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

November 1985

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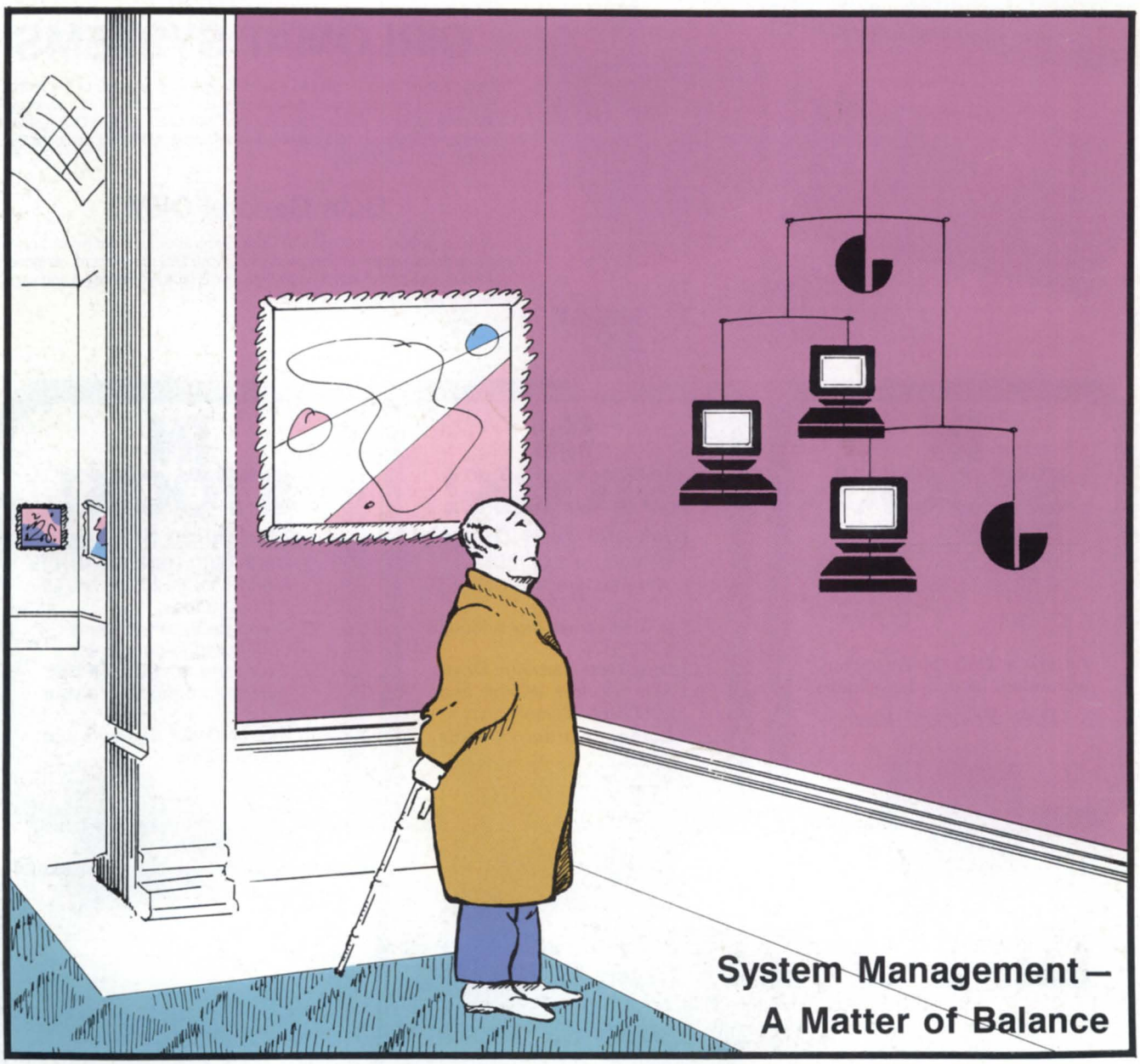

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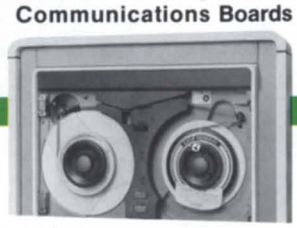

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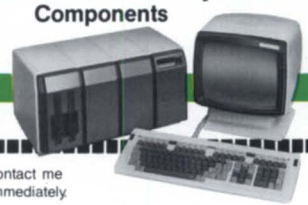

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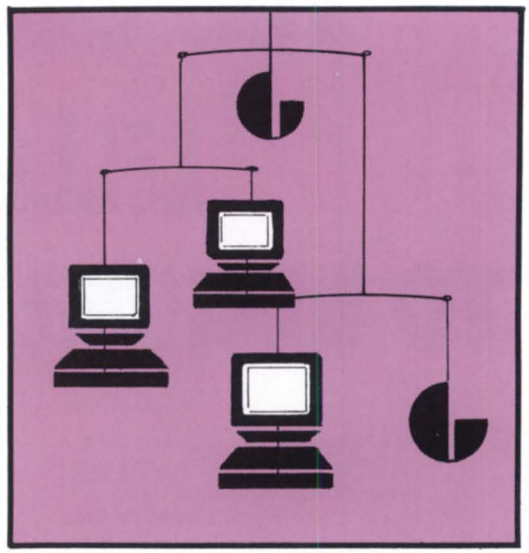

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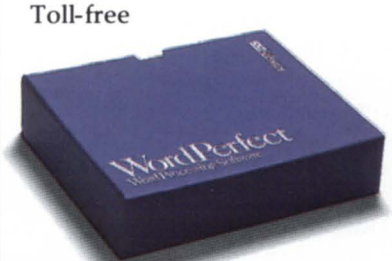

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Running commentary

Like many another health-conscious, slightly-vain, formerly-young man contemplating middle age, I decided sometime last winter that it was time for me to get serious about an exercise program. My wife endorsed the idea, but I think she was contemplating not my age, but the spare tire around my middle. Remembering how much I used to enjoy running in the hills above Stanford, I bought some shoes and vowed to do 15 miles a week.

After eight or nine months of disciplined running, I have to say the results are mixed. I feel pretty good, and I'm certain that my stamina and general health are better. The disconcerting thing is that the spare tire is still there. Despite all that sweat and toil, I still weigh almost exactly what I did in my flabbier, pre-fitness condition.

If there is a conclusion to be drawn from this soliloquy, it's only that exercise definitely made me fitter, but if losing weight is important to me, then I'm going to have to eat less. That's not exactly profound. However, it does point to a more general tendency that has doomed some of my best efforts at improvement. I'm not talking just about myself here, but about that human propensity for looking at a situation, perceiving a problem, and then very single-mindedly proceeding to implement part of a solution.

Take, for example, the dedicated efforts of the system manager who sets out to coax every conceivable increment of performance from her computer. As she toils to fine-tune the system, she produces marked improvements in all the machine analogs of heart rate, muscle tone, and oxygen uptake. But to her chagrin, the users are just as restive as ever, and the backlog of work seems, if anything, slightly more overwhelming. The system is clearly healthier, but if reducing that backlog is important to her, she will have to look for broader solutions.

Like the rest of us, this hypothetical system manager is facing a revolution of rising expectations. The people who authorize computer purchases and sign payroll checks are growing more sophisticated about information processing. They are also beginning to expect a higher level of professionalism from the people to whom they entrust their information resources. It's no longer good enough just to keep the computer running efficiently; the successful information processing manager depends somewhat less these days on technical competence, and much more on management skills.

This trend is gradually producing a shift in the membership of NADGUG. In recent years, an increasing proportion of the people who attend NADGUG conferences would be described as managers, rather than as technicians. Many, having come up through the technical ranks, feel poorly prepared and somewhat uncomfortable in their new roles. NADGUG's new president, Rene Dominguez, points to this fact in the interview which appears on page six. In fact, one of Dominguez' goals for the next year is to make sure that future NADGUG conferences provide more sessions to address the needs of these emerging information management professionals.

This month *Focus* brings you two articles that do just that. On page 14, Thomas M. F. Doyle begins an intriguing description of a development project that had everything going against it. The users didn't trust the equipment, the bosses considered it a lost cause, and there were no commercially available solutions. Turning a deteriorating situation into a successful installation required technical competence, to be sure, but it depended at least as much on being able to address the needs and feelings of the users. In a similar vein, Donald A. Sellek's article on page 25 describes how his company implemented an off-the-shelf solution over a period of years.

In both these cases, it was as much a victory for management skills as it was for technical tools. Not every problem situation can end as happily as these, of course. But perhaps more of them will if NADGUG begins to support the same kind of sharing and cooperation with respect to management concerns that it now does with technical issues. Δ

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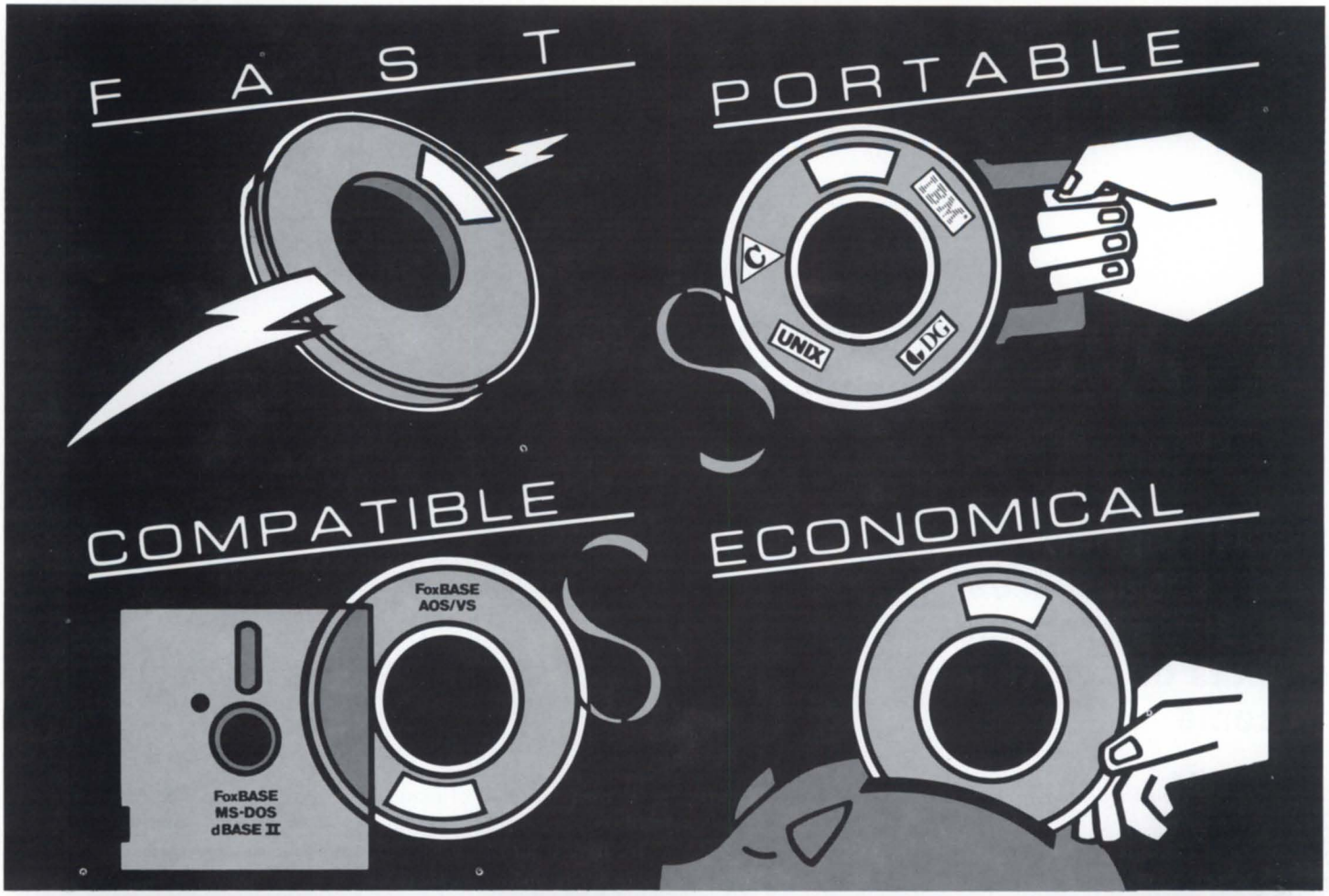

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A spur for growth

NADGUG's new president assesses NADGUG's progress, reflects on the year to come

When Rene Dominguez accepted the president's gavel at Conference '85, he knew that he was taking on the task of leading NADGUG through a period of growth and change. However, as a former RIG chairman, RIG/SIG Committee chairman, and NADGUG vice president, Dominguez is no stranger to growth or change. In this interview he reflects on what NADGUG has accomplished, and what still lies ahead.

Conference '85 was the biggest NADGUG meeting ever. I don't think I'm alone in being pleasantly surprised at this year's growth spurt for attendance. Was it a fluke? If not, what do you attribute it to?

I think it was a combination of things. First, you have to recognize that the group is getting larger each year, but I think a couple of other things helped us this year. The fact that we had the meeting in Boston helped, because there are a lot of users on the East Coast, which put them in proximity of the conference location. I think another thing was that with the conference so near to Westboro, a lot of people thought that they would have a chance to rub elbows with people in DG's software development area, as well as the other people in the corporate offices. In fact, they did have that opportunity. Both of those factors probably contributed, because the attendance was higher than we would have predicted based just on our growth spurt.

Another thing that I think is happening across the board is that the Data General user community is changing. It used to be a predominantly tech-oriented, bits-and-bytes kind of group—and we still have a lot of people like that. But I do think we're finding many more users of equipment—and managers of users of equipment—attending the conferences. We're seeing more users who represent the larger "Fortune 1000" corporations that Data General is now targeting with its marketing. This is partly because large corporations have more money to spend sending people to conferences.

Will these changes result in different offerings for the people who come to future conferences?

I don't think we'll ever ignore the technical area, because that's always been the real strength of the conference. I think that we will cater a bit more to some of the other people that are coming to the conferences, however. Up until now we have basically neglected the management-level people in terms of the offerings from DG Education Services and even in the sessions. We will try to cover more of the things that are problems for them—things like time management, stress management, program and system development, testing requirements, and so on. I would like to see some influx of that kind of emphasis.

That's one of the points I want to make at the meeting we're having with the conference staff tomorrow *[this interview was conducted during the last week of September]*. To most people who attended Conference '85, it probably looked like it went off very smoothly. But to those of us on the sidelines there were a lot of bugs and gotchas. We're going to take a look at what went well and what didn't go so well, and try to make it so next year's conference can go a little smoother.

The size of the conference was impressive. It looks like it could take several months for me to do something with all the information and names I collected in Boston. Other than size, though, what was memorable for you about Conference '85?

This was the first year I can recall that we had so many roundtables. We've had roundtables for AOS and AOS/VS every year, but this year we also had one on CEO, which turned out to have a lot of support, and one for RDOS, and another for AOS and AOS/VS system managers. They were a real forum for people to share information and experiences.

I heard a lot of people comment about the number of exhibitors who came to Conference '85, and the exhibit area seemed much busier this year than last. Did NADGUG do anything special to promote the exhibits?

Calvin Durden *[NADGUG's vice president]* would be able to tell you more about that. I don't know that we did anything special, but we found that we had a lot of com-

panies that were interested in exhibiting this year. That, combined with a little bit more relaxed approach on the part of Data General, made it possible for us to accommodate a lot more vendors. I think we're going to see more of that. If the conference becomes a good tool for them, the exhibitors will want to be there.

Representatives from the Atlanta Software Support Center were there in force to talk about changes they had implemented since last year. They seemed to give NADGUG a fair amount of credit for the improvements. What is your perspective on Atlanta's progress on customer support?

I guess I like to hear them give us credit. It makes me feel good, but I think that what they were referring to came out of a meeting that *[NADGUG past-president]* John Brudz and I had last year with various DG vice presidents, including Frank Silkman *[DG's vice president, Data General Service]*. Based on a questionnaire that we had sent out to the Regional Interest Groups, we knew that the Atlanta Support Center was one of the major issues. We brought up a number of specific points at the meeting, none of which seemed to be new to Frank. They were already aware of them and seemed to be taking some action to clean them up.

Calvin Durden and John Brudz went down to visit the Atlanta Software Support Center subsequently, and they indicated that our involvement had helped to spur some action. In reality, it's probably a case of our involvement helping to heighten their awareness of the problems.

As Edson de Castro said some time ago, if we give them some statistics about what we need, they're going to take some action. It's my intent to do more of that.

What is your evaluation of how effective the changes that were put in place have been in solving the users' problems with software support?

Based on the impromptu surveys I took at the conference, I see an improvement. How much of that is real and true will take some time to sort out. We're talking about some 300 people making those comments, and there are a lot more people out there using the Software Support Center. I'd like to make sure that we get a better survey from our entire membership before I make a real strong comment.

From my standpoint I'll say this: DG is going to put the effort into cleaning up the problems, and to the extent that we find other problem areas, I feel very comfortable that DG is going to respond to them.

Other than the Atlanta Center, what do you think are the priority areas where users could end up having an impact on DG's operations?

There are a lot of areas that we can take a look at. I think we can use questionnaires in *Focus* to identify some of them. What you might want to do is pop out some kind of a quickie questionnaire for the NADGUG board members to give us an idea of what we can do for the users. I'd like to get some kind of idea about what those areas are, and I'd like to publish the results—and then see what the results of those results are!

Looking ahead to the problems you will encounter in the next year, what do you think are the most important issues facing NADGUG?

There's one issue that's dear to your heart and mine: we want to make sure that *Focus* continues to be a tool for surveying the membership and presenting some very solid information back to users.

We're also going to be upgrading the administrative support system. We have the authorization to purchase software to support the association needs that we have. Upgrading the hardware has basically been taken care of, thanks to DG for donating the MV/4000.

We're also looking at doing some expansion to our membership base. At the meeting we had with the Data General VPs we got their agreement on the "Box of Tide" concept, where with every MV class system that is purchased there will be a free membership to NADGUG. Before long we ought to be able to see how effective that particular program is.

The on-line user group bulletin board that is being implemented on *[Rational Data Systems President]* Doug Kaye's computer will help users to communicate back and forth on all kinds of issues. We're also going to be publishing a roster of the NADGUG membership this year. That will let users know who some of their cohorts in crime are, so they can respond to one another between the annual conferences, and help spur some of that activity and camaraderie.

