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

March 1986

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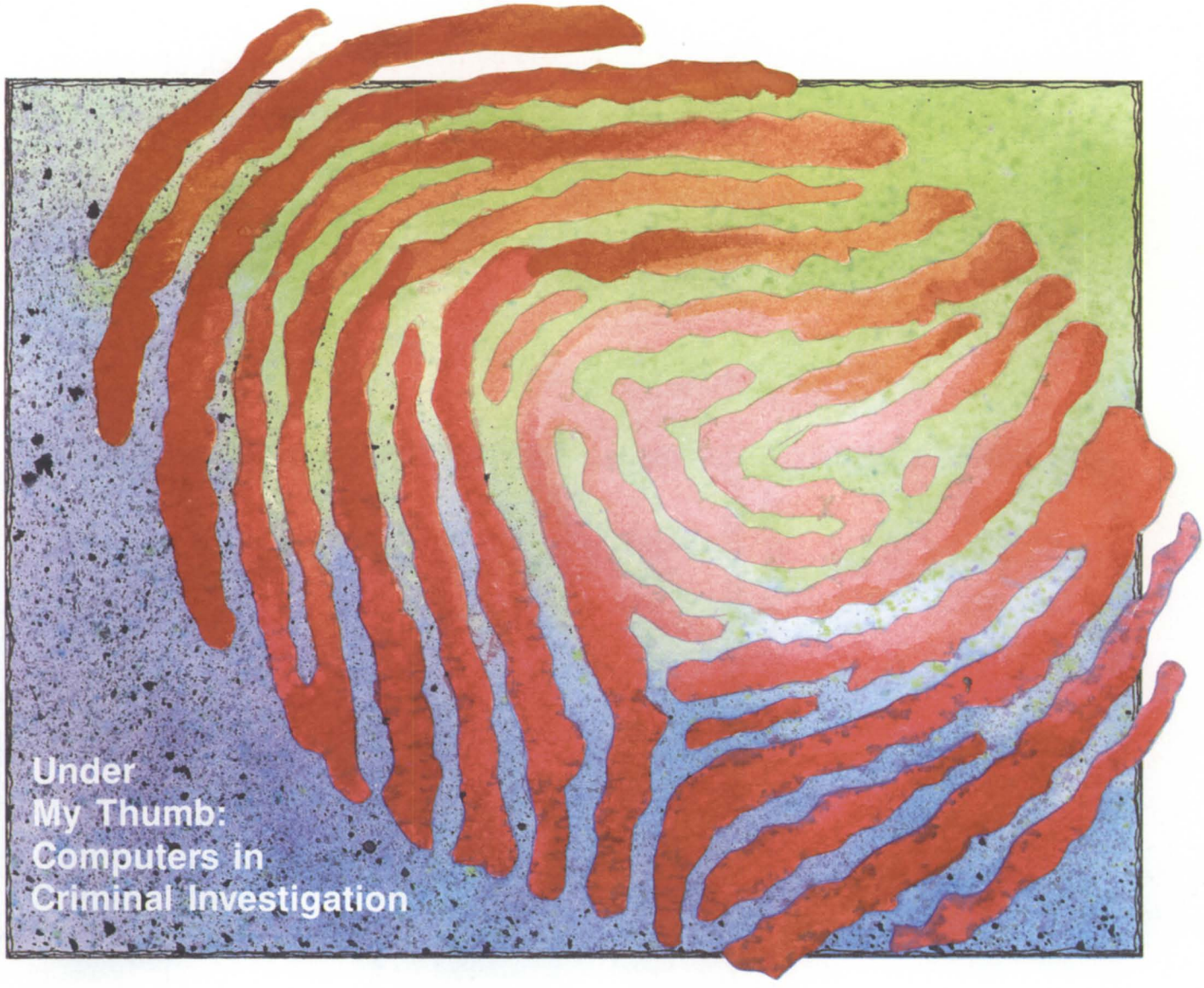

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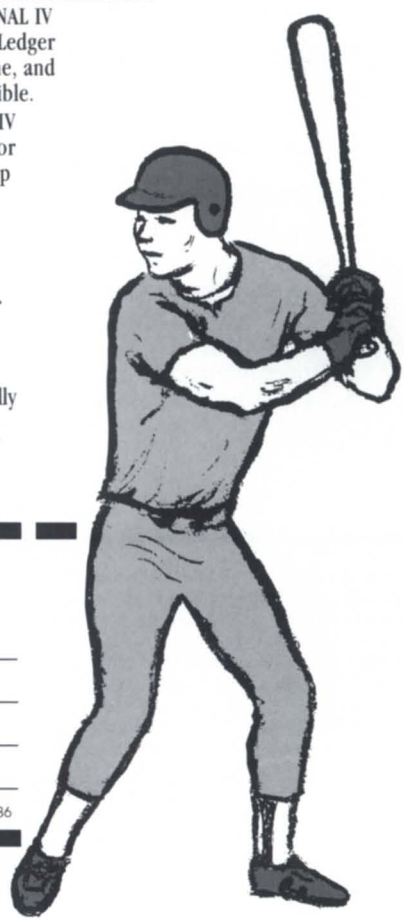

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The Magazine of the North American Data General Users Group

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Who *are* those guys?

The phrase keeps coming back to me, and I'm not sure why. I think I'm remembering it from *Butch Cassidy and the Sundance Kid*—wasn't it Paul Newman who kept saying it to Robert Redford while the Pinkerton agents hounded them across two continents? Nobody I've talked to recently seems to remember it quite the same way, but the phrase nonetheless persists.

Who *are* those guys? We found out this month. The answer? They're pretty much like you and me. Right now I'm thinking of the people who manage DG's Customer Support Center in Atlanta. When Ed Lindberg wrote a letter last month about his frustration as he tried to work with the CSC system, we knew it was a problem worth pursuing. Ed is not the kind of guy who complains for the sake of complaining; he's an experienced user, and he wouldn't flood the system with frivolous problems. His concerns must be real.

However, I had returned only a few months earlier from a visit to the Atlanta facility, and had just written a somewhat congratulatory article about the visit. Quite frankly, the CSC staff impressed me with the management controls they put in place to deal with the very frustrations Ed cited in his letter. Something didn't fit.

You'll see the results of our investigation in the Troubleshooter column on page 12. Our troubleshooter had lengthy telephone conversations with Ed, with CSC director Jim Foxworthy, and with customer support manager Cliff Izer. It would be too much to expect that all the problems they discussed could be solved immediately, but the conversations helped define the problems and made a start at finding solutions.

Our troubleshooter was impressed by the amount of goodwill she found on both sides of the situation. "Those guys" turned out to be pretty much like any of us—ordinary people working hard to do a good job for their respective organizations. When they got together and started talking, they found a lot of common ground.

Bringing people together is perhaps half of what NADGUG does best. Former NADGUG president Mort Kahl often says that even *one* of the ideas and contacts he makes at an annual meeting is enough to make attending worthwhile—and he gets many ideas and makes many contacts at each meeting. *(In case you haven't already started planning, Conference 86 is scheduled for August 11-14 in Orlando. Come see for yourself whether Mort is right.)*

The other half of what NADGUG does best? Sharing information. This involves another set of "those guys." Informally, it's the people who take the time to attend RIG meetings, or who form a local buddy system of people to call when things don't go right. Or it's the casual acquaintances that blossom into friendships when people with similar interests start talking over lunch or in hallways at the annual meeting. It's also the people who go out on a limb to share their ideas more formally, whether as speakers at a meeting, or as writers for *Focus*.

One of the things I love about this job is the almost daily conversations I have with DG users, wherever they may be. Many of these people eventually become authors of articles for the magazine. As we talk, it often turns out they have found a solution for a nettlesome problem, or maybe found a trap the hard way, and want to warn others.

Turning those discoveries into publicly shared information—i.e., an article or a presentation—entails a risk: what if they're wrong about some key fact? What will people think if they make an elementary mistake? Whether we're writing an article or making a presentation, most of us have a palpable fear of what the audience thinks of us. For many, that fear is enough to keep us from writing or speaking. It may be a little easier for the "gurus," because they are more sure of their technical accuracy, but even this is only a matter of degree. A certain amount of audience anxiety is probably inevitable.

NADGUG is very good at promoting informal sharing, but all of us would benefit if we could make *public* sharing less threatening. Those in the audience shouldn't expect perfection, any more than those doing the talking should expect hostility. After all, the biggest difference between audience and speaker may be in how willing they are to go out on a limb.

As I often say to potential authors, sharing an idea about system performance isn't like performing before an audience of drama critics. Yes, you're putting your thoughts before an audience, but it's an audience made up of "those guys," who are really "us guys." What have you got to lose? Δ

—G.F.

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IPC control of user-written utilities

Most Data General users are familiar with issuing commands to DG utilities. They may not know, however, that they can also write their own utilities and control them using the interprocess communications facility (IPC).

My approach is to implement the system calls ?GPORT, ?IREC, ?CREATE, ?SEND, and ?RETURN in assembler language. Each call then becomes a subprogram that can be called by AOS/VS COBOL. It can be controlled from the CLI by any user who has the privilege ?PVIP.

I'm willing to share the programs with anybody who's interested enough to send me a small reel of tape in a self-addressed box or "jiffy bag" with postage affixed. I'm including a portion of a program listing I named IPC.DEMO so you can get a better idea of how it works (see below). It's a meaningless example, but it demonstrates a real situation. With the machine-readable programs, you would have to define a syntax that makes sense for your application, edit the incoming messages, and process the commands.

The program first creates an IPC file, then it reports its presence to the OP:CLI. Once those amenities are out of the way, it drops into a loop looking for command data with the ?IREC call. Upon receiving input, the program processes the message and acknowledges the receipt of the message. This is done by first translating the global port returned from the IREC routine into a process identifier (PID). The PID is used as input to the ?SEND routine. The message is echoed as received, and a success or failure message is sent.

Jesse Edward Anderson
Technical Services Manager
Atlantic Soft Drink Company
P.O. Box 261, Columbia, SC 29202

Breaking into macros, part 22

The issue of system security from the CLI has been much discussed in your magazine over the past few months. After reading the December issue, we were compelled to break the security of the macro submitted in your Letters column. After reading the January issue, we were compelled to write to tell you how we did it.

Before we start, it should be recalled that the thrust of Siegman's original article was to keep *malicious* users out of the CLI, not inexperienced clerks.

The first letter in your January issue states that creating a dummy CLI.PR file before doing the !READ will keep the user out. The experienced DG user knows that CLI.PR resides in a commonly used directory, usually : . The way out of the first macro is therefore:

;X :CLI.PR<NEW-LINE>

Many of our products *require* that CLI.PR, or a link to it, reside in : , so this macro becomes easy to break out of.

The third letter suggests putting the !READ in parentheses within an !EQUAL pseudo macro, such as:

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

We broke this one as well. Bear in mind that breaking this would take a dedicated, malicious hacker, but anyone who is very familiar with CLI macros could probably do it within a day. It took us 20 minutes. Here is how it's done:

),][!END]X CLI;

The first parenthesis will close the opening one on the !READ, the comma provides the required number of arguments for the !EQUAL, the first bracket closes the opening one on the !EQUAL, and the !END will terminate it. The semicolon at the end tells the CLI to stop evaluating and execute the command.

We wholeheartedly agree with Tom Gutnick's article in the December issue (page 18). The CLI was designed for convenience and ease of use, not security.

Dave Cochran, Project Leader
Steve Crumley, Senior Software Engineer
Data General Corporation
Research Triangle Park, NC

```
PROGRAM-ID. IPCDEMO
AUTHOR. JAY ANDERSON.
*************************************************************
* PURPOSE: THIS PROGRAM FRAGMENT DEMONSTRATES HOW
* THE IPC FACILITY CAN CONTROL A CCBOL PROGRAM.
*************************************************************
. . . .
PROCEDURE DIVISION.
0010-CONTROL.
*** CREATE AN IPC PORT
*
    CALL 'ICRE' USING IPCFILE ERRWRD.
    IF ERRWRD NOT = ZERO THEN
        CALL 'IRTN' USING ERRWRD.
*** TELL PID 2 THAT I'M RUNNING
*
. . . .
    MOVE 2 TO PID.
    CALL 'SNDD' USING PID ACKNOWLEDGE.
*** DO THE PROGRAM LOGIC UNTIL HE SAYS TO QUIT.
*
    PERFORM 0020-DO PROGRAM THRU 0020-EXIT UNTIL
FINISHED.
    STOP RUN.
0010-EXIT. EXIT.

0020-DO-PROGRAM.
*** RECEIVE FROM ANYONE
    MOVE ZERO TO PORT.
. . . .
    CALL 'IREC' USING PORT IMESS ERRWRD.
    IF ERRWRD NOT = ZERO THEN
        CALL 'IRTN' USING ERRWRD.
. . . .
    PERFORM 0030-PROCESS-COMMANDS.
. . . .
*** TRANSLATE PORT INTO PID OF CALLER
*
    CALL 'GPRT' USING PORT PID.
*** ACKNOWLEDGE HIS MESSAGE
*
    CALL 'SNDD' USING PID ECHO.
    CALL 'SNDD' USING PID ACKNOWLEDGE.
0020-EXIT. EXIT

0030-PROCESS-COMMAND.
. . . .
```

LETTERS

Winner of Dr. Pepper award, finally

Editor's Note: We forwarded the following letter to Jim Siegman, who hated to admit it, but found he couldn't break out to the CLI. Mr. Ward will thus be the honored recipient of the promised can of Dr. Pepper. Jim added that the can may be empty, but will be awarded nonetheless.

Dear Mr. Siegman:

In response to your article "[!Read] and System (in)Security" (*Focus*, October 1985) and my colleague M. Brent Fuller's response (*Focus*, December 1985), I would like to suggest a solution to your stated problem of ;X CLI in response to a [!READ].

First, while Mr. Fuller may not have been able to invoke a CLI by the methods described in your article, I was able (with little effort) to invoke a CLI using the macro printed in Mr. Fuller's response. The method I used is an equally insecure response to the [!READ]. There are three ways to override the current PROMPT:

(1));X CLI;(

(2));CHAIN CLI; (

(3) ;PROMPT DIR; (In your original macro.)

But on to my solution, which I feel is applicable for either version of the macro.

The only secure way I have found to prevent any attempts to break into a CLI is to change all lines in macros that read

STRING [! READ question-prompting]

in all macros that will be doing [!READ] type of questioning with:

PROC/STRING/BLOCK/DEF/IOC/L=@NULL :CLI ASKIT question-prompting

Notice the ASKIT after :CLI in the PROC line. This macro basically does nothing more than BYE [!READ %-%]. ASKIT.CLI looks like this:

```
Comment ASKIT.CLI—Secure !READ macro
PROMPT BYE
CLASS1 ERROR;
comment protect the users from themselves
BYE/L=@NULL [!READ, %-%];
comment This is the "secure" !READ
BYE/L=@NULL;
comment This is just for protection . . . .
```

What happens is that the response to the [!READ] (in ASKIT.CLI) is returned in [!STRING] to the process issuing the PROC line (in this case, CHECK_NEWS.CLI). The /L=@NULL on the BYE commands suppresses the CLI TERMINATING message from echoing to the CRT. Similarly, the /L=@NULL on the PROC line suppresses the extra new line that would be produced by the execution of the PROC command (keeps the line spacing the same as before).

