chart is explained in part by the accompanying descriptions of some of the key solutions software. In the area of instruction and research, Wachtler emphasizes that the specific solutions for engineering and social sciences are provided as examples of the kinds of field-specific software available.

The *ISV Solutions Catalog* has more than 700 pages of available technical solutions that universities can use in their academic and research efforts. "What we provide for this functional area is a toolkit of software that people expect and need to have," he said. The CBT tools listed in the chart refer to computer-based training tools. In addition to providing specific CBT tools for its own products, DG provides a number of products, such as the "Educator," that make it easier to author such training tools. A full listing of CBT tools is available in the *Customer Education Catalog* from Educational Services.

For users wanting some basic computer tools, DG offers an educational software package that includes the AOS

Figure 1



operating system, the CEO office automation package, Fortran, COBOL, Pascal, PL/1, and the SQL data base management system. Communications software includes X.25, SNA, SDLC, and Xodiac. "This package," Wachtler said, "is one of the distinguishing features for us." Data General makes avail-

Market segment analysis of education OEM and ISV solutions

Administration

EMAP—Educational Management Assistance Program software from ABMP, Inc. A complete interactive data processing system for administrative and student functions at the kindergarten through twelfth-grade school and district level.

ISIS—Integrated Student Information System software from CMD, Inc. A complete integrated administrative system for management that addresses the administrative problems associated with all student, financial, and alumni development administrative activities.

PTAS—Pupil Transportation and Assignment System from ADS. Software that enables schools to find the most effective and cost-efficient solution to their transportation problems.

Libraries

LS/2000—From OCLC. An integrated local library system that increases access to library resources and streamlines technical processing tasks. It addresses all library administrative functions, including on-line public access cataloging, circulation, and control.

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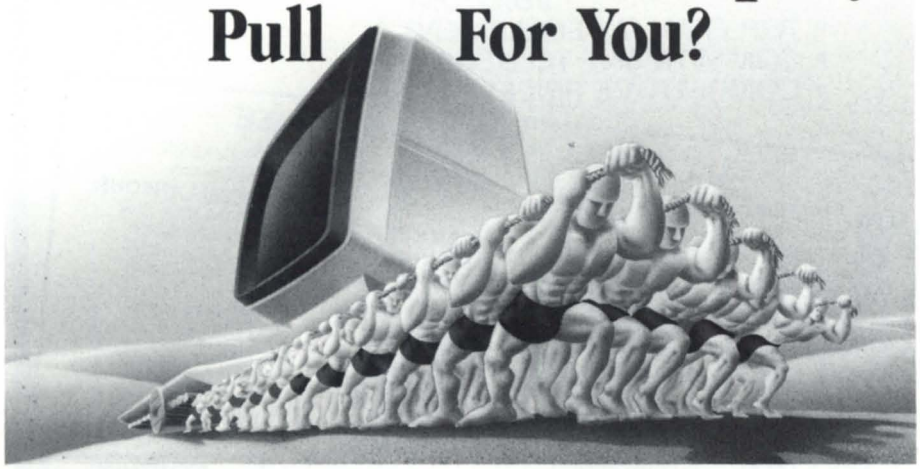

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able as much software as they can for one fee. It usually amounts to about an 80 to 90 percent discount for the school and includes software that doesn't command a royalty.

"We are looking for a few select relationships with ISVs and OEMs to address particular market needs. For Data General, it is enough to apprehend the emerging technology in hardware, system software, and communications. Our job is to stay on the leading edge of that technology and to form partnerships with software vendors who work to stay on the leading edge of their fields."

To make this strategy work, Data General is putting a major effort into developing and maintaining these third-party relationships. An example of this commitment is their work in the past year with Computer Management Dynamics, Inc. (CMD) in Nashua, New Hampshire. CMD is an ISV that specializes in administrative software for colleges in the 1,000- to 10,000-student range. Their ISIS software is an interactive, menu-driven system composed of 18 different modules for administrative functions. Schools can select the functions they need and tailor the system to their particular requirements.

"Compared with the academic segment of the market where the effort is to provide a basic toolkit of software," Wachtler said, "the administrative segment is problem-driven." From Data General's perspective, CMD offers small colleges the type of solution they need.

"What we've done to foster this relationship," said Wachtler, "is pursue a variety of publicity and sales efforts." Each week the local DG branch sales representative in Nashua meets with the CMD vice president of Sales to review available opportunities from around the country. Based on this review, they devise a marketing strategy for each potential customer that will capitalize on the strengths of both CMD and DG.

A great deal of Wachtler's time has been spent on the CMD relationship. As the sales force becomes more aware of the product, he will be focusing more attention on other areas. One of these other areas is the larger university.

"For larger schools," he said, "CEO is a good horizontal platform." He compares the communication problems of these larger schools to the basic office automation situation. "CEO, with its mailbox and integrated filing and

"TRIM financial and management software gives you the impossible: rich functionality and ease of use."

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Tell us about your support services.

Right. A couple of things are important to remember here. First of all, since we are the authors of the software, we can customize a program with ease. Many packages marketed today are not supported by the original authors, making changes to the programs difficult and expensive. Second, we have been a DG VAR for over 13 years. We know the hardware, how it works, its capabilities. Usually, any problems that arise can be handled with just a phone call. Last but not least, we have been in the business a long time, which gives the customer assurance that we'll be there when we're needed.

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Anything else we should know about TRIM?

When we set out to develop TRIM, we wanted to create as perfect a product as possible. That's why seventy percent of the design came directly from input we sought from our users. We're also the only system around to take full advantage of the architecture of DG's 32 bit MV family of machines. In addition, TRIM is written in ANSI COBOL, utilizing structured coding principles and extensive copy facilities. We're talking real power and flexibility.

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Just give us a call on our toll-free number. We can either set up a demo over phone lines or in person in your office. You really do have to see TRIM work to appreciate the power and potential of the system.

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The software takes advantage of DG's 32-bit architecture.

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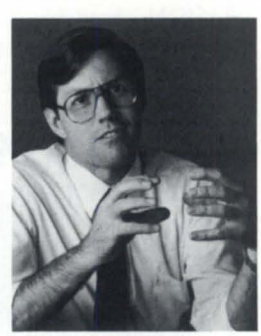

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word processing system, gives enormous utility to people and ties the university community together."

At Northwestern University in Chicago and Evanston, Illinois, a Data General system was selected as the foundation of an office automation and communication system. DG was selected because only 3 out of 13 major office automation systems analyzed were compatible with the existing unshielded twisted-pair wiring used in Northwestern's internal telephone network. Of these three, one lacked the necessary software and another had no users. Data General's system was able to communicate with the existing IBM mainframe and IBM PCs.

Wachtler sees their success in this larger school environment as an endorsement of DG's pursuit of an open-system strategy. According to Wachtler, "We embraced standards as they began to emerge, and we speak to IBM better than IBM speaks to itself!" In these environments, DG is pushing to make what is already in place work to maximum advantage.

While CEO provides a basic platform for the large school administrative strategy, Wachtler would like to find an all-purpose package for this level that would complement existing offerings. At the other end of the scale, DG has recently added EDGO, a Unix-based administrative system, and Campus-America, an AOS/VS system for schools with under 1,000 people, to its group of university solutions. ABMP, Inc. is providing its EMAP software as the administrative base for local elementary and secondary school districts.

BITNET is a problem that Data General has faced in the education market. This store-and-forwarding software product was developed on IBM, ported to DEC, and has served as a worldwide communication network for academics. Until recently, the fact that DG couldn't offer this capability was a problem—automatically excluding them from some key customers. Bob Owen, the person who ported BITNET to DEC, has now finished porting it to DG, and it's 100 percent operational. DG will be taking it to its exhibit at EduCom in October.

This work on BITNET is an example of DG's strategy of aggressively finding solutions for the market segments being addressed.

In another arena, the donations program at Data General is helping schools and universities keep up with fast-changing technology, while also fulfilling some of Data General's needs. "There is a change coming in the donations program," said Dave Dimmick, donations administrator for Data General. With donations totaling almost $2.5 million this year, it could pay to understand this new focus.

"The new emphasis," said Dimmick, "is on establishing clear goals and responsibility for each donation." If a specific division wants to establish a university relationship, they will bring their request to the Equipment Donations Committee, which represents 14 distinct areas of the company. The division's job is to convince the committee of the value of the donation by explaining the specific goals that it will accomplish."

The system can work in reverse as well—a university can bring a request to the committee if they feel they can offer Data General something of value in return. It may be, for example, that technology will be advanced, students will be trained on DG equipment, or articles will be written in journals. Requests from universities will only be accepted, however, if a specific division wants to accept sponsorship.

A recent example of the donations program is the establishment at California State University, Long Beach, of a Logic Design System and Interactive Logic Simulation Laboratory within their School of Engineering. This lab will be fully operational in the fall of 1987 and represents a $575,715 investment in the essential tools of computer-aided electronic design. The donation was arranged through the efforts of DG's Industrial Marketing Division.

"Schools simply can't afford to keep up," said Dimmick, "and donations help make sure they are working on current technology." At the university level, DG tends to donate hardware, software, and, less frequently, some software-related service.

A Community Donations Program focuses on public schools as well as community groups. Again, the focus is on strategic relationships. Proximity to DG facilities is also a factor. Westboro High School recently received a donation in the $350,000 range, which is being used for communication courses (journalism and foreign language training) and computer science instruction. Δ

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JUST DON'T DO IT

A crash course for college system managers

by Edward E. Lindberg
Special to Focus

Western New England College is a private, co-educational, secular college located in Springfield, Massachusetts. Enrollment is about 2,100 students in the day, 1,500 at night, 830 in law school, and 600 in off-campus programs. We offer undergraduate degrees in the arts and sciences, business, and engineering, as well as graduate degrees in business, engineering, and law. All three undergraduate schools have computer science programs and make extensive use of computers in their other degree programs.

We purchased our first Data General computer in July 1978. The machine was an M/600 with serial number 12. This computer was supposed to last the college at least five years. We presently have one MV/8000 dedicated to administrative data processing, one MV/8000 dedicated to academic timesharing, and an MV/4000 for special academic applications. We are considering upgrading to an MV/10000 for administrative applications and replacing both academic computers with an MV/20000.

This article is intended to point out special facets of academic computing in our college environment. Administrative computing is another topic. I should mention, however, that in terms of administration, we have developed all of our own integrated software using some pre-packaged software such as WordPerfect, MathPlan, Cyberquery, and Interactive COBOL. We pulled these together ourselves because, in my opinion, there isn't anything out there that can do the job as well.

Our first problem has always been creating 1,300 to 1,500 usernames in a matter of hours at the beginning of each semester. We've tried several different procedures, but our present approach is to create a file on magnetic tape from the administrative computer. The tape, which is the equivalent of a set of class rosters, is created at the end of the last registration day. Using "sneaker net," we then carry the tape to the academic computer and load it.

A program on the academic machine creates a set of usernames with pre-determined characteristics (for example, no owner access) from this roster file. A faculty member can request usernames for a class by either calling or writing us a note. We even have a set of macros that will automatically signal username OP that a given instructor has requested usernames for a specific course. All usernames are created by the computer center staff, and to balance the disk load, every UDD entry is really a link. Users are alternately linked to one or another of our 277 MB drives. The linking of usernames is transparent to the person running the program.

A monitor process controls the allocation of resources and the amount of time a student can occupy a given set of terminals. During peak periods we always have more students wanting to use the machine than there are terminals. This is especially a problem at the end of each semester.

Also, some students don't make the best use of their terminal time. They may start to create a program without even coding any instructions on paper. As a result, they spend more time *looking* at the terminal than *using* it. We felt that after one hour a student became less productive and could use a break, so we created the monitor program.

This Fortran program logically groups the terminals. For example, the hardcopy terminals are one group, the upper-case-only terminals are another group, the terminals in the Computer-Aided Design Laboratory are a third group, etc. When a student logs on to a terminal group, the monitor notes the time and allots a one-hour connect time slice to that username. At the end of one hour, if 90 percent of the terminals in this particular group are in use (the percentage can be changed system wide), the student will be sent several warning messages, and then the session for that student will be ended.

Students are given a "one for two" time credit. After using one hour of connect time, if students need another full hour, they must stay off the machine for two hours. If they only worked for half of an hour and then voluntarily stayed off for one hour, they will again be eligible for a full hour of connect time.

The monitor has additional features to control the batch streams. The first program to run on our M/600 was written by a faculty member with a Ph.D. in electrical engineering. He developed a compute-bound infinite DO loop. Anyone familiar with AOS knows the result of this type of program. The monitor only allows 20 minutes for any job in a batch stream. This feature and other improvements in AOS and AOS/VS have kept the system from disappearing in similar circumstances.

Over the years we have tried various configurations and priorities for the batch streams. All compiles and links go through the streams and are handled by another overhead process. Students don't have to worry about switches and different macro names. All compiles have the same syntax. For COBOL, the compile and link command is CCOMP Progname. Similar macros for Fortran and Pascal are F77COMP and PASCOMP. All the macros understand the no-link switch, and the program that controls these activities will not attempt a link if the compile wasn't successful. One valuable feature of this approach is that the macros can detect when a student doesn't understand how compiles or batch streams work.

We noticed that students were batching off compilations, then recognizing an error in the source code even before the program was in a stream. They would proceed to invoke SED, "correct" the source code, and rebatch off the job. It was disconcerting to see 10 compiles and links of the same student's PROG1 waiting to get into the four batch streams. The compile macros now cancel a prior compile anytime a student batches off another compile of the same program.