Another general area that we are going to address at our meeting this week is the staff support that Data General is providing. One of the things we have to decide is how they are going to replace Chuck Colombo *[Chuck resigned his position as NADGUG Executive Secretary at the end of August]*. I hope DG will turn it into the kind of position that everybody wants to have—we want it to be more of an entrepreneurial position where someone with solid business experience and knowledge can put together an organization that he or she can be proud of.

If you really think about it, there are funds available through NADGUG to support some very creative activities. For example, an executive secretary could come to the board and ask for money for travel to the various Data General offices to foster more activity in the Regional Interest Groups. I think a person could really have a lot of fun, and could really build an organization. It's going to require a person who can handle the volume and make sure they go fast enough, but not too fast—they've got to make sure that the conference is good, and that the planning is being done. If it was me with that job I could have a ball. I get excited about it and I think somebody else should get excited about it.

Supporting this kind of organization is something that Data General can reap rewards from. The closer the user community is and the better their communication is, the more acceptable Data General's products will become. Likewise, from a user standpoint, the stronger we become, the more support systems we will have to help us get our problems solved. And the stronger that becomes, the more users there will be, because people are going to want to buy Data General systems.

I guess I look at my function as being a spur—more of a catalyst—trying to get people to think about getting the resources together to accommodate the activities that I think we ought to be able to accomplish. If I can do that and we find the right person on the other end—a person at DG who's willing to take some of those priorities and implement them—then I think we'll have a real winner.Δ

Meet me at the OASIS

by Charlene A. Kirian
Special to Focus

By now, I hope you have heard about OASIS (Office Automation Special Interest Subcommittee). Maybe you've even filled out and returned your application form. We are now about 100 strong—an increase of about 33 percent since our organizational meeting in Boston. And this is just the beginning!

OASIS is a group of Data General users whose common interest is sharing information about office automation products. We have a quarterly newsletter and are in the process of developing a roster for distribution to all members. The roster will contain the name of the company, a contact person, telephone number, and general information about the company's configuration of equipment and applications. It should be a useful reference tool for each of our members when they try to find other users with similar interests.

At the 1985 NADGUG conference, we voted on a set of by-laws, elected officers, and adopted a $25 membership fee. If you have already turned in your application form, you will soon receive an invoice for payment of the fee. If you have not sent in your application form, what are you waiting for? We've got a lot of information to share and many new ideas that may be of interest to you.

Here are the newly-elected OASIS officers:

President—Charlene Kirian, of OCLC, Inc., Dublin, Ohio; 614/764-6435.

Vice President—Bobbie Pressman, of Deutsche Credit Corp., Deerfield, Illinois; 312/948-1814.

Secretary—Ron Cohen, of the St. Louis County Police Department, Clayton, Missouri; 314/889-2822.

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CEO Workshops. During the OASIS business meeting, we found that we didn't have time for what we were really interested in: sitting down to discuss various concerns and functions unique to each installation. Next year we will schedule a special session specifically for this purpose.

Right now we are in the process of organizing a one-day workshop to be held in Indianapolis sometime in the spring. It will be open to any interested CEO user, but details of cost and content are still being planned. More information about this activity will be distributed in the next newsletter, and also in future articles in *Focus*. If this workshop proves to be beneficial, we may offer it at a later date in another region of the country. If you have suggestions or ideas, please notify any of the OASIS officers.

Requests for Enhancements (RFEs). I recently met with members of the software development staff from DG's corporate offices in Westboro. It was a good opportunity to discuss some of the difficulties that CEO users have encountered when they requested enhancements for a product. As a response for a user who has taken the time to submit a Software Trouble Report, "Will be considered in a future revision" is sometimes not an acceptable answer. Maybe they will. . . and maybe they won't. But what if many of us thought it would be a valuable addition? Would the development staff listen to just one or two, or would they give it more credence if "we," as a group, banded together to say, "Yes, it is very important, and we would like to see it developed." The people I talked with said it would have more meaning if a group of companies requested a feature and stated why that feature would be important.

From that conversation, I volunteered OASIS as a forum for disseminating that information to corporate development. We agreed that OASIS would develop a questionnaire for members to rate their priority enhancement items in order of importance. The Technical Communications Committee, headed by Randy Siebert, will collect the information necessary to provide development staff with a priority listing of enhancements requested by our membership. Software development will look at that list as a consensus of users.

I feel this is a major step in the right direction. Not only will it help users to feel that their opinions count, but it will also help DG make decisions about where to direct its development resources. In the end, we will all be winners.

CEO Roundtable. As planned, OASIS hosted a CEO Roundtable at this year's conference. It was very well attended; in fact it was such a success that we are already on the calendar for next year. We feel confident that next year's roundtable will grow even larger.

The Boston roundtable started with Mary Lynch, representing Data General's Business Automation group, giving a brief summary of where DG plans to go with office automation. Director of Software Development Al Scura, Manager of OA Development Skip Richards, and Product Manager for OA Products Chris Stone then fielded questions previously submitted by users. Here, in summary form, is a sampling of the topics the panel discussed:

When will CEO be 32-bit?

The 32-bit CEO is coming out in pieces as follows: rev 2.10—POA and QManager; rev 2.12—Control Program; rev 2.20—Word Processor.

When will it be easy to remove a user from the system?

These concerns are being addressed in future revisions to be released early next year.

When will DG start supporting various types of printers?
DG supports only specific printers. If others worked, it was by pure chance. The problems were caused by changes in the formatter. The long-term solution is to have user-definable printers.

Why does CEO Connection need a CLI process?
DG/BLAST requires bidirectional access in rev 1 of CEO Connection. This will be eliminated in rev 2.0.

When will CEO Decision Base be improved to meet microprocessor capabilities?
It is DG's intent to make the product more like Lotus 1-2-3. Rev 2.10 of CEO improves performance, but quality comes first.

What is the future of 16-bit CEO on Desktops?
Most work is going to the 32-bit environment. There are no major future enhancements being considered.

When will all the problems with the calendar be fixed?
Rev 2.10 has fixed most problems. It has been used in-house extensively and seems extremely stable.

Will the restriction on the number of remote aliases be raised?
Yes, in rev 2.20.

When will we be able to attach a slave printer to the D410 and D460 terminals?
Sometime in 1986.

When will DG start supporting independent word processing again? It was sold as a DG product. What about supporting it?
Independent WP is in Quality Assurance at this time.

When can we expect documentation for rev 2.0?
Documentation will ship with rev 2.10. (In a later meeting, DG announced that they will always be behind in documentation in order to bring a product to market in a timely fashion.)

The roundtable sessions were audiotaped, so you can get a copy for yourself if you want more of the details. Also, the videotapes of the roundtable will be available to Regional and/or Special Interest Groups in the near future.

Looking ahead. As you can see, we have been busy trying to get the information flowing between DG and users. But we're just starting. Why don't you join us? With your help, we *can* make things happen! If you've got questions, please call one of the officers listed above. Any of us will be glad to give you any information available. Δ

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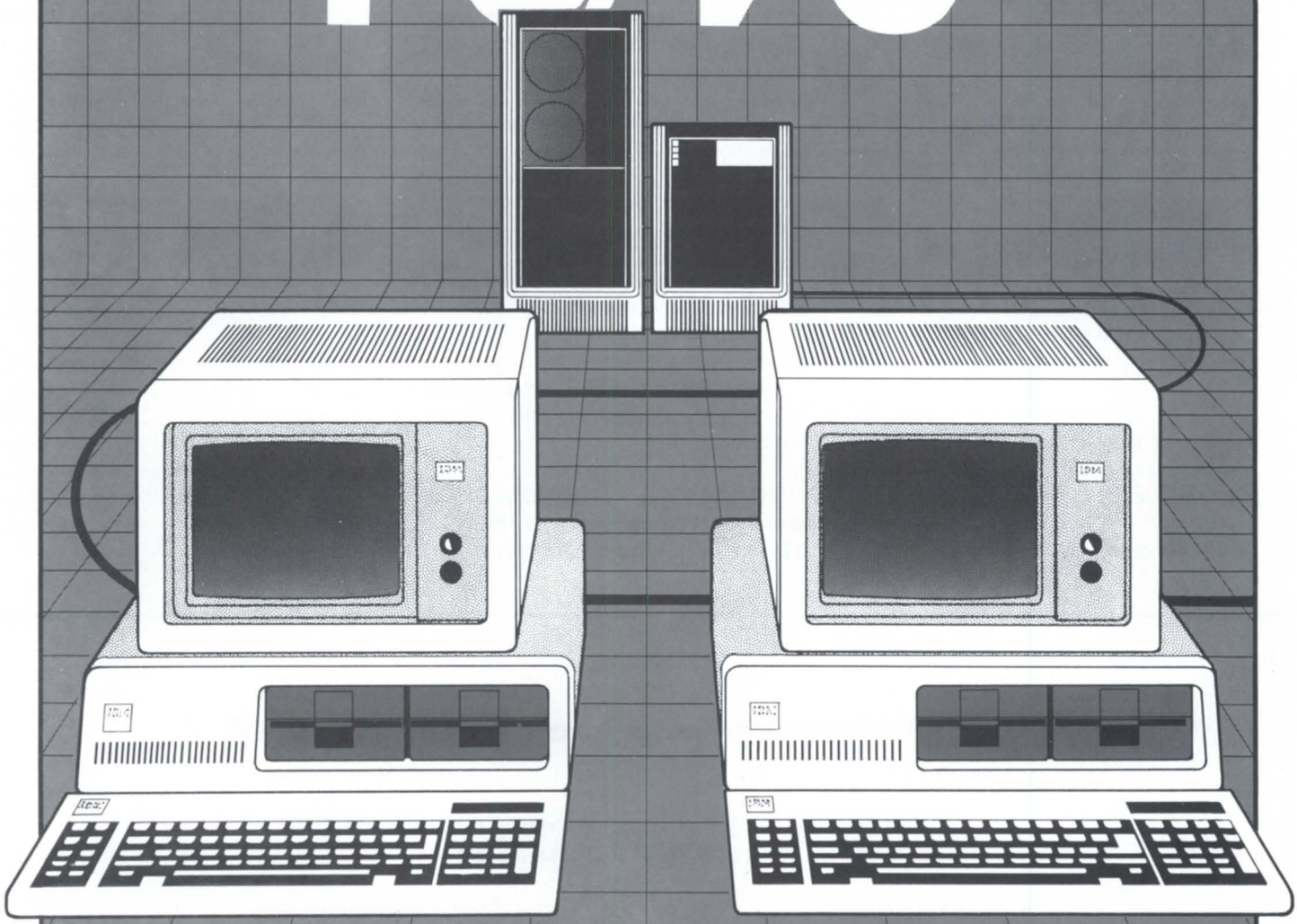

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Welcome aboard

The new NADGUG bulletin board is cheap and easy—a good way to find help when you need it

by Greg Farman
Focus Staff

WELCOME TO THE OFFICIAL BULLETIN BOARD SYSTEM OF THE NORTH AMERICAN DATA GENERAL USER'S GROUP (NADGUG).

Hmmm. Doesn't seem too bad so far. . . I guess that qualifies as a user-friendly introduction. . .

It was my first experience with the bulletin board system that NADGUG's executive board authorized at its last meeting. I was just a bit nervous about it because I had no written instructions, and little experience with other bulletin boards. I was guessing that my ignorance was going to cost plenty in long-distance charges until I could figure out how to make this thing work.

So far, I had to admit that it was working as advertised. They said all it would take was a 300 or 1200 baud modem, a terminal program, and a phone line. I was using a $375 modem and a Macintosh running MacDasher (the DG terminal emulation software from Kaz Business Systems). I had been told that the phone line, 415/924-3652, was operating 24 hours a day, 7 days a week. I guess it was, because I was calling after midnight on a weekend.

What's this? It was prompting me for my name. I wasn't sure I wanted to give it. That way I could pretend to be a wrong number if I screwed up anything. *Oh what the heck.*

I answered the prompts for name, city, state, and terminal type. Actually this made me feel a bit more confident. These were questions I knew the answers to, and the BBS even confirmed my responses. It was even somewhat satisfying to see my name spelled right in a computer data base for a change, even if I had to do it myself.

Next it asked me for a password. *Wait a minute. There's a catch here—it warned me earlier that passwords are case-sensitive. That means there are a lot more ways to misremember the password. It would be humiliating to have to beg the sysop to tell me my password.* I gave it the license number from a car I once owned, and wrote it down exactly the same way to keep in a safe place.

Oh Oh. Here comes something else to tax my memory.

P=Pause, <CR>=Continue, S=Stop

These were keyboard instructions to control the flow of text across my screen. As it turns out, it's not quite that simple. Well, it really is that simple, but that's not all there is to it. What I really mean to say is, you can also use XON/XOFF by typing control-Q and control-S for flow control. Just don't mix the two modes. Oh, don't worry about it—it's in the on-line help. I didn't find out about it until later and it didn't make any difference.

What's this? Another inducement to give up my anonymity? **"You only have 10 MINUTES of READ-ONLY access to this system until you REGISTER! Therefore, please select the <*>REGISTER option below by typing an asterisk, ("*").''**

Who could resist a pitch like that? I went ahead with the registration procedure. Most of the prompts were the same as the log-on routine I had just completed. Why didn't the system just fill in the blanks with the information I gave earlier? I had a hunch that maybe it's done that way to give new users who fibbed about their names earlier a chance to come clean. Probably too many people are tempted to use "handles'' to indulge their fantasies and hide their identities. A registration process like this one just might give the sysop a fighting chance to keep hackers and foul-mouths off the bulletin board.

My supposition was confirmed much later in the session, when I called up THE RDS BBS POLICY: "This is where most hobbyist boards make statements about not using their system for illegal purposes. We've all seen recent stories of system operators (or SYSOPS) being arrested, of TRW passwords being posted on bulletin boards, and even threats made against the lives of others. We assume that the special interest groups to which our system is targeted will preclude such problems. Should this not be the case, we'll just shut it down. —Doug Kaye, President, Rational Data Systems, Inc.''

This from the guy who once described himself as NADGUG's anarchist laureate?

I talked with Doug a few days later, and he reiterated this position. His company is donating the computer time and software for the NADGUG BBS, to say nothing of the time it takes to monitor and maintain the bulletin board. He wants it to be a free and useful resource for serious users—not a hacker board.

Doug strongly discourages the use of "handles,'' because they are not in keeping with the serious nature of the NADGUG bulletin board. They also make life harder for the sysop; anonymous hackers are more prone to clutter the board with spurious news and offensive comments.

Doug strongly discourages the use of "handles," because they are not in keeping with the serious nature of the NADGUG bulletin board

Judging by the more than 2,000 open messages that have been posted since the board began operating, the NADGUG BBS is well on the way to becoming the communication tool Doug envisioned. But you can judge that for yourself when you log on. To make it just a little easier, I want to share some advice I plagiarized from the help files.

Conceptually, electronic bulletin boards are just like the ones made from cork. The NADGUG BBS is subdivided into different areas that correspond to different Special Interest Groups. You can browse through the messages left by others, or (if you are registered) you can respond to messages or leave some of your own for others to see.

All BBS messages have headers, which makes them much easier to scan than the scraps that decorate cork bulletin boards. **TO:** tells who the message was addressed to. Anybody can read it if it's posted, but the addressee is alerted to it the next time he logs on. **FROM:** tells who sent the message. **SUBJECT:** is a one or two word description of the general subject matter. **MSG#**: is the number by which the system keeps the message. BBS headers also show the date and time the message was sent.

After you've had a little practice perusing the NADGUG BBS, you will appreciate how some users—just like seasoned users of the cork boards—make good use of header information to direct your attention to relevant messages. You'll also learn shortcuts for reading and posting messages quickly, so you can reduce the long-distance charges.

The most pleasant surprise about the whole experience for me was the fact that the NADGUG BBS is well-documented. Extensive information about the system and how it operates is nested in a menu structure that works out something like figure 1. Doug warns that the system is still being modified as more features are implemented. It would be advisable to check from time to time to see what has changed. You can even download the help files to make your own documentation—just like I did to prepare this article.

Keyboard controls. Now, let's get back to the details of flow control. There are two methods: either use P to pause and carriage return (<CR>) to continue, or use the XON/XOFF option with a control-Q (^Q) and control-S (^S) to start and stop the text. If you opt for the first method, the P may be either upper- or lowercase. Don't try to mix these styles; ^Q will not unstick a P, and <CR> will not unstick a ^S.

If by chance your terminal hangs during a session, chances are that somehow a ^S was sent. If you can't unstick it with a ^Q, Doug recommends checking your terminal characteristics. The BBS is expecting eight data bits with no parity and one stop bit, so set yours accordingly.

Finally, you can use S (either upper- or lowercase) to stop the text altogether. S will abandon the display of a file and return to the current menu. S can also be used to stop a message or bulletin board <R>ead or <P>eruse.

Reading and perusing. The BBS supports a variety of retrieval methods to allow you to quickly access the messages you want. You should probably use the <P>eruse option to quickly scan just the header information, rather than reading every message. Doug recommends using the peruse backward option, which starts you with the most recent messages. If an item interests you, you can mark it for retrieval later.

Whether you are reading or perusing, there are several retrieval methods: forward and reverse (which are based on message numbers), and selective (which is based on the subject, or who the message is to or from). In addition you may elect to pause after each message to exercise an option to reply to the message. If you are after speed (say, you're calling long distance and spooling the messages to disk for later reading) you may elect to have all messages displayed with no pauses. In either case you may pause with either a CTRL-S or the "P" key. The retrieval options are:

- <F>orward. The BBS asks you for a starting message number, and then displays all messages on the selected board(s) that have numbers equal to or higher than what you specified.
- <R>everse. Same as forward, except the display proceeds in reverse from the number you specify.
- <N>ew messages. This causes a forward retrieval of the messages which were left since your last time on the system.
- <M>arked messages. This causes a display of any messages which have been marked, in ascending numerical order. Messages are marked when you use the mark option on a peruse, or when there is a message for you. In the latter case you would receive a message-waiting notification at logon. Marks remain for the entire logon and go away when you log off.
- <I>ndividual message. You specify a single message number and if the message exists on the selected board(s), then it will be displayed.
- <S>elective retrieval. You are asked if you wish to select by <F>rom, <T>o, or <S>ubject. After you pick one, you will be asked for a text string you want the BBS to match. This string may be a partial one; any message which contains the specified string anywhere in the specified field will be displayed.

On all retrievals except individual, you will be asked:

Pause After Each Msg(Y/N)?

If you enter Y, the following prompt will be displayed after each message:

<N>ext msg, <R>eply, or <S>top?