If I may address Mr. Fuller's final comments as well, I would like to include my changes to CHECK_NEWS.CLI so that the NEW NEWS message will reflect changes to NEWS.TEXT. I use the result of the FILESTATUS command (specifically, Date & Time last modified) rather than just the pathname of the file. My version currently reads:

```
Comment CHECK_NEWS.CLI . . .
[!equal, [!logon], console]
   push; prompt pop; comment prompt pop in case it aborts!
      [!nequal, [!path news.text],]
         DIR[!EDIR [!PATH NEWS.TEXT]]
         [!nequal,[!size NEWS.TEXT],0]
            [!EQUAL, [!FILE [!DIR/I]:LAST_NEWS_CHECK],]
               WRITE/L=[!DIR/I]:LAST_NEWS_CHECK NONE
            [!end]
            STRING [[!DIR/I]:LAST_NEWS_CHECK]
            PUSH; PROMPT POP
               DELETE/2=IGNORE =LAST_NEWS_CHECK
               FILESTATUS/Q/NH/TLM/CPL=65535/L=[!DIR/I]:
                  LAST_NEWS_CHECK & NEWS.TEXT
               STRING [[!DIR/I]:LAST_NEWS_CHECK]
               [!NEQUAL,([!STRING]),([!STRING/P])]
                  write
                  write *** THERE IS NEW NEWS IN THE
                    BULLETIN ***
                  write
               [!end]
            POP
            PROC/STRING/DEFAULT/BLOCK/IOC/L=@NULL :CLI
               ASKIT & Do you want to scan the news bulletin?,,
            [!equal,([!string]),(Y)]
               CHAR/PM; comment Note the /ON is not
                  needed. . . .
               type news.text
               char/off/pm
               PROC/STRING/DEFAULT/BLOCK/IOC/L=@NULL
                  :CLI ASKIT & Press NEW-LINE to continue . . . .
            [!end]
         [!end]    ;comment end of !size = zero check
      [!end]          ;comment end of !string check
   pop
[!end]             ;comment end of !logon check
```

There are, as should be expected, a few drawbacks to this solution:

(1) Increased system overhead of PROCing an additional CLI;

(2) The prompting of the [!READ] in ASKIT.CLI will be in uppercase only.

All in all, a small price to pay for security! I would be most interested if anyone can find a way to break this one.

Mark D. Ward
Sr. Systems Engineer
Data General Corporation
Manhattan Beach, CA 90266

Here's Siegman's reply:

Congratulations. Your technique does look very unbreakable and quite secure. I spent almost an hour at it before I gave up. Someone may eventually find a way to get past the [!READ], but it held up against an experienced user for quite a while and that's good enough for me. I do wonder if Tom Gutnick can get through it.

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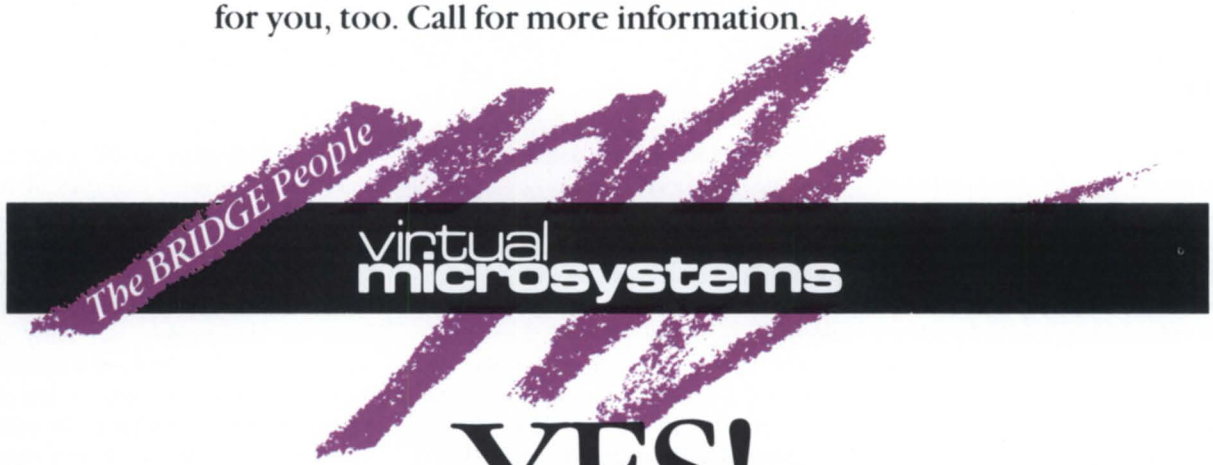

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The system is unique because it allows the four agencies to communicate with each other using shared data bases, while still allowing each agency maximum autonomy

Catching crooks

Iowa county and DG systems team up for crime prevention and investigation

by Jeanne Sangster
Focus Staff

This story might provide a script worthy of television greats such as "The Untouchables," "Dragnet," or "Hill Street Blues." Well, maybe it's not quite ready for "Miami Vice," but a computer system in Black Hawk County, Iowa, has already increased the efficiency of law enforcement agencies by a factor of five, and in 1985 Black Hawk's Criminal Justice Information System (CJIS) was awarded the County Achievement Award by the National Association of Counties.

The Black Hawk CJIS is an integrated, distributed, multiagency computer information network linking the Black Hawk County sheriff's department and three police departments. Together, these agencies serve a population of 145,000, according to Nancy Smith, administrative coordinator of CJIS.

According to Smith, the system is unique because it allows the four agencies to communicate with each other using shared data bases, while still allowing each agency maximum autonomy. The network establishes direct local control, provides rapid access to self-generated information, and distributes the automated workload.

Black Hawk County implemented the system to provide the community with the best possible law enforcement services while saving tax dollars. So far this goal is being achieved.

The system is configured using Data General CS/200 computers. Communication and networking are provided through Programmable Interface Connectors (PICs), which front-end each computer. This communication ability allows shared information and files to be accessed by all agencies. It also provides each agency access to the state system, the federal network, and the FBI.

Packages that optimize current DG technology are replacing original software applications. CJIS has contracted Applied Micro Technology of Reston, Virginia, to design and implement a new generation of law enforcement software to run on DG equipment.

Lt. John Myers serves as head of the special services division, sheriff's department. He and Smith provided examples of how the arrest/booking system has proven its distinct efficiency.

According to Myers, "There were three suspects for an armed robbery of a residence, and our investigators had fairly detailed descriptions of the three, so we pumped that information into the computer and came up with a number of candidates for each of the suspects. . . . The investigators cleared the case—they made three arrests."

The staff has used the computer to target special problem areas of the county—they can saturate their enforcement by putting officers in at specific times, with unmarked units, undercover people, etc., exactly where problems are happening. They can target a particular area at a particular time of day by using parts of all the arrest reports received—offense data, and the times crimes occurred and were reported.

Smith described how the police and sheriff's departments handle cases: after sus-

The computer's ability to correlate massive amounts of data makes it an effective tool in spotting complex patterns

pect information is entered on the computer, it's run against other cases' suspect information, then against known arrests. "There *always* is a pattern involved—there's no question of that," Smith said. The computer's ability to correlate massive amounts of data makes it an effective tool in spotting such patterns.

Myers noted that the computer has been used in link analysis, a process used in large ongoing investigations where there is an enormous amount of data. One example: suspects were making numerous telephone calls and Myers' staff tracked who made the calls, the date and time, plus who received the calls, the date and time. The computer then did the correlation and determined the pattern to the calls.

"As it turned out, these guys were calling prior to committing a crime—when it was going to be a crime in one area, they'd call one person, and when it was a crime in another area they'd call another person," Myers said.

Nancy Smith described an important area where the computer is helpful: "Juveniles are a real pain, whether they're your own or someone else's. A couple of juveniles had been picked up for vandalism in a certain area of the county, and while they were being questioned, John (Myers) ran all of the vandalism cases over the last year, and looked particularly at cases from that part of the county. Before the investigators were done, they had cleared an enormous amount of cases, just because they were able to come to these kids saying, 'Hey, what about this one and this one and this one?' and all of a sudden the kids think, 'What *else* do they know?'. There's been a lot of cleared cases that way. If you get an arrest for one type of crime, you'll run that type through the data base to see how many similar uncleared cases you have, determine if there's any correlation, and then maybe you can start questioning suspects about other things."

It's difficult to accurately measure the impact the system has had on solving crime, Myers said—"We've gradually brought it in, rather than dramatically dumping the whole thing on everybody at one time. There was some opposition to begin with, and we've just very neatly snuck it in on people. It has increased our efficiency probably five-fold. We're tracking information much better than we ever did manually, and we have more information available to our people faster. We have also *not* had to increase our clerical staff even though we've had as much as a 150 percent increase in crime and in some of our workloads."

Why was Data General equipment chosen? According to Smith, the decision went back to the original implementation in 1981, when they were on a grant and chose a turnkey system because there were very few law enforcement packages available. The one they started with ran on HP, DG, and Durango. The DG was the middle-of-the-line choice. They've been "very pleased." They're getting rid of the original package because it was very basic, and they're becoming more sophisticated.

Three-pronged approach

The system is made up of three parts, but so far only the first is in use—**the arrest/booking system**, implemented in July 1984, which has components for arrest records management, booking management, and jail management.

The system in use organizes and manages arrest records. According to Smith, it includes personal data about the arrestee and details of the arrest and charge. It captures Uniform Crime Reporting statistics for arrest information, and generates a report in the FBI format. It generates all required arrest reports, including arrest history information, a daily administrative arrest log, an arrest log for the press, and other statistical reports for management. Prosecution data may be added to provide conviction rate statistics, and arrest records may be searched by physical descriptors to help identify suspects. Establishing a single data base facilitates the arrest and booking of prisoners. The system results in better organization, elimination of duplication between agencies, paperwork reduction, and a general streamlining of operations.

All criminals' physical descriptions are entered in detail. According to Smith, "You name it, we put it in, including classifications of fingerprints. Our physical descriptor pretty well captures the appearance of a person—height, weight, hair, eyes, face shape, distinguishing characteristics like scars, marks, tatoos." These details can be sorted against a description supplied by a victim or witness to produce suspect lists for line-ups and mugshot identification.

The booking management system, designed to capture and manage booking information, provides a way to record all information required during the booking of an arrestee—the collection of property, medical matters, calls, detainers, bonds, and fingerprints. The system generates all booking reports, plus booking rosters and statistics.

The start of every file is fingerprints. Law enforcement agencies currently use two basic fingerprint classification systems—NCIC (National Crime Information Center, supported by the FBI), and Henry. It is possible, for example, to take a partial handprint and perform an analysis against other classifications in the data base, according to Smith. She admits they haven't seen dramatic results yet, but believes the potential is increasing.

The NCIC system is a 20-character classification. It is needed to transfer fingerprint information. The Henry classification was developed in England around the turn of the century and is a mathematical method of filing prints. It breaks the fingerprint down by counting points (the swirls, ridges, and other characteristics), and then converting these points into an alphanumeric classification. Both systems use visual comparisons.

Black Hawk County is considering the purchase of a more comprehensive package, an automated fingerprint identification system that uses a laser scan. The system stores and automatically classifies the complete inputting of fingerprints, but if purchased will have to be on a state level. It's too expensive for their current local budget—$3 million for the state of Iowa.

The jail management system organizes and manages areas such as the tracking of inmate accounts, their schedule of events, and disciplinary action. It provides all required jail reports, including jail docket and statistical reports.

In addition to records management, the second software package is the **distributed computer-aided dispatching system.** Its design is already in place, and Black Hawk hopes to have it running by this summer. It will be a microcomputer front end to the Data General network, making it independent of the

network's routine down times. The micro will be located in the dispatch center and will dump files directly to the DG system. DG equipment wasn't selected to serve in the micro capacity—the DG/One was too small for CJIS' needs, and the Desktop too expensive.

This dispatch system will provide an orderly means of recording calls for service, managing personnel assignments, timing calls, and automatically looking up grids and beat assignments. It will automate the radio log and provide pertinent statistics.

The **offense system** will complete the system. CJIS staff is currently in training for this software, which captures all of the information related to an offense—the officer's report, property, vehicle, suspect information, modus operandi information, and investigative management information. The system will generate statistical data for crime analysis and tracking, and will derive much of its data input from the distributed computer-aided dispatching system. It is designed to minimize officer down time for report writing.

These three sections, combined with the word processing already in use (WordPerfect from SSI), will give the system capability to fulfill the needs for information system service in the law enforcement agencies, as identified in ongoing system capability evaluation.

The success of the system has spread beyond Black Hawk County—CJIS has been a leader in the frontier of law enforcement computerization throughout Iowa and the United States. CJIS was instrumental in the organization of the Law Enforcement Data General Users Group (LEDGUG), and continues to support the group's efforts (see RIG/SIG Roundup in this issue for details on LEDGUG's meeting and training seminar this April in Dallas). Myers serves as president of LEDGUG.

Smith reported no problems with the system so far. Applied Micro Technology of Reston, Virginia, is writing the software, and has served as CJIS' consultant for 5 years. Smith believes Tom Marshall of Applied Micro Technology has extensive knowledge of the system and is "doing incredible things with the strength of the DG."

Smith noted that for every police department in the county, crime peaked in a drastic increase around 1983, and since that time has slowly decreased. She admitted that many factors can be taken into consideration in regard to that statistic, but said, "The computer has been enough of an aid to the agencies that I want to give it a little bit of credit. Lots of things are involved, but there has been a gradual decline, and I think this is partly because of greater efficiency, and this is where the computer does help." Δ

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Getting the Customer Support Center together with a frustrated user

by Geri M. Farman
Focus Staff

"Troubleshooter" is a column for people who have problems that are more practical than technical—the problem itself may be simple, but it's often hard to find the person who can help solve it. The column's agenda is set by users who call or write for assistance in locating help for their problems.

Last month Ed Lindberg, AOS/VS Special Interest Group treasurer, wrote a letter in which he cited a number of problems he has experienced with Data General's Customer Support Center (CSC). We contacted Ed to get more information.

Q. Ed's questions about the Customer Support Center (CSC) fall into the following areas:

• **Why do customers have to play telephone tag?** In Ed's experience, the lines to CSC are consistently busy, or he's put on hold, or he must wait for a call-back. Frustration builds and he finally gives up.

• **How can the software support system be held accountable to the customer and not just the system?** In other words, how can customers be sure their problems are actually being worked on? In one month, half of Ed's calls were written up as Software Trouble Reports (STRs) and forwarded to the Software Development Center. When that happens, he feels he loses touch with the problem-solving system. He can call to find out which future rev may hold a solution, but that doesn't help him today. He'd like to give software developers direct input concerning needed changes, and he wants to know what they plan to change and how (and when) they plan to do it. Similarly, a recent status report from DG indicated that half of Ed's reports were "Resolved and closed." He doesn't feel some of those problems were resolved, and wasn't aware they were considered closed.

• **Why do customers always have to start at the bottom and work their way up to the people who can really help them?** Ed is very experienced with DG systems, and his work site (Western New England College) is frequently used as a beta test site for various software products. Even so, when he calls CSC his problems receive the same approach as the newest kid on the block's. As a result, he almost always winds up re-explaining the problems to more experienced DG professionals. Is there some way to avoid this elementary level and the consequent telephone tag that occurs with each layer in the system?

A. To get to the top with Ed's concerns, I called the Customer Support Center (1-800-DG-HELPS). To their credit, the phone was answered immediately, and I was put straight through to Jim Foxworthy, director of customer support. This initial contact was supplemented by a call from Cliff Izer, manager of customer support. Their combined answers to Ed's questions are summarized here. In addition, they have set up a personal meeting with Ed to discuss his concerns in more detail.

Telephone tag. Previously, 90 percent of the software calls were handled as call-backs. As a result, telephone tag was a significant problem. At present that number is 40 percent, and DG wants to continue to drive it down.

As far as busy signals or "holds," the CSC staff is doing a number of things to prevent these problems. The new toll-free number was inaugurated during the past few months, and there were a number of telephone problems related to that transition. Most of those problems should be resolved by now. To handle peak calling periods, the CSC uses an on-line monitoring system that generates call reports every 30 minutes. This allows management to reallocate resources to handle the phones and reduce "holds" or call-backs.

Accountability. If a problem has been escalated to the Software Development Center, the CSC can call to discover its status and report on that status to the customer. STRs aren't considered closed cases. Customers don't have a direct link to the Software Development Center at this time. When a problem warrants it, however, the CSC staff will talk to the customer in person and transmit their concerns to the development staff. This is what the CSC staff plans to do for Ed—meet with him as a group of software experts, and determine a course of action.

A file is not supposed to be closed without customer approval. Sometimes there is disagreement over whether a problem can be solved directly or whether its solution is, in fact, a software enhancement. However, when there is disagreement, the customer has final authority over whether the case is closed. Cliff said it's possible that staff members may not be asking formally for a closure. They may be closing files when they feel they have

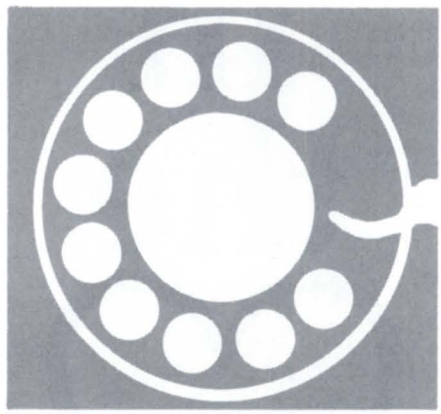
Sometimes there's a disagreement over if a problem can be solved directly or if its solution is a software enhancement

provided a solution. In the future they'll be encouraged to ask customers directly for approval to close a file.