We make use of the system logs for a variety of activities. We can produce charts of terminal activity and point out to both faculty and students that there is adequate machine availability. We can assess hardware needs and make planning projections using this information. On at least one occasion, a student told a faculty member that he had worked in excess of 20 hours on a

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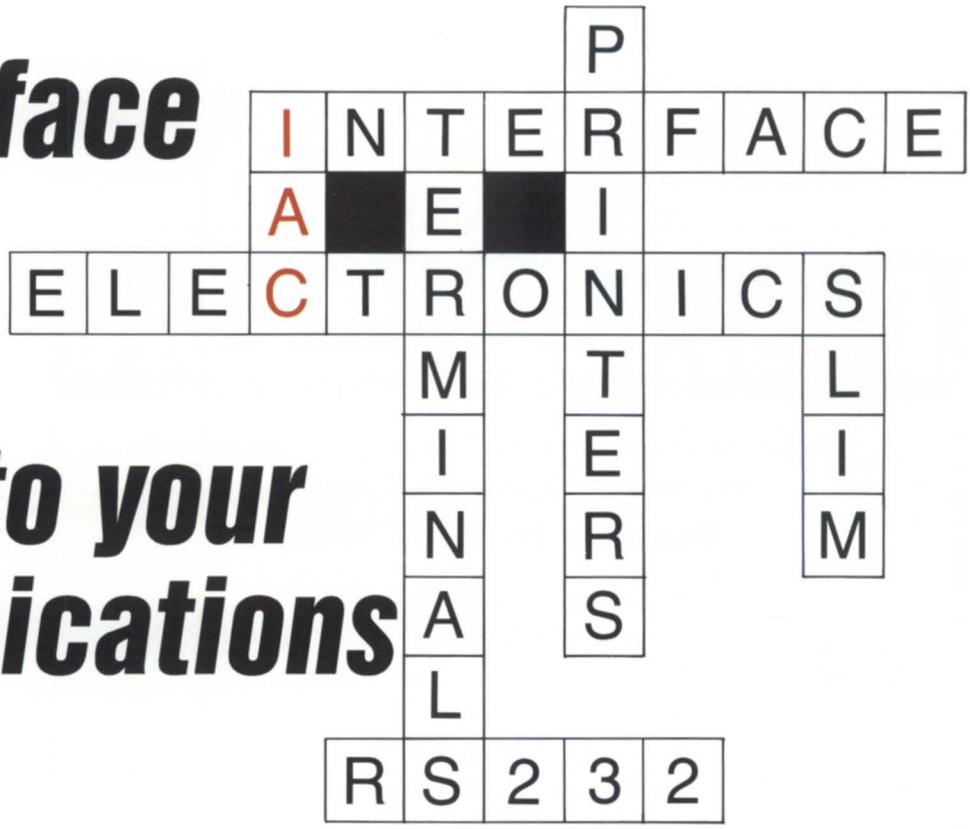

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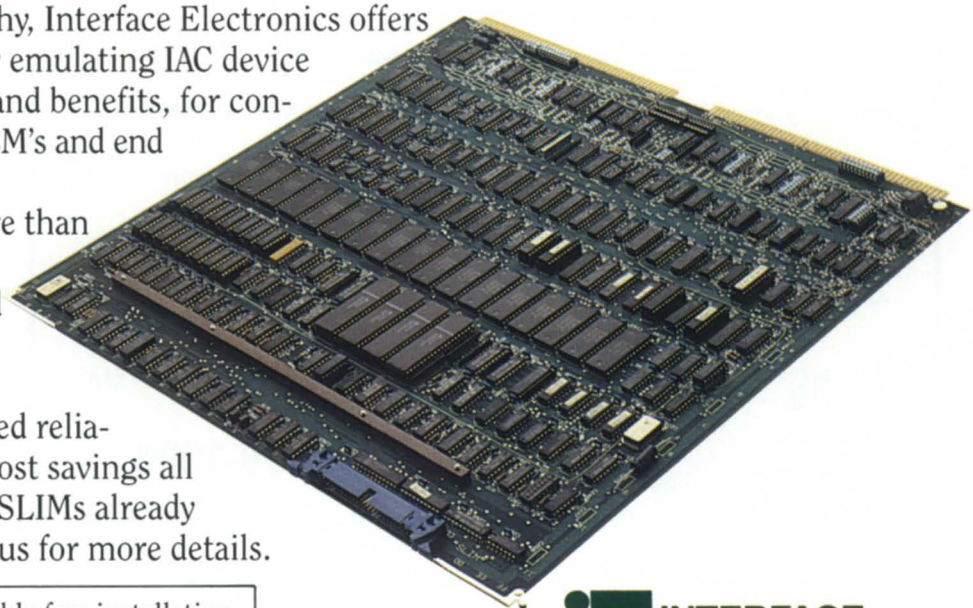

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project that was intended to only take a few hours to complete. With our programs, we were able to show that the student hadn't been on the machine for the duration of time he was claiming.

We also produce monthly usage reports that can indicate to faculty members that a student hasn't been on the machine in the past month. It's always an interesting discussion when a student who hasn't been on the machine requests an extension for computer projects.

We use the same set of procedures on all three machines to back up, restore, and recreate user files. Each day we batch off a series of commands that provides for our daily backups. The common structure asks when the backup should begin and how far back it should copy files. It contains obvious defaults and understands the day of the week (on Friday nights we delete all +.ED files).

When it's time to run the backup, a batch job will start up, pause all streams, and wait for the streams to empty. After the streams clear, this job will proceed to dump to disk every file we wish to back up. A file will be copied if it has a time last modified within our copy range and has the appropriate template. We don't back up .ED, .OB, and .PR files, and we back up different files for different users (faculty get more files copied than students). We make extensive use of templates, the plus, the backslash, etc.—and as you might expect, we have never been successful using DUMP_II. (I understand it might be working in rev 7.5 of AOS/VS.)

The obvious disadvantage to this approach is that we need sufficient disk space to store all the modified files. When all the files have been copied, the job will continue the streams (allowing batch jobs to begin again), declare itself successful, and batch off a final job. The final batch job—a disk to tape copy of the modified files—is released by the morning operator. Writing down what happens is certainly more difficult than the actual activity.

This approach to backups isn't without its problems. I've already noted the problem that turned up when DUMP_II was developed, and we found out that we weren't getting backups of all that we needed. There is also the interesting problem of what to do when a student nests more than the maximum number of subdirectories allowed under AOS/VS (a total of six, I believe). The backup, which starts with the root directory, encounters a directory structure that it can't handle.

This results in the backup "blowing away," and unfortunately, it isn't easily detected. Not only do that student's files not get backed up, but the job thinks that it is done. We have filled out an STR for this problem several times. Our approach is to do a directory depth check before the backup. If a student has created a structure that will kill the job, the backup automatically excludes that student.

I suppose that the most interesting challenge for students over the years has been figuring out how to "blow away" the computer. At times it has felt

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like the odds were 1,500 to 1—all against me. The problems that have been detected are varied, sometimes innocent, sometimes deliberate and malicious. For example, a few students have created very large print files by getting into infinite print loops, and when the queue tried to exceed its maximum size, away went AOS.

We heard that one student had figured out how to blow away the machine using SED. He would enter two complete lines of tabs (in SED) hold down the CR key and the repeat key. AOS crashed. He actually told us how he was killing the system. Data General's workaround to this problem was profound: Tell the student not to do it.

Another "don't-do-it" workaround involved a student innocently typing in XEQ EXEC. Again, away went AOS. We had one problem that actually caused us to post notices asking anyone who could shut us down to please tell us the procedure. The problem also had the area hardware people going crazy. We would get panic codes 12300 or 17300 from time to time, most often late in the week, but much too often for a stable system. These panics pointed to a hardware problem, but we were betting that it was software. At this particular time, we were moving compiles and links to a separate directory and then back to the user's directory when the compile or link completed (to avoid giving the students a huge directory space to allow for the large temporary files the compilers created).

We were actually watching the system activity with hardcopy terminals when AOS crashed with its usual panic. We made all the students on the machine wait in the terminal area until we were sure we knew the username of everyone on the system at the time of the crash. They weren't allowed back on the system until we looked at each and every one of their directories and tried to reconstruct what was happening.

In one directory, we found that the student had run out of space. When we talked to him, he said that he had just compiled and linked a Fortran program and was in the process of executing the program when the system crashed. He had a perfectly good looking .PR file, but it was only a fraction of its correct size. His directory had run out of space when we tried to move the file back to his area after the link. When he executed this incomplete program, the system crashed. We quickly put directory size checks all over the place to make sure students had adequate space in their directories.

We have numerous other programs and procedures that may be of interest. Feel free to contact me if you want additional information. Δ

Edward E. Lindberg is the director of Computer Services at Western New England College. He can be reached at 413/782-3111.

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It's a system manager's nightmare: you have two weeks to teach 500 people word processing and the basics of the operating system. Not only that, a year from now 600 new faces will have the same training needs. Is this just a bad dream? Not if you're an academic institution that grants computer access to students for report writing, statistical analysis, or programming.

With the increasing use of computers in education, the academic world is faced with the dilemma of how to quickly, efficiently, and cost-effectively train a constantly changing student base. According to Skip Pomeroy, director of Academic Computing for Roger Williams College, "More than half of our students now use the Data General system. In the past the course instructor taught the basics of the system in a one-hour lecture. If you looked at the notes of those 30 students, you'd think they attended 30 different lectures! An inordinate amount of time was spent by professors and the computer staff explaining things after this initial training."

The solution for Roger Williams College has been to use computer-based training (CBT) courses from Data General Educational Services. "With the CBT approach," said Pomeroy, "we can cycle hundreds of students through introductory training in a 24-hour period. CBT insures that each student is learning the same thing and can learn at their own pace. It also allows the professors to focus on what they are hired to teach, be it COBOL programming or sociology."

The CBTs available from Educational Services are interactive, self-paced training programs that run directly on a user's terminal. Since they reside on the system, CBTs are always available and can be used to train new users, or for future reference. In the college environment, training can occur whenever students have access to the system.

The full range of CBT tools that are available from Data General are found in their *Customer Education Catalog*. Some of those that are especially popular can be completed in only a few two-hour sessions. They include:

- CEO Word Processing (five sessions)
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- CEO Printing and Filing (two sessions)
- SED Text Editor (one session)
- AOS/VS User (eight sessions)

These and other CBT programs are available to all nonprofit educational institutions at a 40 percent discount. For example, the Introduction to CLI and SED courses on an MV/10000 cost $990 with this discount, enabling an average college to train 250 freshmen at less than $4 per person.

Computer-based training will be used increasingly in the academic environment since it enables students to spend more productive time in the classroom learning advanced concepts and insures that they are already trained in the basics.

For more information on Data General's CBT courses, contact Michael Cadden, product manager in DG Educational Services, 617/870-1686. Δ

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Video assists end-user training

CMS/Data, one of the first firms to distribute WordPerfect word processing software, invests heavily in customer training. According to Scott Kadlec, marketing director, "When the customer understands the software and does a better job, we benefit."

Those benefits include such tangibles as fewer support calls and such intangibles as reputation. Their investment in training includes a full-time training staff of four people and a proprietary video training program called Perfect Teacher for WordPerfect software. A separate training staff of six people is available for CLO, their own law office package.

"Most of our training," said Kadlec, "is done on-site—anywhere." They may spend as little as three days on-site, or as much as a year in situations where a large firm is phasing in a word processing system. They recently spent several weeks in Toronto doing basic training at a site where a new MV/20000 has just been installed. During the next 12 months, the training staff will return several times to give one-week sessions to a few people at a time.

Training often includes developing a key operator who will be in charge of a firm's ongoing training. Whatever approach a firm uses, most training starts with CMS/Data's Perfect Teacher, a four-hour video. Eleven lessons cover 160 procedures that a user practices in conjunction with a terminal and a workbook. Although the video lasts only half a day, a full day or two half days per person are usually allocated so the users can proceed at their own pace.

Perfect Teacher is updated through rev. 4.2 of WordPerfect. It's available directly from CMS/Data for $795, or can be purchased from distributors. Δ

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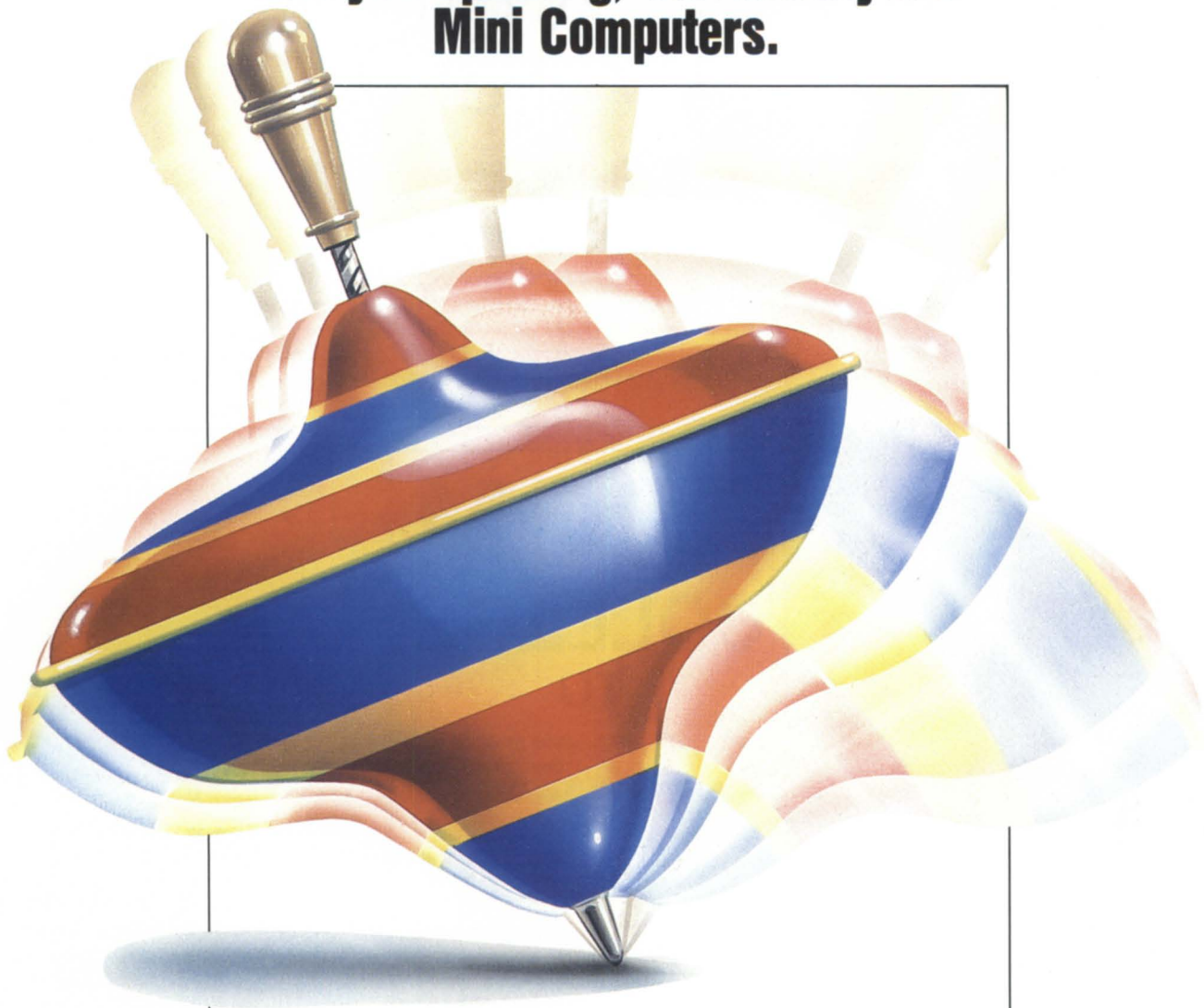

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FIRST CLASS

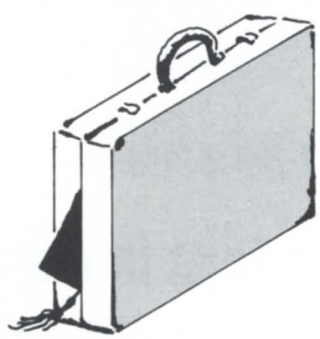
Using a 4GL for teaching about data base systems and file processing

by Gary L. Nunn, Ph.D.
Special to Focus

I teach the Introduction to Data Base Systems to seniors, and File Processing to the sophomores and juniors in the computer science department of Radford University, which is a medium-sized state university in the Blue Ridge mountains. Our programs are designed to prepare students as applications programmers for careers in industry, government, and education.