Pressing either N or <CR> will display the next message in the retrieve. Pressing S will abort the retrieve. Pressing R will allow you to enter a Reply to the message you have just seen displayed. This reply will be chained to the message for future retrieves.

If a message is either from you or to you, you will be given a chance to delete it every time you read it. This is to remind you not to leave old messages on the system—they take up valuable disk space.

Reply chain reading. When you are retrieving messages (except in individual or reverse modes), if a message has replies, you will see the prompt:

read now(Y/N)?

If you enter a Y, the reply chain will be displayed at once. This allows you to read all messages in a given discussion in order so the train of thought is not lost. After the last reply

(continued on page 46)

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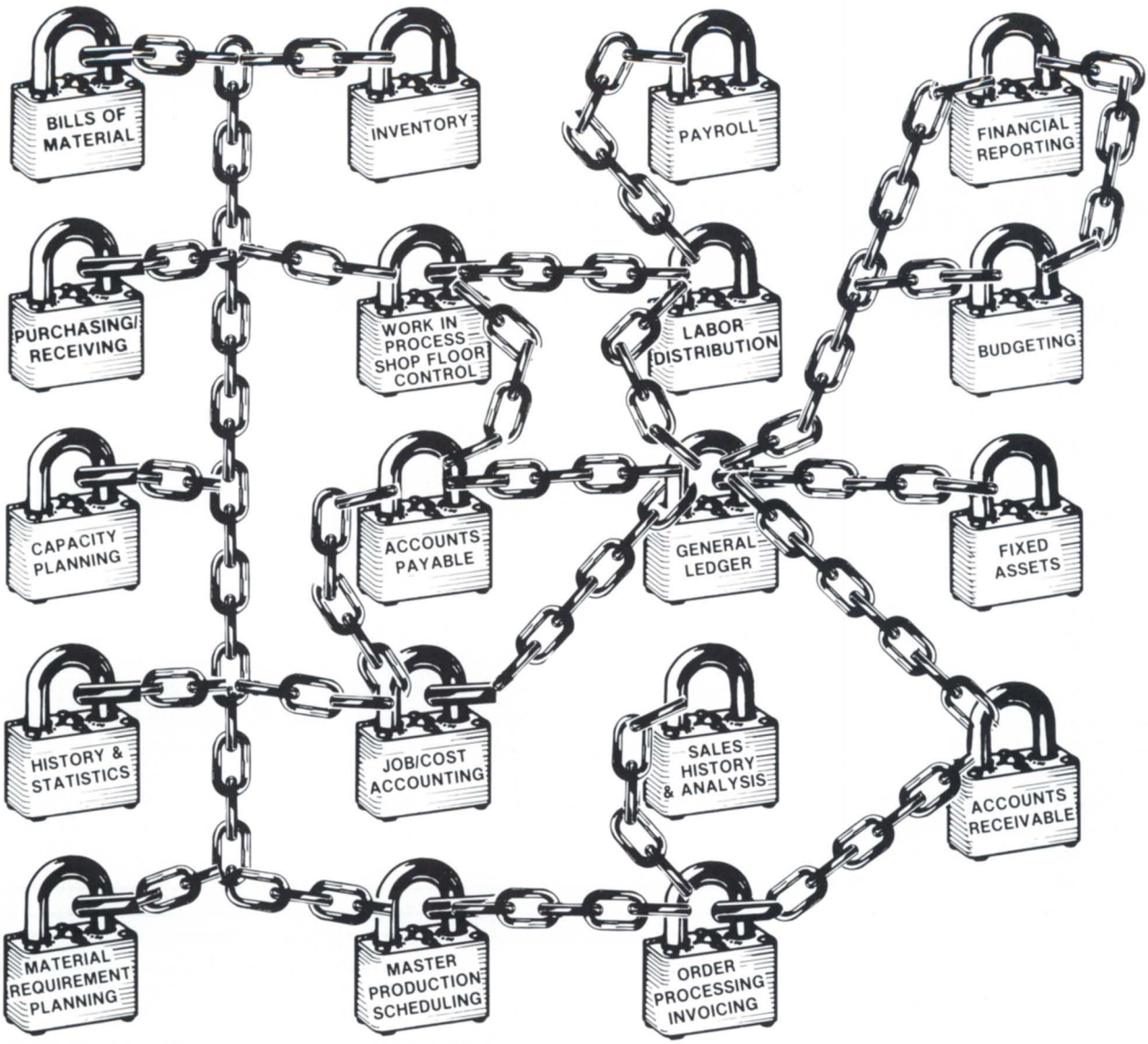

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Colorado rainbow

Computer-aided process control at the Rainbow Park Treatment Plant

By Thomas M. F. Doyle
Special to Focus

When the Rainbow Park Regional Wastewater Treatment Plant went on line in the spring of 1983, it was described as a state-of-the-art facility. The clean, functional engineering, by M & I Consultants of Fort Collins, Colorado, featured a design that allowed exceptional flexibility in process control. By replacing four older, failing facilities, this 8-million-gallon-per-day treatment plant was expected to vastly improve the environmental quality of the Arkansas River basin in the Canon City-Florence region of Colorado.

The centerpiece of this new plant was a computer-directed process-monitoring system. This system, as originally installed, is detailed in figure one. Initially, 22 analog points and 93 digital points were monitored by the central computer every six seconds. The analog points included such monitoring devices as flow meters, basin level detectors, and units monitoring dissolved oxygen concentration in liquids. The digital points measured on/off status of process units such as pumps, as well as the occurrence of high- and low-level alarms (torque alarms, low-/high-temperature alarms, etc.).

These signals were brought directly to the central computer room and received by Data General's analog/digital converter (DGDAC). The system itself was run on a Data General Nova 4x, with 256K of RAM and RDOS. Installation of all instrumentation and the computer itself was done under a contract with Passavant Corporation of Atlanta, Georgia. The process-monitoring software was developed and installed by R & M Associates of Houston, Texas.

Amazingly, at startup there were very few problems involving the instrumentation or the software. Serious problems developed immediately, however, due to the inadequacy of the installation site for the computer.

The original design called for a hard-wired plant-monitoring system, with no computer at all. The lines from the various monitors were to be brought into a central room where their signals would be displayed by various dials, lights, and trend charts. The computer was added late in the design of the plant at the suggestion of the subcontractor (mostly for economic reasons).

Because of this, little thought was put into using the computer for anything but a device

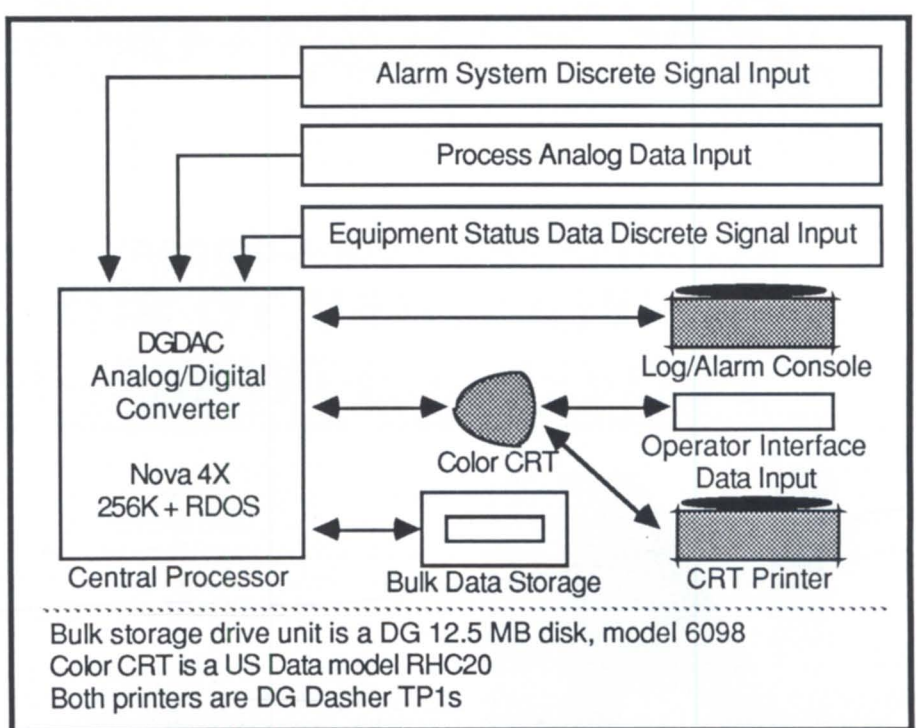

Figure 1: Schematic diagram of process control system

Heat and static generation were serious problems that had not been addressed in the design of the facility

to replace the dials and lights. The role of the computer in the design was simply as an agent to receive the signals and display them.

More serious, however, was the fact that little consideration was given to the special environmental needs of the computer. The original room had been designed as a small central office in the administrative building, with no windows and no air conditioning. When the Nova was placed in this room, in a site elevation over a mile above sea level, and in an environment with very low humidity, it did not respond well. It was impossible to keep the system up for more than an hour at a time (and often not possible to get the system up at all). Serious corruption of the data occurred. The Data General Dasher TP-1 printers frequently poured out reams of paper before someone came by and stopped them.

Heat and static generation were serious problems that had not been addressed in the design of the facility. The Nova itself generated significant heat, but the DGDAC unit was the main source. On a cold Colorado winter day, it was easy to heat the administrative building by leaving the doors open to the computer room. Even then the temperature in the room was well above 90 degrees Farenheit.

Although this situation eventually was remedied by the installation of an air conditioner, a humidifier, and some antistatic mats, this one early bad experience had a deadening effect on the success of the project. Getting the environmental problems corrected involved endless arguments among engineers, subcontractors, and district personnel, all attempting more to place blame than to solve the problem. In the end, a mistrustful attitude developed about the reliability of the computer and the wisdom of choosing it. Since few of the District employees had had any experience with computers, this initial failure led to a long-term unwillingness to accept the machine.

Once the problems had been corrected in the environment, the Nova performed faithfully. In spite of this, the computer was still blamed for being unreliable, not the installation. The system could function effortlessly for months, and then a single crash would bring back comments about the "uselessness" of the computer.

Although these early environmental problems formed the core of the negative attitudes, other problems fed the flames.

As is the case with most treatment plants, the facility had been built under the federal grant program mandated by the Clean Water Act of 1970. Design and construction were conducted with no input from the persons who would later operate the plant. The operations staff was hired in the last few months prior to plant startup.

Much confusion arose from the simple fact that in meeting with the staff prior to startup, the computer/instrumentation system was often referred to as a "process-control" or "process-monitoring" system, rather than as the "plant supervisory" system that it actually was. This led to expectations that the computer would be used to manage the massive amounts of analytical and process-control data generated in the activated sludge process. A great deal of disappointment resulted when the staff realized that the system would not provide this capability and that it provided few practical benefits over a more traditional hard-wired alarm system (as had originally been designed). When early environmental problems led to frequent system failures, the staff was ready to junk the system for something they could understand and be comfortable with.

Certainly the instrumentation and software subcontractors could not be faulted for this. They supplied precisely the system that had been outlined in the bid documents. The analog and digital points were continually monitored, their status could be displayed on a CRT screen (a US DATA color monitor), and changes in status were continually printed on a status log on the Data General Dasher TP-1 printer. Four analog outputs were provided to an automatic dialer, so that operators at home could be notified of problems after-hours when the facility was not staffed. This was the system that had been specified, and this was the system that had been provided.

For the first full year of plant operation, the system was used as designed, simply as an alarm monitor. The plant was staffed by two shifts of operators during the hours of 8 a.m. to 10 p.m. After that, the dialer system was used to alert the operators to unit failures. All data-management tasks related to process control were performed manually by the operations staff.

On the surface, there were no problems with this scheme of operations. The plant performed efficiently, as designed. There were no violations of the federal permit requirements for the quality of the plant effluent discharged into the Arkansas River. Nonetheless, the huge volume of calculations needed to successfully track the progress of the biological treatment process meant that manpower was concentrated on performing repetitive calculations and generating stacks of paperwork every day. A good deal of attention was spent in streamlining this process, but even after that, nearly 40 staff hours were spent on such work. Manpower was desperately needed for other tasks, particularly maintenance of the facility. It was at this point that staff recognized the need to make use of the mostly idle potential of the Nova.

From the start, all the users of the system were encouraged to participate in the design of the system. Informal one-on-one discussions were held to encourage the users to make their needs known. As the project progressed and various modules were implemented, the users were continually urged to suggest improvements. Great care was taken to integrate these needs. No suggestions were dismissed out of hand as being "impossible" or "impractical." If some suggestions didn't seem wise, a supportive dialog was encouraged to get the users to realize this on their own.

From these discussions, a set of measurable goals for the implementation was developed. These five goals were : (1) reduce operator time spent on paperwork and routine calculations; (2) increase operator time available for maintenance tasks, planning and management tasks, and process analysis; (3) maintain the quality of process performance at least at the high standard already achieved by the operators; (4) reduce the number of operations shifts from two to one; and (5) reduce the operations staff by at least one person.

These were lofty goals, because they called for increasing non-process-related man-hours while decreasing the size of the staff and maintaining a high effluent quality with fewer

Development of the system proceeded using Data General FORTRAN IV

hours of on-site process control (one shift instead of two). Nonetheless, achieving these goals would clearly demonstrate the success of the program. In addition, the goals helped provide some basic guidelines in the design of the system.

These users had had no computer experience; even after a year on line, they had entered no data. And they had a strong mistrust of the system. To overcome these obstacles, great care was exercised to develop a system that would be easy and unintimidating to use. Program crashes and mysterious runtime errors had to be avoided at all costs, since even one bad experience would quickly ripple through the staff as an anecdotal nightmare.

For these reasons, specific design criteria were established for the design of the system: (1) The process-control strategy must follow methods in use by the staff. (2) The system must be menu driven and include an alternate navigational command system using special function keys for experienced users. (3) Data entry must be easy and use simple English-language commands that relate directly to the data. There should be no special codes to memorize. All appropriate commands should be displayed continuously on a command line. A consistent command structure should be used throughout the various user segments of the program. There must be thorough error checking of data entry and appropriate, nonintimidating error recovery. (4) One full year of data base must be available on line, to be accessed quickly by entering only the date of the data requested. Multiple entries should be possible for a single process-control variable on a single date. (5) A maximum of one hour of training should be required for persons with no previous computer experience. (6) There should be full implementation of floating averages in process-control calculations, when desired. (7) All data entry should be designed to be performed by the person who originally generated the data. (8) Users must "enjoy" using the system and "believe" in its value.

With goals and design criteria set, a search of available software was begun to avoid "reinventing the wheel." This search was performed mostly with an eye toward garnering ideas from what already had been done rather than purchasing a product. The District's Board of Directors already viewed the Nova as an expensive boondoggle, and was not in the mood to spend any more on it (no matter how convincingly the economics of the situation could be presented).

There was a wide variety of wastewater process-management software, although most of it had been designed for microcomputers. Over 40 products were identified through searches of technical publications and queries directed to professionals in the field. A trip to the annual conference of the Water Pollution Control Federation provided an opportunity for hands-on evaluation of these products. The results were disappointing.

It was, perhaps, not an insurmountable barrier that no products were designed specifically for Data General machines. None of the products reviewed, however, came close to satisfying the design criteria set for the system.

Although these limitations were many and varied, there were certain problems common to most of the products. For example, many products required the memorization of elaborate codes (one required a six-digit numeric code, unrelated to the data, to identify a test result as a chlorine residual). None of the products provided for multiple entry of test results on a single day. This is a serious limitation, since frequent status changes (such as flows and organic loadings) in the biological process make multiple testing throughout the day mandatory. Most of the products were simply data-storage programs. They did not provide for conversion of the data into advice on what process changes should be made. In many cases, the overpriced product was nothing more than a commercial spreadsheet or data base set up by the vendor for entry of laboratory data. In most cases, error checking and recovery were inadequate or nonexistent. Surprisingly, these products seemed to have been developed by persons having little knowledge of wastewater process control.

This review was useful, since it certainly provided a lot of information on what *not* to do. Development of the system then proceeded in house, using the Data General FORTRAN IV compiler supplied with the system. Certainly INFOS or a similar data base configured for the Data General environment or an appropriate fourth generation language like Henco's INFO would have facilitated this task, but, again, no funds were available for such "extravagant" purchases. Even so, creating the system from scratch may have been the best alternative, since it allowed design of a system to meet requirements without making any compromises.

Integrating the new software with the real-time system already in place meant mastering the mysteries of an absent person's code. Once this had been accomplished and the bare-bones documentation on Data General D200 terminal screen control had been deciphered, the project proceeded rapidly.

The only previous function of the D200 was as a master terminal to start up the system. For more than a year, it sat in the computer room, a mysterious blank screen, viewed by the staff as an expensive nonessential. In fact, it was not even needed as a master terminal, since one of the TP-1 printers was equipped with a TTY keyboard and could be used for this task.

The long-standing presence of this blank screen provided the opportunity to make some quick changes that would give the staff a feeling that something was happening during early development of the system. A main program was written to display a menu on the screen. The menu listed all the program modules (including ones to be implemented in the future). This made access to the programs easy for the staff. They simply input a number from the menu and control was immediately passed to the requested program using a DG FORTRAN FSWAP or FCHAN routine. When they exited the program, control was chained back to the menu and another choice could be made. The special function keys on the D200 were programmed to allow users to chain directly to any program module without passing through the menu. Users did not have to worry about the details of the operating system, since all their needs could be handled from within the program.

This simple addition gave a new presence to the D200, which now displayed the menu (or the screen of some applications module) at all times. The staff began to look forward to the services offered by the menu. A feeling of progress developed as each new item was implemented.

The challenge was to maintain staff enthusiasm and avoid problems that would reinforce the old attitudes of mistrust

The first modules developed were input programs for laboratory and operations testing. The program was written such that, upon selection of the module, a blank input form for the current day would be displayed on the screen. Input forms for previous days could be accessed simply by entering the appropriate date. The day of the week was displayed at the top of the screen along with the date, to minimize the possibility that data would be entered on the wrong date.

Numerous error-checking routines were included such that inappropriate data were erased and the cursor was returned to the appropriate position on the screen for the corrected data to be entered. A reverse video command line at the bottom of the screen displayed all appropriate commands. All commands related directly to the data (e.g., CL is the command for entering chlorine residual). To avoid confusion, the setup of the data-entry screens and command structure was the same for the laboratory and operations modules. The data resided in random access files based on the Julian date.