Sophisticated Users. A number of sophisticated users have expressed the same frustration Ed has felt with working their way up through the system. As a result, the CSC is beta testing a new "Direct Access" system at four customer sites. The results should be in within 90 days. The basic idea is that premium priced service would allow customers to have more immediate access to higher technical staff. This program should reduce the time it takes to solve customer problems.

Cliff says he's the first to admit the Customer Support Center is not perfect, but he also feels they are working hard to solve customer problems—and frustrations. We'll check with Ed after his meeting with the DG staff to see what additional progress toward perfection is made! Δ

Send comments, questions, and pleas for help to The Troubleshooter, Focus Magazine, 5332 Thunder Creek Road #105, Austin, TX 78759; 512/345-5316.



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Austin facility houses peripherals lab and manufacturing plant under one roof

by Jeanne Sangster
Focus Staff

DG's Austin plant is on a hill outside the southeast corner of the city. The view takes in the Colorado River, the State Capitol, downtown Austin, and the University of Texas.

A friend of mine moved to Austin, Texas' capital, last fall to enroll in a doctoral program at the state university. Since even Ph.D. students crave physical as well as intellectual nourishment, I proposed that we journey south of the Colorado River to a night spot known for its flavorful fajitas. My friend took off her horn-rimmed glasses to stare at me with astonishment—"*What* river?"

Unlike my friend, who took 4 months to venture beyond the UT campus, most Austin students *do* explore the town's nonacademic highlights. In fact, after enjoying Austin's extracurricular options (including canoeing, hiking, swimming, camping, and the excellent local music scene), many choose to stay in Austin after graduation. The competition for professional positions is fierce despite the presence of IBM, Texas Instruments, 3M, Rolm, Tandem, and other major high-tech employers. Those lucky enough to be hired by DG Austin could find themselves involved in anything from an R&D team that designs peripherals and graphics software, to industrial design, technical writing, and even administration.

I recently toured DG Austin, an expansive white structure, five stories high, on a rolling hill just outside southeast Austin. It's a unique facility because the manufacture of printers, terminals, and power supplies coexists and works hand and hand with R&D (the Peripherals Development Laboratory). The Austin facility, built in 1978, employs nearly 400 (114 in R&D; approximately 250 in manufacturing). My impression was that the "no frills" philosophy of DG's early years hadn't had excessive influence. The building's interior takes into account employees' need for a pleasant work space—large picture windows affording views of the hill country, grey and maroon or grey and blue work areas, and walls lined with colorful artwork. I noticed a relaxed but active work pace, and a *genuine* friendliness.

In a conference room titled the "Jalapeno Room" (carpeted the color of green chili pep-

pers), I spent a morning talking with Todd Woodcock, director of the Austin laboratory, Don Wilde, plant manager, Phil Worrick, human resources manager, Brian Duff, section manager of personnel, and Ed Russell, senior representative from corporate public relations in Westboro.

There are almost 30 DG facilities worldwide. Remembering the barely tolerable heat that smothers most of Texas every summer, I wondered why Austin was chosen as a site.

DG chose Austin as a location because of its excellent economy, quality of life, education resources, state business climate, and the strong computer science and engineering programs at UT Austin and Texas A&M (UT's arch rival, located two hours away). According to Russell, "In today's very competitive climate, you have to look at these factors in order to get good quality people. We young professionals look at where we want to live. There will be a lot more coverage of DG Austin in the upcoming months and years."

The Peripherals Development Lab

Todd Woodcock, a Vietnam veteran who came to DG as director of R&D 4 years ago, summarized the Austin lab: "The majority of the work has to do with terminals, printers, and graphics software. We find that the products are coming to be almost commodities nowadays. It's very important to run the business tightly, looking at the bottom line. Every nickel is worth a lot to us because of the volumes we sell, and yet we have to maintain high reliability. For example, our reliability on terminals is twice that of our initial design specifications ."

Past hardware products of the lab include the D400, 410, 450, 460, 555, G500, G33, amber terminals for the Dasher, the 6215 printer, all of DG's daisywheels, the new laser printers, and the Dasher/One. Software products include the following graphics packages: GKS, Trendview, CEO Drawing Board, and CEO Wordview.

Woodcock felt the Dasher/One has been very important to DG Austin: "It's their first workstation product and sets a new direction for the laboratory. Although it took less than a year to make, we wanted to do it more quickly, but we ran into some design problems. Difficulties included the extreme schedule and the need to be completely compatible with the DG/One portable unit from Japan. The original build took place in Hong Kong, so there was an awful lot of back and forth; we spent lots of time in the air between those locations. It was a very satisfying product, but very difficult."

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"Many of our successes can be ascribed to the fact that engineering, field engineering, marketing, and manufacturing are working together."

Despite this difficulty, Woodcock had no doubt which project was the most exciting he's had at DG: "Shark, our name for the Dasher/One, because it was the quickest. It was sort of a jugular vein project."

The process used to choose, staff, and fund a project is long, according to Woodcock. It involves working with the marketing and manufacturing groups to determine a strategy that will go on for several years. "Every year we review that strategy and determine what the marketing and business divisions' priority items are, and adjust our priorities to match. Then the actual assignment of budget is done in Westboro by the Executive Council, and we determine how much money we have and tick off the projects from the top. The ones that are below the line we hold on to and say, 'Well, if we get some extra funding, we'll do those.'"

According to Woodcock, customers also provide input concerning decisions: "We're very much a marketing driven company—we try to get out to the customers. Here in Austin, several times we've sent engineering personnel out to talk and visit with our customers to find out one-on-one what they want to see. The D555 (DG's recently announced integrated voice and data terminal) and CEO Drawing Board are examples of products that came out of customer visits."

In terms of recruitment, Woodcock believes the Austin Lab has done very well with UT and A&M. "We've found their students really want to stay in Texas, so we give them that ability," he explained. "We have to compete on a national basis for engineering talent, so we've gone to Wisconsin, Purdue, Penn State, the University of Illinois, the DeVry Institute, and have done quite well. We tend to be a younger laboratory than the R&D organizations in Westboro in the way we've done our staffing.

"Although we originally had some people transfer in, since that time our growth has been largely through internal promotions and university hiring. That's good for everybody—it makes sure that you stay on top of the technology curve and that the people who have worked for you for a number of years are able to benefit when it comes time to promote someone."

Employee training is done in concert with Westboro, Woodcock stated. However, DG Austin's location means less access to some of the Westboro training, especially sessions that are a few hours daily over a period of time. One of the reasons the lab is in Austin is its proximity to UT. The technical staff is encouraged to continue their education there, and DG Austin provides a tuition reimbursement. Courses are brought from Westboro for organizational and management development. DG Austin also sends people to Woodstock,

(continued on page 51)

A view from the inside

Touring DG Austin's manufacturing plant

Until recently, my only experience with manufacturing plants was secondhand—through movies like *Norma Rae* , which depict factories as gloomy, cramped places with very loud and very constant noise. Dinginess, unhappy tired workers, not a place you'd want to spend time in. Last December I had a chance to spend time in DG Austin's plant, however, and my predictions turned out dead wrong—I discovered a high-ceilinged, clean, cheerful room with a sense of virtually unlimited space, of light, and of quiet efficiency. I was aware that work was being accomplished, but at a less-than-frantic pace.

Ralph Smith, production manager at DG since 1984, was my tour guide. After I'd donned the required safety glasses, which looked more like designer eyeglasses than goggles, Smith gave his introduction to the plant—"Our basic purpose in life here on the manufacturing floor is to build printers, magnetic tapes, and power supplies for DG products. We've got a mission that's getting stronger and stronger—to build displays for the corporation. Right now we've got 100 people on the floor who are directly related to the building of products. Our mission has been growing as the plant has matured over the last 5 years, from the standpoint of getting new products in here and aggressively keeping up with what the company's doing in maintaining the state-of-the-art technology. I've really seen improvements. The only way you can stay state-of-the-art in your end product is to have state-of-the-art processing."

After taking me past several boards that were being assembled, Smith showed me a large chart labeled "SPC" and explained, "We're learning how to do SPC (statistical process control) better. The key thing is getting the people to understand first of all that mathematics is not frightening. That's a big hurdle, and then after we get past it, the next step is going in and applying it. We've seen a tremendous improvement as a result of actually living by SPC. Every person on the floor has been trained in SPC. Our goal is for employees to understand their problems and have the ability to solve problems by themselves if at all possible."

Smith was proud to point out that the plant's employee turnover is "almost insignificant—probably less than 3 percent a year. I was at TI before I came here, and the turnover was much higher. One of the main factors involved is the benefits here. I see

(continued on page 53)

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Close Encounters revisited

An alternative approach to sorted files under Business BASIC, Part 2

by John Ferry
Special to Focus

Last month I talked about using temporary index files in place of permanent indexes or sort routines (February *Focus*, page 16). I reviewed the pros and cons of the various techniques in terms of (1) system resources required, (2) impact on users (or their impact on *you* if you slow the system down too much), and (3) the additional programming and disk storage involved in the maintenance of additional permanent indexes.

This month I'll show you the nuts and bolts of putting this concept to work, and I'll include other tidbits I forgot last month. If some of the coding and explanations seem a bit trivial, feel free to skip over them. I've included all the gory details so as not to exclude the less experienced user. I've kept the coding to a minimum, since the *concept* here is really of more interest than the implementation.

To review, a program using the temporary index file operates in two passes: the first creates the temporary index and the second uses this index to read the data file. Let's flowchart both passes to define what tasks we have to accomplish in each.

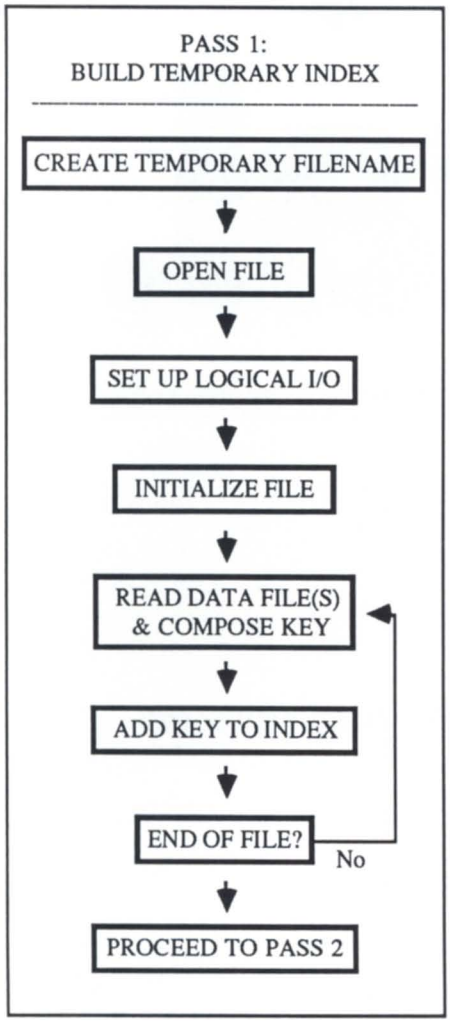

Figure 1

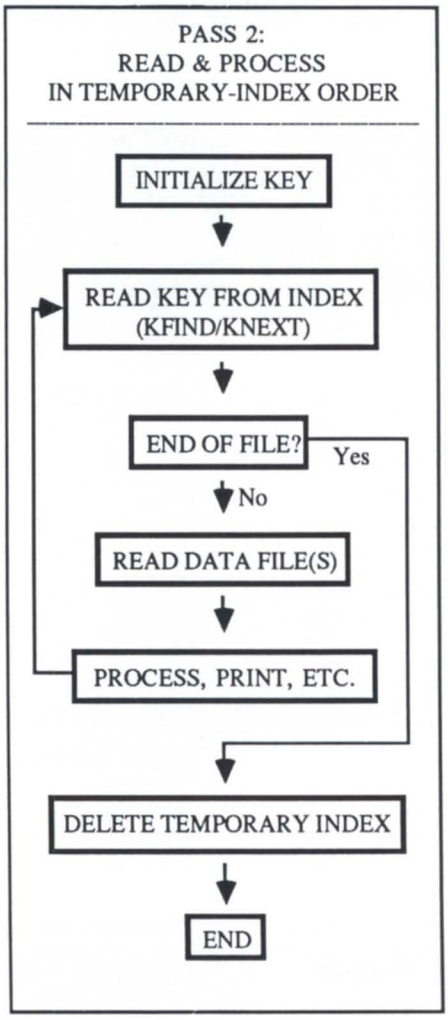

Figure 2

Before actually creating the temporary file, let's establish a unique name for it. By using a consistent method of composing unique file names, we avoid unpleasant surprises later. I use a file name composed dynamically at runtime from three different pieces of information, as opposed to just picking a name and coding it into the program. This avoids several potential problems, as you will see.

The main or root file name is the same name as the program, up to eight characters and with no extensions (Excuse me—my RDOS is showing. You AOS(/VS) users can make it any length you want!). Add to that your BBASIC job number from the trusty SYS(9) function. Finally, add the extension ".TM" to the end. This is a case where a picture is worth a thousand words:

```
.
.
0010 DIM TFILE$[13],PGM$[10]
.    (Strings to hold program name and
temporary file name)
.
0100 STMA 9,2,PGM$    :GET PROGRAM
  NAME AT RUNTIME
0110 LET TFILE$=PGM$,SYS(9),".TM"
  :BUILD TEMPORARY FILE NAME
.
.
```

A lot of work just to compose a file name? Yes. Worth the effort? You bet, for a variety of reasons. First, by making the root file name the same as the program name, you identify that file as being associated with your program. This is convenient if someone is running the program and you happen to be doing a !LIST or running SCHANS. When you see this temporary file, you don't have to wonder what file XYZTMPNDX is supposed to be. Also, you won't have to worry about another program opening the same temporary file.

Second, the SYS(9) identifies this file as belonging to your job. Since job numbers are unique within BBASIC, you avoid the problem that may occur if two or more users running the same program try to open the same file.

Third, the .TM identifies the file as temporary. This is convenient if your system crashes or your program aborts without first deleting the temporary file (more on this later). In this case, a simple !DELETE/V-

By using a temporary index, your permanent indexes remain intact, and your system maintains an acceptable response time

.TM in the BBASIC CLI will remove all such garbage files from your directory.

Need I say more? OK, fourth (there's always one in every crowd), by using STMA 9,2 instead of hardcoding the program name, you don't have to worry about changing your code if you choose to rename your program.

I use this scheme to compose names for any temporary file I have to create, whether it's for an index or some other application. By using this or some other well-defined and consistent method of creating file names, you won't have to worry somewhere down the road about being bitten by unexpected FILE ALREADY OPEN errors or garbage output resulting from several jobs loading data into the same temporary file.

BBASIC will automatically create your file when using mode 0, as long as the file doesn't already exist. Using mode 0 also allows you to open your file for exclusive use—an additional safeguard against multiple users trying to use the same file.

One precaution here. Note that we've carefully made sure we delete temporary files after we use them or in case our program aborts abnormally. However, just in case, we'll try deleting the temporary file before we open it. If it doesn't exist, there's no harm done.

```
.
.
0200 LET ERROR=0 \ TCHAN=15
   :SET ERROR RETURN, TEMP CHAN #
0210 DELETE ERROR, TFILE$
   :DELETE OLD FILE, IGNORE ERROR
0220 OPEN FILE[TCHAN,0],TFILE$
   :OPEN NEW TEMPORARY FILE
.
.
```

The selection of channel 15 for the temporary file is purely arbitrary—you may choose any free physical channel available in your program. I prefer to open my regular data files starting on channel 0 and go up, and open temporary and print files on channel 15 and go down.

Link the physical and logical channels. The file has been created and physically opened. However, the BBASIC logical file I/O routines don't know that yet! Remember, we opened the physical file, not the logical file. To allow the logical version of the K statements to work, we have to describe the file in LFTABL$. The mechanics of this are simple—add the following line immediately after the OPEN FILE statement above:

```
0230 LOPEN FILE[27,TCHAN],TFILE$,"I",
512,5000
```

This little statement has an important function—to place file parameter data for an already opened physical file into the logical file descriptor string LFTABL$. The 27 is an arbitrarily selected logical file channel similar to the 15 used for the physical channel in TCHAN. TFILE$ is the file name. "I" identifies this file as an index file. 512 is the record size (indexes are always 512), and 5000 refers to the number of records in the file.