Radford maintains a modern computer center that includes a Data Gen-

FROM COLLEGE TO CAREER



Like most growing companies, Cognos Corporation invests a great deal of time and effort in finding and training top students. However, Cognos has a unique partner in this effort: the cooperative education program at the University of Waterloo in Waterloo, Ontario.

"Almost 50 percent of our technical staff are Waterloo grads," said Mike Lupiano, manager of Human Resources for Cognos. The reasons are clear. The University's cooperative program requires all students to spend two years in industry as part of their five-year degree program. These two years consist of six work terms alternated with study at the University. "By the time students finish, they are fully trained and ready for the business world. In fact, they are usually two years ahead of other graduates," said Lupiano.

The program has been in operation at the University for more than 25 years. Formal placement starts every four months when the University requests local companies to post job notices. Students sign up for those jobs, and the University forwards their resumes to those businesses. An interview series begins at that point, after which the employers rank students, and students rank potential employers. A computer then makes the match.

"The cooperative program is one of the best investments of our time," said Jim Sinclair, manager of Information Technology at Cognos. If all is going well, each student spends at least two work terms with the same employer. Because the students are in great demand, most businesses treat them very well. At Cognos the students are regular employees and full members of their development teams.

"The types of students we look for come from a wide variety of disciplines, although the majority in the development teams are computer science majors," said Sinclair. "We've found that the major is useful in the first two years, but after that, their basic ability to learn is more important." Cognos development teams include math, engineering, computer science, system design, biology, and library science graduates. English cooperative students are found in the technical writing area, and business and computer science graduates are used in the marketing group.

Since the students who are hired after graduation already have practical experience at Cognos, little internal training is necessary. Technical proficiency is maintained by continuing educational assistance at local universities and internal workshops.

Another element of the Cognos college-to-business strategy is their aggressive marketing of PowerHouse to the university community. At present Cognos has about 160 academic licenses for PowerHouse at colleges and universities. "Since PowerHouse is a 4GL development language designed to replace 3GLs," said Sinclair, "it made sense strategically to train academics who will then enter the work force and want to continue to use the product." Δ

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eral Eclipse MV/10000 dedicated solely to academic use. It is equipped with 10 MB memory and 136 I/O ports for terminals and printers, as well as more than 80 terminals in two laboratories available to students. The MV/10000 runs a significant library of software used in instruction, including standard languages such as Ada, Pascal, Fortran 77, COBOL, APL, C, and LISP.

However, we needed fourth-generation software tools for integration into our classes. After considerable searching, we chose PowerHouse (from Cognos) for several reasons. It is easy to use, and comes with excellent documentation and on-line help, which minimizes the class time that has to be spent teaching the system. It is comprehensive enough to be used for all the kinds of projects that we would expect. It has a good, active dictionary and strong data-typing abilities. It is also easy to install and maintain, and is reasonably priced.

PowerHouse has four components: Quick, an on-line screen builder and transaction processor; QTP, a volume processor; and Quiz, an ad hoc and production report writer. At the heart of these is PhD, the PowerHouse dictionary, an on-line repository of user-defined element, record, and file definitions.

I use PowerHouse to teach my data base class how to build and maintain data bases, concentrating on theory, design, and practical use. In this class, students learn to solve relatively sophisticated data base problems and to develop complete usable systems with users' guides, maintenance documentation, on-line help, appropriate menus, etc. The students haven't had prior experience with PowerHouse, but they enthusiastically learn the systems and seem to really enjoy these experiences.

The data base students, who are seniors, have written enough programs in 3GLs to appreciate the productivity gains from using a 4GL. They like to list this experience on their resumes, and they value it highly. This situation should become even better as I teach some of the uses of PowerHouse to my file processing class, which has recently become a prerequisite for the data base course.

In file processing, my students examine traditional file processing problems and solve them by using both a 3GL and a 4GL solution. We recently used a license plate owner file, which is typical of many data files. The car license plate owner file was created by my students from real and imaginary cars and owners. Each record consists of the license plate number, the owner's name and address, the model year, the body type, the color, and the make.

Many kinds of queries can be requested from such data, for example, finding the owner of a given license plate or finding the address of a particular owner. To answer these queries (or any others) in a 3GL requires anticipating the kinds of queries to be made and writing application programs to answer each kind of query. Using a 3GL to access this information requires considerable work, and would have to be redone if the queries changed.

The students write programs in Pascal to build direct access files and in-

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dexes on various keys in the data items. The students then use these files and indexes to answer queries against data. Of course, programs are needed both to create the files and to perform the queries. In all, several hundred lines of code (with documentation) are required in these exercises. They are then shown how to convert this file into an INFOS II ISAM file using PowerHouse, and the same queries are processed using this system. The students are impressed with this easy way to answer queries and manipulate the files. To show how simple this is in PowerHouse, here is a description in the exercise below.

This example requires a relatively simple set of activities within the PowerHouse system. The target file and its record must first be defined in PhD and named for use within PowerHouse. After choosing the names, the students select the file organization type and choose a file type of INFOS. Then they give the file a name in AOS/VS.

The students define the elements of the file, after which they define the sequential file where the data will reside. The raw data file can then be loaded using QTP, which is the batch processor in PowerHouse. From QTP, the students receive statistics on how many items have been loaded, and they are ready to use the data base.

This phase goes smoothly if the data is properly defined, matched in length, and matched for field in the two files. The students must not have any invalid items, like characters in numeric fields or extra line-end symbols, and they must fix any errors in the data before the process can be completed. The error-checking capabilities of PowerHouse are helpful because it gives more accurate data in the data base than would be possible with a simple file processing application.

In the final step, students go into the main menu and choose Quiz. They retrieve data items to write reports and answer queries, satisfying the kind of queries mentioned above. Most importantly, they aren't limited to previously written applications in the type and complexity of queries that can be processed.

There are other ways to obtain the file conversion described. For example, an AOS/VS utility could have been used, but then all of the queries and the data checking would still have to be written in a 3GL.

Converting an AOS/VS sequential file to an ISAM file represents a relatively small time commitment, which I would estimate as being approximately equal to writing a single Pascal or COBOL application for this file.

It isn't just the students who benefit from using a 4GL. I use PowerHouse because it allows me to introduce real-world problems and solutions to my students. I am planning on integrating some 4GL concepts into my software engineering class because I think that they should receive early exposure to 4GL tools. Δ

Gary L. Nunn is an assistant professor of Computer Science at Radford University in Radford, Virginia.

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STEEP UPGRADE

Some upgrade solutions are pretty expensive. How do you decide what's right for you?

by Paul R. Keys
Special to Focus

Since the recent introduction of the MV/7800 and MV/15000 computers, there has been a lot of interest in upgrades to existing computer systems. Many people treat this as something new, but upgrades have been around since the first Nova.

Let's look at some of the things to consider and the associated costs of upgrading at any level.

Enhancements to existing systems (pseudo-upgrades): Usually, people think about upgrading because of either poor performance on their existing system or expansion plans wanted by management. Most people need miraculous results from a limited budget.

Upgrades in the 16-bit Nova and Eclipse line normally consist of additional memory, disk space, and communications. Many of these enhancements can be made for just a few thousand dollars, or even a few hundred, if only minor changes are needed. Prices have continued to drop on 256 KB memories and ALM communications boards. The addition of a Data Control Unit (DCU) is also available now for a reasonable price. In many cases, these items can prolong the useful life of an existing processor.

Adding another disk drive or subsystem is an overlooked solution to poor system performance in a single disk system. One of our customers who had more than 300,000 items in inventory was experiencing a lengthy backup time and poor terminal response whenever the accounting department was posting transactions. They got only slight gains in performance by tuning the system software and properly structuring the disk files. We added a 192 MB add-on disk to the existing subsystem and split off the large inventory files to the second drive, keeping them on the opposite disk from accounting. The increase in speed was dramatic, and backup time was cut in half.

Our other option would have been to migrate to a higher powered processor. We accomplished the speed increase and subsequently added more terminals for about one-fourth of the cost of a new processor.

In the MV series systems, the most common enhancements are the additions of more memory, disk, or communications lines. AOS/VS isn't forgiving of those who haven't purchased enough memory. As with 16-bit systems, we usually loan our customers memory for a trial run before they actually purchase the board from us. It normally improves performance, but it's better to be sure before spending the money.

Multiple disk subsystems can be a very good enhancement on MVs when I/O speed has become a problem. The BMC channel allows for overlapping disk transfers when it is used with more than one controller. File layout on each disk is important to get maximum performance from the system.

In one customer's installation, their MV/4000 was dragging because the number of users had expanded. Their corporate management was struggling with the thought of allocating funds for an MV/15000 that hadn't been planned for in the yearly budget. We added another large Winchester disk subsystem and redistributed the files between two drives. The results were amazing, and the user is now able to continue operations with decent response time. Although we didn't sell an MV/15000, we helped a customer with their budget plans, which will have a positive effect on their growth.

Communications enhancements are easy with the use of IACs. Exercise care to prevent overloading the maximum current limit of the power supply (this is possible on several MVs such as the MV/4000). An expansion chassis will eliminate that potential problem, but it adds to the cost.

True upgrades (replacement of processors): When the MV/7800 was announced, customers wanted to know how to upgrade from their 16-bit systems to 32-bit systems. It sounded easy from the information provided by the DG sales force, like a bargain no one could resist.

Let's look at an inquiry that is typical of those we receive at Computer Engineering Associates (CEA). Suppose a customer has an Eclipse S/140 with 1 MB memory, a 6234 60 MB disk subsystem, a 6125 streaming tape drive, an ATI-16 16-line mux, an AMI-8 8-line mux, a 4264 band printer subsystem, and 12 D/200 CRT terminals.

The S/140 upgrade to an MV/7800 with 4 MB memory is shown to cost $13,500. Not a hard item to sell management on for the extra horsepower. But what about the peripherals?

The disk subsystem must be a BMC disk device to operate properly as the master disk under AOS/VS. The 6234 must be replaced. The choices are 73 MB (6160), 147 MB (6161), 50 MB (6067-H), 96 MB (6060-H), 192 MB (6061-H), 277 MB (6122), 354 MB (6236), or 592 MB (6239). These can range from a few thousand dollars for the removable disks (60XX series) to about $30,000 for the 592 MB disk.

The 6125 streaming tape drive will still work, but it will be too slow to use

for backups if a large disk is selected. The 6026 (800/1600 bpi) and 6299/6300 (1600/6250) tape drives will also work.

The ATI-16 and AMI-8 muxes must also be replaced—perhaps the most expensive part of the whole upgrade. The IAC-16 is $5,850 and the IAC-8 is $5,300. But that's not all. TCBs are used with IACs to provide connections from the terminal lines to the mux. Rack-mount versions are $1,025 for the 16-line and $910 for the 8-line. In many cases, this will cost you more than the processor.

The band printer subsystem will work if the printer is running on a DCH controller (and at a fairly high revision level). The only possible change could be from an unhardened to a hardened cable.

The D/200 CRTs will work without change. So will D/400s, D/210/211s, D/410/460s, etc.

So the final cost of upgrading to an MV/7800 with all peripherals could be $70,000 or more. Quite a difference from the $13,500 you were going to ask management to approve!

All is not lost, however. This is one of the more costly MV/7800 upgrades. For those users who already have the disks, tape drives, and terminals mentioned above, the cost of this upgrade can be very reasonable. It's a good path if you use a 16-bit system that can be upgraded. On a system that needs only a small number of IACs, the MV/7800 upgrade can be done in the $20,000 to $25,000 range.

There have been numerous articles written testifying that an MV/7800 doesn't enhance performance much over the MV/4000. This has been confirmed by our benchmark tests. But for many users, especially those moving up from S/140s, there will still be good performance gains. The largest gains would be for those using lots of floating-point calculations. At CEA, we recently added a 4 MB MV/7800 to the in-house computer center. It offloads our software development from an MV/10000 and brings over word processing and inventory from an Eclipse C/150 under AOS. The overall effect has been pleasing, even though it is considerably slower than our MV/10000.

Because we already had the necessary peripherals in-house, our decision to purchase the new system was made easier. We currently run 40 user ports with about 700 MB of disk on multiple drives to maximize performance. This freed up the MV/10000 to create large data bases without slowing up users. In normal usage, there isn't a noticeable slowing down on the MV/7800.

The newest interesting upgrade system is the MV/15000 family. This processor is designed so that you can get the system you need now, and then upgrade the processor as needed in the future. There are three versions: the model 8, model 10, and model 20. Performance characteristics are similar to the MV/8000, MV/10000, and MV/20000. The big difference is that to go from one processor to the next larger processor, you don't have to replace the box or move peripherals. The upgrade is a field-installable board set that can be replaced in a short period of time. Once new microcode for the appropriate processor is loaded, you are set to go. These upgrades are expensive, but not nearly as expensive as trading in the old one and buying a new one.