With this data base in place, modules were soon developed to perform the process-control calculations previously done by hand. In most cases, each calculation used nine days' worth of data. When performed by the operators, these voluminous tabulations for calculating running averages frequently led to mistakes. A great deal of enthusiasm resulted among the staff when a simple module was implemented that displayed (or printed) these averages with the touch of a key. The enthusiasm grew as the staff began to realize the impact the implementation of the remaining modules would have.

Some operators continued to spend hours calculating these averages, but this practice passed quickly as it became apparent that the program was accurate and less error prone than the manual method. Moreover, the operators had never enjoyed this work and appreciated the free time that became available for pursuing other projects.

At this point, the challenge was to maintain the enthusiasm of the staff and avoid any problems that would reinforce the old attitudes of mistrust. The next module added was one that used all available data and produced a daily log of the more than 20 calculated process-control variables (food-to-microorganism ratios, mean cell residence times, hydraulic loadings) that the staff had been determining by hand. This was set up as the task that would automatically be run each midnight, with the results being printed on the second TP-1 printer (previously, only the TP-1 dedicated for the status log had been in use). When the staff arrived each morning, a full report on the process "magically" awaited them on the printer.

Again, a simple implementation offering tangible information promoted enthusiasm. Also, putting previously idle components of the system to use gave the staff the feeling that the Nova was "doing something."

This was, perhaps, the turning point in the implementation. Once the staff realized how the Nova could perform for them, skepticism was replaced by demands for speeding up the implementation of other modules.

The addition of a report generator followed naturally, but the addition of the process advisor added a service the staff had never had before, even with their hand calculations. Among other data this module added was full information on organic and hydraulic loadings. The data was displayed on a screen showing maximum and minimum values since midnight and current 15-minute averages for all variables. Flashing and reverse video flags were set when these values exceeded design parameters. For the first time, the operators had true real-time information on what was happening in the process. The original system provided only instantaneous values from the monitors and did not use this data to generate the various calculated process parameters based on the information.

Combined with this module was a worksheet with which the staff could model the process, starting with current values and then supplying changes to predict the effects on the process. In addition to being a useful operational tool, this later proved to be a valuable asset in training new staff members on the principles of process control.

Most valuable in this series was the module that used the current process status, let the operators set process goals, and then calculated the process changes that would be needed to achieve these goals. Once this module had been added, operators simply needed to input the results of their tests and then make a few adjustments to unit timers and analog controllers right there in the computer room. An easy extension of this would be to have the system make these changes itself, using analog and digital outputs already in place in the system. The initial decision, however, was to let the operators make these adjustments, following the instructions of the program, and then evaluate how successful this advice was in controlling the process.

The general feeling among the staff—that the system was a success—was in itself a victory, given the initial negative attitudes. Because feelings are not easily quantifiable, we had designated five measurable goals so that the success of the system could be analyzed objectively.

The fully implemented computer-aided process-control system went on line at the start of September 1984. In the summer of 1985, as the end of the first year of operation neared, the system's performance was evaluated on the basis of the original five goals.

In order to determine the success of maintaining the level of process control, the daily results of operator-directed process control in January through June 1984 were compared with the daily results of computer-directed process control in January through June 1985. The same months (although different years) were used to minimize the effect of seasonal variations on the analysis.

Three indicators of quality process were defined. First was precision in control of process. This was defined as the ability to achieve the results reported. It was measured as the standard deviation of the actual process value from its control setpoint value.

Second was stability of process. This was defined as consistency in results. Wide swings in values would be an indication of an unstable process. It was measured as the standard deviation of the actual values from the mean actual values.

Third was quality of process. This was defined as purity of the process effluent.

Several different process parameters were valued in each case. In all cases, the results of the computer-aided process were better than the already high standards set by the operator-directed process. In many cases, the

A once underutilized system is now feeling size contraints

computer-aided process performed two to four times better than the operator-directed process.

The other four goals were also achieved. Operator time on routine calculations was reduced from 5 to .5 hours per day (for data input). This resulted in an annual savings of 1,643 man-hours.

As a result, staff time was freed for non-process-related tasks. Tangible evidence of this included the ability of the staff to take over grounds maintenance and thus cancel a $6,000 annual outside contract.

As planned, two operations shifts were reduced to one, and the operations staff was reduced by one person. This person then assumed supervision of two laborers hired to clean and maintain sewers. The district was thus able to cancel a $200,000 annual outside contract.

Further indications of the success of this system came from a bottleneck of users competing for time on the previously unused D200 terminal. A reluctant board of directors was convinced of the need for expansion, and the RDOS operating system was replaced by Nanosecond's DISCOS operating system, allowing the addition of more grounds and more users. After nine months of operation, there has not been a single problem with this system. Two additional D200s have since been added.

The addition of these grounds allowed the clerical department to use the computer, and a spreadsheet (Supercomp) and word processor (WordPerfect) were added to the system and integrated into the menu structure.

A once underutilized system is now feeling size constraints. Plans now include an increase of RAM to 512K, more disk space, more CRTs to allow for input of data at the site it is generated, and the implementation of accounting and plant maintenance software (this time, thankfully, off the shelf).

Because the staff continues to request modifications and new modules, the system is constantly growing. Currently, modules are being developed to manage the huge amounts of data involved in the district's soil reclamation program.

The experience at the Rainbow Park Plant shows that negative attitudes can be reversed by working closely with the users and seriously addressing their needs. The use of a computer-aided process-control system can lead to significant benefits in a medium-sized facility. These benefits include an increase in process quality, a decrease in personnel costs, and the availability of more man-hours for non-process-related tasks. Δ

Thomas M. F. Doyle is Chief Operator at the Rainbow Park Regional Wastewater Treatment Plant, Fremont Sanitation District. He may be reached at P.O. Box 405, Florence, CO 81226, 303/784-6335.

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Bridging the performance gap

C/380 and RDOS INFOS rev 3.0 provide a solution for Data General 16-bit users

by Bob Hogan and
Wayne Keseberg
Special to Focus

Frequently, users of Data General 16-bit equipment want to increase performance or add new peripherals without moving up to a 32-bit Eclipse MV/ Family computer or sacrificing their considerable 16-bit software investment. How can they attain these goals?

One way is with the Eclipse C/380 computer system, developed specifically to meet the needs of 16-bit Data General users. Compatible with Data General's existing 16-bit family, the Eclipse C/380 combines S/280 functionality with several high-performance features. This powerful addition to the 16-bit family provides a path of upward mobility, and enables 16-bit users to address present computing requirements while planning for future needs.

The Eclipse C/380 computer system incorporates the following standard hardware features:

- Burst Multiplexor Channel (BMC) support for enhanced system and I/O performance;
- Commercial Instruction Set for manipulating decimal data either in packed or unpacked format;
- hardware floating processor for rapid execution of Eclipse floating-point and commercial instructions;
- standard Nova or Eclipse I/O bus fully compatible with Data General's peripheral devices, controllers, communications adapters, and custom-designed Nova and Eclipse compatible interfaces;
- two-set associative system cache for rapid program execution;
- autoincrement and autodecrement memory locations.

The Technical Issues. Several of the above features required complex hardware and software modifications to the Eclipse S/280 computer system.

For example, (1) the Commercial Instruction Set required new microcoded CPU instructions, as follows:

- EDIT—converts a decimal number from either packed or unpacked form to a string of bytes under the control of an edit subprogram;
- LDI (Load Integer)—translates a decimal integer from memory to (normalized) floating-point format and places the result in a floating-point accumulator;
- LDIX (Load Integer Extended)—distributes a decimal integer of data type 0, 1, 2, 3, 4, or 5 into the four floating-point accumulators;
- LSN (Load Sign)—evaluates a decimal number in memory and returns a code that classifies the number as zero or nonzero, and identifies its sign;
- ST (Store Integer)—translates the contents of the specified floating-point accumulator to the integer of the specified type, and stores it, right-justified, in memory, beginning at the specified location;
- STIX (Store Integer Extended)—converts the contents of the four floating-point accumulators to integer form and uses the low-order eight digits of each to form a 32-digit integer.

(2) These instructions (except for EDIT) required Floating-Point microcode because the two (CPU and Floating-Point microcode) are closely coupled to perform floating-point operations.

(3) The instruction set FINT, which converts the floating-point accumulator to an integer value, had already been added to the S/280. Since FINT required a normalized floating-point accumulator, it was necessary to change the Floating-Point microcode to accept unnormalized arguments.

(4) Autoincrement/autodecrement features required new circuitry. Even though newer processors had already eliminated autodecrement/increment, we considered it important to demonstrate our commitment to provide a transparent computer system to customers running software developed for systems with autoincrement/decrement.

(5) A revision of RDOS INFOS was required. This allowed us to respond to our commercial customers with on-line applications.

Finally, it was important to provide Data General Field Engineering a fully supported processor. Therefore, we also enlisted the assistance of Data General development and diagnostic groups for Eclipse C/380 support.

The RDOS INFOS (rev 3.00) Solution. Our major software challenge was to integrate INFOS rev 2.8 database functions into the RDOS rev 7.3 operating system. Using new software development tools, file comparisons were performed between the old and new RDOS sources. This allowed us to determine where INFOS-dependent code resided and thus to reinsert it into the newer revision of RDOS. We also used existing Data General tools for assembling and linking the software.

Finally, using both existing RDOS INFOS development tools and the search comparison facilities of AOS/VS utilities, the debugging process was easily completed.

As a result of these efforts, system performance has increased dramatically. The Eclipse C/380, coupled with the new version

of RDOS INFOS, represents a new performance milestone for Eclipse Commercial Series computer systems. The Eclipse C/380, under both RDOS INFOS and AOS, now supports Data General's high-performance Winchester disk subsystems (354 MB). All of these modifications allow existing commercial Eclipse users to transport their applications with minimum effort to the Eclipse C/380, thereby achieving higher performance.

The following example illustrates how RDOS INFOS rev 3.0 has increased system performance.

In implementing RDOS INFOS rev 3.0 on the Eclipse C/380, a Data General customer realized significant performance advantages over his previous Eclipse Commercial Series system. System performance was enhanced by 50 percent—without using memory resident overlays. With memory resident overlays, system performance was increased another 35 percent—for a total of 65 percent. These types of improvements are application-dependent, but typical.

Additionally, since the Eclipse C/380 supports new Data General peripherals, the amount of disk storage space is significantly increased. Under RDOS, the new drives offer 354 MB of storage versus the previous 192 MB.

With the Eclipse C/380, 16-bit Data General customers can increase their computing power and, at the same time, protect their software investment for COBOL, INFOS, and RPG II applications. In fact, the C/380 is the only Commercial Series computer that can run the older versions of COBOL used by many Data General customers. As a result of these efforts, Data General has provided a higher performance solution for current C/150, C/300, and C/350 customers. Δ

Bob Hogan and Wayne Keseberg led the recent RDOS INFOS development efforts for Data General's Special Systems Group. Bob Hogan is Project Group Leader, Systems Software; Wayne Keseberg is Software Staff Specialist. Eclipse and INFOS are registered trademarks of the Data General Corporation. For additional information on RDOS INFOS enhancements of the Eclipse C/380, contact Data General at 617/480-7150.

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Service is a custom here

Dr. Michael Schneider describes the DG Customer Service Division

The following is a condensed version of an interview with Dr. Michael Schneider, vice president in charge of the Data General Customer Service Division. In his 14 years with DG, Dr. Schneider has enjoyed positions in almost every division except finance. The conversation took place in Westboro during Conference '85—John Hartzell.

Where would you like me to begin?

Why not provide an overview, a look at the Customer Services Division, its operations, departmental relationships, and so forth?

Good. Let me put it in the context of Data General's approach to the market place. There are many different approaches. You can be a niche player. You can build a major company that way. That isn't Data General's approach. We want to be a full-service vendor—to supply a very broad line of generally applicable products useful in a large number of markets with associated services.

In addition to a general product line, there are numerous elements involved in being a full-service vendor. We've put many of those elements in what we call the Customer Service Division. Basically, Customer Services tries to make DG products more useful to our customers. That's the broad philosophical purpose.

One way of looking at it is that Customer Services has several hundred people who know our products very well and who function within various departments. We "lend" these people out to our customers, so they in turn can use our products more effectively and can be more competitive in their marketplace. If we can help our customers obtain a better share in their marketplace, then they may be more likely to return to Data General on an accelerated basis.

What do you mean by "on an accelerated basis"?

For example, an end user wants to implement an application in a pilot plant. If that application is completed, it gets duplicated in other plants. Additional applications are needed. Hence, if we lend a customer some of our experts, accelerate his schedule from nine months to four, the Kansas City plant gets its computer five months earlier than other plants. After it's running, users decide that computers are useful things to have. And they get other applications that require additional memory, additional disks, additional terminals, etc.

We respect our OEMs. If we are able to help them get their product to market faster or make it run faster or take less memory, they get a bigger market share.

That's the philosophical background. Now we can talk about the specific organizations within Customer Services and then see how they fit into the pattern.

First, there is the Systems Division. Basically, they're software houses. They do jobs on a complete turnkey basis, they do little drivers, and everything in between. All they do is work on DG software for our customers. They get pretty good at it. We have three here domestically—in Cambridge, Atlanta, and Los Angeles. We also have them in Melbourne, London, Paris, and Madrid.

I had no idea it was that extensive.

It's a big operation, a lot of growth. You can cover the U.S. well with three of these. You can make them big that way, so you end up with a lot of product expertise. But since these houses do applications work, it's very difficult to have a French operation do work for the Germans. So, there's going to be continued growth in Europe.

Almost all of the large deals that make the newspaper involve this operation. For example, one recent customer required an adaptation of CEO so that it would work with their existing communications network. They had four or five thousand non-DG terminals they didn't want to throw away. Effectively, we provided a new port into CEO. This was probably about 15 man-years' worth of work.

Another large contract was with the U.S. Forestry Service. That was also an office automation contract. The Forestry Service had Univac computers and needed an RJE-type

capability, a 2780-type capability, into that system.

These operations are very good at interfacing with customers—at going on-site to install, at defining requirements in unambiguous ways at the front end of a job, at writing work statements, and at meeting the requirements that were defined. Different from a pure development operation. To make a customer happy, you don't just ask, "What do you want?" You go through a real process of defining it unambiguously and then delivering to the requirements that were written.

Because customers don't always know what they want?

I'd go the other way. Development operations often are a little free-wheeling, as they should be. They have general requirements of what a product should do, but don't get too specific at the front end in order to see where the technology leads them, what the capabilities are, where the market is.

But in a contractual relationship, the customer expects something specific at a specific date. He's budgeted a certain amount. Therefore, the Systems Division groups are very good at sitting down and defining what is required with the customer and at doing on-site work. I guess it's an R&D environment with the emphasis very much on D.

The Systems Division is divided up into three parts. Ed Connors heads the North American Systems Division. We have a European division under Noel Jones. In Australia, we have Steve Jones. All three divisions are growing rapidly. So, that's the Systems Division. It comprises software factories that are customer-driven and that have the right to enter into contracts on behalf of Data General. It tries to be complementary to what the company does. In fact, if something proves to have a high demand, we would move it into the company. We like to see our children grow up.

Next, let me talk about the hardware operations of Special Systems. They basically specify, define, and manufacture custom hardware for our customers. For example, our computers have been used for a number of years in catscans and in nuclear magnetic resonance scanners. That's an example of the kind of thing the group does—everything from pipeline processes involving the highest technologies to services requiring just a technician, from cabling and baud changes to "paint it blue."

They do a lot of communications protocols, say, to make a system work with a foreign phone system. If you want your system to work out in the Gulf of Mexico, to be shock-mounted, to work off a battery, they'll do it. If you want a terminal to have Serbo-Croatian characters and to be gimbaled, they'll take a standard product, and change the PROM and the casing.

Like the Systems Division, Special Systems meets its commitments. These guys are good. They almost never fall on their faces. It's run by a fellow named David Wilson.

Let's talk about Howard Berg's Continuing Products Division and DG Direct. There are a number of operations under him. For example, one major operation is used equipment. That department buys back and refurbishes equipment for resale. All the used equipment that we sell goes through a part of manufacturing appropriately called Renaissance. It's one of those high-morale places with signs all over the place that say "We build it better than new."

Another part of DG Direct is a Supplies and Accessories business. You could find alternate sources. However, if you want to make sure this is really the right mag tape, if you want it really fast, if you don't know exactly what you want, we have people who can tell you how much you need, what type, and we'll ship it out within 24 hours.

DG Direct also provides a fast-delivery mechanism, as an alternative to an order entry system. With an order entry system, you might get a 30-day delivery. This is a 48-hour delivery. There is a price difference. If you have a large contract and you're an OEM, you're better off going through the order entry system. If you only want one, and you want it fast, this might make more sense.

Other examples of DG Direct's services include such things as contracting to handle a large company's individual employee computer-configuration needs. There's also a fairly large upgrade operation for our installed base. You get what you want and give back what you don't want. Every so often we'll go through our customer list, find everyone who has 2 MB memories, and send them a brochure line on 8 MB.

We haven't talked about Educational Services, under Richard Jaross. Let me do that. We have a very large, very complete training program.

Are these items often customer-tailored too, or are they pretty much standard?

The majority of that business is standard. But we offer trainees a variety of mechanisms. The conventional ones are training centers. We also offer self-study courses, state-of-the-art computer-aided instruction, and a complete training manuals operation.

We view high-quality training as a requirement in the end-user market. Recently we did a lot of training in China. For language reasons, we ran those courses at about one-half normal speed. We'll do it any way you want. For the Forestry Service, we trained about 2,000 employees in locations none of which were nearer than four hours to an airport by jeep.

Also, at the users group, we're doing a fair number of seminars. When we tried it last year for the first time, we didn't know what the reaction would be. We were overwhelmed by the demand. We get some leading people to do it, the very best you can get.

All this seems to provide great flexibility.

If you're not flexible, you're not going to get market share. It's a tough market out there. It's very difficult to win orders only on the basis of your product's being better. If a customer can't satisfy his total need, you're not going to get market share.

We're trying to use the Customer Service Division to help Data General become a full-service vendor. I just have to believe that each one of these little things makes it easier for us to do business. Will a guy stop doing business with DG because he can't get cables in 24 hours? I don't think so. But the sum total of all this is that it makes it a little bit easier to do business with us, makes the customer a little bit more satisfied, makes him a little bit more successful in his marketplace, gets his application up a little faster, all of which I think reflects on how successful we will be as a company. Δ

Getting here from there

by Donald A. Sellek
Special to Focus

Today I can say that we lived through an "MRP" system installation at Labtest Equipment Company. My daughters thought that an MRP installation was some sort of project involving missile sites. The military analogy was not lost on me. After all, manufacturing people operate out of the trenches, are often shot at and criticized, and receive few accolades. Yet they contribute heavily to winning the war of manufacturing efficiency.