Don't be concerned that the 5000 will cause giant chunks of disk to be eaten up by this temporary file. It's only used for file initialization to define a maximum file size—the file isn't actually created that large. If you find 5,000 isn't large enough (God forbid), you can make it larger.

Before we can use the file we've just created, we must initialize it. This involves setting up key sizes, duplicate flags, and all sorts of stuff the K routines need in order to work. BBASIC thoughtfully provides this ability through a little subroutine called LINITINDEX.SL ("*That's* what that routine is for!"). Enter this routine into your program—it starts at line 7700. It requires the mysterious T9$ string, so dimension T9$ in your program to 512 bytes. For those who object to tying up 512 bytes of memory to be used only once, use a previously defined but currently unused string at least 512 bytes long and change every T9$ in the subroutine to this string name.

LINITINDEX.SL requires you to pass it several parameters, including the logical file number (F%) (which is already defined), the key length (X), the duplicate-key flag (Y), and the blocking factor (Z). You should have already determined the logical file number from the previous section, and the key length is simply the total length of all the fields you're going to use as a key. If you're going to allow duplicate keys, set Y=1, otherwise Y=0. Set Z=50, since the "K" statements pretty much assume a 50 percent blocking factor anyway. Execute the subroutine and you're ready to go! Again, the code is simple:

```
.
.
0300 LET F%=27\X=12\Y=0\Z=50
   :SET UP PARAMETERS
0310 GOSUB 7700
   :EXECUTE SUBROUTINE
.       (Don't forget about T9$!)
.
```

That's all there is to the unusual part. From here on it's pretty much straight BBASIC file I/O. Read through your data file(s) using whatever technique is required, i.e., sequentially or through a regular permanent index, and extract the necessary key information. Build the key and add it to the temporary index using KADDs just as you would a regular index.

The second pass involves reading and processing, which are easy. Reinitialize (null-fill) the key, then read through the temporary index using KFIND/KNEXTs to extract the data record numbers in sorted order. Read the data records and do whatever processing and/or printing is desired.

Now it's Miller time, right? Wrong. Although your report or other processing is finished and your boss is patting you on the back for a job well done, you've still got to clean up your mess. Yes, you may call me "Mom." What mess? How about that temporary file sitting out there just waiting to clutter up your disk? Make sure you close and delete it before you quit.

Don't forget IKEYs and program errors—immediately after you physically open your temporary file, set up both an interrupt (ON IKEY THEN. . .) and error (ON ERR THEN. . .) trap so if you abort the program in process, or the program itself bombs for some reason, this temporary file gets deleted and doesn't become permanent. Otherwise, your disk becomes burdened with orphan files that are no longer needed but still take up space.

Unique solutions and other off-the-wall uses. In addition to a straight substitution of a temporary index scheme for a sort routine, temporary indexes offer (1) flexible alternatives to problems that aren't easily solved within traditional file structure frameworks,

Always remember the words of one DG software instructor—"The limitations are unlimited!"

or (2) significant performance improvements in situations that *can* be handled by traditional methods.

As an example of the first, suppose you have a report that needs to be compiled in an order different from that of the data file or any of its permanent indexes. Since a convenient index doesn't exist, you could sort. However, if you sort, in addition to slowing your system down to a crawl, you corrupt your other permanent indexes. This shuts down your other users, who now form an angry mob outside your door for lack of anything better to do. By using a temporary index, your permanent indexes remain intact, and your system maintains an acceptable response time.

As an example of the second, suppose you only need to extract a small amount of information from the data file(s), such as an account number, total sales YTD, and the date of last sale for this account. You could extract those three fields, put them in the key, and add them to the index the way you did in the first pass. However, on pass 2, use the index keys as data records, bypass reading the actual data file(s), and go directly from KFIND/KNEXT to CALCULATE or PRINT.

As you may note, the performance data is missing. Unfortunately, I didn't get the comparisons finished in time for the deadline. If you're interested, drop me a line and I'll send the results to you. Or better yet, try it on your system. I'm sure you'll find a pretty dramatic difference.

The coding examples I've included are for RDOS BBASIC rev 7.0 or later, and/or AOS BBASIC rev 4.0 or later. This concept works just as well with older revisions, but requires a little different coding. If you're running an older revision and want the coding, drop me a line and I'll send you my original write-up, which was for an older revision.

Since my background is in RDOS BBASIC, I've left out references to features not shared by both AOS and RDOS versions. Any corrections or comments by AOS BBASIC users are welcome.

Always remember the words of one DG software instructor—"The limitations are unlimited!" I'm sure as you experiment with this technique you'll find more and more uses for it. With a little imagination, you too can create bizarre solutions to otherwise normal problems! After all, isn't that one of the purposes of BBASIC? Δ

John Ferry is vice president of Ferry Brothers, Inc., a distributor of nuts and bolts. Contact him at 15300 Industrial Parkway, Cleveland, OH 44135; 216/267-6636.

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Circle 29 on reader service card

Now that DG supports the use of the inner rings from high-level languages, I feel a lot more comfortable using the technique in applications.

Pleasant surprises

A simpler way to use inner rings, and an easy way to spot performance-wasters

by Tim Maness
Contributing Editor

Wouldn't you know it. Within a few days of completing last month's column, I received revision 3.40 of the AOS/VS common language library. It now supports the use of inner rings with a high-level languages—a pleasant enough surprise, except it made all of my examples from last month obsolete. The explanations still apply, so you can just ignore all my examples and substitute the following *much* easier equivalents.

With the new revision of LANG_RT it's no longer necessary to play games in assembly language to get the inner ring initializer (R.INIT) to run in place of the ring 7 initializer (I.INIT). You can insert the new INNER.LB module immediately before LANG_RT on the LINK command line when you link the inner ring routines together. In addition, a new utility called GATEM reads a single source file that defines the correspondence between entry names and gate numbers, then produces OB files to initialize the gate array and define gate entries. This is much easier to understand than the equivalent MASM sources.

The example I used last month can now be rendered in a much simpler manner: GATE_ARRAY.SR and RESOLVE.SR are replaced by GATE_ARRAY.GAT, which contains

```
GATE 0 SUB1 ACCESS 7
GATE 1 SUB2 ACCESS 7
```

The GATEM utility is executed as follows:

```
) X GATEM/RING=6 GATE_ARRAY
```

and produces two files, GATE_ARRAY_GAR.OB and GATE_ARRAY_GTS.OB. The first of these files replaces GATE_ARRAY.OB to initialize the gate array, and the second takes the place of RESOLVE.OB to define the correspondence between the gate numbers and entry names.

The inner ring routines and the ring 7 program can then be linked as follows:

```
) F77LINK/RING=6/O=SUBS GATE_ARRAY_GAR SUB1 SUB2 INNER.LB
) F77LINK TEST RINGLD GATE_ARRAY_GTS
```

This method is much better for using the inner rings. Now that DG has decided to support it this way, I feel a lot more comfortable using it in applications.

Using routines in inner rings does save memory, but it's not without a penalty. I ran a few tests, and found that calling a routine in ring 6 takes about twice as long as calling the same routine in ring 7. (It took 1842 ms to make 100,000 calls to a routine in ring 6, but the same number of calls to the same routine in ring 7 took just 883 ms.)

The same release notice had information on building and using shared libraries. A shared library contains code that can be used by processes executing different programs. In the past this could only be accomplished by using inner ring programs, but for some applications shared libraries are better because they are faster and less complicated. My first attempts to use this new feature met with no success, however, so I can't say glowing things about it. I'll continue to try, and will let you know in a future article how to set up shared libraries (or tell you whether you can!).

This month I thought I'd explain when and how to use HISTO, a useful little program that comes with AOS/VS. In case you didn't know, histogramming a process while it's running will produce a report of where the process is spending its time. If you have a program that seems to be consuming CPU time well beyond its fair share, a histogram can help pinpoint a problem or at least identify the sections of code that would benefit from some rewriting. The only special privilege you need to run HISTO is the ability to become resident.

To produce a histogram of a running process, the first step is to start the process, because HISTO needs to know the PID number. The other parameters for HISTO are the time (in seconds) you want the data collection to last, the starting and ending addresses for the portion of the process you want to histogram, the size of the bucket (partition) you want HISTO to use, and the output file for the raw data.

To determine which starting and ending addresses to use, at least for the first try, use the $K command in the debugger, as in Figure 1. The numbers returned by the debugger are the start and end addresses of the unshared and shared partitions used by the process—in this case ring 3 (the agent) and ring 7 (our program). I usually start by histogramming the shared code in ring 7.

If OURPROGRAM is running as PID 11, the command line for HISTO for our example would be:

```
X HISTO 11 600 16004606000 160057 77777 27 OUR1.HIST
```

The order of the parameters is PID, number of seconds, start address, end address, num-

A histogram can help pinpoint a problem, or identify the sections of code that would benefit from rewriting

ber of words in a bucket, and the name of the output file. The PID and seconds are decimal; the other numbers are octal.

After running HISTO once and identifying an area of interest, HISTO can be run again using a smaller address range and smaller bucket size. There is a limit of 20000 (octal) buckets for each run.

After the specified number of seconds, the output file contains the raw data, which is then formatted by HISTOREPORT to make the histogram chart. HISTOREPORT needs the input file, an output file and the symbol table for the program:

X HISTOREPORT/I=OUR1.HIST/O=OUR1.REPORT/ST=OURPROGRAM.ST

The unit of measurement in the histogram is a tick, which is a real-time clock pulse. The header gives a summary of the total number of ticks, the total inside and outside the address range selected, ticks in other processes, and ticks in the system and the system idle loop. If there are no ticks in the range, you picked a bad range of addresses to analyze.

The histogram itself looks like Figure 2. This particular example illustrates the best case: a single routine (FIXPAGE) is using more than 85 percent of the ticks. FIXPAGE was also a good example of the value of the utility, because there turned out to be a problem in the routine (it was busily removing blanks from a large array where it didn't really need to be). Correcting this problem decreased the number of ticks spent in the routine to 19 percent, and the overall CPU time was cut by 80 percent (from 60 minutes to 12 minutes).

Not all histograms work out this well. Sometimes you discover that the ticks are spread uniformly over many routines, and there isn't a clear candidate to investigate. Other times there is an obvious culprit, but it is difficult to do anything to decrease its CPU usage. However, I've had enough dramatic successes to always use HISTO on anything that is CPU-bound. Δ

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

Figure 1

```
) DEBUG OURPROGRAM
DEBUG AOS/VS User Debugger    Revision 005.000
00000000000 00000000000 00000000000 00000000000 00000000000
_$K
UST Status: 020000
      Task Scheduling is inhibited by the user.
Active Task:            1.(TID=1.)  Pended on ?POKE
1. Active TCBs:   1.(TID=1.)
There are no TCBs on the free chain.
      Memory            SUS         EUS         SSH         ESH
      Ring 3:     06000000000 06000045777 06001066000 06001771777
      Ring 7:     16000000000 16000645777 16004606000 16005777777
_$Z
(Note that $Z terminates the debugger.)
```

Figure 2

Ring	Bucket Address	# Ticks	Cum Ticks	Rel %	Cum %	Symbolic Representation
(7)	16005022466	0	10	0.19	0.19	CLEANUP+3
(7)	16005022515	6	16	0.11	0.31	CLEANUP+32
(7)	16005022573	1	17	0.01	0.33	CLEANUP+110
(7)	16005022622	2	19	0.03	0.37	CLEANUP+137
(7)	16005022651	26	45	0.50	0.87	CLEANUP+166
(7)	16005022700	40	85	0.78	1.65	CLEANUP+215
(7)	16005022727	1	86	0.01	1.67	CLEANUP+244
(7)	16005022756	1	87	0.01	1.69	CLEANUP+273
(7)	16005023005	5	92	0.09	1.79	CLEANUP+322
(7)	16005023034	10	102	0.19	1.99	CLEANUP+351
(7)	16005023063	1	103	0.01	2.01	CLEANUP+400
(7)	16005164266	1	104	0.01	2.02	FIXFN+11
(7)	16005164315	1	105	0.01	2.04	FIXFN+40
(7)	16005166040	16	21	0.31	2.36	FIXPAGE+15
(7)	16005166067	1402	1523	27.36	29.72	FIXPAGE+44
(7)	16005166116	2286	3809	44.61	74.33	FIXPAGE+73
(7)	16005166145	220	4029	4.29	78.62	FIXPAGE+122
(7)	16005166223	402	4431	7.84	86.47	FIXPAGE+200
(7)	16005166252	32	4463	0.62	87.09	FIXPAGE+227
(7)	16005166301	17	4480	0.33	87.43	FIXPAGE+256
(7)	16005166330	19	4499	0.37	87.80	FIXPAGE+305
(7)	16005166406	1	4500	0.01	87.82	FIXPAGE+363
(7)	16005167061	5	4505	0.09	87.91	FIXRI+2
(7)	16005167110	22	4527	0.42	88.34	FIXRI+31

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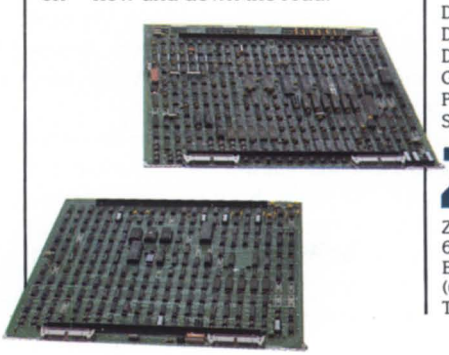

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Specify the lowest baud rate that will keep the printer running at full speed. Even a tabletop laser printer rarely needs more than 2400 baud

Fit to print

Remedies for printer-induced headaches

by Brian Johnson
Contributing Editor

:NEW___NAME

Goodbye :SYSMGR, hello System Manager's Log. The reason will become obvious in a month or two.

:AOS{/VS}

Several people have asked why I use "AOS{/VS}" in my columns. The answer is that I use "AOS" if what I'm talking about refers to AOS alone, "AOS/VS" if it applies to AOS/VS alone, and "AOS{/VS}" if it applies to both.

Unfortunately, a review of previous issues shows that the braces (brackets with a drinking problem) have been either converted to brackets or parentheses, or dropped altogether. In the case of braces, some seem to have imbibed more than others. Perhaps this polite reminder will wake up the editor. *(It did.—ed.)*

:LPSIG

I was swamped with requests for the minutes of the informal printer Special Interest Group that was held over lunch at last summer's NADGUG conference. It's pretty obvious that this is a subject that interests everyone, so I'm going to include the minutes here.

:LPSIG:PARALLEL

The most common error people make when specifying parallel printers is to use LPB for printers that don't have Data Products-compatible DAVFUs (Direct Access Vertical Format Units). If you get a line of trash across the top of each splash page (or the first page of the job if you print "dry"), then change your printer from LPB to LPD.

For LPB printers, PMGR starts each job by downloading the VFU information (whether it's default or user-specified) into the printer. For all printers except LPB, the PMGR simulates the operation of the DAVFU in software. The cost of this simulation is microscopic, so don't bother trying to teach XLPT your special VFU logic.

:LPSIG:SERIAL

When hooking up serial printers, gen them as TTY devices. Default all the characteristic words the first time around. Don't bother specifying ?MIFC/?MOFC in word 3. (Aside: /IFC/OFC are necessary only when using flow control with AOS{/VS} binary I/O protocols; XLPT never uses binary I/O even when using QPRINT/BINARY. PED, SED, CEO, and other DG software products either never use binary I/O, or they set /IFC/OFC themselves).

Later you may want to go back in and remove ?MEOC from word 1 to keep noise on the line from getting echoed back to the printer. You may also want to add ?MNRM to word 2 so that SEND @CON - - doesn't come out on the printer when the spooler hasn't been started.

If the printer is on a dial-up modem you might want to change word 2 to add ?MMOD for auto-answer modems or ?MMRI for manual-answer modems. (Flash: /MOD and /MRI are conflicting characteristics—never specify both!) Dial-up printers work just fine. When a call comes in, XLPT starts printing; if you hang up prematurely, XLPT reprints the file next time you call in. CONTROL @EXEC STOP@device will actually cause AOS{/VS} to force a disconnect, because closing the device drops DTR, which hangs up the phone. Pretty neat, huh?