The MV/15000 model 8 with 8 MB of memory starts at $62,500. The upgrade from model 8 to model 10 is $72,000, and the upgrade from model 10 to

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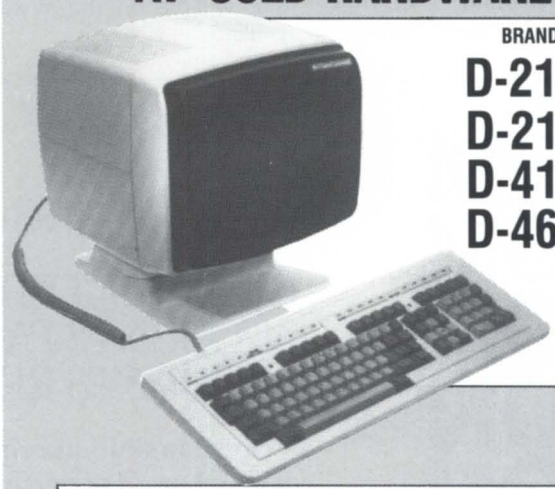

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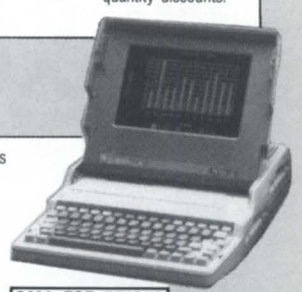

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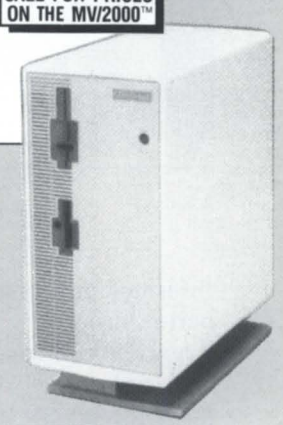

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model 20 is $87,200. With this "path for the future," it's easy to see the impact this could have on budgets for purchasing capital equipment for the data processing department. There is no upgrade from current MV/8000 or MV/10000s to the MV/15000 without replacing the entire processor, frame, and power supplies. All peripherals would have to be moved from the old system to the new one.

When is it time to upgrade? The data processing department or manager should be able to advise users when it's time to upgrade. If there isn't such an advisor, users should take an inventory of what they expected when they bought the system, where they are now, and where they want to be in the future. As more users and more work are loaded onto the system, there will usually have to be expenditures on hardware to keep performance at acceptable levels. A solution is needed when terminal response time slows and jobs start taking longer to run.

We help our customers assess their needs if they feel an upgrade may be necessary. First, we see if additional memory or restructuring of the data on the disk will help. It's fairly easy and inexpensive to try this before spending much money. If those items don't help, we often try to add another disk subsystem just to move files around. We can usually provide these to our customers at little or no cost. The third thing we do is determine what size system would be appropriate if a new one has to be purchased. Then we set up a benchmark test with actual customer programs on a machine similar in size to the proposed upgrade. This gives the customer an actual timing to compare to what they are used to. Note that we don't simulate operations with all the users that will be on the system once it is installed.

After we have completed these three steps, we have a reasonable idea of what the customer needs. The other consideration is what type of expansion needs are to be incorporated into the new system. According to published specifications, a system is at its maximum capability when it is about 70 to 75 percent full.

When selecting an upgrade path for your system, assess your current position, your future needs, and the money you have available to spend. Ask for help from your OEM or DG system engineer if you are still not sure if your choice will be adequate. It's worth getting all the advice you can because you need to make the right choice the first time. Δ

Paul Keys is the president of Computer Engineering Associates, Inc. (CEA), a DG OEM and system integrator, located at 3922 Vero Rd., Baltimore, MD 21227; 301/247-5244.

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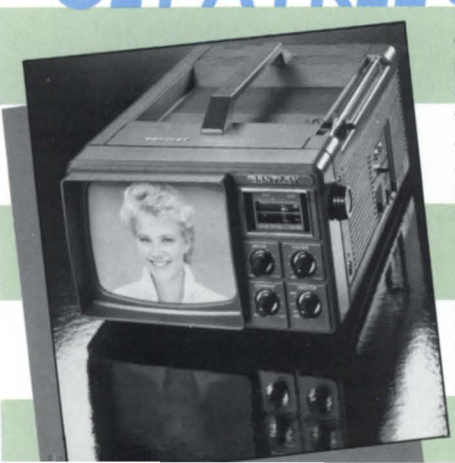

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BY JOHN A. GRANT

IT'S A WONDERFUL LFE

Library File Editor can help you organize your toolbox

The key to any well-organized shop is the toolbox. Working with computers is no different; that's why directories were invented. However, dumping a bunch of files into a directory has the same effect as dumping your tools in the toolbox. In both cases, it is important to organize the tools (files). In this article, I will discuss some of the good and bad methods of accessing these files.

Over the past year, I have presented about 20 subroutines and functions in this column. Most of these are packaged system calls and as such are general-purpose software tools that can be used in many of your programs. As a software developer, you probably have several hundred of your own routines. Management of these software tools can be done either at the source level or at the object level. Clearly, the first rule is: Let there be only a single copy of each source or object file on your system!

For example, if you have a toolbox routine called AAA.F77, you are just asking for trouble by having copies of AAA.F77 or AAA.OB in several directories. It doesn't matter if it is needed by several programs, each of which resides in a different directory—that's what searchlists and pathnames are for, as I will discuss later.

My working environment

For each application program, I create a separate directory that contains everything related to the program. For program XXX.PR, I create a directory called PROGRAM_XXX.DIR that contains the following:

- XXX.F77—the main source program file
- XXX.F77.IN—INCLUDE file of COMMON or PARAMETERS
- LINK_XXX.CLI—macro to build XXX
- XXX.DOC—documentation or user manual for XXX.

Most programs will use subroutines written specifically for the program as well as toolbox subroutines. The main XXX.F77 file may contain all of the XXX-specific subroutines, or they may exist as separately compiled external files. In the latter case, I usually use names like XXX_AAA.F77, XXX_BBB.F77, and XXX_CCC.F77, etc., instead of AAA.F77, BBB.F77, and CCC.F77.

Of course, the name of the file doesn't have to be the same as the entry point declared inside with the subroutine or function statement, but symmetry is retained if the file that contains SUBROUTINE XXX_AAA is also called XXX_AAA.F77 instead of AAA.F77. The calling sequence in XXX.F77 then looks like:

```
CALL XXX_AAA
CALL XXX_BBB
CALL XXX_CCC
```

instead of:

```
CALL AAA
CALL BBB
CALL CCC
```

This makes it easy to use an editor or search utility to scan the source code for all references to these subroutines. You can take it one step further and name all of your toolbox routines with a common prefix (i.e., "Z" or "TBX_") so that you can quickly find all source references to toolbox routines.

This scheme is especially useful for languages like Pascal or C, which don't use special verbs (like Fortran's CALL) to invoke procedures. Even in Fortran it's useful because, while a search for all occurrences of CALL will find subroutine references, it will not find func-

tion references. Also, it will find *all* subroutines, whether they are from the toolbox or specific to the program.

The tools

Let's focus on the toolbox routines now. The logical thing to do is have a directory called TOOLBOX.DIR, which contains all of your toolbox source files. Assume you are using my GET_SWITCHES, YES, and LISTERR toolbox routines (see previous *Focus* articles for details). When you build each application program, you can access these routines at either the object or source level.

If you elect to find the .OB routines at LINK time, there are two similar methods: by SEARCHLIST:

```
)PUSH;PROMPT POP
)SEARCHLIST :UDD:GRANT:TOOLBOX.DIR
  [!SEARCHLIST]
)F77LINK XXX XXX_⟨AAA BBB CCC⟩ &
&)GET_SWITCHES YES LISTERR
)POP
```

or by pathname:

```
)F77LINK XXX XXX_⟨AAA BBB CCC⟩ &
&):UDD:GRANT:TOOLBOX.DIR⟨GET_SWITCHES
  YES LISTERR⟩
```

The problem with either of these methods is that you must know the names of all of the toolbox routines you require, and they must all be listed in the LINK_XXX.CLI macro (a real pain if your application uses 50 or more toolbox routines). Another problem is that LINK will load the .OB files into the .PR file whether or not they are actually needed.

If you delete a call to a subroutine but forget to remove it from the LINK_XXX.CLI macro, your .PR file will be larger than actually required. Whether it's forgetting to remove or add the name of an object file, you will be forever trying to get a one-to-one correspondence for external references.

Another solution is to find the toolbox source files at compile time, as shown in the following:

```
PROGRAM XXX
. . .
END
INCLUDE ":UDD:GRANT:LISTERR.F77"
INCLUDE ":UDD:GRANT:YES.F77"
. . .
```

After you have compiled XXX.F77, the .OB files for LISTERR and YES are contained within XXX.OB so you only need to LINK one module:

```
) F77LINK XXX
```


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The first problem with the INCLUDE method is that it is useless if any of the toolbox routines are written in another language, as is the case with GET_SWITCHES, which must be separately compiled with MASM.

Another problem with INCLUDE is that the toolbox routines are needlessly recompiled each time the main XXX.F77 file is compiled. The extra overhead is entirely unnecessary, time-consuming, and expensive. In the old days of cards, a box of cards was submitted each time a program was to be run. The card deck contained the main program and all of the subroutines.

Most programmers probably never knew (or cared) that the program and its subroutines were compiled, linked, and loaded each time. The idea of saving or cataloging an executable image (i.e., a .PR file) probably never occurred to most programmers. I think the INCLUDE statement originated in Pascal for accessing external Pascal source files or defining interfaces for external procedures (early versions of Pascal insisted on everything being compiled in one shot). Since Fortran allows separately compiled modules, the use of INCLUDE for external source files is simply a lazy approach to LINKing, and is just a modern variation on that deck of cards.

A legitimate use of INCLUDE is to access an external file of PARAMETERS as a type of compiler dictionary or a COMMON block definition, but even this may become obsolete with the new MODULE statement in Fortran 8X.

There is yet another reason to avoid INCLUDEing toolbox source files in application programs for compilation. Many toolbox routines contain tricky code that you only want to code once: that's why you put such routines in your toolbox. Many of my toolbox routines are packaged system calls and bit-twiddling routines that INCLUDE the QSYM.F77.IN file of parameters (F77 equivalent of PARU.32.SR).

Ken Heron (March 1987, *Data Base Monthly*) mentions that inclusion of QSYM.F77.IN "results in massive increases in compilation times." That is correct, and the problem is further compounded if your application INCLUDES many toolbox routines, each of which INCLUDES QSYM.F77.IN.

Mr. Heron's solution was to bypass QSYM.F77.IN and hard code the routines with the system call numbers, packet offsets, and bit masks as extracted from QSYM.F77.IN or PARU.32.SR. I disagree with that approach; it makes the code difficult to read and maintain. As you may have seen from previous articles in this column, I use SED or SPEED to change all of the occurrences of ISYS_ in QSYM.F77.IN to "?" since Data General's Fortran 77 allows "?" in variable names (implicit integer).

The code is now much more readable and similar to assembly language because you can code directly with the same symbols used in the *AOS/VS Programmer's Manual* (system calls). For example, you can use ?READ instead of ISYS_READ.

An easy solution to the problem of the lengthy compile time is to use the F77BUILD_SYM utility to build a smaller QSYM.F77.IN , which contains only the PARAMETER definitions from PARU.32.SR that you require. However, a better approach is to make sure that each toolbox routine is only compiled once, then it doesn't matter if it takes a long time to compile. This brings us back full circle to the concept of LINKing application programs with object (.OB) files for toolbox routines, or even better, use the AOS[/VS] Library File Editor (LFE) to combine all of the toolbox .OB files into a single library (.LB) file.

The toolbox

When you LINK with a library file, you only have to specify the name of the library file:

```
) F77LINK XXX TOOLBOX.LB
```

which frees you from the chore of explicitly listing all of the modules required. Note that LINK will always load a .OB as supplied in the LINK command line, whether it needs it or not. However, if a .LB library file is specified, LINK will only load the modules it actually requires to resolve external references. This makes the LINK process more efficient and ensures your .PR file will not be unnecessarily large.

Information on LFE can be found in the *LINK and Library File Editor User's Manual*. I won't describe it in detail because it is quite easy to use. LFE allows you to create a library, analyze it, and list its contents, as well as insert, remove, and replace individual modules. You can also use it to merge several libraries.

Suppose you have a directory called TOOLBOX.DIR, in which all of your toolbox source files reside. Even if they all contain INCLUDE statements for QSYM.F77.IN, you only need to compile all of them once with an F77ALL.CLI macro:

```
QBATCH/QOUT=@NULL/QLIST=@NULL/
  NOTIFY/M
DELETE/2=IGNORE =F77ERRORS
)
```

and then create the library:

```
) X LFE N TOOLBOX.LB/O [!FILE,+.OB]
```

If you're wondering why I used QBATCH/M, just try entering:

```
) QBATCH F77/E==F77 ERRORS
  ([!FILE,+.F77])
```

The above LFE command assumes none of your toolbox routines call each other. If any routine calls another in the same library, you must be careful about the order of the .OB files when using LFE to create the .LB file. LINK doesn't care about the order of the .OB files in the F77LINK command line because they will all be loaded. But LINK only makes one pass through each module, and if a module happens to be an .LB library file, then the .OB files within must be ordered correctly. In short, "the hooks must be out before the fish swim by." The easy way to order the files is to make a test library without regard for the order:

```
) X LFE N TEST.LB/O [!FILE,+.OB]
```

and then use LFE to analyze the library and list each module with all of its external references:

```
) X LFE/L=@LPT A TEST.LB
) DEL TEST.LB
```

After sifting through the listing, you can then build an ordered list of .OB files and put them in a CREATE_TOOLBOX.CLI macro:

```
) X LFE N TOOLBOX.LB/O CCC ZZZ AAA BBB
```

Once you have created your TOOLBOX.DIR library, you can put it in your public directory for everyone to access, or if it is yours alone, your LINK_XXX.CLI macros can access it via searchlist or pathname.

Pinstripes for your toolbox

There is one more finishing touch you can add to your toolbox. You can set up a latent debugging/trace feature for all of your toolbox routines. In each subroutine, you can insert the following:

```
common/?toolbox?/toolbox_trace
logical              toolbox_trace
  . . .
if(TOOLBOX_TRACE) then
  write(screen,*) "starting TOOLBOX routine
      LISTERR now"
end if
```

Figure 1

```
c     TOOLBOX_TRACE_OFF.F77
      blockdata
      common/?toolbox?/toolbox_trace
      logical           toolbox_trace
      data              toolbox_trace/.FALSE./
      end
```

Figure 2

```
subroutine TOGGLE_TOOLBOX_TRACE
common/?toolbox?/toolbox_trace
logical           toolbox_trace
toolbox_trace=.not.toolbox_trace
return
end
```

The debug/trace code can be anything you think might be useful for debugging later on. Now the only thing to do is define the initial value of TOOLBOX_TRACE and provide a method of toggling its value. The initial value is easily defined with a BLOCKDATA module, perhaps called TOOLBOX_TRACE_OFF.F77, as shown in Figure 1.