Labtest Equipment Company manufactures a complex instrumentation spectrometer used in the analysis of elements in alloys. Labtest currently has in place a functioning data management system utilizing the service bureau of Jacobsen and Associates, Inc., Temple City, California. Through a 9600-baud dedicated line, Labtest's terminals and printers are linked to a powerful Data General supermini MV/8000. Using the JAI software time share services, we have access to a system that allows us comprehensive control over the Labtest installed data base.

Our management system includes material control, production planning, inventory control, accounting (payables, receivables, payroll, general ledger, invoicing, and operating budgets), order entry, shipping, and purchase order generation. Total startup costs for 1982 were $55,000. Realized and documented savings were $125,102, an impressive return on investment. How this came about is an interesting story.

In 1981 Labtest was purchased by Baird Corporation of Boston, Massachusetts. Labtest was viewed as an organization in transition. The technology was rapidly becoming obsolete, and the manufacturing operation was under manual control. Competitive pressures continually forced improvements on the hardware/software areas of the business.

The new management team installed after the purchase by Baird had a charter to propel Labtest into a position that would enable it to grow and compete in the marketplace of the 1980s. Computerization was inevitable. There were problems, but problems breed opportunity. The transition that occurred with the new staff provided an open forum for new ideas and different approaches to solutions.

A system such as JAI's was proposed as the solution to the monumental task of data management and control. The obvious attraction was a belief that this approach would fulfill the needs of Labtest for many years to come, with the prospect of accepting considerable increase in product volume without increasing overhead expenses in indirect labor.

The project concept was accepted by our management. Around us were the three absolute requirements for success: supportive management, dedicated prime movers, and a good environment. Targets, goals, and objectives were established, but in a very loose fashion to encourage direct participation by those involved. The key consideration was that the acceptance of responsibility, a benefit of active involvement, is correlated with a commitment to objectives.

Initial tasks included entering the master file, entering bills of materials, reconfiguring bills of materials for manufacturing, entering standard costs, and taking physical inventory.

As we accomplished our immediate objectives, the scope of the effort was expanded to include first MRP, then accounting, then order entry, and most recently invoicing and automatic purchase order generation. Chronologically, the events proceeded as follows.

In December 1981, Labtest management decided to install a manufacturing control system utilizing the JAI net material status system.

In January 1982, the first initial inventory was taken. Tag counts were loaded back into the data base to form the beginning of inventory stores control. Work in process was not considered in these first efforts to establish a partially valid data base.

In April 1982, a second physical inventory was completed. It cleared up the problems encountered with product structure, bills of materials, and standard costs. At this point we began recruiting a few key individuals who would ultimately be instrumental in learning and teaching the system, setting up procedures, and providing support to others in the company. The system was beginning to provide a viable data base with much improved accuracy.

In August 1982, Labtest performed its annual physical inventory. Yes, this was the third physical inventory for 1982. At this time, very close attention was given to work in process. This inventory was audited, and the results were tied into the accounting ledger. This was the first time that journal entries were substantiated by net material status reports.

In September 1982, at Labtest's request, Baird Corporation provided a system review and offered constructive criticism. With this help, we were able to navigate some rough spots and continue to progress.

In October 1982, a solid accounting function was forming under the guidance of a new Controller. Payables and receivables were brought up on line in less than one month. The general ledger was installed on the JAI system and tied into manufacturing.

In March 1983, all data inputs to the system were done by Labtest personnel.

In July 1983, the payroll was transferred to JAI from Bank of America. This lowered costs and tightened up data input (labor) to work in process.

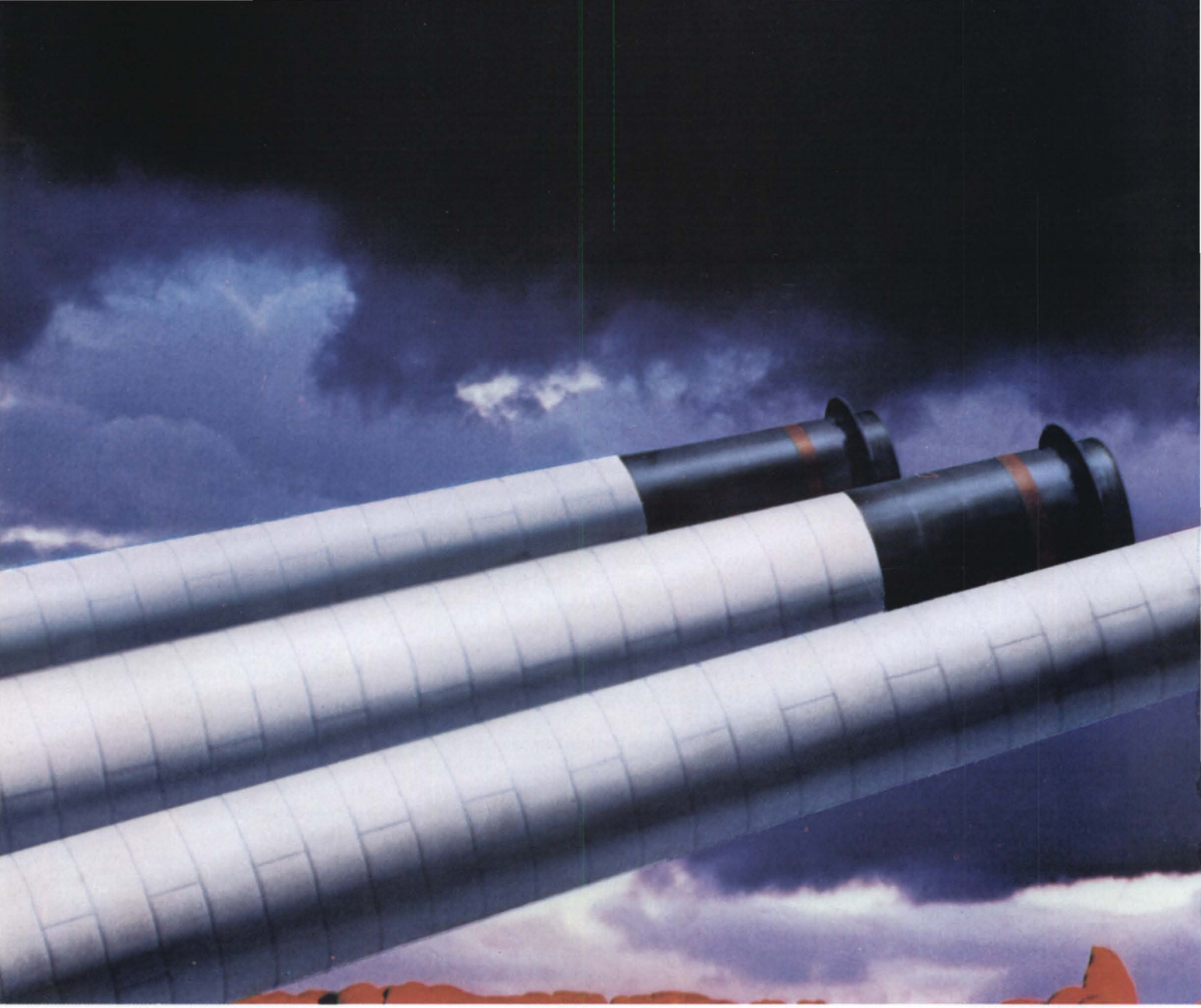
In August 1983, physical inventory for 1983 was completed, with substantial savings documented in favorable variances. System generated shippers was working. The normal month-end closing, which in the past had taken several months to clear, was being completed within five working days after the close.

In November 1983, order entry went on line, and the process of pricing and profit control was initiated with direct marketing involvement.

In August 1984, the 1984 annual inventory was audited. It received high marks for accuracy and accountability. Year-end adjustments were only .7 percent on a million dollar inventory. The data base was beginning to demonstrate that the Labtest burden rate was artificially high and needed to be adjusted downward. This had the overall effect of making our products more competitive in the marketplace.

As of this writing (August 1985), Labtest is presently in the middle of its annual physical inventory.

The plan from the start was the familiar "how to" structure. This means we had a



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The disturbances caused by the human side of enterprise often cannot be properly anticipated in the initial plan format

game plan with time goals. The target was the installation of a working data system module approximately every two to three months. One of the more satisfying experiences in implementing the plan was finding the skills and talents needed in people who wanted to work together because they liked the team, they wanted to learn, or they were professionals who knew how to generate their own satisfaction in a job well done.

It was obvious from the start that the game plan would have to change from time to time. There was a need to cope with the everpresent resistance to change. The disturbances caused by the human side of enterprise often cannot be properly anticipated in the initial plan format. At best we were able to allow for and anticipate problems. Egos got in the way, and professional pride and outright antagonism were factors. Also, there were real, but far more tolerable, problems generated by the fear of computers. The new team needed to be sensitive to the trepidations of the "old guard" and to be willing to prove that the system really could work.

At times it was neccessary to push ourselves to follow through to completion. Things don't always go as planned. Upper/lower management may lose sight of the ultimate goal or may shift priorities. We would not have succeeded without the close support of the JAI organization and the dedication of our key people. Today we are proud of our people and their hard-won achievements.

In December 1984, Labtest made a management presentation to the president and vice president of Baird Corporation. In the status review of the manufacturing operation, Labtest reported a three-year cumulative savings of $535,667 directly attributable to efficiencies and savings generated by the data management system. The monthly cost of the system is $3,500, or $42,000 a year. Currently, there are two fewer people in accounting and two fewer people in manufacturing indirect labor.

In committing to excellence in manufacturing, the focus must be on control of expenses. They are the prime indicator of whether or not a problem is understood. Many companies and organizations have gone overboard with the rationalization that a data management system is an end in itself. This is not so. In this case, the combination of Labtest's personnel, JAI's software and expertise, and Data General's MV/8000 enabled not only careful cost control, but also accurate forecasting based on reliable, current information. Δ

Donald A. Selleck is Operations Manager, Engineering and Manufacturing, Labtest Equipment Company. He may be reached at 11828 La Grange Avenue, Los Angeles, CA 90025, 213/478-2518.

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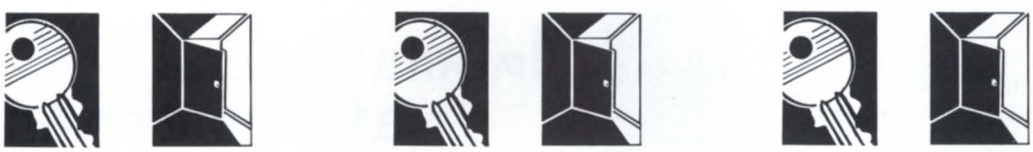

Circle 37 on reader service card

Tidbits from a cluttered desk

by George Henne
Contributing Editor

This month's column is going to be a collection of short items that have been cluttering my desk, along with snippets of news from the NADGUG Conference in Boston.

The conference was the biggest ever, with record numbers of attendees and exhibitors. There were a number of good presentations. As usual, though, the real value was in getting together with other users at meals and coffee breaks, trading problems, rumors, and war stories.

Business BASIC users were perhaps a bit less in evidence than in previous years: I think it's mostly due to the increased proportion of end users running CEO-based high-end machines. Also, since BBASIC users are much more likely to be having problems with AOS/VS than BBASIC, no doubt they tended to go to AOS/VS sessions. If you have ever considered attending a NADGUG conference, now is the time to start campaigning in your company so you can go next year; it's really quite worthwhile.

There were quite a few interesting bits of news from the conference. Most of them were related to operating systems, and several might have an impact on your future planning.

In the RDOS world, the health of the Business BASIC product was confirmed. The development group seems to be working on consolidating the language into a more easily supportable, enhanceable product. Currently, Data General supports separate flavors for mapped and unmapped Novas, Desktops (DGRDOS), S/20s, and various types of mapped and unmapped Eclipses. It adds up to a lot of conditional code and other things that make building a new revision a nightmare.

The solution is to consolidate it all into a single version for support and enhancement. It appears DGRDOS, now running on the Desktop, will be extended to run across the Eclipse line. Unfortunately, this means support for other versions will be dropped over time.

The first to go unsupported will probably be Nova RDOS. If you read this column last month, you know BBASIC on the Nova was rumored to be going the same way (rumor now confirmed). While you have the cold comfort of knowing a new release of Nova RDOS isn't going to come along and obsolete Nova BBASIC, it's one more reason to start looking at that upgrade.

Making DGRDOS the standard version across the Eclipse line has a hidden problem: it reportedly assumes your machine has CIS (the Character Instruction Set). This item is a CPU option that isn't very expensive when you first order the machine. However, since it hasn't been required for BBASIC systems, your machine may very well not have the option. On most machines, adding the option requires an expensive CPU board swap. This situation is most likely to turn up on S/140s.

On the other hand, we could see some nice things coming for the new versions of RDOS. While it sounds like DG's plans are still in the formative stage, things such as better backups and better diagnostics are promised. Now would be a good time to send them your suggestions.

The big shock of the conference was the revelation that AOS is going to be put into "maintenance mode": no real enhancements, but problems will continue to be fixed. The developers want to concentrate their efforts in the 32-bit world (AOS/VS), which will continue to be advanced. This apparently also applies to all products tied into AOS. For example, AOS CEO will move to maintenance mode with the next revision.

If AOS/VS is going to continue to be enhanced, but AOS isn't, what will future compatibility be? Data General proposes to maintain the ability to network systems and transfer files. For BBASIC users, there probably won't be much effect for a while. No major revisions of Business BASIC are imminent, so SAVE files should be able to move back and forth for the indefinite future.

What this move on AOS really indicates is the future of Data General's product line. The S/280 and S/380 really seem to be the end of the line for high performance 16-bit machines. DG's most important goal has to be to sell new machines, and there's not a lot of point to investing money to enhance a product which will not directly contribute to that end.

If you'll recall last month's column, it wasn't much cheaper to upgrade an S/140 to run AOS than to buy an MV/4000. The future of AOS is one more reason to look at an MV/4000.

A good piece of news for BBASIC users is that DG for the first time in its history has appointed someone to market Business BASIC. The product has been quite successful for many years with no sales effort at all from DG: a well-conceived marketing campaign for the product could certainly help it a lot. Marketing Business BASIC is now the responsibility of Russell Harms at Westboro.

There are two questions that have prompted constant speculation and argument since they were first asked. One of them is, "How many angels can dance on the head of a pin?" The other is, "Just how many terminals can you hang on a BBASIC system?" Between new releases and new equipment, the latter question may never get a definitive answer.

The largest RDOS BBASIC based system I know of is one we put in ourselves. It's an S/280 with 27 terminals, 2 serial printers, two system printers, and connections to computerized time clocks. The DP Manager, who must do a good job of scheduling, reports that even with this load he has no serious speed complaints. The S/280 certainly helps, but he says this loading would not be possible without BBASIC rev 8.0.

The most serious problem at this level is the number of RDOS channels that are required. RDOS allows a maximum of 255 channels. Divide that by 30 jobs, and you are allowed an average of 8 open files per terminal. I don't expect this limit to be raised by DG. Discipline in program size is also vital in getting a configuration like this to work.

To my knowledge, the largest AOS/VS BBASIC system is the one that RANAC installed in Illinois. Last I heard, they added enough terminals to bring the count up to 90! It's running on an MV/8000. I'd love to hear how many terminals can be loaded onto an MV/10000.

The development group seems to be working on consolidating the language into a more easily supportable, enhanceable product

I attended several NADGUG sessions where Data General people were boasting about improved response to STRs (Software Trouble Reports). They said the backlog has been reduced, and fewer new ones are coming in.

The STR is the last resort for getting a software problem fixed. In the case of BBASIC, it is virtually the *only* resort: your local DG Systems Engineer and the staff at the Atlanta Support Center usually don't have a lot of in-depth knowledge of the product. It's hard to blame them. BBASIC is not a product that has a lot of problems, so they get asked for help infrequently. I suppose I'd rather have a product that didn't need much support (and didn't have much) than one that needed and had lots.

Personally, I stopped submitting STRs many years ago because nothing ever happened to them. But, being basically an optimistic person, I thought I'd give it another try when I got back from NADGUG. I'll consider this a test of the process, and will keep you posted on how it progresses. I'm assuming that DG won't give my STR special treatment because of this live coverage.

The STR I submitted is on a fine point, but one that causes definite problems. In AOS/VS, there are a bunch of new 'STME' commands. These do various operating system calls, and replace some of the RDOS STMCs. The problem comes when you want to write a program that will be used both under RDOS and AOS/VS, and you need to use an STME.

Ideally, what you want to be able to do is make the use of the STME or STMC conditional on the operating system you use. (There is a SYS function you can use to test for this.) As long as you don't actually try to execute an STME under RDOS, you should be OK. However, as soon as the interpreter (not the executor) encounters the STME, your program bombs with the very impolite ERROR 04—PROGRAM IS LOST message.

There is a precedent for this type of stuff working correctly. The STMD statement is for RDOS only, but it doesn't bomb in AOS/VS unless you actually execute it. It is perfectly OK to have one in your program.

So, here's the STR scoreboard as of September 20:

- STR forms requested from local DG office—August 30,
- STR forms received—September 4,
- Completed STR form mailed back to local DG office—September 5,
- Photocopy of STR form returned with no comments—September 16. Δ

Send Business BASIC questions or comments to George Henne, vice president, MICOM Computer Systems, 575 Madison Avenue, Suite 1006, New York, NY 10022; or call 416/445-4823.

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Everything you always wanted to know about cabling

by Brian Johnson
Contributing Editor

:CONTEST.CORNER

One correct entry has arrived for the AOS/VS penetration contest from the September issue. A can of the old Coca Cola is on its way to John Kramer at Concepts Automation in Sterling, Virginia. If John asks for one of your dial-up numbers, don't give it to him.

I'm still hoping for a few more entries, so I'll cover the solution in next month's column, along with a review of the AOS & AOS/VS System Manager's Roundtable held at the NADGUG conference.

This month I'm going to solve all your asynchronous line problems. Hard to believe, right? A lot of people consider cabling to be a Black Art. Perhaps we can change that.

Properly wired terminals get enabled when the system is booted and get disabled when the system is shut down. If your terminals exhibit any other behavior, chances are good they were never wired up right in the first place.