A note about speed: specify the lowest possible baud rate that will keep the printer running at full speed. Even for a tabletop laser printer you rarely need more than 2400 baud. Running the printer at 9600 baud will only increase the error rate, decrease the maximum cable length significantly, and cause spongey echo for CRT users sharing the same stat mux with the printer.

:LPSIG:SETUP

AOS{/VS} expects the following behavior from printers (configure your printer to match):

- CR returns the print head to column 1
- LF advances the paper one line
- FF goes to TOF *and* implies CR

CONTROL @EXEC LPP and CPL override whatever was set at sysgen time. Set LPP to the actual paper size (66 for 11-inch at 6 lines per inch, 88 for 11-inch at 8 lpi). Set CPL to the actual printer width or less. If you set CPL to the full printer width and find that the printer double-spaces after full lines, you should either disable wraparound in the printer, or re-gen the line and add the ?MWRP characteristic.

:LPSIG:SERIAL:FLOW__CONTROL

The preferred method for flow control is software flow control (known variously as XON/XOFF, DC1/DC3, or ^Q/^S).

Hardware flow control (RTS/CTS) can be used with directly connected printers and printers connected via most statistical muxes, but not with dial-up full-duplex modems or with most line drivers (they don't "pass through" modem signals). However, there's a gotcha: most DG interfaces (ALMs, IACs, and their brethren) require that CTS can be dropped only "between" characters (during or after the stop bit, but before the next start bit). Few printers and multiplexors meet this requirement (but DG's do). Obviously, timing is more stringent when the baud rate is high (another good reason for minimum baud rates).

I prefer software flow control because it always works, and I don't have to waste time reconfiguring a printer when I move it from a direct-connect line to a line driver. It also

I prefer software flow control because it always works, and I don't have to waste time reconfiguring a printer when I move it from a direct-connect line

allows me to use three-wire cable (TXD, RXD, and GND) for everything except dial-up modems and hardcopy master consoles.

However, even software flow control has some gotchas. If you put any box that can experience overruns between AOS{/VS} and the printer (e.g., concentrators, error correctors, statistical muxes, and network access boxes), you must configure it very carefully. The box must not recognize XON/XOFF from AOS{/VS}, but it must be able to use XON/XOFF to throttle AOS{/VS}. At the printer end, the box must accept XON/XOFF from the printer for throttling purposes, but must not send XON/XOFF to the printer. If you don't get this right, you won't be able to send special sequences using XON/XOFF to the printer. Most printers (and DG CRTs) have special control sequences that include XON/XOFF; Okidata uses XON/XOFF to control print suppress mode.

Note that completely disabling XON/XOFF is not an option. By the time the XOFF from the printer reaches AOS{/VS}, the box could already have hundreds of characters in its buffer, and that will cause an overrun.

Last but not least, several printers I've hooked up (Diablo comes to mind) do not disable hardware flow control when software flow control is selected. The first time I hooked the printer up with a full eight-wire cable, the ALM went bonkers, because Diablos don't drop RTS between characters as DG controllers require. Selecting XON/XOFF and jumpering CTS to RTS at the printer caused even more problems; when the printer sent XOFF it also dropped RTS. Because RTS was tied to CTS, the printer refused to send the XON required to resume data transmission until CTS went high. The final solution to the deadlock was to leave RTS dangling and wire CTS to pin 9 (always high on a Diablo).

:ERRATA

In the January issue I recommended running some resident processes at priority 258 if they needed residency for some reason (like histogramming), but didn't need a high priority. I said that would be the same effect as running at priority 2 SWAPPABLE. Well, the number should have been 257, not 258. 258 corresponds to priority 3 SWAPPABLE. Δ

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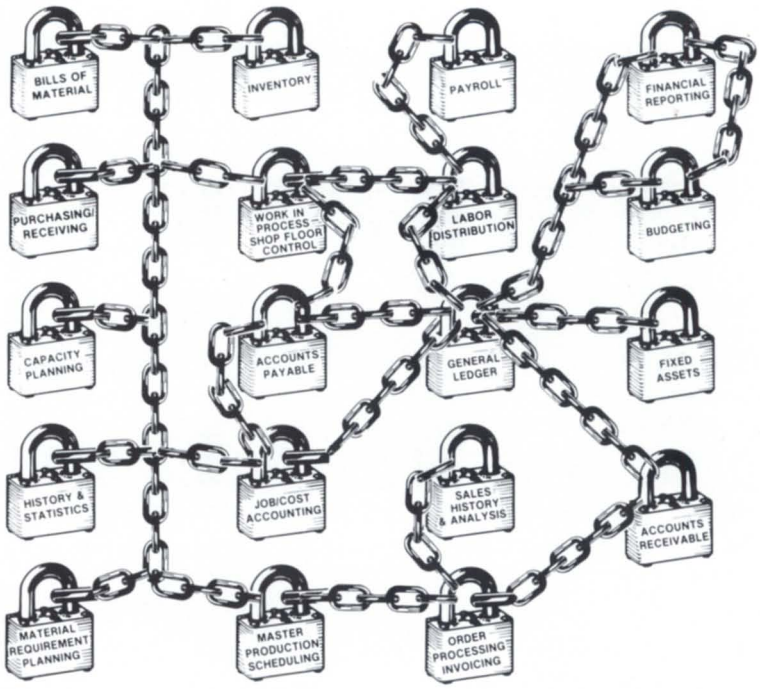

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Expletive undeleted

UNDELETE to the rescue—but you have to know how

by Tim Boyer
Contributing Editor

A friend called me the other day with a problem. I'm eternally grateful, because my deadline was approaching and I didn't know *what* I was going to write about this month.

It seems he accidentally posted invoices that were incorrect. With the software that most of us ICOBOL people are using, this means that the selected orders were deleted from the order header and line item file. He's a fanatic about backups, so the inventory file, customer file, etc., were relatively easy to recover. Since the last backup, however, several hundred new orders were entered, and these would be lost if he simply brought the old files back in. He wondered if there was a way to run through a file and UNDELETE all of the deleted records.

The main problem with the UNDELETE verb is that you have to know the actual key in order to use it. When I've used it, I've found that if I have the entire key I usually have the rest of the information in the record, and it's a lot easier to simply enter the thing again. Now, what would *really* be useful is an UNDELETE NEXT verb.

But back to the original question—can you write something to undelete records? Well, if you can't, this is going to be my shortest column yet. To make this explanation quick and easy, I need to start with a little background on the structure of the .XD file.

The first 512 bytes of the .XD file contain information about the data file—length, number of alternates, revision, next record, etc. The data records themselves come next. Each record is prefaced by a 6-byte preamble, plus 4 bytes for each alternate key. Thus, a record that looked like this:

```
01 ANY-RECORD.
   03 ANY-DATA    PIC X(16)
```

and had no alternate keys would be 22 *physical* (16 + 6) bytes long. With one alternate, it would be 26 (16 + 6 + 4) bytes long, 30 bytes with two alternates, and so on. If you've ever done a REORG on the .XD portion of the file in order to get the .NX portion back, you may have noticed that the INPUT RECORD SIZE and OUTPUT RECORD SIZE don't match. This is why—REORG is treating the input file as a sequential file, and counting the preamble; it treats the output file as ISAM, and ignores the preamble.

This preamble is what we're concerned with. If the ASCII value of the first byte is 128 (decimal) or greater, the record is treated as deleted. If it's less than 128, the record is active. That's all—nothing but the first byte is physically touched, so the data itself is not damaged. This is why periodic REORGs are so important. When doing a READ NEXT, ICOBOL will actually read this record but recognize it as inactive. If you have a lot of inactive records in your file (an order file is usually a good example), a lot of machine time is wasted reading meaningless records. On the other hand, if you REORG the file and *then* try to undelete a record—forget it! We REORG these files about every other day, on the assumption that if more than one day's work is blown, it's easier to start again than try to rebuild all of the related files.

That's all the background information you need to write your own quick and dirty UNDELETE program. Now let's get down to business.

First, you're going to need two FDs—one to read the header, and one for the data.

```
SELECT HEADER-FILE ASSIGN DISK XD-FILE-NAME
   ORGANIZATION SEQUENTIAL
   ACCESS MODE IS SEQUENTIAL
   FILE STATUS IS XD-FILE-STATUS.
SELECT DATA-FILE ASSIGN DISK XD-FILE-NAME
   ORGANIZATION SEQUENTIAL
   ACCESS MODE IS SEQUENTIAL
   FILE STATUS IS XD-FILE-STATUS.
FD HEADER-FILE
   LABEL RECORDS ARE STANDARD
   DATA RECORD IS HEADER-RECORD.
01 HEADER-RECORD.
   03 HEADER-RECORD-ALTERNATES    PIC 9(4) COMP.
   03 HEADER-RECORD-LENGTH    PIC 9(4) COMP.
   03 FILLER    PIC X(508)
FD DATA-FILE
   LABEL RECORDS ARE STANDARD
   DATA RECORD IS DATA-RECORD.
01 DATA-RECORD    PIC 9(2) COMP.
```

Notice that the files are selected as sequential. With a data name as the file name in the select, you can then put XD-FILE-NAME in working storage and accept the file to be processed in your screen section. Remember that this is a sequential file and not an ISAM file, and it must be selected using the .XD extension. Since I'm as absent-minded as most, I put a message on the screen asking for the file name *without* any extension, and then (before any OPENs)

```
INSPECT XD-FILE-NAME REPLACING FIRST SPACE BY ".".
INSPECT XD-FILE-NAME REPLACING FIRST SPACE BY "X".
INSPECT XD-FILE-NAME REPLACING FIRST SPACE BY "D".
```

This works just fine.

The first FD is in there for sheer laziness. I know I could enter the physical length of the file, but why not let the machine do it for me? Besides, I tend to forget one or more alternates and *really* screw

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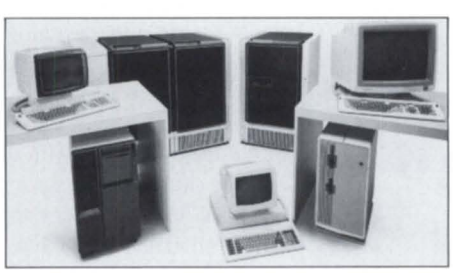

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up the file. It's much easier to do this:

```
OPEN INPUT HEADER-FILE
(put an "It's not there, dummy" message here)
READ HEADER-FILE RECORD.
COMPUTE RECORD-LENGTH =
    (4 * HEADER-RECORD-ALTERNATES) +
    HEADER-RECORD-LENGTH + 6.
CLOSE HEADER-FILE.
```

The variable RECORD-LENGTH now contains the physical record size of your data file. The next step is to OPEN I-O the data file and read past the header information, like so:

```
OPEN I-O DATA-FILE.
PERFORM READ-ISAM-DATA 512 TIMES.
```

One more READ positions you to the preamble, and then you are ready to undelete:

```
PERFORM READ-ISAM-DATA.
PERFORM UNDELETE-RECORDS UNTIL
    DATA-FILE-STATUS = AT-END.
UNDELETE-RECORDS.
IF DATA-RECORD > 127
    SUBTRACT 128 FROM DATA-RECORD,
    REWRITE DATA-RECORD.
PERFORM READ-ISAM-DATA RECORD-LENGTH TIMES.
READ-ISAM-DATA.
READ DATA-FILE RECORD.
```

As you can see, I'm just checking whether the first bit is greater than 127, subtracting 128 from it if it is, and reading until I get to the next preamble. that's all there is to it.

Although this technique is easy to use and easy to understand, it isn't very fast. I just tried it on my order line item file (don't worry—I used another disk, just to be safe) and it took about 7 minutes to recover the file (118 bytes long, 1,157 records). Not the fastest performance—but it sure beats the alternative! Of course, with a file this size, reading one byte at a time means the system is doing about 20,000 reads per minute, which isn't too shabby for an S/140. I wouldn't want to try this in ICOS!

There is, however, a way to make this technique much faster. Instead of one byte at a time, imagine making the DATA-RECORD 512 bytes long instead of one, and reading it into a data name such as

```
03 DATA-BYTES OCCURS 512 TIMES PIC 9(2) COMP
```

Then you would read once to get over the header, and read again to bring in the first block of 512 bytes. The first byte of that block will be the first byte of the preamble, and after that it is merely a matter of adding the record length to a pointer and checking if DATA-BYTES(POINTER) is greater than 128. If your record length isn't a multiple of a power of two, be sure to keep track of the overflow when you read in the next 512-byte block. The rest, as they say in textbooks, will be left as an exercise for the reader.

With this method, undeleting becomes practical even for ICOS. I restored the line item file in just over 24 seconds.

One word of warning—actually, it's more of an annoyance than a problem. I named this program the obvious thing, UNDELETE.CO, and used UNDELETE as my PROGRAM-ID. Every time I tried to compile, I got these messages:

```
ERROR: DATA NAME
ERROR: PERIOD MISSING
ERROR: UNRECOGNIZABLE WORD
```

After staring at WORKING-STORAGE for long enough to memorize it, I finally saw the obvious (for those of you out there who are snickering, it isn't *nearly* as obvious on the screen as it is written down). Don't make your PROGRAM-ID a reserved word! I changed to UNDELETES and the program compiled just fine.

And now for something completely different. I've noticed a severe shortage of RDOS/ICOBOL participants on the NADGUG bulletin board. There have to be more people out there with problems, suggestions, and gossip! Find 10 minutes, call 415/924-3652 any time, and put in your two cents' worth. I spend most of the national conference listening to gripes about RDOS, and then find three or four messages a week on the board. Here's a chance to get in touch with people who can help you—use it! The service is free, it's easy to use—and I'll bet our response time beats Atlanta! And besides, if I don't hear any ICOBOL problems, I don't know *what* I'm going to write about next month.

And now for something to fill up the bottom of the page. I just got a copy of Data General's 1985 annual report. On the back and front covers is a history of each processor they ever produced, in chronological order. Very slick looking. It seems, however, that in 1978 they came out with the "Eclipse CS/40."

I'm surprised, but since it's certified by Price Waterhouse, I guess it means we should look for some *real* cheap Eclipses—maybe even as cheap as the Novas they usually put in CS/40s. 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.

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Circle 39 on reader service card

One problem appeared only infrequently at AOS sites, and was impossible to reproduce. It was tough to get enough information to fill out an STR anyone would take seriously

Troublesome threesome

More evidence that solving the problem is often easier than defining it

by George Henne
Contributing Editor

From time to time in any complex computer system you will come up against situations that look like bugs until you finally figure out what's going on. This class of problem is the most frustrating, but perhaps the most rewarding to fix, because the solutions are often quite simple in the end. This month, I'm going to describe a few of my favorites.

I should mention that these problems aren't unique to our own sites. A number of other users have told me about similar problems, and when I spoke to the people in Business BASIC development at DG's Research Triangle Park facility, they noted quite a few STRs caused by the same problems.

The first happens only with AOS Business BASIC. It plagued us for quite a while, but at only a few of our AOS sites. It appeared infrequently even at those sites, and was impossible to reproduce. Under those conditions, it's tough to get enough information to fill out an STR anyone will take seriously.

The problem was this: messages ERROR 14—NO MORE PROGRAM MEMORY, and ERROR 23—NO MORE DATA MEMORY would appear at random in programs that were obviously not too large. In fact, they were less than 10 KB total, and had been running for years with no sign of trouble. The messages didn't seem to be confined to any particular program, so we suspected the operating system.

The situation was made worse because we were getting a similar message on our AOS/VS systems about that time: I/O ERROR 22—INSUFFICIENT MEMORY TO EXECUTE PROGRAM. As I related last month, this message can be caused by an operator leaning a book on a keyboard—the buffer overflow message that results is incorrectly reported. At the time, it seemed the two problems might be the same thing. They weren't.

Another red herring was a set of patches to AOS and AOS/VS that was supposed to fix the way the Ghost (or the Agent) handles memory pages. As you are probably aware, not every release of AOS or AOS/VS (or even RDOS!) works properly with Business BASIC. We went through a lot of frustration putting in different revs to see if the problem would go away. Since it appeared erratically, we thought we had it licked more than once.