Compile this module and modify your CREATE_TOOLBOX.CLI macro:

```
X LFE N TOOLBOX.LB/O
TOOLBOX_TRACE_OFF/F  CCC ZZZ AAA BBB
```

The /F switch on the module tells LFE to put it in TOOLBOX.LB with a flag on it that tells LINK to force-load it (this is needed because it has no entry point and otherwise would never be loaded). Now all of your application programs that use TOOLBOX.LB have some debug/trace statements that are disabled by default.

How do you activate them? Well, all you have to do is change the value of TOOLBOX_TRACE to .TRUE. This can be done at LINK time or at runtime. To redefine the value at LINK time, you create another module called TOOLBOX_TRACE_ON.F77, which is exactly like TOOLBOX_TRACE_OFF.F77 except that the initial value of TOOLBOX_TRACE is .TRUE. Whenever you wish to debug/trace your application program, you LINK it again with the additional module:

```
) F77LINK XXX TOOLBOX.LB
  TOOLBOX_TRACE_ON
```

To activate the trace statements at runtime, write a routine called TOGGLE_TOOLBOX_TRACE, which toggles the state of TOOLBOX_TRACE. This is shown in Figure 2.

Each time you call TOGGLE_TOOLBOX_TRACE, the trace variable will be toggled. You can use this subroutine in several ways. Two examples are demonstrated in Figures 3 and 4.

These examples use two of my toolbox routines that have been presented in previous *Focus* articles: GET_SWITCHES

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Figure 3

```
c    enable TOOLBOX_TRACE
c    at the start of the program
     program example1

     integer          idummy,ier
     character*32     cdummy
     logical          trace

c>>>begin
     call GET_SWITCHES(0,idummy,cdummy,ier,
    #      trace,"trace-toolbox-routines",0)
     if(trace) call TOGGLE_TOOLBOX_TRACE
     ...
     end
```

Figure 4

```
c    toggle TOOLBOX_TRACE
c    whenever ^C^A is entered
     program example2

c>>>begin
c    !start task 2
     call tqstask(toggle_trace,2,0,0,ier)
     ...
     ...
     end

     subroutine toggle_trace
     do while(.true.)
          call WAIT_FOR_CA_INTERRUPT
          call TOGGLE_TOOLBOX_TRACE
     end do
     end
```

(September, October, and November 1986) and WAIT_FOR_CA_INTERRUPT (May 1987).

Finally, libraries created with LFE aren't shared libraries. If programs XXX.PR, YYY.PR, and ZZZ.PR all use GET_SWITCHES from TOOLBOX.LB, there will be three copies of GET_SWITCHES in memory when these three programs are XEQed. In order to share routines between different programs, you must create a shared library (TOOLBOX.SL) with the shared library facility that was discussed in an excellent article by Brian Johnson in the June 1987 issue of *Focus*. 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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BY CHARLENE KIRIAN

ONLY THE BEGINNING

Education should continue after training ends

According to *Webster's Dictionary,* the word "training" means "to teach so as to make fit, qualified, or proficient"; and "education" means "to develop mentally or morally especially by instruction."

Many people believe that training and educating are the same thing. The methods may be similar, but the concepts are different. To train someone is to teach them a specific skill. To educate someone is to teach them why they have acquired a certain skill and how to use this skill best.

With computers, users may be thoroughly trained on a specific application or task; however, many of them aren't taught anything beyond. They may not need any more training, but they may need further information on the concepts surrounding their particular skill. Why is it important that they use a zero instead of the letter "O," or the number "1" instead of the letter "l?"

User education can be accomplished by various methods. Part of the education can be incorporated into training sessions for specific products. However, follow-up after these sessions is imperative. There will be unanswered questions even in the best training classes, and that's where the real work begins.

So how do you go about providing this continuing education for your users? Probably the first place to look is at the support materials you provide for them to use as they encounter new problems and questions. Many software packages come with manuals. Look over each of them carefully to make sure it will accomplish the goals you have in mind.

You will probably need to keep a variety of manuals on hand for your users. Data General documentation has historically been very descriptive. That's great if you have the time to read all the words. For example, the *CEO Word Processing Manual* is a lengthy document that explains each function in great detail. I prefer a more direct guide such as the *At a Glance* series. It is a great example of easy-to-use and understand documentation that guides a user through procedures with step-by-step instructions.

An in-house manual outlining company standards and procedures for using your system is also a necessity. It should contain information about training classes and all reference materials available. A section about log-on procedures can be very useful for new users. Since all installations have different equipment, the manual provided by the manufacturer of the software doesn't explain how to use all of the equipment you might have on site, so it's helpful to outline the various systems and devices that are available to them.

If you are fortunate enough to have an information center or a help desk, your manual should address the procedures and hours for getting help. You should also include a section on system availability and scheduled down time, as well as what to do about *unscheduled* down time.

Restrictions on using the CEO public cabinet should be outlined, along with a list of dos and don'ts. Also, users have to understand that they have a certain amount of responsibility for the upkeep of their own accounts. For example, they should be checking their inboxes frequently and weeding out old messages, keeping a regular inventory of their filing cabinet for file restorations and disposal of unneeded documents, changing their passwords frequently, and staying current with any new training that is offered.

With the increasing number of PCs used in workstations, it's important to give instructions on the differences between the PC workstation and a DG terminal. If you are using CEO Connection, the template provided indicates the differences in function key access, and the manual outlines the C# function keys but doesn't reference some of the other functions such as HOME, EOL, ERASE PAGE, etc.

A reference page in the manual including those functions along with alternate key configurations will be handy until users are familiar with keystrokes. The host ID file standards should be documented if any of them differ from the default files given. If you've ever tried to create your own host ID, you know that it is not an easy chore unless you read the manual instructions. If a portion of the manual were dedicated to standard host ID configurations, it would save many people a lot of time.

I can't let this opportunity slip by without plugging OASIS (the Office Automation Special Interest Subcommittee). We have developed a network of experienced CEO users throughout the world.

Also, the OASIS workshops, which are held every few months, are a tremendous source of education for our members and nonmembers. The networking that goes on at the workshops is invaluable.

Education is a *vital* part of the training process. And it doesn't stop when the training is finished—it's the continual enhancement of the skills already taught.

■

In my July column, I said that Data General wasn't going to continue support for the HP LaserJet Plus series. Later I received a call from Corporate Software Development and was told that DG has changed its mind and will support the complete LaserJet Plus series, including graphics, and intends to support the rest of the HP printer line in the future. (They made it clear that it was *not* my column that swayed their decision. But maybe it was the numerous phone calls made to hardware support management by those of us who had already purchased the LaserJet Plus and then found out it was no longer going to be supported.)

Whatever changed their minds, I'm grateful for the reconsideration on this issue; however, those of us with LaserJets hope that DG will not charge for this extra support. Δ

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

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UP AND AWAY

A sophisticated UP macro can save you a lot of trouble. Part II.

In last month's issue, I discussed techniques that can be used to write a re-executable UP macro—one that can be restarted in its entirety without manual interference. So if any part of the system fails to come up, the problem can be corrected, and the UP macro can be rerun to pick up the pieces it missed the first time. At most sites I have seen, this couldn't be done because the UP macro would abort if anything (such as EXEC) was already started.

Last month I defined the problem and discussed why you might become possessed to hack a neat, efficient, 30-line :UP.CLI into a monstrous multikilobyte system with a number of support macros and several hundred lines of CLI commands. I also got as far as (re)defining all the serial devices and grafting the other disk drive(s) into the system.

The next step in this process is to start all of the system service processes. At this point we still have only PIDs 1 and 2 running, and those of course are handled by AOS[/VS]. Now we can't just go out and start PROCing up things left and right. We need to determine in what order to start the software. I have seen numerous sites that simply started EXEC, enabled users, and then proceeded to bring up the application. One day they had trouble with their batch queues. It turned out that the problem was that the batch jobs were starting before the file server was up! They had never had a problem before because nobody had ever left an incomplete job in the batch queue before. This type of problem is more common than you might think. I've seen it on numerous occasions, and the thing that each system manager learned the hard way is that you need to bring up server processes before starting anything that might need them. Seems so simple, yet so often it's overlooked.

So in what order do we start things? I generally look at network software and file servers first, device despoolers next, automated jobs next, and last and least, interactive terminals. As a concrete example, Xodiac; INFOS, ICOBOL, (or BBASIC and DBMS); EXEC and its printers; batch streams; and finally the users. We can now add the following to :UP1.CLI:

```
UP_XODIAC
UP_INFOS
UP_MLS32
UP_EXEC UP_SYSPRINTER UP_LQP
CONTROL @EXEC SILENCE 1
CONTROL @EXEC CONTINUE 1
CONTROL @EXEC ENABLE @CON(2 3 4 5 6 7 9 11 12 13)
```

Now for the fun part. Rather than discuss all of the UP_XXXX macros called by the listing, let's use UP_INFOS for our discussion. In the good old days (meaning the early 80s), this would typically be just one command line, that being a PROCESS command with an assortment of required switches to start the INFOS process. To make the macro re-executable, we need to take a second to check if INFOS is already running and only issue the PROCESS command if needed. This will become the UP_INFOS.CLI macro that we referenced in UP1.CLI above. In the listing, I didn't give the complete INFOS process command, since the options on this command are documented and can vary from site to site. This macro reads as follows:

```
  comm—UP_INFOS.CLI—starts INFOS if not already up
delete/2=ignore ?check.pid.tmp
create ?check.pid.tmp
who/2=ignore/l=?check.pid.tmp
write
[!ueq,[!size ?check.pid.tmp],0]
  write *** starting INFOS_II process ***
  process/name=infos/dir=@/pri= . . . ( . . . etc.)
[!else]
  write *** INFOS II already running ***
[!end]
write
delete/2=ignore ?check.pid.tmp
```

Note that if INFOS is already running, the macro will detect it and won't attempt to start another INFOS. The same technique can and should be used with MLS32, DBMS, or any other global type file server. However, for those file servers such as MLS32 (for ICOBOL), you might want to consider calling the DG supplied macro instead of issuing the PROCESS command yourself. There are two things you gain by doing this. First, the supplied macros not only create the process, but also wait for the IPC port to be created. Thus, it guards against continuing the batch streams later on before the file server is ready. The second thing you gain is that if DG changes any of the required switches on the command line (in future releases), they will automatically be incorporated.

However, there is also a down side. If something goes wrong and the server IPC doesn't get opened, you get stuck in that macro and must manually abort your way out. Furthermore, not everyone likes to automatically add the new switches to the system processes without being aware of them. As always, the decision is up to you or your system manager as to which of the two situations is preferable.

Now that all the file servers and other global servers are started, it's time to start the most common of them all—EXEC. To do this, I write an UP_EXEC macro similar to the UP_INFOS macro above.

Once EXEC is up, we will then start all spooled printers and then the batch streams. To start the system printer, I called a macro called UP_PRINTER.CLI, which might read like this:

```
CONTROL @EXEC START LPT @SYSPRINTER
pause 3
control @exec start batch_(in out)put @sysprinter
control @exec trailers @sysprinter 1
control @exec cpl @sysprinter 132
control @exec defaultforms @sysprinter default
control @exec silence @sysprinter
pause 3
control @exec continue @sysprinter
```

I then start the letter-quality printer @DIABLO with the macro UP_LQP.CLI. It can look very much the same except for setting headers to zero and a few other things. Here's where the big advantage of using generic device names comes in. Suppose for some reason the console port with the letter-quality printer got hung up. All you would have to do is CONTROL @EXEC STOP @DIABLO, delete and recreate the link @DIABLO to point to the new IAC port, and rerun the UP_LQP.CLI macro to start up the printer on a new IAC port. This assumes of course that you have embedded the CHAR/DEF command in the UP_LQP.CLI macro. This all can happen so fast that your poor operator doesn't even have time to get dizzy trying to figure why the hung printer is working again. If this change were to be permanent, all that it would take is to change exactly one line (count it) in :UP1.CLI, to wit, the CREATE/LINK command.

Now that everything is running nice and orderly, it is time to play havoc with the system. It's time to enable the user consoles for logon. The DG supplied macro contains CONTROL @EXEC ENABLE/ALL, but I don't like that for a number of reasons. First and foremost, any device that is on an IAC port that isn't controlled by a despooler process (such as XLPT) is now set up for logon. If you had a port dedicated for communications with BLAST or GATE, you just gave it to EXEC, and now you can't use it. I always modify the ENABLE command, remove the /ALL switch, and list the consoles as follows:

```
CONTROL @EXEC ENABLE @CON(2 3 4 5 6 7 11 12 13 14)
```

Furthermore, I only list ports that are connected to a terminal (or modem) that is intended for EXEC controlled logons to

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the system. I also like to add a PAUSE X command (x = number of terminals) to give EXEC time to display all of its acknowledgements and messages before continuing.

We now have the system completely up, and there is only one more thing to do: set up the master console environment. As noted in my column on securing the master console, I tend to finish my UP macros with something like this:

```
pop ; comment back to level 0
searchlist :macros :util :op_macros
prefix OP_CLI[!ascii 251]
x :cli ped/all
```

This will give the PID 2 process its own prompt of OP_CLI) so that you can easily tell whether or not your master console is also at the master CLI process. Now you are ready for a day of typical and intense operations.

If I may paraphrase an old saying: "What goes up must come down, and with any luck, it won't do so in the middle of your job." The techniques to use for bringing things down are quite similar. Commands that can be issued without consequence if they fail (such as CONTROL @EXEC STOP @SYSPRINTER) can be issued as usual. Commands to terminate processes should not abort if the process doesn't exist. File servers should not be terminated if they are still doing things. Disk drives shouldn't be released if other things aren't down yet, and so on.

So what does it cost me to do all this? Well, my root directory and @ directory have a number of entries (almost all of them are links) that they might not normally have. Also, it takes a few extra milliseconds for each link to be resolved; thus, my system comes up a little more slowly, perhaps by a minute or two.