:CONFIGURATION.ISSUES

It is common practice for DG personnel to recommend 20 mA current loop interfaces for terminals farther than fifty feet from the computer. On the face of it, this is a laudable practice. However, in practice it's a disaster.

It's an unfortunate fact of life that when 20 mA terminals are turned off or disconnected without disabling the console, the multiplexor (and the peripheral manager) see an endless stream of characters coming in from the terminal. This causes excessive peripheral manager and EXEC CPU usage, spongy-feeling keyboards, and poor response time. This is especially true if you use the ENABLE/ALL option on AOS/VS and have unused 20 mA lines.

The moral of the story: avoid 20 mA interfaces. I would even go so far as to convert existing 20 mA muxes to EIA RS-232C or RS-422A. As a minimum, you should at least install test plugs on any unused 20 mA lines. DG used to ship systems with test plugs for each mux port, but they seem to disappear after the machine is installed.

If the distance proves to be too much for RS-232C at the speed you want run, try the following: If you're using the new terminals which support RS-422A and you have IAC's, try switching to RS-422A. Otherwise, use RS-232C and either install a couple of signal boosters (INMAC p/n 510 or equivalent) or line drivers (INMAC p/n 8125 or equivalent) on each of the affected lines.

The only other alternative is to manually disable the 20 mA terminals when they're powered off. You must have a better way to spend your time, right?

:CABLING

For local cables (distribution panel to modems, stat muxes, secondary distribution panels) I prefer telephone technology cabling to ease reconfiguring hassles. These cables are not shielded, but the distances are such that it doesn't usually matter.

For direct connections (distribution panel to terminal) my personal preference is to use foil-shielded four-wire cable with the foil tied to pin 7 (ground) at both ends. More exotic shielding rarely adds significantly to the distance possible at the desired baud rate, and costs substantially more.

For RS-232C, only three of the four wires are required: transmit data (pin 2), receive data (pin 3), and ground (pin 7). As an option, you can also connect clear-to-send (pin 5) to carrier-detect (pin 8) at the terminal.

For 20 mA and RS-422A, four wires are used: transmit data (pins 3 and 18) and receive data (pins 2 and 11).

The same cable works peachy for the short haul modems which require four wires with DC continuity.

:JUMPERS.CPU_END

For direct connections (distribution panel to terminal) jumpering control signals is preferable to running cables with extra signalwires.

Hardcopy master console lines are exceptions because most stand-alone software doesn't support XON/XOFF, so a hardware busy signal line is used to avoid overruns. Use the standard DG cable.

Muxes that don't support modem control signals require no jumpering at the CPU end. Muxes which do support modem control signals require jumpering pins 4 to 5 (RTS to CTS), and 20 to 6 and 8 (DTR to DSR and CD). Failure to do this will cause terminals to occasionally "hang," forcing you to do a DISABLE/ENABLE cycle (and sometimes even a reboot!) to get them working again. The problem is caused by noise on the floating modem signals at the CPU end. The jumpers eliminate the problem.

If your terminals exhibit any other behavior, chances are good they were never wired up right in the first place

Aside: I have a suspicion that this is the persistent problem which causes lots of STRs and which the AOS{/VS} group think they have solved with the new ?CLRDV system call. There is still a need for the ?CLRDV call as long as users with remote printers resort to powering them off to clear faults instead of clearing the fault the proper way. The printer sends an XOFF when it faults, and cycling the power makes it "forget" that it sent an XOFF. The only way to get it to send an XON so that AOS{/VS} resumes output is to force another fault and clear it the proper way, and that only works on a few printers like NECs and DIABLOs.

:JUMPERS.TERMINAL_END

In general, you want to follow DG's instructions for jumpers at the terminal end. Shorting pin 4 to 5 and 20 to 6 to 8 will avoid the annoyance of having D-series tubes go off-line each time you reboot.

The recommended DG jumpering can be found either on the installation drawings or in the user's manual for the tube (e.g., pages 4-6 through 4-8 in 014-000761 for the D410/460).

:SYSGEN.ISSUES

When genn'ing printers on asynch lines, disable echoing (no ?MEOC) and don't specify ?MOFC or ?MIFC. In next month's column I'll include the minutes of the Foreign Printer SIG meeting which was held at the NADGUG conference.

:STAT.MUXES

In case you haven't figured it out yet, AOS{/VS} is not compatible with full software flow control (XON/XOFF) on stat muxes and other buffering devices between the CPU and DG tubes. If you can, set the line speed at the CPU end to match the line speed at the terminal end, and disable flow control completely. If you can't (for instance, if you're using the mux to provide auto-baud selection on dial-up modems), then set the mux for inbound-only flow control at the CPU end, and outbound-only flow control at the terminal end.

:SUMMARY

1. Avoid 20 mA lines like the plague.
2. Use 8-wire cables to modems/muxes (2 through 8, and 20).
3. Use 4-wire shielded cable for all direct connections.
4. Jumper 4 to 5, and 6 to 8 to 20 on ALM/IAC8s at the CPU end.
5. Jumper 4 to 5, and 6 to 8 to 20 at *all* CRTs and serial printers. Δ

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Unmasking the culprits

PED—the Process Environment Display—is a useful tool for spotting bottlenecks and resource hogs

by Tim Maness
Contributing Editor

The people in charge of the NADGUG meeting in Boston deserve a gold star— the entire week was very well done. As a first time attendee, I was impressed with the number of people attending, the number of technical sessions, and the exhibit area. DECUS look out! I'm already making plans for the meeting next year in Orlando, although I can think of cooler places for an August meeting.

I would also like to thank the people who wrote to me about my September column. It was good to get some feedback. If you have any comments or topics you'd like to see covered in future columns, please let me know.

This month's column is devoted to another tool you can use to improve the performance of processes on your 32-bit machine. This tool is the Process Environment Display program, PED. PED is used to monitor processes as they run. It has several options that make it quite useful for analyzing what system resources an individual program is using. However, if you use only the PED macro supplied with the system you may be missing some valuable information about individual processes and total system usage.

For an individual user, PED provides a way to monitor system load and program performance. It gives you a way to know who to blame when the system isn't as responsive as it usually is—and it lets you know if the culprit is you!

You can either view the cumulative use of system resources over a period of time, or you can take a snapshot of resource usage at a particular point in time. Both types of figures are useful. The PED macro supplied with your system displays only the cumulative information for elapsed time, CPU time, and I/O blocks. Elapsed time is the amount of wall clock time the process has been running, and CPU time is the amount of time that the process has utilized the CPU. The number of I/O blocks is the number of 512 byte blocks that the program has read or written.

PED also has switches that allow you to watch the dynamic changes in resource utilization as they occur. The following macro is my favorite for monitoring processes. It displays the process identification, user name, program name, elapsed time, number of milliseconds of CPU time used per second, blocks of I/O per second, cumulative number of logical page faults, cumulative number of physical page faults, number of logical page faults per second, number of physical page faults per second, page-seconds, and the current working set size:

```
PED/PID/USER/PROG/ELAPSED/CPUS/&
IOS/FTL/FTP/FTLS/FTPS/PAGE/WSS
```

Running this macro will display the current processes with their current resource usage. The screen is refreshed every 10 seconds. You can use the < key to decrease the time between samples by 1 second.

If you are happy with the elapsed time or response time of your process, you can use PED just to see what level of resource usage is giving you this satisfied feeling. If, however, you are not happy with the performance of a process, you can use the macro when the system is unloaded to help identify which of the system resources is limiting the performance of your process.

Resource usage boils down to this: processes are using CPU time, doing I/O, and making memory references. PED measures CPU usage with the cumulative number of CPU seconds (CPU) and the number of milliseconds of CPU time per second (CPUS). I/O usage has both cumulative (IO) and per second (IOS) measures. Memory references are measured by the page seconds and page fault information. Of course, different types of programs will have a different mix of these three components, but with practice, PED will allow you to identify the types of numbers which indicate opportunities for improving performance. For example, you can identify programs which are CPU- or I/O-bound, as well as those which are thrashing (paging excessively).

CPU Usage. Using the CPUS switch shows the number of milliseconds of CPU time your program is using per second. This tells you what fraction of the CPU your program is using. The biggest number you will ever see in this column is 1000, which corresponds to 100 percent. If you're seeing 700 or above in this column, then the CPU is the rate-limiting step in your program. That is, the program is definitely CPU-bound. If this is the case, you can chart a histogram of the process (the directions for doing this are in :util:histo.doc) and see which routines are eating up the CPU cycles. You can then rewrite those routines in assembly language or perhaps rework the algorithm itself.

I/O Blocks. Being I/O-bound is a little harder to identify. If you have a small number of CPU seconds and a small number of blocks of I/O per second, you can probably assume that you are always waiting for I/O. If you have a program that does a lot of I/O, the problem is usually not that you are asking for data that you don't need, but that you are making too many requests to get it. This means your process is always waiting for I/O and can't use CPU cycles when they are available. If you have an I/O-bound program, improvements should be aimed at having the program use the maximum bandwidth of the I/O channel.

Although it is sometimes difficult to identify the bottlenecks in I/O-bound programs, buffering is usually the answer—more buffers, bigger buffers, or more sophisticated buffering schemes can usually be applied to substantially increase performance of I/O-bound programs (more about these items in future columns).

If you are happy with the response time, you can use PED just to see what level of resource usage is giving you this satisfied feeling

To give you an idea of what to expect from the IOS numbers, the best I've ever been able to get is 1,000 blocks a second—while reading a 16 MB, contiguous file on an MV/8000 with a 6214 (602 MB) disk. I frankly find this number puzzling, because it signifies a transfer rate of .5 MB per second, which seems much too slow for a disk that is rated at 1.9 MB per second. If anyone else has been able to do better or understands why it's so slow, let me know and I'll talk about it in a future column.

The best I/O score I've been able to get while writing is 400 blocks per second. Obviously, most programs do something besides just reading or just writing, so you can expect numbers smaller than this for a normal program. How much smaller depends on how you do the I/O. Using FORTRAN 77-formatted I/O you can expect about 30 blocks per second, and about 200 blocks per second with unformatted I/O—if you're lucky.

You can get a lot more I/O done if you completely avoid the I/O facilities provided by the high-level language you're using. Instead, you can use the ?READ and ?WRITE (or ?RDB, ?WRB) system calls directly. ?RDB and ?WRB avoid having the AGENT do things for you, but they are harder to use—and while they slightly decrease the amount of CPU time used, they don't decrease the elapsed time. In my opinion, they are rarely worth the effort.

Paging. FTPS, the physical page faults per second, provides a measure of how well the system is able to keep your program in memory. If yours is the only program running and your program's logical address space is smaller than the amount of physical memory, the only physical page faulting that will occur is when your program is initially loaded into memory. This is the ideal situation, since there are no physical page faults.

Usually, however, systems are loaded heavily enough that some physical page faulting will occur. You can minimize page faults by writing your programs so memory references are localized. For example, in FORTRAN, knowing that arrays are stored in column major order implies that if elements of your array are to be referenced with do-loops, you should make sure that subscripts change fastest from the left, i.e., (1,1), (2,1), (3,1), (1,2), (2,2), etc. And make sure routines that call each other are close together in physical memory. You can do this by ordering the list of .OB files.

Overall System Performance. PED allows you to see what types of jobs are running, who is getting what percent of the CPU, who is causing the disk to jump around the room, and who to hassle to rewrite some code. There is also a certain amount of feel to a system which you can acquire just by watching PED. You can often avert problems by noticing jobs which are behaving strangely. For example, if a program is using only CPU time, it may indicate a CPU loop. Programs using excessive I/O—especially if accompanied by an alarming decrease in the amount of available disk space—may indicate a loop with a write statement in it.

If you know the normal number of milliseconds of CPU time the PMGR uses on your system, you can usually spot a sick terminal (i.e., one that is constantly sending characters). If the PMGR is using a lot more CPU time per second than normal, and if EXEC is constantly active, chances are good this is the problem. Unfortunately the only way to tell specifically which terminal it is to unplug them one at a time. Δ

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

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Circle 20 on reader service card

ICOBOL 1.30 has given me enough new statements to keep me busy rewriting programs for years

The poor man's Gerry Manning

by Tim Boyer
Special to Focus

For those of you to whom the title of this article makes no sense, Gerry Manning is a writer for a certain other Data General-oriented magazine. For years now, Gerry has been telling us how to make our ICOBOL systems run better, faster, and for less money. I'm the poor man's Gerry Manning. I don't know a thing about ICOBOL or RDOS internals. I get nervous when writing a program to read MAP.DR, and I don't pretend to have the years of experience (and horror stories) that Gerry has.

I am, however, one of those idiots who loads a new revision tape whenever he gets one. And since I am running in a true production environment, I tend to find the bugs very quickly. Therefore, for those of you who have not seen ICOBOL rev 1.30, I can give you a sneak preview.

If you think I'm going to give you neat RDOS things like how to write your own device drivers, forget it! I'll leave that up to Ira Ellenbogen. I deal with RDOS in the context of using it for backups, macros, etc., and that's about all I'm going to write about.

First, the bugs (Sorry, RTP, but this is what everyone wants first). When the interpreter writes pass files to ICX.LP, rev 1.30 is adding some strange octal characters after the file name. If you spool the same file from two different terminals (or two different programs), two entries will appear in the PASS queue. Either one will print the file correctly, but this could be a source of much confusion to your operators.

A much more serious bug is the way the new revision handles remainders. It doesn't. I wrote a simple program to test this after I found some remainders not coming out correctly. All it does is accept two numbers, and then

DIVIDE A BY B GIVING C REMAINDER D.

For A and B as 1 and 9, respectively, the remainder shows as 0.000000001. With A as 1 and B as 900000000, the remainder is 0.1. Serious problems! It also reacts this way with DIVIDE INTO, and, lest I be accused of truncating something, the PICTURES are all 9(9).9(9).

There is also a problem with the compiler handling 88-level statements. It has been quite a few years since I've used 88-levels, and I gave the field the form

01 QUESTION-ANSWER.

88 VALID-ANSWER VALUE IS "Y".

If you don't give the 01 level a picture, the compile traps out on you!

Fortunately, I talked with the good people from Research Triangle Park while I was at the NADGUG annual meeting, and they assured me that both of these bugs have been fixed. All you have to do is find the patches.

Now, for the fun stuff. ICOBOL 1.30 has given me enough new statements to keep me busy rewriting programs for years to come. I'll give them to you in the order that I implemented them.

- PRINT AFTER ADVANCING data-name LINES: This one is so useful that I immediately rewrote all of my print copy files. It seems that some printers (the Printronix P-300, for sure) will form-feed at 12 inches per second, but will print blank lines at a much slower rate. When I use this new construction instead of PERFORM LINE-FEED data-name TIMES, it kicks into form-feed mode and increases my throughput about 33%.
- LINE AND COLUMN POSITIONING: If there is one reason for a Nova user to upgrade to an Eclipse and start running ICOBOL, this would be it. I can now describe a screen entry as

01 SCREEN-1 LINE line-number
COL column-number PIC

and set the line and column in the procedure division. If I don't feel like doing that, I can set up the screen in the old way and declare in the procedure division

DISPLAY SCREEN-1 AT LINE line-no COL column-no

If that isn't enough cause to scrap your CS-40, how about this: I can now use subscripted variables in the screen section! My MAINMENU program goes like this:

01 SELECTIONS-SCREEN LINE line-no COL 24 PIC X(35) FROM
SELECT-STATUS (SELECT-INDEX).

RTP now has a computer system to track STRs, and they are paying close attention to their age

This enabled me to cut out about 100 lines of code. In other programs, I am doing things that weren't even possible (or at least weren't worth the trouble to write) in old revisions of ICOBOL.

• IF STATEMENTS: Actually, this encompasses two new constructions, one in the procedure division and one in working storage. Instead of the statement

```
IF QUESTION-ANSWER = "Y"
OR QUESTION-ANSWER = "y"
```

we are now able to use the form

```
IF QUESTION-ANSWER = "Y" OR "y"
```

Using 88-levels, on the other hand, I have just about eliminated this kind of statement. This appears in working storage:

```
01 QUESTION-ANSWER    PIC X(1).
   88 VALID-ANSWER    VALUES ARE
   "Y" "y" "N" "n".
   88 YES-ANSWER      VALUES ARE
   "Y" "y".
   88 NO-ANSWER       VALUES ARE "N"
   "n".
```

Then, in the procedure division, I can evaluate a response without using a lot of conditional statements.

```
IF NOT VALID-ANSWER
   PERFORM NO-GOOD-ANSWER,
ELSE IF YES-ANSWER
   PERFORM AFFIRMATIVE,
ELSE IF NO-ANSWER
   PERFORM NEGATORY.
```

• CALL program-name: this is a feature that I have just begun to implement. It allows you to go from one program into another, run the other program, and return to the same spot you left in the first program.

I am using CALL in our employee file maintenance. When an employee is about to be deleted, the Worker's Compensation program is called. If the employee has any current claims open, the program returns and tells me not to delete this employee. If not, it spools out all previous claims and returns. With CALL, I eliminate 3 files and a few hundred lines of code from a program that is too big already. It is very useful for putting routines that are not used very often into another program.

Once again, a small criticism. Switches cannot be passed using the CALL function. CALLed programs inherit their switches from the calling program. I'm sure there is a good reason for this, but I would like to hear what it is.

The CALL function can also be used to call assembly language subroutines. I'll leave this part up to somebody else to write about, unless I get really gutsy. In AOS and AOS/VS, however, the function allows access to the CLI. Poor RDOS!

The other new features will have to wait until next month or I'll never get to . . . .

RDOS. The people from Research Triangle Park asked me to send a message along to all of you ICOBOL, RDOS, and BBASIC users out there: *send in your STRs!* If you have been around ICOS, BBASIC, or RDOS for any length of time, you have probably given up on the STR process and quit sending them in—mostly, I suppose, because you never got any reaction to them. This has changed. RTP now has a computer system to track STRs, and they are paying very, very close attention to their age. At the RDOS roundtable in Boston, one of the problems that the people from RTP said they are having is that there are problems in RDOS that everyone knows about—except them. These are the problems that have been around for so long that we have all worked our way around them, and basically take them for granted. RTP does not want to take them for granted—they want to fix them. But they need to know what the problems are. So—one more time— *send in your STRs!*

The just-finished (as I write this, at least) NADGUG conference was an auspicious one for RDOS. For the first time, we had an RDOS roundtable just like the big boys! Contrary to our fears, the room was filled, and Dennis Doyle didn't have to make up questions in order to fill the time. The representatives from Research Triangle Park were well-informed, and seemed to be glad to see that people actually were using RDOS. RDOS seems constantly under-represented at the national conference, and I feel that this is because of a neat little Catch-22 situation. NADGUG doesn't schedule a lot of RDOS sessions because RDOS people don't attend, and RDOS people don't attend because there are so few RDOS sessions. Let's get our attendance up, and we could have the clout within the organization that AOS has.