Eventually, we decided to submit an STR, even though we didn't think we were sending enough information to get a solution. But RTP had seen this one before: it was caused by allocating too little space for the AOS swap file.

The size of the swap file, which is set when you do the AOS gen, defaults to 2,000 blocks. Even on very busy systems, this is often enough. But sooner or later enough processes do enough swapping that either the program area or the data area of some program can't be swapped. Hence the error message, which in this case is telling (more or less) the absolute truth.

For more information on correcting this, refer to the DG manual *How to Load and Generate your AOS System*, pages 4-22 and 4-27. The proper size of the swap file should be

SWAP FILE SIZE = N * ((B*4) + 13)

where N is the total number of processes and B is the maximum number of pages per process.

The second problem is far more subtle, nasty, and dangerous. I've got a real respect for it, since it happened to me personally. It cost me a week's work, and I feel lucky to have gotten off so lightly.

It started when I moved a simple print image file from another system, and wrote a bunch of programs to manipulate and print it out. My first hint of trouble came when the data my program printed out was not what I expected. Perhaps a bad tape, I thought, blaming the folks who created the streaming tape drive with no read-after-write checking. I was genuinely puzzled when the new tape gave the same result.

I cut my program down to the bare minimum as follows:

```
0010 OPEN FILE[1,5],"OUTPUT"
0020 DIM REC$[64]
0030 READ FILE[1],REC$
0040 IF EOF(1) THEN STOP
0050 PRINT REC$
0060 GOTO 0030
```

Too simple to be wrong, right? But I discovered that when I ran "AOS" and then did a TYPE OUTPUT, I got different results! It printed the file properly, instead of repeating it part way through. Even more distressing was the fact that !LIST OUTPUT also worked correctly. I dissected the CLI LIST program to see how it worked—not an easy task with any of the CLI programs.

I found that it opened the file in mode 3 instead of mode 5. I modified my program,

Imagine if a file gives different results depending on how you OPEN it. And what if it gives you incorrect data without generating any sort of error message?

and then it ran perfectly. Now I knew we were all in trouble: imagine if any file you open gives different results depending on how you OPEN it. And what if mode 5 can give you incorrect data—here's the spine-chilling part—without generating any sort of error message about what is going on?

Careful study of the incorrect output revealed that it started going funny on the 4,097th character. This magic number comes right after the AOS/VS minimum element size. So I tried adding a new line of code to the original program:

```
0025 POSITION FILE(1,4097)
```

Running the modified program gave an incredible result. The message SYSTEM RING TRAP came up, along with the contents of the system registers, and I was signed off! I was plainly having a bad day.

It was about to get worse. Horrified at what I had created, I went to the next office to show another programmer. Wouldn't you know, it worked fine on his terminal: it didn't crash, and it gave the correct results.

We guessed the critical factor was that he was signed on as OP, and I had a normal account. We looked through all the account characteristics as set up on PREDITOR, and couldn't find anything that we could control in the accounts that made any difference. Early on, we also checked the SEARCHLISTs and the ACLs: they appeared to be fine. The ACL was OP,OWARE +,RE, which seemed reasonable for a file we were only reading.

It was time to talk to Research Triangle Park again. Turns out they'd seen this one before, and that in fact the access control list was causing the problem. The explanation:

OPENing a file in mode 5 causes it to be opened as an AOS/VS shared page file. This yields better performance for multiuser environments, because if a section of a file is in memory, it can be shared by all the users. System overhead for file locking is also reduced. However, for the system call ?SPAGE to work properly, it requires both READ and WRITE access to the file. Changing the ACL on the file to +,OWARE cured the problem.

ACLs had claimed another victim. The duo of ACLs and SEARCHLISTs has probably claimed more wasted programmer time than any other feature of AOS or AOS/VS. I sometimes wonder if the cure might be almost as bad as the disease.

The moral of the story: make sure all your data files have at least the R and W attributes in their ACLs, unless you are never going to OPEN them in mode 5. In addition, give the DEFACL (DEFault ACL) on your file directories the same attributes. That way if you create new files, they'll be OK as well.

The third problem is related to a topic I covered last month: KEY$ variables of incorrect length. Last month I told how every eighth character had become an UNPEND key because the buffer had overwritten a section of the interpreter, in this case the character definition table.

Other sections of Business BASIC can also be overwritten because of a too long KEY$, and the result could be almost anything. In addition to the expected hangs, users have noted phantom jobs being created, mysterious user traps appearing, and people suddenly running someone else's job.

Happily, this problem has been fixed in the next release of both RDOS and AOS/VS Business BASIC. RDOS BBASIC 8.01 is currently in manufacturing, so you should be able to get a copy by the time this is published. AOS/VS BBASIC 4.11 is due to be released around the end of February, which means you can expect it to get to you a few months later.

These releases fix many of the STRs that have accumulated. If you are on software subscription service with DG and you can't wait for DG to get around to mailing you an official copy, your local SE can sometimes be cajoled into loaning you a tape.

One final note: I heard a rumor that DG was planning to drop the QMUL, QADD, QSTORE, and other quad precision arithmetic statements from a future release of Business BASIC. I checked, and there are no current plans to do so.

The root of this rumor appears to be that when TAC first introduced these statements into BBASIC II, they said they would eventually be taken away again. Now that DG has taken over support for Business BASIC and TAC is out of the picture, those plans have been cancelled. Δ

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

Merge right!

DG made sorting, selecting, and merging documents easier since rev 2.10 of CEO

by Charlene A. Kirian
Contributing Editor

List processing—it's one of those office automation features that sounds as if it ought to be a wonderful timesaver, and it would be if only more people understood how to use it. If you take the time to learn how, list processing will let you sort specified fields out of a document, select certain fields, or even merge two letters into one if necessary.

Unfortunately, the older revisions of Data General's CEO (Comprehensive Electronic Office) software made learning how to use these features pretty cumbersome. However, in rev 2.10+ of CEO, DG provides a nice, compact menu that combines the creation, editing, and printing of list processing documents. To find it, go from the main menu to the utilities menu, and then select list processing. The new menu is simple to understand, and walks you through each succeeding step. It gives you the options of creating the list or text documents, merging list and text documents for printing, printing just the text document, or printing just the list document. The last option is useful for sorting or selecting certain data fields from the list.

Before I proceed, it would probably help if I explained some of the terminology. *Merge* means to combine two documents—a *text document* that stays basically the same except for *fields* that will be replaced with variable data from a *list document* that contains the data. Merge is especially useful for mass mailings or repetitive documents that need only small, predictable changes.

The *text document* is created in the same way as a normal letter, except the sections where variable information would normally go (such as name and address) are replaced with the name of a field of information from the list document. At the time of merging, the field name will be replaced with the information from the list.

The *list document* consists of the fields of variable information—such as names and addresses—that will replace the corresponding merge fields in the text document at print time.

Confused? Don't give up—there's more.

The list document can be prepared in two formats: free form and table form. *Free form* allows you to use editing features—such as centering, tabs, etc.—within fields, and it puts no limit on the length of a field of information. It is relatively easy to set up, but it lacks the organized, easy-to-read format that would let you sort and select data from the list.

Table form requires you to edit the format ruler to specific tab stops. Then the data is entered into field-columns that are easy to read, and which can be sorted or selected. No editing features can be used within a field, however, and the information in a field can't exceed the distance between tab stops.

The *select* feature lets you pick specific information contained in the fields you specify, and store it in a new list document. Using the *sort* feature, you can then sort the new information in ascending or descending order. New documents created by selecting or sorting can then be merged with other text documents that contain matching fields.

The key to creating list processing documents is to be organized before you start to enter the information. The fields need to be defined, and the data gathered, before you enter the text of the document. Keep in mind that each field you define gives you the abil-

A new list can be created by sorting the current document in ascending or descending order. It could save hours of hand-sorting

ity to sort and select on the information it contains. Therefore you might want to subdivide some of your information categories to create more fields if there is a possibility you would want to pick out specific information later.

For example, a business address usually has no less than four lines—the name of the person, company, street address, and city, state, and zip code. If the information does not need to be sorted into any special categories, the entire address could be entered as a single field. However, if you need to sort or select all records within a certain state, for example, you would want to create a separate field for the state portion of the address. Taking it further, each line of the address could be represented as an individual field for future use in the body of the letter.

Companies that send out letters to customers often personalize the letter by referring to the customer by name, and possibly by their personal residence, in the body of the letter. These letters are created by merging documents such as the ones described above. It adds a personal touch to the letter, yet saves time in preparation.

The same list you used to produce the inside address can also be used to address the envelope. Create a new text document that contains only the address field names in their proper places on the envelope. (Using 12-pitch, you need to either tab or bring the left margin to about the 65-character position, then space down approximately 15 lines.) Merge and print this new text document with the list document that contains the address fields. Even if you have more fields identified in the list document, it will only print the information for the fields you specified in the text document.

We use list processing to alphabetize and sort information. Using the sort/select function, it takes a few minutes to put a list of names or numbers in the proper order. A list document is created with the necessary number of fields. Then the names are entered in table format (last name first, if using only one field). By exiting from this document and going to the sort/select features, a new list can be created by sorting the current document in ascending or descending order. It could save hours of hand-sorting.

If you've never tried using the list processing feature, I hope my explanation hasn't frightened you away. It's not as hard as it may sound. The online documentation is a great help when you get lost—it will guide you through each of the steps as you come to them. The Data General *CEO at a Glance* reference guide is a bit confusing because of its terminology. It refers to the text form document as a "primary" document, and the list document as a "secondary" document. I will contact someone in documentation to see if this can be changed in future printings.

Don't be afraid to try this feature. After all, what's the worst that could happen? If you get a printing error message, you can always check the queue information history and find out everything you need to know . . . Or would you? But that's a topic for another month! Δ

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

Circle 2 on reader service card

Start your own!

Support from DG and NADGUG makes it easier to build a successful RIG/SIG

by Joyce Carter
Special to Focus

Members of NADGUG's executive board often talk about RIGs and SIGs as the backbone of the organization. For users who are already part of an active RIG or SIG, the reason is obvious. An active RIG can introduce you to other DG users in your own community, while an active SIG links DG users who share common interests, regardless of geographic location. In either case, the common denominator is people—meeting and communicating with others who can provide help when you need it.

In recent years, NADGUG has put more emphasis on supporting RIGs and SIGs, so more users can find out firsthand about their benefits. It's not easy to build a successful group, but it's definitely worth it, and NADGUG now provides a variety of ways to make it easier. I hope this article will encourage people to make the effort.

Let me start by defining "RIG" and "SIG." RIG stands for regional interest group. These are groups of Data General users in a particular geographical region who join together to interact with other users and with their local Data General sales and service representatives. A SIG is a group whose members may reside anywhere, but share an interest in a specific subject such as software, hardware, applications, or usages, for example, the Law Enforcement DG Users Group mentioned elsewhere in this issue.

There are vast differences between RIGs and SIGs in the ways they hold meetings, communicate between meetings, set goals, and obtain their goals. However different they are, both serve users in important ways, and NADGUG and Data General are working hand in hand to find new and better ways of supporting these regional and special interest groups.

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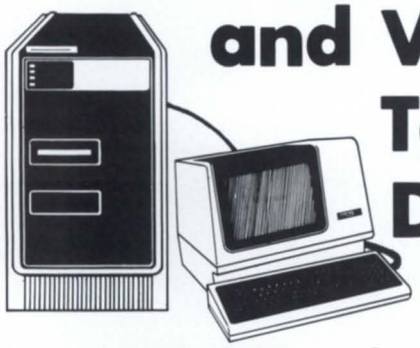

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Data General offers the following kinds of support for RIGs and SIGs:

- An individual from local DG offices can be designated to work with a RIG.
- DG will provide temporary data base space for start-up records, if needed.
- The local office will help conduct an initial membership promotion and meeting invitation mailing.
- DG will provide programs for meetings as needed and when possible.
- Where feasible, the local office will provide space for group meetings.
- DG may assist in financing the support items listed above.

In addition, NADGUG offers the following kinds of support for RIGs and SIGs:

- Start-up funding.
- Development bonus program.
- Matching funds for speaker expenses at meetings.
- Financial support for RIG/SIG officers to attend NADGUG executive board meetings.
- Address labels from NADGUG files for start-up mailings.
- Program aids, including videotapes from NADGUG conferences, videotapes from the Pinnacle series (a recent PBS series of corporate profiles cosponsored by Data General), and speakers (when available).
- RIG/SIG Roster listings.
- The resources and support of *Focus* magazine.
- Membership promotion brochures.
- Support and information from the NADGUG support staff and SIG/RIG committee chair.

The lists above only touch on the support offered to RIG/SIG groups.

If you are interested in organizing or restarting a group, I advise that you follow these steps:

1. Contact the NADGUG support staff at Data General—4400 Computer Drive, Mail Stop C-228, Westboro, MA 01580; 617/366-8911, ext. 4721.
2. Contact your local Data General sales office to arrange for their support.
3. Send the NADGUG support staff a letter of intent to organize a RIG/SIG.
4. Work with your Data General sales office to conduct membership promotion mailings.
5. Petition NADGUG for official recognition.

These steps provide a solid beginning, but there's a lot more to it. First, you should determine how much need and desire exists for a group. Usually a few interested people will get together and decide to give it a try. It takes a lot of time and work to get a group organized, so it's a good idea to look into the help you can get from DG and NADGUG. Following your initial contact with the NADGUG support staff in Westboro, you will receive several brochures, samples of bylaws, etc. When you have made more formal plans for an organizational meeting, the NADGUG support staff will work with your local DG office to provide address labels for NADGUG members and DG users in the areas you wish to serve.

Funds are available for reimbursing up to $200 of the expenses you incur during this start-up phase. The first $100 is NADGUG's

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contribution; the balance is an interest-free loan to be repaid by the RIG/SIG after the group becomes financially self-sufficient. To qualify for this funding, at least three persons must be named as group initiators, and the expenses must already have been paid.

After your group has met and gotten organized, it should petition the NADGUG executive board for formal recognition. Some of the support items listed above are only available to recognized groups. The bonus development program, for example, provides each recognized RIG/SIG with one free registration to the annual NADGUG conference. At the discretion of the individual RIG/SIG, this registration can be offered to the individual who has made the greatest contribution to the group. These contributions might be in the form of newsletter articles, bringing in new members, or providing programs for the group's meetings. Each RIG/SIG is responsible for establishing its own criteria for the award, and before the conference to inform NADGUG who will receive it.

According to the NADGUG bylaws, the chair of each recognized RIG/SIG is a voting member of the executive board, which meets twice a year. To encourage greater participation, NADGUG provides financial assistance for RIG/SIG delegates when they attend executive board meetings.

Matching dollars for speakers is another benefit reserved for recognized groups. To receive funds for bringing speakers to their meetings, the RIG/SIG must submit an account of their expenses to the SIG/RIG committee chair.

The responsibilities of the RIG/SIG to NADGUG are few. According to NADGUG bylaws, the chairperson must be a member of NADGUG, and the group must submit an annual report of its activities, officers, and treasury. RIGs and SIGs are expected to hold at least one meeting each year, and to remain fiscally responsible.

There are many RIGs and SIGs already in existence. If you're interested in joining a group, consult the roster that appeared in January's *Focus*, page 44, and see if there is a group that interests you. If none meets your needs, then you should consider finding other users with a common interest to form your own group. If you need help getting started, just call me or the NADGUG support staff.

Joyce Carter serves as chairwoman of NADGUG's RIG/SIG committee. For more information, contact her at 15024 Brookside Circle, Omaha, NE 68144; 402/559-7253.

Δ

NADGUG's Conference 86 set

The annual conference of the North American Data General Users Group has been set for August 11-14, at the Buena Vista Palace Hotel in Orlando, Florida.