What do I gain? A nearly bulletproof blockade to the operator who knows how to type on a terminal but can't spell CLI. His instructions are real simple: Let the system take the standard boot procedure; if that fails, enter :UP and try again. Keep on trying. If it doesn't come up after two or three tries, and nothing is obviously wrong (like printer off, the drive is in write protect, etc.), then it's time to call for help.

Now let's go to the mailbox . . .

We have a winner to the DOW.CLI bug contest I started in the July issue. Bruce Cary of the Association of Operating Room Nurses sent in a corrected macro. Actually he pointed out two minor errors in the macro. Although Bruce correctly pointed out that the macro did not take into account the fact that not every century is a leap year, this wasn't the problem I was looking for. What I wanted to point out is that the macro uses a technique of adjusting the Julian date by the number of leap years including the current one. However, this results in adding one to every day in the leap year instead of just March through December. So for the months of January and February, which occur *before* the leap day, the dates were off by one, causing it to be wrong 2 out of every 48 months or approximately 4 percent of the time. I guess I'll be seeing Bruce in Las Vegas for dinner on me.

I'd also like to thank everyone who sent in a corrected macro. The techniques used varied widely, but most had something to do with [!umod,%8%%9%,4] to check if it was a leap year and then [!ugt,[!var0],60] using the current Julian date to see if they needed to subtract one. Honorable mentions go to Randy Berndt (who says he's just wasting away—fat chance, Randy), Rodney Radford and Diane Denny (sounds like a movie couple), John Eymann (who noted that for the 21st century Friday = 0, Saturday = 1, etc.), and Gordon Huke (who set [!var3] to 1 if it was January or February and then could simply subtract that from the calculated value on leap years). After that dinner with Bruce Cary, I'd like all of you join me at blackjack. I'll take care of a round or two of drinks.

■

Robert McFarlane of the U.S. Air Force asks if anyone knows of a program to convert DG Fortran 5 to DG Fortran 77? I seem to recall hearing about one but couldn't find anything in my notes. How about it? If anyone out there knows of a converter, call me at 312/673-1700, or call Mr. McFarlane at 402/294-5455.

■

George Hardy is looking for documentation on parts breakdown or bill of materials for DG hardware. This documentation is the 015- series in the TIPS manuals. I don't know if everything has manuals on it, but most of it does. If you don't have a TIPS catalog, your best bet is to contact the TIPS administrator in Westboro. My phone book says you can do that at 617/366-8911 extensions 4022, 4032, or 4033. If there are certain out-of-date manuals you need, let me know, and I'll put something in the column to see if anyone out there still has one. 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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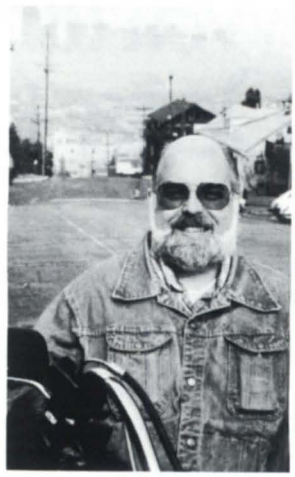

:ANATOMY_OF_A_MACRO

While I was writing last month's column describing some of the macros I use frequently, it occurred to me that quite a few readers are less proficient with CLI macros than they would like to be.

Instead of just publishing some more of my macros with descriptions of what they do, I'm going to do something a bit different this month. I'm going to describe a relatively straightforward need and then walk you through the resulting macro with a detailed description of how it was designed and developed.

I don't expect this particular macro will be extremely useful to many of you, but that's not important because we're more interested in a macro that's simple enough to illustrate a few basic points common to most of the macros you'll write. Also, you'll see how fairly simple macros can balloon tremendously when the necessary packaging is added to supply comments, help information, and argument checking.

Those of you with less than total recall on the subject of CLI commands and CLI pseudo-ops may want to haul out a CLI manual to have handy for the rest of this discussion.

:PROBLEM_DESCRIPTION

I often find that I need to "publish" a complete directory of files, including subdirectories and their files. Some of the files are text, some are data, some are programs, and some are links, but the thing they have in common is that they are intended to be accessible and usable by a variety of users. In order to protect the files from the users, I'd like to set the ACLs of the published files to allow reasonable access, but disallow modification or deletion, at least by nonsuperusers.

The solution involves setting the ACLs of the files and directories to allow the minimum reasonable access. So our job this month is to design a macro that will set the ACLs of the files in a particular directory sub-tree according to a set of rules. The first step is to write a mini-spec.

:SPEC_0.00

We need to pick a name for this macro. Personally, I hate macros with short, cryptic names that can only be remembered by the person who wrote them. Not only that, but I'm a touch-typer, not a stereo-poker, so I tend toward fairly descriptive names. Today I chose ACL_PUBLIC_DIRS.CLI.

The next step is to choose a format for the macro command. I decided on this:

```
) ACL_PUBLIC_DIRS ⟨directory-name⟩
```

As it happens, another of my eccentricities intrudes at this point. I'm fond of macros that display helpful information when the argument(s) are omitted. So this macro should display a summary of how it's used when you type ACL_PUBLIC_DIRS without arguments.

Like a good subroutine, a good macro should always check its arguments, so we will too. This includes checking to make sure that the argument is a directory and that the argument isn't a template.

Now that the global issues are out of the way, we've got to decide which files get what ACLs. How about this:

Links—ignore
Programs—+,E
Directories—+,RE
All other files—+,R

These rules will allow users to execute programs in the published directory, access its files by pathname, list the contents of the directories, and read all of the nonprogram files (presumably data or text). I've omitted the R(ead) access on .PR files simply because it isn't needed (e.g., both R(ead) and W(rite) are needed to DEBUG).

Aside: Some system managers omit read access on .PR files in an attempt to thwart trap-door artists from MOVEing a copy of the .PR file to their own directory for a leisurely attempt at installing a trapdoor. This is laudable, but not foolproof: clever trap-door artists will still be able to ply their trade using the .OL files associated with 16-bit programs (e.g., :CLI.OL, :UTIL:MASM16.OL . . .). The .OL files must have read access in order to be usable, so this particular hole in the security system can't be closed at this time. Too bad AOS[/VS] doesn't use execute access instead of read access to control .OL file usage. Sigh.

:STRUCTURED_STROLL

A lot of people use structured walkthroughs to analyze macros, but out here in California, we're supposed to be laid-back, so we use stroll-throughs. Your stroll will be a lot easier if you go on down to the photocopier and make copies of the figures so you can follow along without flipping the pages back and forth. The first step is to lay down the framework required by the spec. To do this, I usually start by writing a rough version of the macro with prose replacing the nitty-gritty parts. Figure 1 shows the result.

At this stage the macro is executable, but it isn't ready to be tested for anything except misspelled pseudo-ops and WRITE commands.

Notice the phrase "Build a list of." This is to remind me that I can't just use "ACL template +,R" because there is no way to exclude links. If links aren't excluded, then the ACL command will dutifully follow the link and set the ACL of its resolution file, which is a side effect I'd like to do without.

Lastly, don't worry too much about my particular style (rigorous indentation, plus all commands and pseudo-macros in caps). Use whatever style makes you comfortable and makes your macro readable. One word of advice though: Try to avoid using minimal abbreviations, because there isn't an Olympic event for macro abbreviation.

:PASS_2

Now we need to finish the structure and get something we can execute. The

first problem involves checking to see if the argument directory exists. It's tempting to write:

```
[!EQUAL,[!FILENAMES %1%],]
```

but this has a problem: it will only locate the argument directory if it's in the current directory.

Instead, the trick is to use the !PATHNAME pseudo-macro. If the argument is a template, !PATHNAME resolves to nothing. If the directory is somewhere else, but that somewhere else is in my searchlist, then !PATHNAME will find it. As frosting on the cake, !PATHNAME will resolve any necessary links to locate it.

Figure 1—Draft version

```
[!EQUAL,%1%,]
 WRITE
 WRITE Help...
 WRITE
[!ELSE]
 [!EQUAL,%1%,?]
  WRITE
  WRITE %1% does not exist
  WRITE
 [!ELSE]
  [!EQUAL,%1%,?]
   WRITE
   WRITE %1% is not a directory
   WRITE
  [!ELSE]
   WRITE Build a list of non-link .PR files
   WRITE ACL them to +,R
   WRITE Build a list of non-link, non-.PR files
   WRITE ACL them to +,RE
   WRITE Build a list of non-link directories
   WRITE ACL them to +,E
  [!END]
 [!END]
[!END]
```

The second problem involves checking to see if the argument is a directory. The easiest way to do that is to check for the existence of any files inside the directory like this:

```
[!EQUAL,[!FILENAMES %1%:+],]
```

However, this has a problem: if there is more than one file in the directory, which is likely, then the macro will abort with a "Pseudo-macro has the wrong number of arguments" error message when the CLI replaces [!FILENAMES %1%:+] with the list of matching files and tries to evaluate the [!EQUAL,x,y] part. The cure is to use parentheses to ensure the proper number of arguments to !EQUAL:

```
[!EQUAL,([!FILENAMES %1%:+]),( )]
```


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Note the ",( )]." If you omit this, and the macro argument is either not a directory or it's an empty directory, then the pseudo-macro will end up looking like [!EQUAL,( ),], which is "false," and will erroneously behave as if the argument was a directory.

This illustrates several important points: if a pseudo-op used as an argument to another pseudo-op could result in multiple items, it should be put in parentheses. Two of the most common cases are the !FILENAMES and !STRING pseudo-ops.

Note that there's still a minor problem, because an argument that is an empty directory will cause the !EQUAL to be "true." That's not much of a problem though, because this macro is pretty much useless on an empty directory anyway. So we'll just change the "does not exist" message by adding "or is empty."

Finally, I've added the full HELP text. Note the use of %\% instead of the macro name in the "Usage" line. This is a trick that allows a macro to be un-

Figure 2—Structurally correct version

```
[!EQUAL,%1%,]
 WRITE
 WRITE Usage:  %\% [!ASCII 274]directory-pathname[!ASCII 276]
 WRITE
 WRITE This macro will set the ACLs of directory-pathname and all
 WRITE of its subordinate files to allow minimal public access.
 WRITE
[!ELSE]
 [!EQUAL,[!PATHNAME %1%],]
  WRITE
  WRITE %1% does not exist
  WRITE
 [!ELSE]
  [!EQUAL,([!FILENAMES [!PATHNAME %1%]:+]),()]
   WRITE
   WRITE [!PATHNAME %1%] is not a directory or it's empty.
   WRITE
  [!ELSE]
   PUSH ; PROMPT POP
   DIRECTORY [!PATHNAME %1%]

   WRITE Build a list of non-link .PR files
   WRITE ACL them to +,E
   WRITE Build a list of non-link, non-.PR files
   WRITE ACL them to +,R
   WRITE Build a list of non-link directories
   WRITE ACL them to +,RE

   POP
  [!END]
 [!END]
[!END]
```

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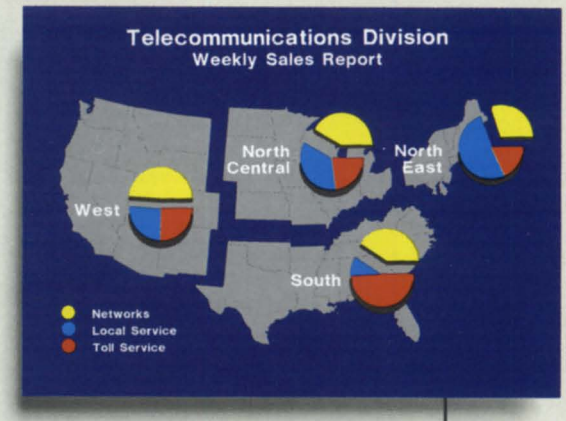

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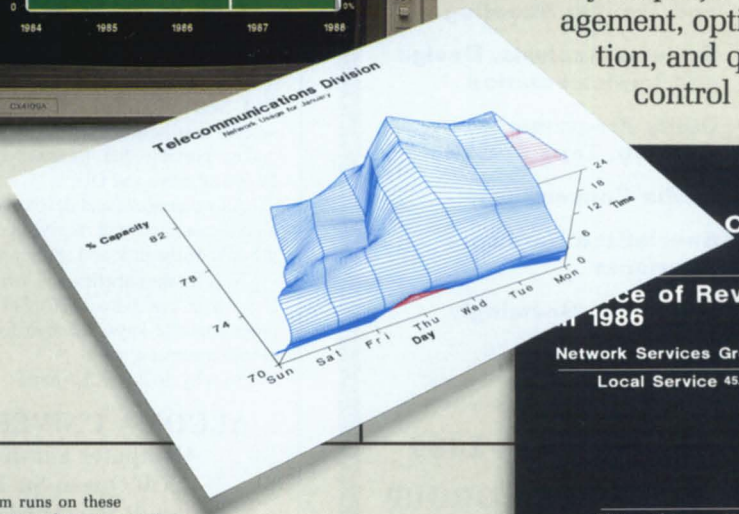

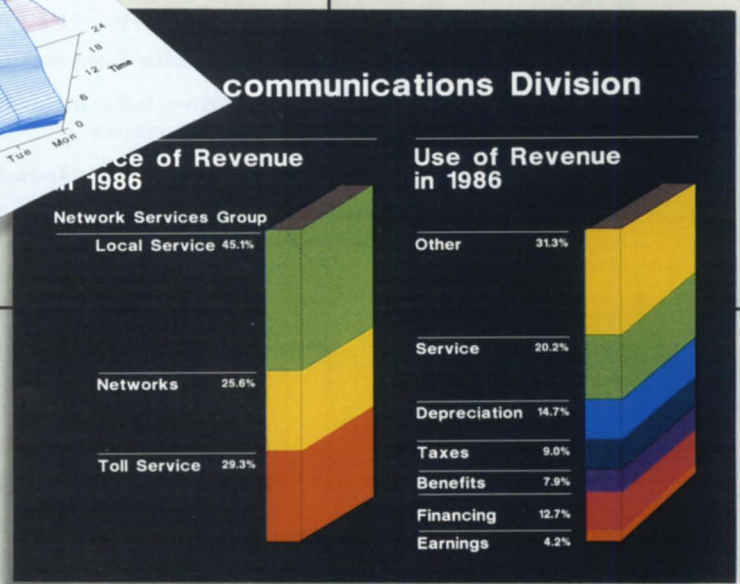

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aware of its own name. "%\%" is the name of the macro itself, minus any switches. I use this technique so users can rename a macro and not have to edit it to change any references to its own name.