One of the nicest occurrences of the roundtable was how much time the participants spent asking us what we want in RDOS. The general idea that I got is that Data General is a market-driven corporation, and if enough of us want 32-bit RDOS then, that's what we'll get.

The only problem with this philosophy is the difficulty in getting our opinions down to RTP. Traditionally, RDOS SIGS have died on the vine. While the IRDOS SIG is still alive, it isn't exactly growing by leaps and bounds. The problem is the newsletter, which is currently non-existent. A SIG newsletter allows the membership to communicate problems and solutions to each other, and allows for such things as reader polls. Unfortunately, we haven't been able to find anyone to function as the newsletter's editor.

Along comes a real *deus ex machina* in the form of Doug Kaye's Bulletin Board System. Doug is the president of Rational Data Systems, which has developed such products as the MIRAGE CP/M board and their new PC/VS micro/mini integration system. Doug has offered his BBS for use as a clearing house of DG information. IRDOS is on the board, and you can now log on to the RDOS/ICOBOL menu (or AOS, CEO, BBASIC, etc.). For some strange reason, I volunteered to be the sysop. If we get enough of us on the board, I'll be able to find someone who will be able to answer just about any question you have (I've got one friend who was such a techie that he balanced his checkbook in octal. It worked fine until he got to check #778 and had a nervous breakdown). So get on the board and see what's going on. The phone number is 415/924-3652 and it can handle either 300- or 1200-baud modems. Call and find out what everyone else is doing!

Next month, I'll finish the list of new ICOBOL commands, and tell you about RDOS rev 7.50 and beyond. If you can't wait until then—you should have gone to Boston!Δ

Tim Boyer is EDP Manager at Denman Rubber Mfg. Co., and president of the Northern Ohio Data General User's Association. He may be reached at P.O. Box 951, Warren, OH 44482; 216/898-2711.

Changes—who, what, when?

Automated configuration management tracks changes throughout the life of documents, design, software

by Alex Lobba
Special to Focus

The last few years have witnessed a tremendous increase in the amount of information handled by computers, and in the quantity of software developed. The problem of keeping track of all this information has also grown. Computers manipulate information at a rate that produces different versions and revisions faster than can be documented manually.

Configuration Management (CM) addresses this problem. The purposes of CM are to identify all the interrelated components of a body of information and to control and document its evolution throughout its life cycle.

Effective CM is needed in a broad spectrum of environments and applies to different types of information. Among those benefitting from CM are: the software developer entangled in the complexity of requirement documents evolving into design documents and then actual code; persons reponsible for maintaining all the different versions of a final software product; the engineering firm trying to keep track of the changes in its computer-generated drawings; the government agency maintaining documents and their amendments; and the government contractor who needs to comply with defined standards.

The conventional manual approach to the problem of CM is unmanageable because it cannot keep up with rapid changes. As the volume of information increases, the manual approach breaks down. Obtaining up-to-date documentation of the status of information requires that the modification process be interrupted. This is unacceptable. Furthermore, manual or semiautomated procedures provide little or no control over who can make changes and where, and over the integrity of information.

An automated approach to CM is essential in effectively implementing the following major aspects of functionality: identification of all the components of a body of information; status accounting reports to document what changed, when, and who made the changes; auditing the history of components to verify their integrity and compliance with the original specifications; and control over what changes should be made and incorporated, and over who can access what information.

An automated CM tool should also provide the ability to identify and document changes as they occur, without interfering with the process. This allows real-time verification that the right changes were made in the right places. It should restrict access to information to selected personnel and eliminate the redundant storage of information shared by

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multiple versions or baselines (i.e., configurations).

What is required is a tool in which the various aspects and functions of CM are integrated into one consistent environment.

The first function of CM is that of identifying all the components of a product. In Softool's Change and Configuration Control (CCC) environment, information is organized as a hierarchy of data structures, with the data base at the highest level.

The data base is composed of systems. In a typical situation, System 1 might be a manufacturing control system, System 2 a simulation program, and System 3 an accounts payable or payroll system.

Each of these systems is composed of one or more configurations of the parent system. For example, Configuration 1 of the manufacturing control system might consist of production routines, whereas Configuration 2 might be a development version and Configuration 3 an enhanced version of the exact same system being developed to run on machine B rather than machine A.

Each configuration is in turn composed of module data structures. Modules may represent the different routines or programs that make up specific configurations of a given system, with corresponding text structures to hold each module's source code, object code, and accompanying documentation.

In another situation, it might make more sense to store all the source routines for a given version in text structures under Module 1 and all the accompanying objects for each routine under Module 2.

In any event, a key feature of CCC is the flexibility it provides in both the representation of and subsequent access to stored information.

Note that any level in the CCC hierarchy may have text associated with it. This provides a convenient mechanism for associating documentation, job control language procedures, macro procedures, test cases, or any other pertinent pieces of information, with an entire level or structure, from the system data structure on down.

CCC also provides status accounting reports that support the activity of auditing the history of components to verify their integrity.

CCC automatically records who makes a change and when the change is made. When a change is made, CCC gives the user an opportunity to enter a change name and a description of the change he or she made, providing a key by which a change, or group of related changes, may be readily accessed and displayed.

For example, a programmer modifying three separate routines to resolve software trouble report (STR) number 65 might name all three changes "STR65". With a single command, the project manager could then examine all the changes made in order to address STR65.

In addition, CCC keeps track only of the actual changes made to a given text structure. This means, for example, that if a programmer changes three lines of a 100-line program or routine, CCC saves only the 3 lines that have changed, not a whole new version of the entire 100 lines of information.

This tracking capability of CCC enables a user to maintain a complete audit trail history of all changes made to any structure within the CCC hierarchy. Also, it provides the ability to reconstruct a component as it was at any point in time. In addition to being able to display the actual lines that have been changed in any text component, CCC is able to generate a number of useful reports based on any one of several change attributes.

For example, the following are typical user requests: What changes were made by programmer Smith? What changes were made to text structure Source1, and by whom? What changes were made to components of System A, after September 27, 1982, at 3:00 p.m.? Show me a list of all changes made that have a name of STR65. Show me the latest version of Routine1, or the previous version being used on January 23, 1982, at 1:00 a.m.

CCC allows programmers and managers to keep track of all changes, recreate or examine any change, and effectively minimize disk storage by storing only actual changes made to a component structure, rather than storing a whole new copy of the revised structure.

CCC also provides the ability to track documents such as software trouble reports

and engineering change proposals. A user could also selectively ask for the description of each status and list the actual contents of each STR document.

CCC offers true configuration control. All components of a given software release or baseline can be organized and managed as a single entity that preserves the relationship between components. Then, all distinct but related releases can be handled as separate units, with CCC doing the busy work of managing the changes that define the separate versions.

In addition, CCC provides the capability of operating on configurations as a whole. For example, a user can combine the changes made in two separate configurations into a single configuration. CCC will flag any conflicts encountered while combining the two configurations.

Finally, CCC maintains a complete history of exactly what has been changed in moving from the original configuration of a given product to its latest version. The ability to document the changes from baseline to baseline gives full auditing and traceability. This allows the user to verify that each component is evolving logically and consistently.

For the purpose of describing how CCC maintains different versions of components, we have coined the term "virtual" configurations. To CCC users, this means that whenever they use the latest version of a piece of information, it appears as though they have a complete, up-to-date copy of the information in question. In fact, however, they really have only a virtual copy of the baseline configuration.

For example, the production version of a software product contains 20 routines. Configuration 1 of the same product also contains these 20 routines, but five of them have been modified to make the system functional on a different host computer. Physically, CCC stores only the changes to those 5 routines under Configuration 1, eliminating the redundancy inherent in duplicating the whole product.

All of this is transparent to CCC users.

CCC provides powerful access control features to define who can do what and where. To ensure that no unauthorized users log into CCC, there is log-in user-ID and password control. User IDs and passwords may be established only by a user with data base administrator privileges, and must be correctly entered to gain admittance to CCC upon initial log in.

CCC users are divided into three categories with different degrees of privileges: data base administrators, managers, and users.

In addition to controlling the access of users to CCC as a whole, CCC provides the capability of limiting user access to a specific structure, on a per user, or class of users, basis. All users of class Updater, for example, might be permitted to log into only a development configuration, effectively locking out the corresponding production version from any accidental modification.

CCC also provides for even tighter control by permitting information to be encrypted.

To determine how data is internally stored, and how difficult it is to access that data, CCC allows the assignments of structure traits.

These traits determine whether a unit of information will be shared among derived configurations (i.e., virtual copy), or its storage will be duplicated (i.e., physical copy); whether CCC maintains a complete audit trait of all changes, or only the most recent version of a component; the degree of compression by which information is stored; and the degree to which information is encrypted.

Keeping track of evolving information is a critical task with which current manual methods cannot cope. The automation of configuration management is essential. Softool's CCC provides the high level of automation that is needed in comprehensive change and configuration control environment. Δ

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Western DataCom Introduces New Security Devices

Youngstown, OH—Western DataCom has added two modems to its line of modem options. The 424 Autodial and the 424 Error Free circuit cards are 2400/1200/300 bits per second full-duplex triple modems and autodialers. Their slim profiles allow mounting of up to 16 modems in only 10.5 inches of rack space.

According to Western DataCom, the 424 Autodial is compatible with all CCITT V.22bis modems at 2400 bits per second, and Bell modems operating at 1200 or 300 bits per second. It offers instant plug-in capability with other Western DataCom microprocessor boards. The 424 Autodial is registered for direct connection with telephone networks, uses one telephone line for all transmission speeds, and has a single serial port for both dialer and modem. The 424 can be used for voice or data applications; it features manual/automatic, originate/answer, and high/low speed operations. The unit is Hayes "AT" command compatible, and has memory for telephone numbers up to 32 digits. It can use either pulse or tone dialing, with automatic tone detection. The 424 Autodialer costs $865 per unit, with discounts for orders of 10 or more.

Similar to the 424 Autodial, the 424 Error Free additionally implements Microcom's Networking Protocol (MNP). When a modem without MNP calls in, the 424 EF enters a pass-through mode and serves as a standard modem. However, when a modem with MNP calls in, the 424 EF adapts to the capabilities of the dial-in unit. According to Western DataCom, the result is detection of 99.999% of all errors and automatic request for retransmission. The 424 Error Free costs $895 for a single unit, with volume discounts available.

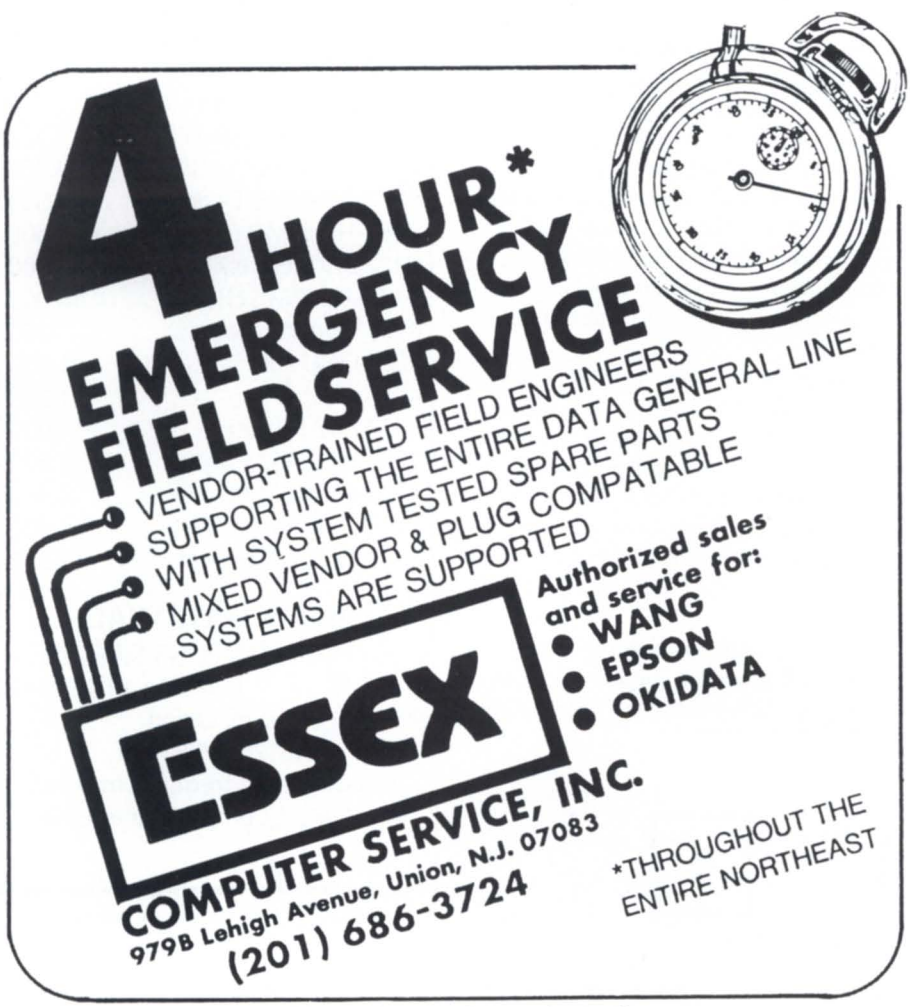
In addition to the 424 modem series, Western DataCom has added a new model to its LineGuard series of data security systems. According to Western DataCom, the new LineGuard 3060 offers three separate asynchronous dial-in ports and a microprocessor with nonvolatile storage of access codes. The device can accommodate up to 60 dial-out modems. Like other LineGuard models, the LineGuard 3060 offers dial-back security; however, the 3060 calls back on a separate line, which allows increased flexibility in assigning phone line and computer port access. The unit fits into a Vadic Multiline Auto-Call system (MACS), along with the other components needed to complete the system. The LineGuard 3060 is priced at $985 per unit, with discounts available for volume purchases.

Other Western DataCom products include the DataCom 1000 asynchronous video display protocol translator, the Uniswitch 1020 and 1021 remote activated matrix switches, the DataCom 1023 error controller, the Prism 1003A and 1003B three-channel asynchronous statistical multiplexers, and the DataCom 1801 adapter-dialer for MACS chassis. Δ

Western DataCom, 5083 Market Street, Youngstown, OH 44512. Call 216/788-6583 for more information.

Drive Spans DG/1 to PC Gap

Isla Vista, CA—A new microfloppy disk drive from Manzana can connect directly to an IBM PC, enabling the PC to access files created on a Data General/One or other portable MS-DOS based microcomputer. The MDP3 3.5-inch disk drive comes with a cable that connects without tools to the standard IBM diskette adaptor card. An accessory kit included with the drive consists of a device driver and formatting software that let the PC read the entire 730 KB capacity of the microfloppy diskette.



Circle 14 on reader service card

When installed on the PC, the device driver is booted automatically when the system is turned on, working just like the standard 5.25-inch drive except for the larger capacity. The driver also provides options for reading files created on other systems using microfloppy drives, including the Texas Instruments Pro-Lite, GRiD Systems GRiDCase, Kaypro 2000, and Hewlett-Packard 110 and 150.

The MDP3 with accessory kit is priced at $625. Δ

Manzana, 935 Camino Del Sur, Isla Vista, CA 93117; 805/968-1387.

Another utility for VS Toolbox

Salina, KS—Eagle Software is releasing The Director, another of the utility programs the company is offering in its VS Toolbox package. The Director re-directs indirect records in an INFOS file to improve INFOS II file processing times. The eight other utilities in VS Toolbox are designed to improve INFOS file organization, monitor system performance, enhance system security, and improve AOS/VS file access.

An indirect record is created when INFOS tries to re-write a record without enough space on the current page. INFOS writes the new record on a different page, and also writes on the original page a pointer (indirect record pointer) to the new record. When a program requests that record, INFOS must first read the page containing the indirect record pointer, and then the page containing the new record.

The Director re-routes the data base pointers in an INFOS index directly to the page containing the data. This eliminates the need to read the page containing the indirect record pointer.

Companies that have already purchased the VS Toolbox will receive The Director at no extra charge. Δ

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

Office Automation System Uses SSI WordPerfect

Boston, MA—Alexander Associates, in cooperation with Copley Systems Corporation, has introduced OASYS, an office automation system for Data General computers. OASYS provides electronic mail, word processing, integrated spreadsheet with graphics, electronic calendar, document filing, and an electronic contact index, all in one integrated package. OASYS uses SSI's WordPerfect and MathPlan for word processing and decision support. According to Ken Alexander, president of Alexander Associates, the system offers a fully integrated office automation system that requires a minimum of computer overhead and user training.

Electronic Mail provides efficient communication among both local and remote system users. Electronic Mail functions include phone message routing, express and certified mail, carbon copies, and mailing lists. Mail can be sent to as many as 80 users at a time via a mailing list capability. Automatic message reply, re-routing, filing, printing, and archiving are also available.

Document filing maintains a secure system for storing word processing documents, spreadsheets, graphs, and reports. It uses standard filing cabinet concepts (drawers, folders, and cabinets). Document transfer is provided by the electronic mail system. The calendar function provides for computer-aided scheduling of appointments, meetings, and company resources, while the electronic contact index provides flexible access to both a personal and corporate data base of names, addresses, and phone numbers. Top level menu support is provided for user applications allowing for easy integration into existing data processing systems.

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Alexander says that OASYS has been designed especially for installations where system performance is critical, and that it provides a cost-effective alternative for Data General users who want to install office automation on the smaller MV or 16-bit computers.

The system is available for a 30-day trial installation. The system runs under AOS and AOS/VS, and uses the INFOS II data base manager. Prices start at $3900. Δ

Alexander Associates, 155 Crocker Road, West Barnstable, MA 02668; 617/362-4225.

QAX system can manage marketing

Palatine, IL—QAX International Systems Corporation has introduced a multi-user sales system for Data General computers that is designed to improve lead response, follow-up, and sales management.

Called inQuiry Action eXpress, the system consists of a Client Finder program and QAX's 3*16 Word Processor. Together, the components allow a timely response to inquiries even if no salespersons are available. Prospects can be assigned to a territory or salesperson, or be placed into the Open Inquiry Pool to be handled by the next available salesperson. The system will also store information about the prospect's type of business, size, how they heard about the user, contact dates, and current status.