Conference 86 is open to all users of Data General systems, as well as to OEMs, systems suppliers, software vendors, and consultants. The 4-day conference features presentations by DG personnel and systems

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ECL S120, 16 slot, 256KB	3,500
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NOVA 4C, 64KB	950
NOVA 3, 64KB	850
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CDC 9771 825MB Drive (new)	9,500
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TANBERG 800/1600BPI Tape, S/S (6026 Emul.)	3,000
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DG 4215 600LPM Drum	2,450
DG 4356 300CPS w/DCH ctrl.	2,495
DG 6041, 60CPS	100
DG 6042, 30CPS w/Keyboard	300
DG 6074 180CPS	350
DG 6077 180CPS	1,400
Dataproducts M120	950
DATAPRODUCTS B600	4,250
DATAPRODUCTS B900	6,000
Okidata SL 160, 160LPM	795
Printronix P150	1,475
Printronix P300 (Unused)	3,500
Printronix P600	3,995
Printronix MVP Printer	1,200
DG 6053 CRT	395
DG 6108 D-200 CRT	485
Emulog 53 CRTs	250

KIMTRON KT-7 CRTs

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users, roundtables on major software products, an extensive exhibit area, and a special day of technical seminars offered by DG's Educational Services division.

Presentations at the conference will feature users from business, industry, academic, and government installations. Last year's conference was the largest ever, with more than 700 attendees, 26 exhibitors, 11 special Educational Services seminars, 47 presentations, and 5 roundtables. A full agenda for Conference 86 will be available in late spring. For more information, contact the North American Data General Users Group, 4400 Computer Drive, MS C-228, Westboro, MA 01580; 617/366-8911, ext. 4721.

Δ

Deadline for speakers, exhibitors

NADGUG has issued a call for presentations and exhibitors for Conference 86. Users who have information or experiences to share, and companies with products or services to exhibit, can contact the NADGUG support staff for application materials. The deadline for returning the speaker or exhibitor applications is March 15. Applications received after the deadline will be considered on a space-available basis.

Speaker applications should contain abstracts of the presentations, and resumes for the speakers. Each presentation is limited to two speakers, except in the case of invited roundtable panelists. Presenters will be notified of their acceptance by April 15, and will qualify for special discounts on conference fees. For more information, contact the North American Data General Users Group, 4400 Computer Drive, MS C-228, Westboro, MA 01580; 617/366-8911, ext. 4721.

Δ

Conference 85 videotapes listed

Jim Siegman, chairman of the NADGUG Publications Committee, reports that videotapes of sessions presented at Conference 85 are now ready for borrowing by qualified RIG/SIG members. Each year selected sessions are taped for later showing at RIG and SIG meetings. The following presentations are now included in the videotape library.

- Mark Espe, Nerco Minerals: "Nerco Minerals Communication Network."
- Bruce Weeks, Boeing Commercial Airline: "MCSnet—A Network Featuring X.25 Communications Between an MV/8000 and a VAX/750."
- Gerry Manning, Creative Synergy Corp.: "ICOBOL: The Promise Fulfilled."
- George Henne, MICOM Systems: "Moving Business BASIC to the AOS/VS World."
- John A. Grant, Geological Survey of Canada: "Designing & Writing Interactive Programs Using AOS CLI Switches & Arguments."
- Paul Kutnick, Computer Associates: "Implementing Accounting Software: Integration and Office Automation."
- Carole Kellett and Edie LaFonte-Howbert, 3CI: "Network Management Using Relational DBMS Technology."
- Stefania Kelabi and Barry Benson, Henco: "Fourth Generation Software Tools

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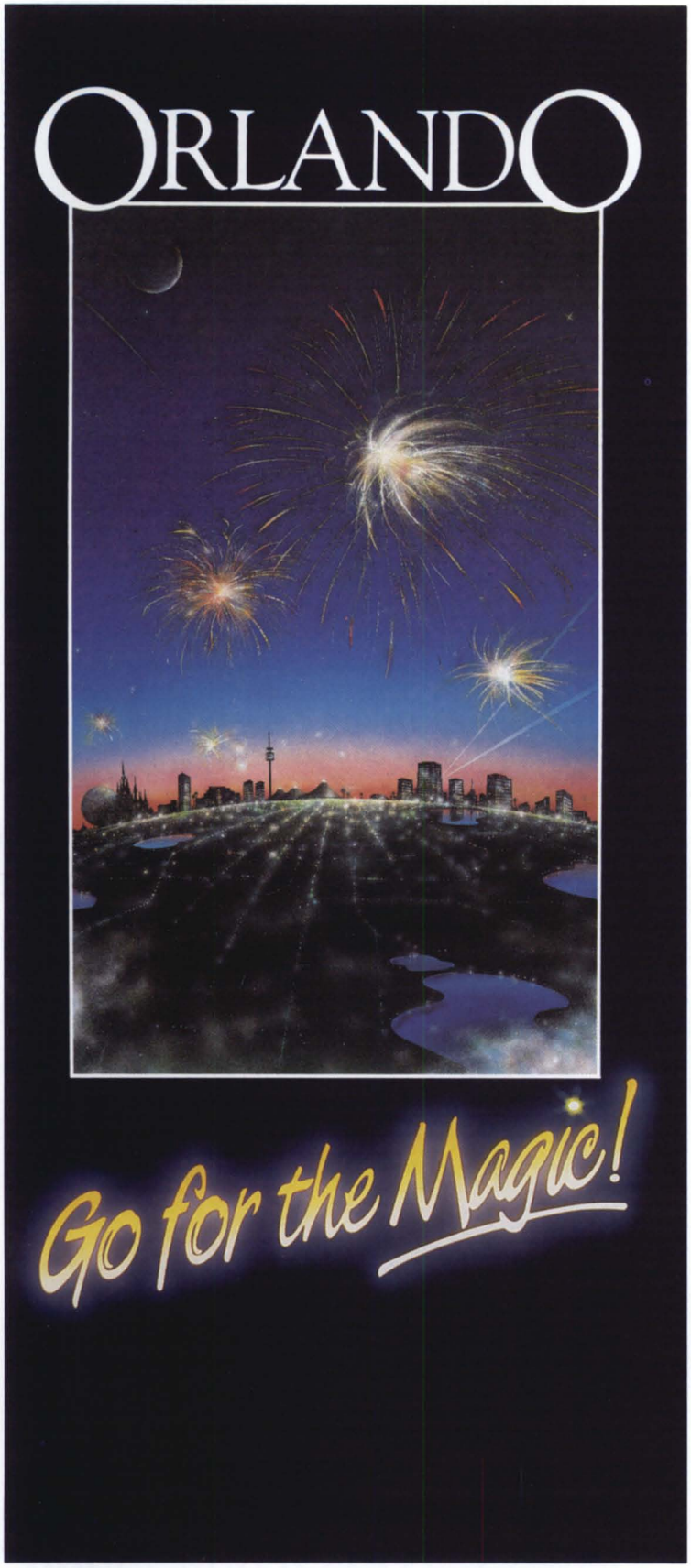

Now's the time to make plans for the 1986 NADGUG Annual Conference

Mark your calendars and tell the boss:

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Orlando Florida

Important! Deadlines for exhibitors and speakers--

NADGUG must receive applications to speak or exhibit at Conference 86 by ***March 15, 1986.***

Call ***617/366-8911, ext. 4721*** *for application forms and information.*

See you there.

Conference 86

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for Data General Equipment."

• Al Hopper and John Jones, Data General Corp.: "North American Performance Analysis Center and System Engineering Consulting Services."

RIGs and SIGs are eligible to borrow the tapes if they are recognized by NADGUG or have petitioned NADGUG for recognition. Users are advised to reserve the tape of their choice at least one month prior to their meeting, because tapes will be scheduled on a first come/first served basis. Reservations for use of a tape should be made in writing to Jim Siegman, 548 Walnut, Elmhurst, IL 60126.

Δ

International Nonaffiliated Groups

Australia Data General Users Group
Status: N/A, active
Contact: Colin Breen
Data General Users Group Australia
30-32 Ellingworth Parade
Box Hill, Victoria 3128
Melbourne, Australia

Data General Holland Users Group
Status: N/A, active
Contact: Janneke van den Tol
Data General Nederland B.V.
Laan Van De Helende Meesters 13
1186 AC Amstelveen
Holland

Mexico City Users Group
Status: Unrecognized, starting
Contact: Victor M. Ramirez
Cypensa/Data General
Eje Central No. 2
Mezannine Torre Latinamericana
06007 Mexico, D.F.
905/512-9866

New Zealand Data General Users Group
Status: N/A, starting
Contact: Doug Barr
Data General New Zealand, Ltd.
13th floor, Grand Arcade Building
Willis St.
P.O. Box 9735
Wellington, New Zealand

Nippon Data General Users Group
Status: N/A, active
Contact: Shinichi Noda
Nippon Data General Corporation
6-12-20, Jingumae, Shibuya-ku
Tokyo 150 Japan

Portugal Data General Users
Status: N/A, active
Contact: A. Bras Gomes/A. Sendin
Data General Portugal
Cassel Data Computadors Esistemas, Lda
Lisbon-Sintra Road
Casal Do Garoto-Estrada
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Amadora, Portugal

Data General Sweden
Status: N/A, starting
Contact: Lennart Johansson
Data General Sweden
Armegatan 38

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Data General United Kingdom Users
Status: N/A, active
Contact: Keith Bevis
Data General Ltd.
Hounslow House, 3rd floor
724-734 London Road
Hounslow, Middlesex
Middlesex, England
TW3 1PD

Δ

Global Pubs Group forms

Since 1973, 40 book publishers representing commercial and university communities across the nation have purchased PUBS DATA turnkey systems from Global Turnkey Systems (formerly STC Systems). The systems consist of modified Data General CPUs and various other manufacturers' hardware, book publishing software, and optional ongoing hardware and software support.

In the fall of 1984, Global Turnkey called the publishers together with the goal of forming a user group to address shared concerns. The second annual meeting of the Global Pubs Data User Group was held in November 1985 in New York City, with 82 percent of the publishing houses represented, and 14 Global personnel attending. Highlights included roundtable discussions on topics including marketing, order fulfillment, and disaster planning. Software consultants gave presentations, and training classes geared to publishers coincided with the meeting.

Although the group is young, it can already point to the following results: better communication between vendor and users, input into product modifications and development, a new documentation committee to aid development of documentation before it is released to users, more training classes at reduced fees, a subscription fulfillment SIG, newsletters, and regional groups. A technical committee is also forming to test new software enhancements.

—contributed by Debra Whitney, chairperson for Global Pubs Data User Group, University of Washington Press, P.O. Box C-50096, Seattle, WA 98145-0096; 206/543-8870.

Δ

LEDGUG meeting scheduled

Officers of LEDGUG, the Law Enforcement Data General Users Group, are currently planning their third annual meeting, to be held in Dallas in April. Consultants now scheduled for the meeting include Gerry Manning, of Creative Synergy Corporation, and Tom Marshall, of Applied Micro Technology. The Richardson, Texas, police department, which is in a suburb of Dallas, will host the meeting.

There are presently about 21 agency members of LEDGUG, and the SIG has been quite active in promoting effective use of computers in law enforcement. For more information, contact Nancy Smith, Black Hawk County CJIS coordinator, 316 East 5th Street, Waterloo, IA 50703; 319/291-6585.

Δ

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Terminal emulation company enters DG marketplace

Fremont, CA—Perfect Terminal, Inc., a privately held terminal company addressing the Data General, Perkin-Elmer, and Prime Computer marketplaces, announces that its goal is to produce inexpensive video display terminals with custom capabilities for vertical markets, scientific applications, large and small OEMs, and the ANSI arena.

The flagship of the company's debut product line is the P-210/211. A Data General 210/211 emulation, the P-210/211 offers as standard features a 14-inch screen, 132-column capability, 32 programmable

function keys, soft setup, and a buffered printer port. The product will retail for $795.

The company offers custom orders of any size to the OEM market. A company spokesman says he believes the DG marketplace is an untapped resource for a company willing to provide custom engineering, desirable features, and prices that are attractive to the distribution, OEM, and end-user sectors.

Other introductions will include a Perkin-Elmer 6312 emulation, a Prime Computer 200 emulation, and an MAI Basic Four emulation. Δ

Perfect Terminal, Inc., 3319 Seldon Court, Fremont, CA 94538; 415/656-8383, or 800/472-2900 in Calif., 800/624-6422 outside Calif.

DG increases SNA support

Milford, MA—Data General recently introduced additional software and support

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services for its IBM-compatible Systems Network Architecture (SNA) software products. DG's Software Product Service Agreement (SPSA) telephone support service has been extended to include DG's SNA products. The services are designed to enhance levels of software support for customers who use DG SNA products to communicate with remote IBM hosts operating in an IBM environment.

The new services include installation of software based on DG SNA/Synchronous Data Link Control (SDLC). Installation of these products' initial software licenses was previously available on a time and material basis only. Post-installation software support from DG's Customer Support Center is also available via an SPSA.

Products supported include DG/SNA, DG/SDLC, SNA 3270, SNA 3278 APL, SNA/RJE, DG/XDLC, and CEO DXA software running under DG's AOS/VS, AOS, and AOS/DVS operating systems.

DG's system engineering organization provides installation services for SNA products. These include structured sets of installation procedures for both batch and interactive environments. Structured procedures and standardized macros are designed to minimize the time required to install and validate the network software, and assist support personnel in troubleshooting network difficulties.

Data General support personnel have access to specialized support tools, including dial-up access to an independent IBM host facility, and specialized test routines to identify and isolate malfunctioning network components.

After completing installation, DG systems engineers will record information on the installation and network configuration. This data will be maintained at the CSC and used to diagnose future software problems, or to answer customer questions regarding DG SNA application products.

Standard SPSA services are available, including software and documentation updates. Installation or validation of installation by DG is a prerequisite for SNA/SPSA support. For existing SPSA, customers, SNA/SPSA pricing includes a site audit to ensure the installation's compatibility with DG standards.

SPSA coverage costs $240 per month for a typical configuration consisting of DG/SNA, DG/SDLC, and SNA 3270, not including any additional prerequisite coverage for the under-

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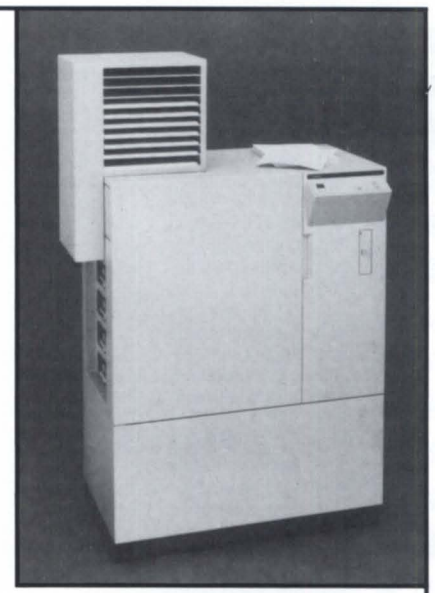

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Terminal emulates both DG and DEC

Minneapolis—Model 20-DDG, an ANSI-based multiprotocol terminal, has been announced by Teleray. The terminal, which emulates both the DG D210/D211 and the DEC VT220, was developed to provide a single terminal for users who would otherwise need both DG and DEC terminals.

Layout of the terminal's low-profile keyboard is similar to the VT220's; D210/211 compatibility is achieved by adding a functional keyboard overlay, color-coded key legends, and a dedicated "home" key.

Each emulation mode contains its own nonvolatile function memory, which will accommodate up to 20 programmable functions. In each mode, the user or the host may uniquely redefine the entire keyboard (106 keys) for special or private applications.

Setup parameters for each of the terminal's emulation modes are selected from the keyboard through a nondestructive full-page menu. Each mode contains its own operating settings plus an alternate set of "saved" parameters, which can be recalled at any time. The terminal features two bidirectional communication ports, for use with either of the host computers, or one host or port selector switch and a printer.

The 20-DDG displays 80 or 132 columns. Two pages of volatile or nonvolatile display memory are optional. Tektronix 4010/4014 compatible graphics is optional.

Teleray's 10- by 10-inch base, and tilt-and-

swivel screen are included in the standard package. It features a 14-inch nonglare or amber CRT. List price is $1,195. Delivery is quoted at 4 to 5 weeks. Δ

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

RDS adds terminal emulation to PC/VS link

Corte Madera, CA—Rational Data Systems reports that its previously announced PC/VS link and its new PopTerm/200 are both ready to ship to customers. PC/VS interfaces IBM (or compatible) personal computers with Data General's MV/ family minicomputers running the AOS/VS operating system. PopTerm/200 is a memory-resident Data General D200 terminal emulator for IBM or compatible PCs.

PC/VS is a combination of hardware and software that allows PCs to use the disk storage, security, file transfer, printing, and other system capabilities of Data General's MV/ family minicomputers. According to the announcement from Rational Data Systems, the PC/VS functionality is transparent to the PC user, and the PC/VS workstation maintains the familiar DOS environment.