Note also the use of the two [!ASCII pseudo-ops used to adhere to the DG documentation convention of showing an argument as "⟨directory-pathname⟩." Pseudo-ops had to be used because "⟨" and "⟩" are CLI expansion characters, and would have been removed by the CLI when the WRITE statement was encountered.

The macro is now executable, and it looks like Figure 2. It still doesn't do anything, but that's OK. Were still just checking out the structural logic.

Try running the macro through its paces at this point to verify that it in fact behaves as advertised.

Figure 3—Almost final version

```
[!EQUAL,%1%,]
 WRITE
 WRITE Usage:  %\% [!ASCII 274]directory-pathname[!ASCII 276]
 WRITE
 WRITE This macro will set the ACLs of directory-pathname and all
 WRITE of its subordinate files to allow minimal public access.
 WRITE
[!ELSE]
 [!EQUAL,[!PATHNAME %1%],]
  WRITE
  WRITE %1% does not exist
  WRITE
 [!ELSE]
  [!EQUAL,([!FILENAMES [!PATHNAME %1%]:+]),()]
   WRITE
   WRITE [!PATHNAME %1%] is not a directory or it's empty.
   WRITE
  [!ELSE]

   PUSH ; PROMPT POP
   DIRECTORY [!PATHNAME %1%]
   DELETE/2=IGNORE/V ?%\%.[!PID].TMP

   BUILD/TYPE=\LNK ?%\%.[!PID].TMP #:+.PR
   WRITE ACL'ing the .PR files...
   [!UNE,[!SIZE ?%\%.[!PID].TMP],0]
    ACL/V ([?%\%.[!PID].TMP]) +,E
```

:PASS_3

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```
    [!END]
    DELETE ?%\%.[!PID].TMP

    BUILD/TYPE=\LNK/TYPE=\CPD/TYPE=\DIR ?%\%.[!PID].TMP
        #:+\?+.TMP\+.PR
    WRITE ACL'ing the data files...
    [!UNE,[!SIZE ?%\%.[!PID].TMP],0]
     ACL/V ([?%\%.[!PID].TMP]) +,R
    [!END]
    DELETE ?%\%.[!PID].TMP

    BUILD/TYPE=CPD/TYPE=DIR ?%\%.[!PID].TMP #:+
    WRITE ACL'ing the subdirectories...
    [!UNE,[!SIZE ?%\%.[!PID].TMP],0]
     ACL/V ([?%\%.[!PID].TMP]) +,RE
    [!END]
    DELETE ?%\%.[!PID].TMP

    POP
    WRITE
    WRITE ACL'ing the public directory its ownself...
    ACL/V [!PATHNAME %1%] +,RE
    WRITE

  [!END]
 [!END]
[!END]
```

ing a list of files matching some combination of criteria—file type and template in this case. Luckily for us, I published a macro last month called BUILD that we can use as a "black box" to solve the problem. Yes, this means that you'll have to rummage through that mountain of magazines under your desk and find last month's copy of *Focus*.

Before using BUILD, there are a couple of things we have to bear in mind: BUILD produces a zero-length file of names if no files match the criteria. That means we'll have to check for a zero-length file of names to avoid an error in the ACL command. This is pretty straightforward. We'll just use this to check the size of the file of names to see if any are nonzero:

```
[!UNE,[!SIZE file-of-names],0]
```

Note the use of !UNE (an arithmetic check for a nonzero value), as opposed to !NEQUAL (a string check for non-"0"). Although either pseudo-op will work

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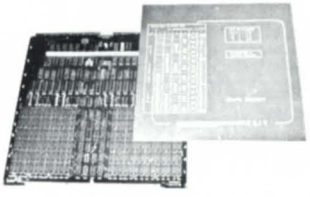

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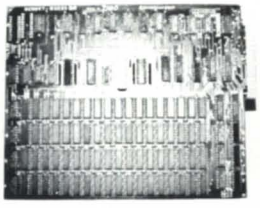

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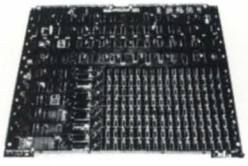

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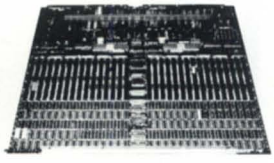

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just fine in this particular case, you should still use !UNE for the sake of correctness.

Also, BUILD complains if the file of names already exists, so we'll have to delete it before each use. It may or may not exist the first time, so we'll use the following command:

```
DELETE/2=IGNORE/V file-of-names
```

I usually use /v on deletes of work files that shouldn't exist. I have two reasons: it gives me some warning if I've inadvertently used the same work file a second time, and it alerts me if the macro was aborted on a previous use (leaving its work file lying around).

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Note that on subsequent deletes you can omit the /2=IGNORE/V because the file was just created by the previous BUILD macro.

The final fact about BUILD is that it always removes the first character from the pathnames (usually "="), so we probably ought to move to the public directory to build the file of names. Since the current directory is one of the environment variables, and Woodsy Owl says, "Give a hoot, don't pollute," we should save the environment before going there. The best way to do this is to wrap the guts of the macro with the following:

```
PUSH ; PROMPT POP
DIRECTORY [!PATHNAME %1%]
. . . guts . . .
POP
```

I combine the PUSH and PROMPT POP on one line to point out the fact that these two operations should be viewed as one "super" command. The objective is protection in case a macro aborts with an error, or the user aborts it with CTRL-C CTRL-A. Without the PROMPT POP, the user would be PUSHed some number of levels and not realize it. The SYSTAPE.CLI macro supplied with AOS[/VS] is a good example of a macro that exhibits this bad behavior.

Finally, don't omit the final POP just because you have specified PROMPT POP! Omitting it will cause really bizarre results in nested macros, recursive macros, or cases where more than one macro is invoked on the same command line (e.g., FOO; ZIP; MUMBLE).

Now it's time to pick a name for the work file. For these, it's always a good idea to use filenames of the form ?something.TMP for two reasons: it makes it obvious that it's a work file, and FIXUP will delete it by default (unless I specify otherwise to FIXUP).

It's also a good idea to use the name of the macro as part of the work filename so that you can identify which macros are missing the cleanup logic to delete their work files, or to detect which macros have aborted. In order to make our macro easily renameable without editing it, use the same trick that we used in the HELP section, and use a filename of the form ?%\%.TMP.

Now we need to add something unique to the work filename to protect against multiple users of this macro who are working in the same directory at the same time. We don't want them using each others' work files. One way would be to use the argument directory

filename as part of the work filename on the assumption that two people wouldn't be using the macro on the same target directory at the same time. This has a flaw: a long directory name might produce a work filename that's too long. A better solution is to use the user's PID, because we know that's unique. The work filename now looks like this:

```
?%\%.[!PID].TMP
```

We're finally ready to add the guts to this thing. Using the first file group (.PR files) as an example, the commands look like this:

```
DELETE/2=IGNORE/V ?%\%.[!PID].TMP
[!UNE,[!SIZE ?%\%.[!PID].TMP],0]
  BUILD/TYPE=\LNK ?%\%.[!PID].TMP
      #:+.PR
  ACL/V ([?%\%.[!PID].TMP]) +,E
[!END]
```

The second group uses a little fancier template in order to exclude the .PR files and the work file (and any other ?+.TMP files).

Finally, the public directory itself is handled a little differently, mostly for cosmetic reasons. I could have done ACL/V = +,RE, but the /V would show "=" as the directory name. So instead, I POP to my previous directory and change the ACL via the !PATHNAME.

Figure 3 shows the finished macro in all its resplendent glory.

:TESTING

The first time you use this macro you may get a bunch of ACCESS DENIED errors. The problem relates to the fact that BUILD produces a list of files in sorted order. This causes inferior directories' names to occur after their parent directory. Once the ACL of the parent directory has been set to +,RE, then there is a good chance that the macro won't be able to change the ACL of inferior directories because of the ACL of the parent directories.

Unfortunately, the only easy solution is to turn on superuser to bypass the access controls. In this case, that's not so bad, because we can safely assume that the only users of this macro will be privileged users. Who else would be publishing directories? However, I have this major problem with putting super commands in macros. I hate to do it because it fosters a casual attitude toward access control in general, so I just let the user turn on superuser before executing the macro, if that's what's needed.

:RETEST

A fast retest at this points shows no more problems (at least for now), so the final step is to add a block of comments at the top of the macro detailing who wrote it, when they wrote it, and how they revised it. I'll leave this to you. Δ

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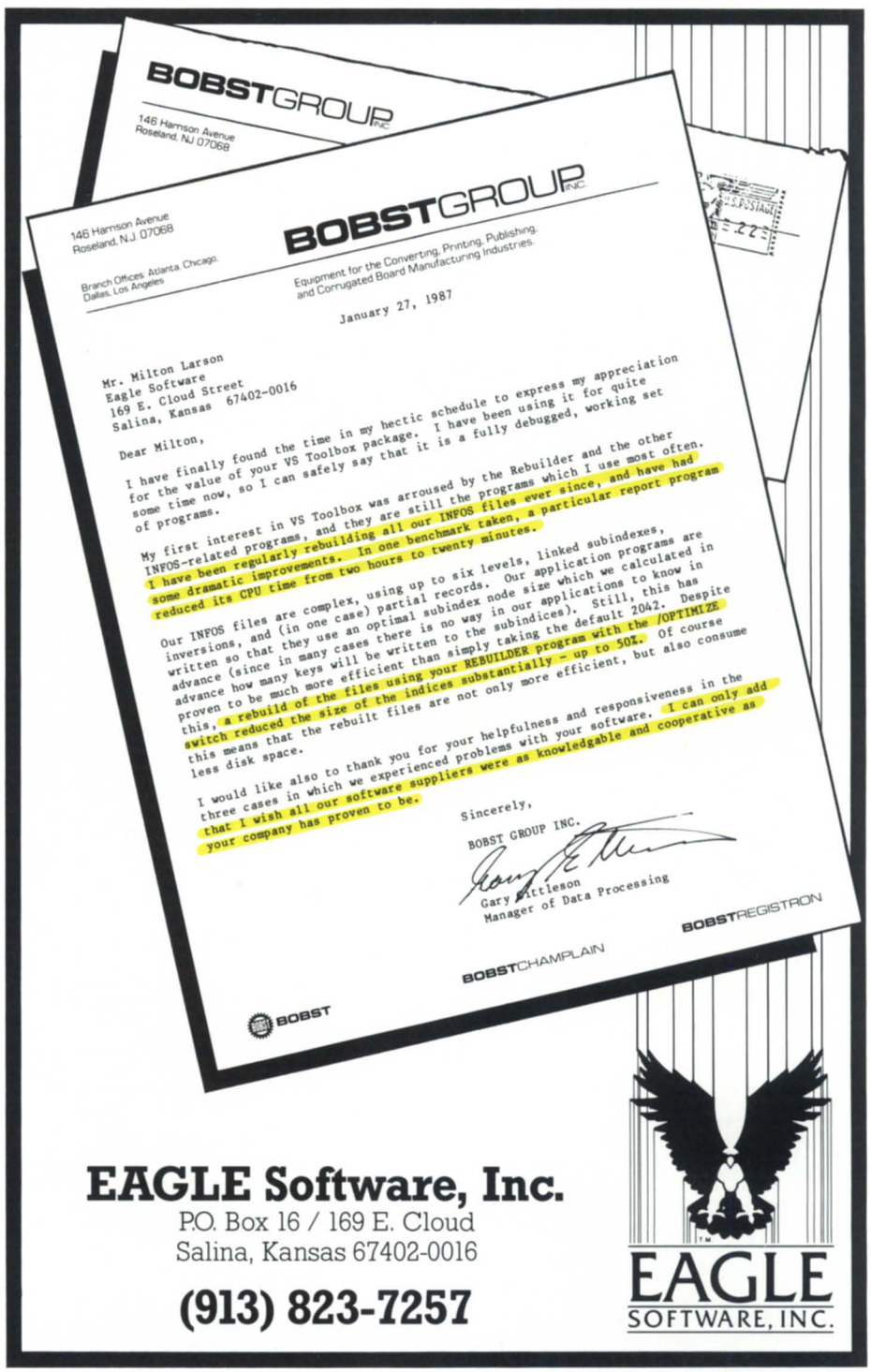

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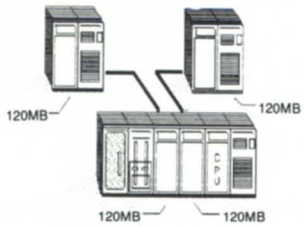

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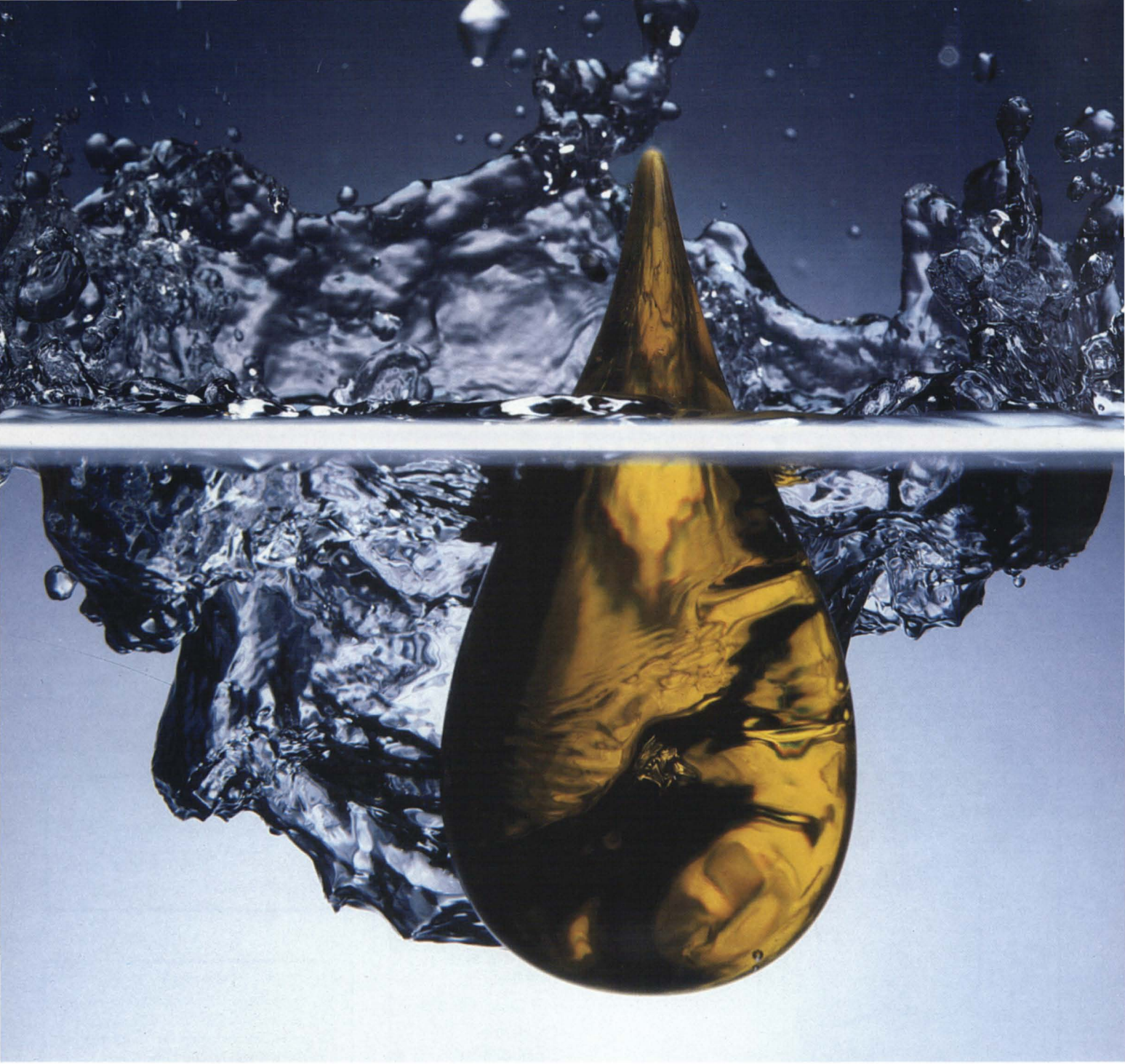
Members of **NADGUG** can use classified space to post personal notices. (Not too personal, please.) Rules are:
- You have to be a paid-up **NADGUG** member to place an ad. (Please include your name and company so we can verify membership.)
- Commercial notices are not permitted.
- Fifty word maximum length. • Notices must be legible. Send ads to **Focus** at 5332 Thunder Creek, Suite 105, Austin, TX 78759



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24. Cincinnatti Users Group
Contact: Vince Thomas, 513/961-5311

25. Northeast Ohio DG Users Group
Contact: Tom Bruns, 216/943-1200 ext. 3890

26. Oklahoma Data General Users Group
Contact: Ray Busick, 405/271-2202

27. Willamette Valley (Oregon) Regional Users Group
Contact: Scott Carr, 503/659-5880

28. Pittsburgh Area Users Group
Contact: Ken Krugh, 412/826-6886

29. S.E. New England (Rhode Island) Users Group
Contact: Frank Perry, 401/277-2558

30. Mid-South (Tennessee) Area Users Group
Contact: Martin Becton, 901/278-0100

31. Dallas Area Users Group (North Texas EDGE)
Contact: Marco Fehlbaum, 214/770-7555

32. Houston Area Users Group (HADGUG)
Contact: Lee Jones, 713/681-2308

33. Central Virginia Data General Users Group
Contact: James Rogers, 804/747-1634

34. Southwest Virginia Data General Users Group
Contact: Betsy Wolfe, 703/380-5000

35. Inland Empire (Washington State) Data General Users Group
Contact: Ed Stohler, 509/624-1321

36. Seattle Regional Interest Group
Contact: Helen Von Erichsen, 206/655-1566

37. Potomac Users of Data General Equipment (PUDGE) (Washington D.C. & Maryland)
Contact: Jess Brown, 301/464-8044 or 301/390-6331

38. Milwaukee Users Group
Contact: Jon Radmer, 414/277-4783

39. Quebec Area Data General Users Group (QUADGUG)
Contact: Andras Gemes, 514/843-5730 Δ

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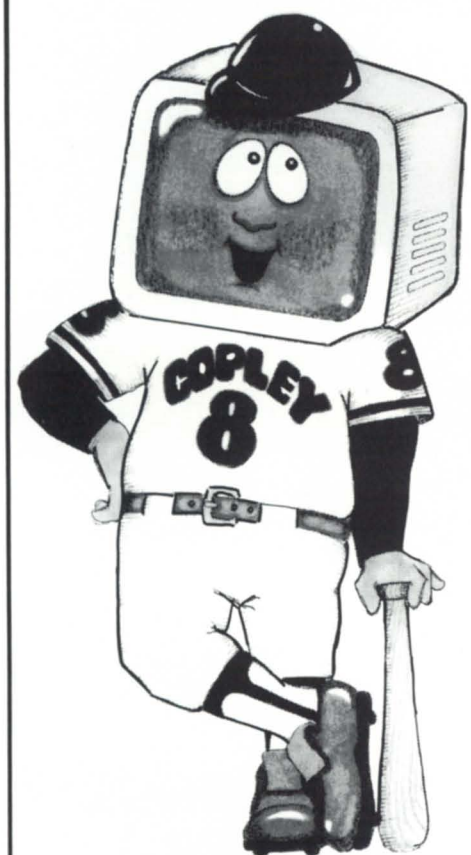

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Third-quarter losses of $65.1 million at Data General have resulted in the shutdown of three DG offices, taking approximately 950 people off of the payroll. Some of the layoffs will occur at the facilities in Hooksett, New Hampshire; Denver, Colorado; and Milford, Massachusetts—all soon to close.

According to Edson de Castro, these measures are part of a profit restoration program for the 1988 fiscal year, which begins September 27, 1987.

At the same time, more DG money will be invested in sales and marketing in order to reverse this two-year downward trend.

■

The Metropolitan N.Y. RIG will hold its quarterly meeting on Tuesday, September 15, from 10 a.m. to noon. Members will gather at DG's midtown New York City office on 757 Third Avenue, third floor, for a presentation on CEO office publishing.

If you would like to attend, contact Stephen Kern at 201/327-6300 ext. 368.

■

Following this summer's announcement of DG/PC*I, low-end products for PCs are slated to get a lot more attention from DG's marketing staff. If you happen to be in New York September 1–3, drop in at the Jacob Javitts Center and catch DG's exhibit at PC Expo.

■

Data General made two departmental mergers this summer. Group Marketing has been combined with the field Sales organization to be headed by Herb Richman, executive vice president. Also, worldwide Manufacturing will be joined with Field Engineering under Frank Silkman, senior vice president of Manufacturing and Field Engineering.

■

Congratulations are in order for *Focus* columnist Jim Siegman, who recently joined Datamark Corporation as senior technical consultant. Jim's strength in AOS/VS system management, COBOL, INFOS, and Unigraphics will complement Datamark's specialties in ICOBOL and Business BASIC applications under RDOS and AOS.

■

Discount shopping is now available through DG/Direct. Customers with a corporate discount agreement can call the toll-free number to order hardware and software products and not lose their discount. Customers with existing agreements may submit verbal orders for up to $10,000 worth of products without a hardcopy purchase order. A contract doesn't even have to be signed for customers buying items that cost less than $7,500.

According to Howard Berg, director of the Continuing Products Division, this service is aimed to increase service and sales of low-end systems and add-on business to existing customers.

■

SPSS, Inc. will sell 20/20 spreadsheet programs, having signed a value-added reseller agreement with Access Technology, the developer of the product. SPSS will market and resell the program for mainframes and minicomputers, enabling users of SPSS-X, SPSS-X Tables, SPSS Graphics, and 20/20 to pass data among the packages. Overall, this should give users extended statistical, forecasting, and graphic capabilities.

■

Business news looks good at MAXON Computer Systems. Their board of directors recently approved a preliminary prospectus for an offering of Class A shares and warrants to be filed with the Ontario Securities Commission. Davidson Partners Ltd. will underwrite the issue.

Second-quarter earnings for this year (ending April 30) show net earnings of $383,000 on sales of $2.5 million. Part of these gains went toward the co-ownership of CMS/Data of Tallahassee, Florida. CMS/Data reported sales of a little more than $5 million.

■

Honeywell-Bull will now provide maintenance and service for users of Teleray multiprotocol terminals (in the U.S.). The agreement covers four model 20 terminals, including the 20-DDG (Data General D/211 and DEC VT220 compatible). Additional models will be added at a later date.

■

At a meeting for the American Association for Artificial Intelligence (AAAI), Data General announced a joint development and marketing agreement with Gold Hill Computers, Inc., signaling a new interest in AI. Gold Hill software products are now available for use on the Dasher/286, PC AT-compatibles, or PCs that are incorporated into networks via DG/PC*I.

This relationship makes available a combination of network-based expert systems and LISP applications on PCs. DG will market and support versions of the Gold Hill GoldWorks, GCLISP 286 Developer, and Golden Connection. DG also made an IHV agreement with Gold Hill for the 386 HummingBoard.

According to J. David Lyons, vice president of Group Marketing, the deal targets seven markets—insurance, banking, brokerage, health, manufacturing, government, and education.

■

A new line of *At a Glance* publications geared for personal computer software is being produced by DG's Educational Services, but will be marketed under the name "DG Learning Systems."

The four new titles are *Lotus 1-2-3 at a Glance, MS-DOS at a Glance, WordPerfect at a Glance,* and *dBase III at a Glance.*

The manuals cost $26.95 apiece and come with a free companion diskette. To order, call 617/870-1600.

■

Data General recently hosted a group of 20 computer industry consultants from Italy. The Studio Organizatio De Industralie (SOI) spends one week each year meeting with and touring a high-technology company. They visited Westboro and toured several customer sites, including a trip to Chicago to see the Premark facility and the city government operations (currently operating with six MVs).

■

Data General beat out 10 competitors, including Wang and Digital, for a $3.4 million contract with the New Zealand Department of Internal Affairs. DG's CEO office automation software is a key element in the multivendor information systems network that will link Data General, IBM, and Digital computer systems. CEO will be used by the 95 elected members of Parliament as well as the Prime Minister.

■

Hanson Data Systems, Inc. now offers a customer training service for training on Data General equipment and related peripherals. Courses now available include: Introduction to Data General Computers, Contemporary Nova/Eclipse Overview, and MV Systems Overview.

Peripheral courses are included on the following products: 6020 and 6026 mag tape, 6098 ECHO, 6299 GCR tape, 6122 Vulcan, 6061 Zebra, 6061 Kismet, and 6236 Argus.

For more information, contact the Training Department at Hanson Data Systems, 617/481-3901. Δ

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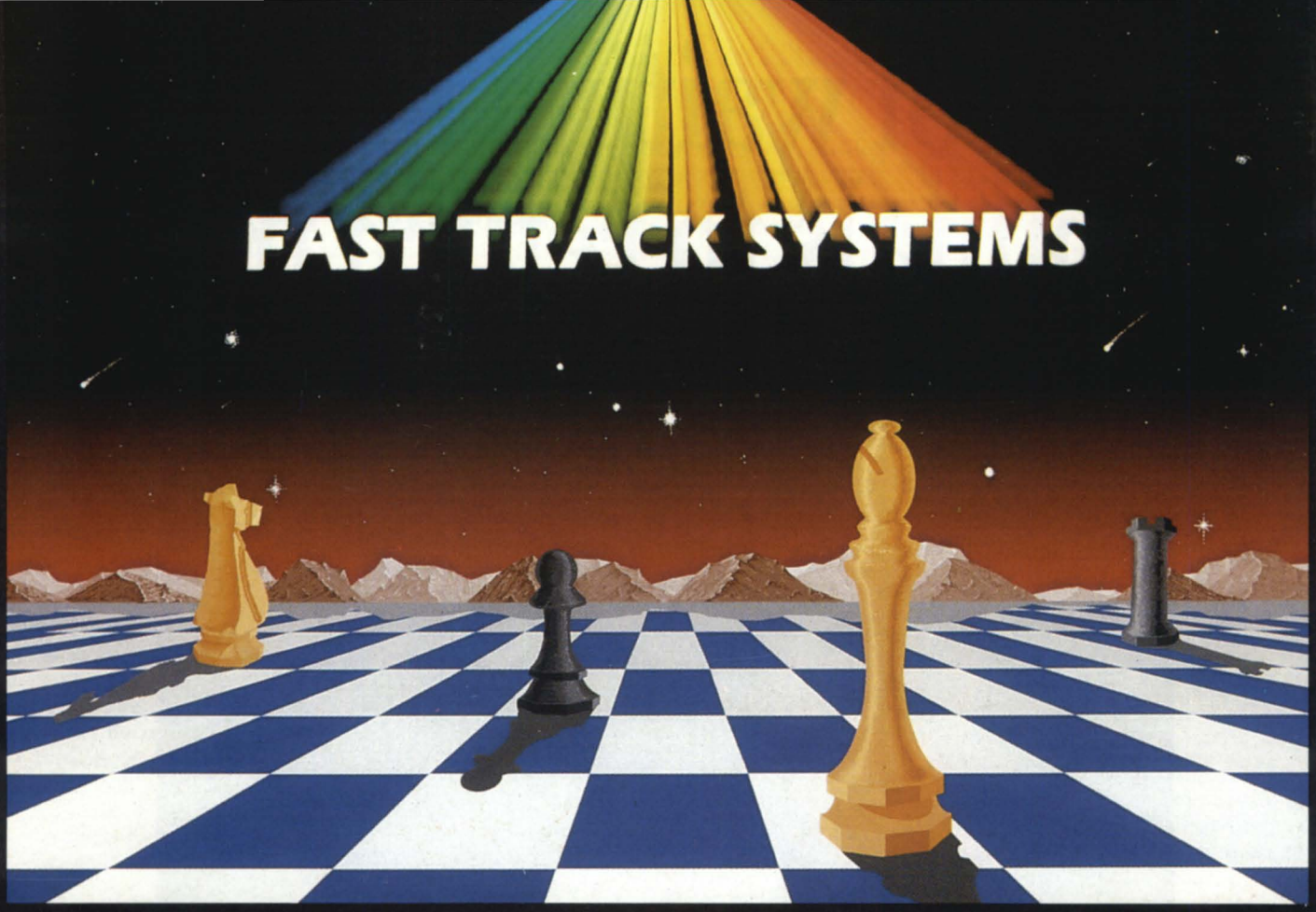

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