According to QAX president Robert Quackenbush, "The program assures continuity of sales contact, because information is consistent and readily available for new personnel if a salesperson leaves or a territory is split. In addition, because it is designed for multiple users, it eliminates annoying and costly duplication of efforts."

The system's "tickler file" can help a company take timely action on follow-up calls, samples, letters, quotes, etc. Statistical reports allow the user to compare the effectiveness of various elements of the marketing effort.

The system can be used to create complete direct mail sales campaigns with individualized mass mailings and multiple-sequenced letters for both domestic and foreign addresses. The user can also record known competitors, "catalog collectors," and students to have them automatically excluded from mailings. Other features of the system include mailing list generation, three levels of information security, and the ability to build a library of telemarketing scripts. Δ

QAX International Systems Corp., 4173 Cavehill Road, Spring Hill, FL 33526; 800/421-5300 extension R51.

New disk package stores 5.3 gigabytes

Westboro—Announced in late September, Data General's new Model 6350 Disk Package offers users with very large computer configurations a cost-effective mass storage option. The Model 6350 can be purchased by itself, or as part of a special MV/10000 system package.

The new disk package offers its storage capacity of 5.3 gigabytes (GB) by matching nine of Data General's 592 megabyte (MB) Winchester-type disks with three intelligent disk controllers. The entire package is mounted in three of DG's meter-high peripheral cabinets.

"This disk package is especially suited for customers who require large amounts of online, high-performance storage," said Joe Mettee, magnetic peripherals product manager for the Information Systems Division. "Mass storage may represent as much as 50 percent of the total cost for a computer system, so savings can be significant in large system configurations."

Designed and manufactured by Data General, the 5.3 GB disk package incorporates features like bad block remapping, optimized and overlapping seeks, dual porting, logical to physical addressing, and incremental backup.

The Model 6350 is priced at $245,000. The price for a packaged MV/10000 system with the 5.3 GB disk subsystem, 16 MB of memory, magnetic tape subsystem, system console, and AOS/VS operating system is $470,000. Δ

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EVB promotes Object-Oriented Design for Ada

Rockville, MD—EVB Software Engineering is marketing a large application of Object-Oriented Design in the Ada programming language. Consisting of more than 700 pages of documentation, the OOD application is an implementation of two well-known metrics for software, McCabe's and Halstead's complexity metrics. Called The CMT (for Complexity Metrics Tool), the application includes more than 22,000 physical lines of Ada source code.

EVB is packaging The CMT as an example of the application of Object-Oriented Design in an Ada software development effort. "Our clients have been asking for a non-trivial example of OOD for Ada, including the resulting code; we are responding to that request," says Ralph Crafts, EVB's executive vice president. EVB also markets a series of reusable Ada components called GRACE, also in source code and also using Object-Oriented Design.

The CMT consists of more than 700 pages of structured design documentation, source code listings, and a users reference manual. The Ada source code itself consists of 256 separate compilation units, which are said to be direct representations of the design process.

The CMT package is delivered in hard-copy format, suitable for duplication. EVB authorizes unlimited duplication on a site basis; distribution is not restricted when the code is embedded in original programs authored by the user. The CMT is priced at $2789 for the first site, including shipping and handling. Additional sites are $499 each. Δ

EVB Software Engineering, Inc., 451 Hungerford Drive, suite 100, Rockville, MD 20850; 301/251-1626.

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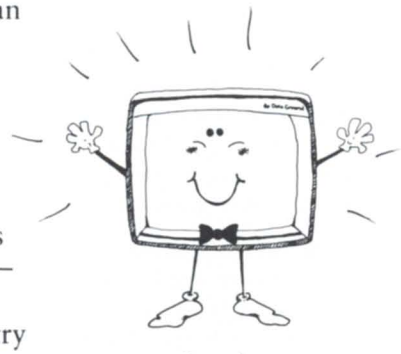

FOCUS now devotes more pages each month to the things you need to know—subjects like system management, industry trends, new products, programming languages, and data communications. It covers all aspects of the North American Data General Users Group and its activities, as well as reporting on developments within Data General. In short, its your best source of information that affects the DG community.

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(from page 38)

is read, the retrieval will continue with the next message in order. The replies which were displayed as a result of the chain read will not be displayed again during this retrieval. If you enter a No to this question, then the display will proceed in order and replies will be displayed in their numerical position as they are encountered.

Occasionally, a reply will have been deleted but the original message is left. In this case, when you read the reply chain the system will display the message:
Reply has been deleted.

Leaving messages. The BBS supports three forms of message entry. These are the line mode, prompted block mode, and unprompted block mode. The line mode is intended for manually typed messages. Since this is the most common type, it's all we will cover here. You start by typing <L>eave message. The BBS then prompts you for the header information. Next it prompts for each line of input, with a line number and the count of characters left in the message buffer. The buffer limit is 2,048 characters, so remember that brevity is the soul of wit.

When you have entered your message you will be given a set of options as follows:

- <L>ist displays your entered text without word wrap, and with each line numbered. The numbers are used for editing, if you wish. Remember that the BBS will word-wrap your message when it finally displays it, so the lines may not come out exactly as you expect....
- <C>ontinue will place you in the line mode at the end of your message so you can add to it.
- <E>dit will ask you for a line number. Enter the number of the line you want to change (as shown by <L>ist) and the current line will be displayed. You then re-type just this line as you want it to be.
- <S>ave will save your message to the system's disk message base, and exit back to the menu.
- <A>bort will give up on entering this message. All text will be thrown away and you will be returned to the menu as if you had never done the enter message command.

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Circle 34 on reader service card

(from page 46)

Figure 1

<H>ELP!
- <O>verview of this system's operation
- <K>eyboard controls
- <M>odifying the BBS and terminal environment
  - <P>assword
  - <V>erbosity of prompts (Expert Mode)
  - <C>haracteristics of my terminal
- <P>rotocol details
  - <E>ntry of messages
  - <R>etrieval of messages
  - <U>ploads
  - <D>ownloads
  - <A>utomatic Logons
- <T>ime elapsed for this session
- <B>ackground information about this system and RDS
- <C>hat with RDS operator (if he's on-line)
- <+>Main Menu
- <ESC>ape to previous menu
- <Q>uit (disconnect)

<S>IGs
- <1>CEO
- <2>AOS/VS
- <3>AOS
- <4>RDOS
- <5>COMMSIG (Communications SIG)
- <6>BB (Business BASIC SIG)
- <7>UNIX (DG/UX, MV/UX, and C)
- <8>MIRAGE (MIRAGE Users Group)
- <G>GOSSIP (about Data General and DG Products)
- <H>ELP. . . How does a bulletin board work?
  - <I>ntro to bulletin board concepts
  - <R>eading a bulletin board
  - <L>eaving messages
  - <D>ifference between bulletin boards and EMAIL
- <E>MAIL (instead of bulletin boards)
- <+>Main Menu
- <ESC>ape to previous menu
- <Q>uit (disconnect)

<Q>uit (disconnect)

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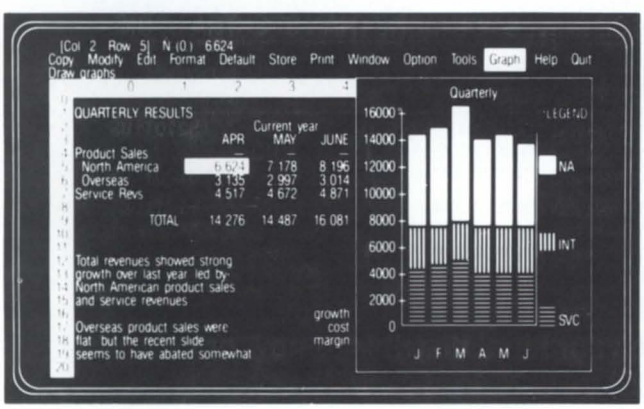

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I don't believe that you are still selling DG junk
Why don't you quit and get a respectable job?

Perhaps once a year, he wanders into our office, looks at the piles of boards, terminals, printers and CPU's. With eyes glazed, he trembles and his voice raises two octaves in pitch. He always asks the same question, "Why would people buy used boards from you, risking their company's money, when they can go directly to DG and get something they know will work?"

It's become something of a ritual by now. I explain that we can often ship the same day, we offer a guarantee that the item will go under DG maintenance and a 30-day, full-money refund if the item does not work.

He never listens to the end of the speech; he's heard it once a year for the last eight years. He will walk out into the warehouse and browse. He passes rows of com chassis, stacks of SBS muxes and peers head first into boxes of cables. He pulls aside an LP2, finds two card readers, and hoots with laughter, saying "Do you really think that you will ever sell those?"

Ten minutes later, a muffled voice from behind a pile of 4218/4034 printers asks "Are these Alpha Data fixed head disks?" "Do you have the controllers?" "Do they work?" And then, somewhat reluctantly, "How much?"

He passes the cartons of Desktops, never looks at D211's, ignores new band printers and disdains streamers. Yet the sight of a 6012 or a 6052 makes his pulse race and he fights to hide any outward appearance of interest. "You know that I'm rebuilding my den. I could use a couple of big heavy CRT's to use as shelf supports—quite a conversation piece. Of course, I can't pay more than a few bucks each."

He normally brings his big old station wagon. Together, we load it with Diablo 33 and 44 disks, a Wangco tape, a couple of 6012 CRT's, and an assortment of 16KW cores and basic I/O boards. He drives away, the front wheels of the station wagon almost off the ground because of the weight in the back. As the car turns the corner at the end of the block, I hear the sound of a chuckle coming through the open window of the car.

I often wander what he uses the Diablo 44 and 6045 disks for—an ash tray? Or could it be that he is running a nine-year-old C300 with 6012 CRT's and several 10 meg 6045's and hasn't paid a penny in maintenance during the last eight years?

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Circle 36 on reader service card

It's now three months since NADGUG began publishing *Focus* in its new magazine format. The response so far has been very gratifying. Readers have discovered that we're here, and our mailbox is starting to bulge with news items and articles contributed by NADGUG members. The companies whose advertisements are providing financial support for this venture are happy with the support they are getting from readers. What we're *not* getting yet is letters—and we want them. To make it easier for you to write, it's now possible to leave messages for *Focus* on the NADGUG bulletin board. See the article on page 11 for more information.

■

From a public relations standpoint giving Tracy Kidder permission to chronicle the development of the MV/8000 may have been the smartest thing DG ever did. After all these years, *The Soul of a New Machine* is still getting ink and recognition for Data General. A front page feature in the September 20 edition of *The Wall Street Journal* took a "where are they now?" approach, and tracked down many of the members of the Eagle team. It also tracked down Kidder, whose most recent book—written with a pencil rather than a word processor—documents the exploits of four carpenters building a house. "It's about people working," said Kidder. "I'm still writing about the same damn thing."

■

DG's recent price cuts on the DG/1 will bring the laptop portable's price into the range of standard micros. The price cuts ranged from 23 to 32 percent. You can now get the base model for $2195, and the top of the line for $3195. However, the news of the price cut was too late for American Express' *The Best of Everything* Christmas Catalog, which pictured the DG/1 under "Executive Perks" (right next to a Xerox desktop copier). American Express is asking $3495 for a version with two diskette drives, 256 KB of memory, and no carrying case or battery pack. It's a pretty picture, though.

■

OEMs in the New York area have announced their goal of creating a national council of Data General OEMs. Keith A. Gransbell, vice president of the newly organized Greater New York Data General OEM Council, writes that the group formed to facilitate better communication with Data General, and better cooperation among themselves. They hope to share sales leads, expertise, and other resources: "Our goal here is to develop a way for OEMs to know other OEMs and their particular expertise [so that] a sales lead can be passed on to a more qualified organization rather than being dropped."

When the GNYDGOEMC met with local and regional Data General sales staff, they received assurances of their support, although DG expressed some concerns about potential brokering of hardware among the OEMs. OEMs who would like to participate should send complete company and product profiles to the GNYDGOEMC in care of Data General Corporation, 633 Third Avenue, 4th Floor, New York, NY 10017.

Incidentally, the GNYDGOEMC may finally have surpassed NADGUG in terms of acronymic ugliness.

■

Concentric Data Systems, the company that developed the Supercomp spreadsheet package for Data General computers, has recently completed work on the 1-2-3 Report Writer for Lotus Development Corporation. The new software allows users of Lotus 1-2-3 to generate business documents like invoices, personnel reports, sales analyses, and mailing labels from a 1-2-3 data base. It retails for $150.

■

Foothill Research reports that it has sold 18 licenses for its Style high-level programming language to two companies in Australia and Sweden. With a total value of more than $200, 000, all of the licenses will go to Data General installations. Liber Grafiska, the largest publisher of non-fiction literature in Sweden (and that country's third largest user of DG computers), bought seven of the licenses for its installations in Stockholm and Malmoe. Sanitarium Health Food Limited, manufacturer of Weetbix, the top-selling breakfast cereal in Australia and New Zealand, will use Style to re-develop its existing business applications and develop new applications related to manufacturing.

The Liber Grafiska sale was made by Leasco Software Ltd., Foothill's sales representative in the United Kingdom. However Software Poole, the independent consulting organization that helped Liber to evaluate competing products, has now been granted the right to distribute Style in Sweden, Norway, Finland, and Denmark.

■

A recent federal government survey asked government employees to rank microcomputer software according to price, ease of learning, quality of documentation, performance, ease of use, and overall value. The thirteen top programs were, in order of ranking: SAS Statistics, Volkswriter Deluxe, Lotus 1-2-3, Multimate, Perfect Calc, dBase II, WordPerfect, WordStar, Condor, Benchmark, Multiplan, SuperCalc, and PeachText.

■

George Henne reports that sales for his company, Micom Computer Systems, were up 85 percent over the year earlier. Henne didn't tell the actual dollar volume, but he did say that Toronto-based Micom is installing a couple of MVs a month.

■

3CI, the Colorado software house, announced that it has enhanced the Forms module in its InFoCen information management system. The Forms enhancement offers standard default forms, as well as custom "painted" forms for data entry and modification. Users can create form specifications on-screen with a series of menus, then save the form definition to a forms data-set, where it will be available for modification, data validation, table look-ups, etc. Adding the Forms module to InFoCen costs from $1500 to $3500; for more information, call 303/223-2722. Federal agencies and approved government contractors can now order 3CI's products directly from the General Service Administration's (GSA's) authorized price list.

■

Troubles at Walker Interactive Products are causing frustration among the DG users that had signed up for DG's CFO financial software. Walker had contracted to provide nine separate modules, but so far has delivered only the General Ledger. It now looks like the next package to be delivered, the Accounts Payable module, will not be ready until mid-1986. At the end of September it was reported that Walker had closed its four regional offices after failing to find a buyer or some other source of financial backing.

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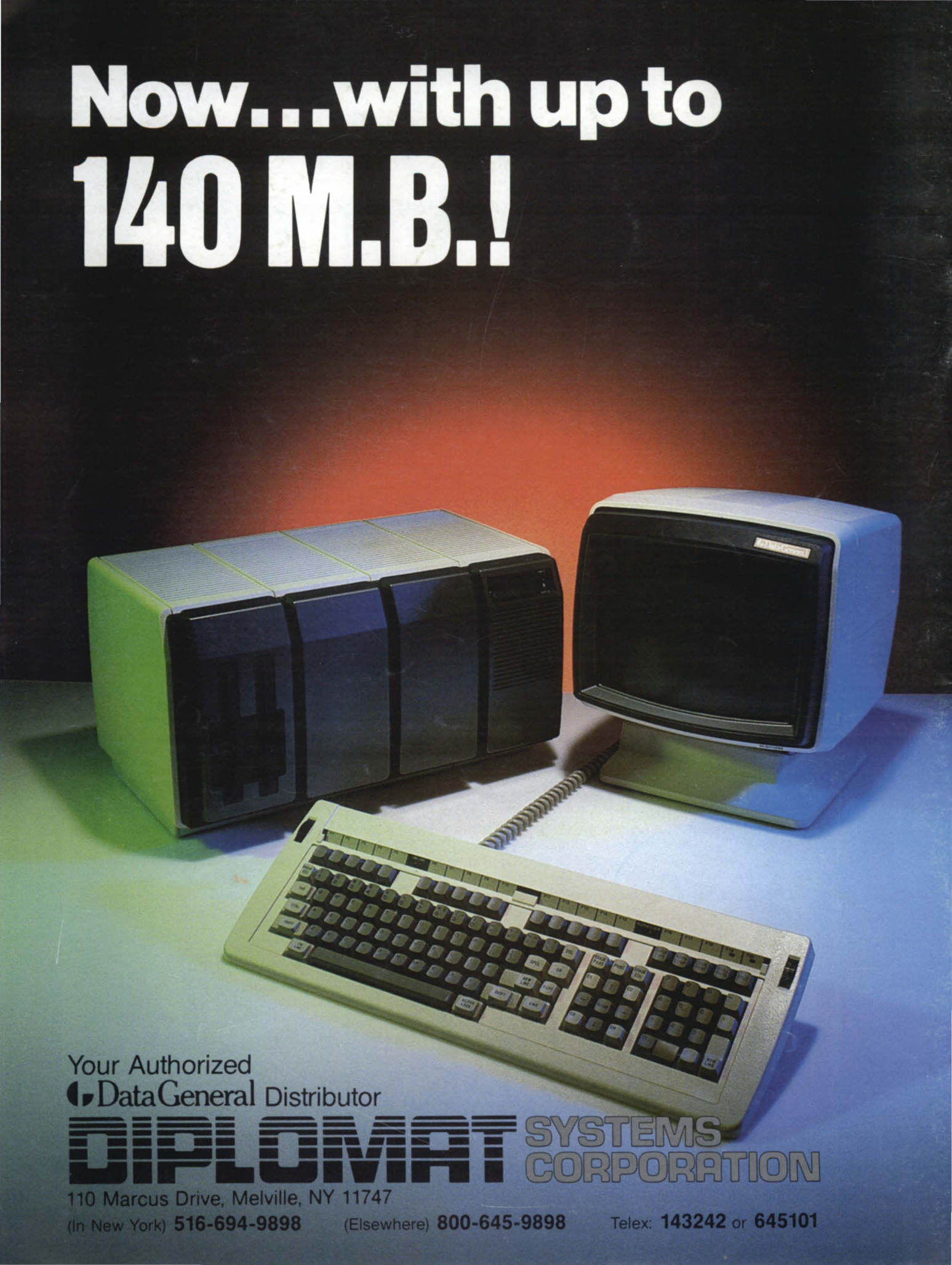

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