During a work session, PC/VS users can create MV/-based virtual disks of up to 32 MB, and mount them on any of four virtual drives. In addition, read-only virtual disks can be accessed by more than one PC user at a time. This reduces disk redundancy and incompatible revisions for organizations with custom or proprietary DOS applications.

PC/VS features a "notification window" that alerts PC users when they receive CEO messages. PC/VS users can also send short (non-CEO) messages to other PC workstations, or to users at terminals attached to the MV/ machine.

PC/VS consists of multiple PC workstations and one or more MV/ family servers connected via IEEE 802.3 Ethernet or RG-58 cable, with appropriate hardware controllers and PC/VS software on both servers and workstations. The 10 MB per second bandwidth of Ethernet can support rapid file transfer speeds between as many as 1,024 nodes. Because PC/VS software includes "hooks" on both the PC and MV/ sides of the network, sophisticated users can develop distributed applications to divide labor and share data between the PC and the MV/.

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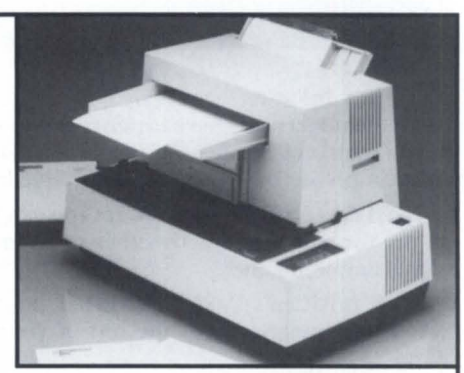

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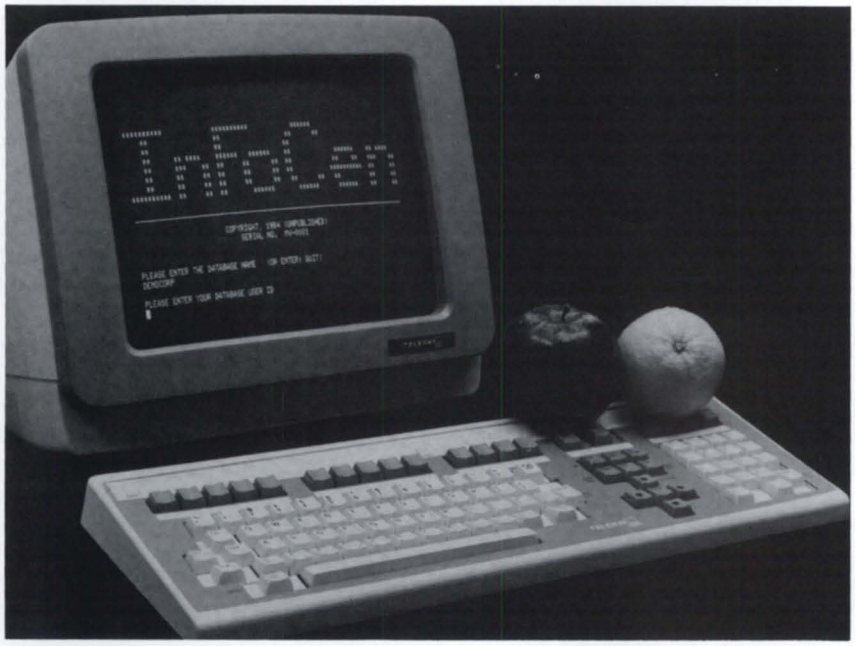

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PRODUCT SPOTLIGHT

PopTerm/200 is the company's memory-resident Data General D200 terminal emulator for IBM and compatible PCs. It features "hot-key" activation, so PC users can switch quickly between DOS and AOS/VS work sessions. It is available separately, or as an enhancement to PC/VS, and can be linked to DG machines either through PC/VS or through its own RS-232 connection. Since PopTerm/200 and the PC/VS notification window can coexist on the PC, CEO mail and PC/VS message notification windows can be displayed on top of users' DOS or AOS/VS applications. Δ

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(from page 16)

Connecticut (the field engineering training center), for other courses. The goal is providing homegrown training while trying to mesh in as closely as possible with Westboro.

I asked Woodcock which DG systems are used in the Austin facility. "We use at least one of everything. We've got DG/Ones, lots of Dasher/Ones, Desktop systems, and a C330 we've boosted to the maximum possible. Within R&D we're primarily on MV/10000s, /8000s, and /4000s. We have an MV/10000 that's dedicated to computer-aided design and another that's dedicated to printed circuit design. One of our MV/8000s is one of the original prototypes and is still going strong. The MV/8000s provide us with our primary administrative backups. Our software development team does graphics software, and they've found a greater return on investment by using MV/4000s in small groups rather than using a lot of people on a large machine. We just put in a new computer room and I think we have one of the nicest DG installations in Texas."

Woodcock summarized how he's seen the focus at DG Austin change during his time there: "I think little by little we've come more into the mainstream. The products we've shipped have come to represent a larger percentage of the company's total revenues, and they're seen as vitally important. There was a time years ago when computer industry people thought a terminal was a necessary evil and that the important thing was the CPU. Now we're seeing some realization that terminals are extremely important to the entire system. Also, with the Dasher/One we're seeing a change of focus—away from less intelligent terminals to more intelligence in workstations. The Dasher/One has been a pivotal product for the Austin laboratory."

The Manufacturing Side

Don Wilde, plant manager, served as operations manager for DG's assembly/test operation in Thailand from 1982-1985, and says he would still be there given the chance.

Wilde said the most exciting part of his present position is seeing overall improvement in every area—he came to DG Austin when there was very little activity—"At the first of the year in 1985 we had just started into the valley of depression, probably the worst downturn this company has seen for 4 or 5 years. In fact, I think it took on unique proportions compared to what we had in '81 and '82. It was exciting being able to pull together an organization, a team that focused on the real issues of working together. Pulling together our statistical process control as well as developing process capability studies within the organization have given me, from a professional point of view, a lot of satisfaction. I like seeing people recognize that they can predict and control the performance of a part or a process out on the manufacturing floor. I also think that some of the new products we've been working on are very exciting."

Wilde filled me in on how they get their interesting in-house names for projects: "One of the terminal group department managers

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has an American Indian heritage and we find a lot of the projects are named after Southwestern and Southeastern Indians."

DG is also unique in the way it names quality circles—PRIDE circles—People Really Involved with Developing Excellence. According to Wilde, they're used extensively in manufacturing. "We've even migrated from quality circles to quality teams, which involve all members of the community, professional engineers, materials planners, and systems applications programmers participating in teams with accountants and personnel people. We have a full-time PRIDE facilitator." The strategy behind PRIDE circles is letting employees take a more active role in analyzing problems and suggesting and implementing changes.

I sensed genuine pride in everyone I encountered at DG Austin. Woodcock expressed his appreciation for the facility's uniqueness—"Austin is unique within DG because on one site it houses R&D, manufacturing, field engineering, finance, personnel. . . the whole shot. It's the only one with all of those. There may be some small manufacturing done at Research Triangle Park in North Carolina, I believe, but not on the same campus. It's been a very successful mixture. I think we all profit greatly from it."

Data General Generally Speaking

Wilde thinks the focus of DG has changed since the days of *The Soul of a New Machine*—"I think we've become much more professional. From a manufacturing point of view, when I first came to work for this company we had no concept of what a quality product really meant. The whole management philosophy has changed to one that is more customer focused, rather than just doing something for the numbers. We spend a lot more time improving our image with the customer, producing products that are very competitive in both price and performance. It's come down to a point where we're working closer as teams, more as colleagues.

"Although there's always the isolated instance where somebody is throwing trash at you, many of our successes can be ascribed to the fact that engineering, field engineering, marketing, and manufacturing are working together. It's much more homogeneous. Although that doesn't mean we don't have some homework to do and a lot more progress to make, I would say that *that* to me is the new Data General.

Back to the future of DG, President Edson de Castro has been quoted as saying that DG will be one of *very* few companies to survive until the next century. DG employees agreed—"I think we're all committed to that statement. We back him up 100 percent," Woodcock said.

What are the factors that will determine the truth of de Castro's statement? Woodcock said price/performance in the marketplace is the key: "The customer is not foolish. He's proving us to be in the (high) position we claim. I think we've seen great success on the basis of price/performance. We're going to press our competitors to really outdo themselves in order to meet our curves." Δ

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(from page 16)

DG's benefits as tremendous when compared to TI's."

The turnover rate has also been lowered because of PRIDE teams, DG's version of quality circles, which Smith said have been emphasized quite a bit—"PRIDE teams are an integral part of this facility today."

Two women were standing watch over two printers in the test area. According to Smith, "The test area is something we'd like to do away with, I guess—we'd like to say we do it right the first time and don't have to test. It's a necessary evil."

Like his colleagues in the lab, Smith believes that having R&D and manufacturing together allows great opportunities to drive problems and work with them. "We can get better at working together, but I see the setup as a real benefit."

What struck me most about the plant was the sense of flexibility within an environment of constant modification. Everything was set up to allow reshuffling as manufacturing plans change. Smith concurred—"This plant is atypical in that it has a lot of different things going on. A more typical plant will produce more of one thing but won't produce as *many* different things. Here we have a lot of different technologies, and will be adding more in the future. The impact is that it stretches not only the supervisors who report to me, because they have to learn a lot of different tasks, but in particular the engineering staff. The engineers are the most prone to difficulty in an environment like this—it really is demanding."

The plant manufactures 30 different types of boards, with an average day to day production of 15 different types. The Austin plant is the only DG plant manufacturing printers in the country, although a number of printer models are produced to DG's specifications by other vendors.

The printer work area displayed a row of sleekly modern printers in various stages of completion. According to Smith, the one item they've really seen turn around is the Jalapeno printer (the 6215). Smith had no idea as to the outside name for the Jalapeno —"We in manufacturing never tie the two names together. We've had it really take off here in the last month or so. It was a slow performer but now is starting to pick up. I think we're starting to see a turnaround in the economy, at least in this plant."

Smith acknowledged that the plant is never boring—"Even during a downturn, while we're not producing a hundred of one thing, we're producing one of everything, which makes for the same number of problems. In the last year we've had more work on new products than I can ever remember having at TI. We've really had an emphasis on new products, which we needed to have to get ahead of the pack rather than be a follower.

"I know it's a better place than where I came out of, from the standpoint of morale and where we're going as a facility. We've got a definite direction in the future, and that's great—it really carries over to the folks who are working here." Δ

-J.S.

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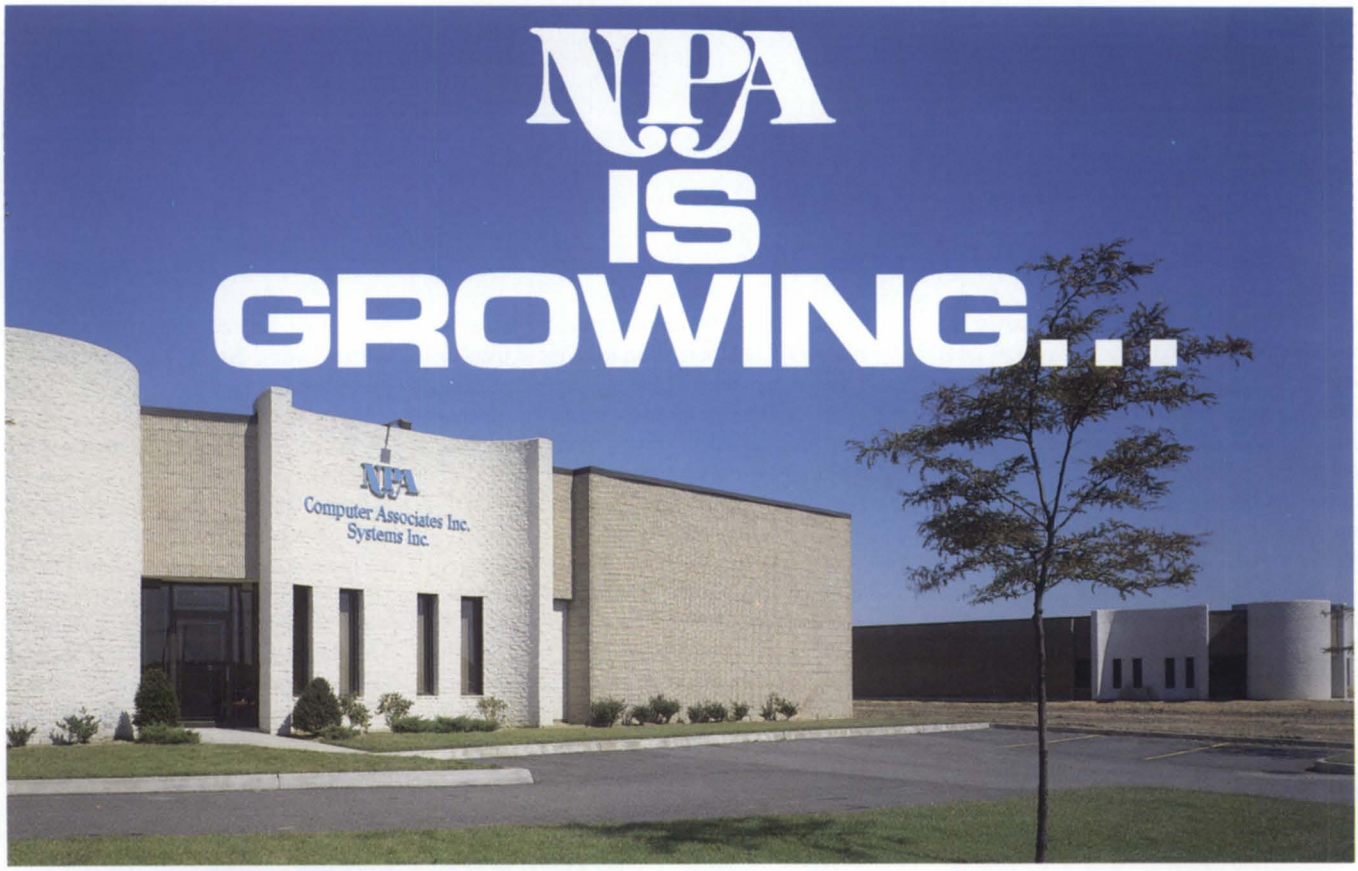

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Circle 37 on reader service card

DG President Edson D. de Castro told stockholders at the company's annual meeting not to expect "any dramatic shifts from the last quarter" for the period ending March 30. DG also reported lower earnings and revenues for the period just ended. Sales continued to be sluggish—de Castro told the stockholders he hadn't seen much improvement through January.

The rest of the industry was showing mixed results. Wang posted lower earnings, but saw an 11 percent increase in revenues. IBM reported a 23 percent rise in its fourth quarter revenues—largely due to good sales of its Sierra mainframes—but showed a slight decline for the year. IBM President and CEO John Akers predicted more hard times ahead: "There is an absence of convincing evidence the North American economy is showing sustained improvement, and we are approaching 1986 with caution." The story was similar at Burroughs: strong earnings for the fourth quarter, but weak results for the full year. However, DEC surprised analysts with better than expected earnings for its second quarter; Apple and NCR also posted good reports.

■

Tim Boyer puts out a plea in his column this month for more participation on the ICOBOL segment of the NADGUG bulletin board. Most of the other segments have a lot of activity, but there seem to be more readers than writers. Most of the messages that have been on the board for more than a day or two have been read many times—often more than 100 times for hot topics like CEOWrite, AOS/VS rev 6.02, CEO printers, and communicating through Kermit.

Logging on to the bulletin board is definitely worth the long-distance phone charges, even if you plan only on reading. It's more than useful—it's fun. Where else could you get the inside story on a Nova 800 that comes out of retirement twice a year to pick the National Football Man of the Year and do the NBA All-Star scoring?

■

That semiretired Nova sounds like a candidate for the "No Boat Anchors on This Bus" contest. In case you weren't here last month for the contest's launch, these are the rules: write a brief, more or less factual description of what your installation is doing with your old Nova(s), and send it to *Focus* by March 10, 1986. Prizes will be awarded for the oldest machine still in use, the most creative application, and the most unusual installation. Pictures and other documentation are appreciated, but not required. Prizes will be vintage LP recordings from the year in which the Nova in question was manufactured.

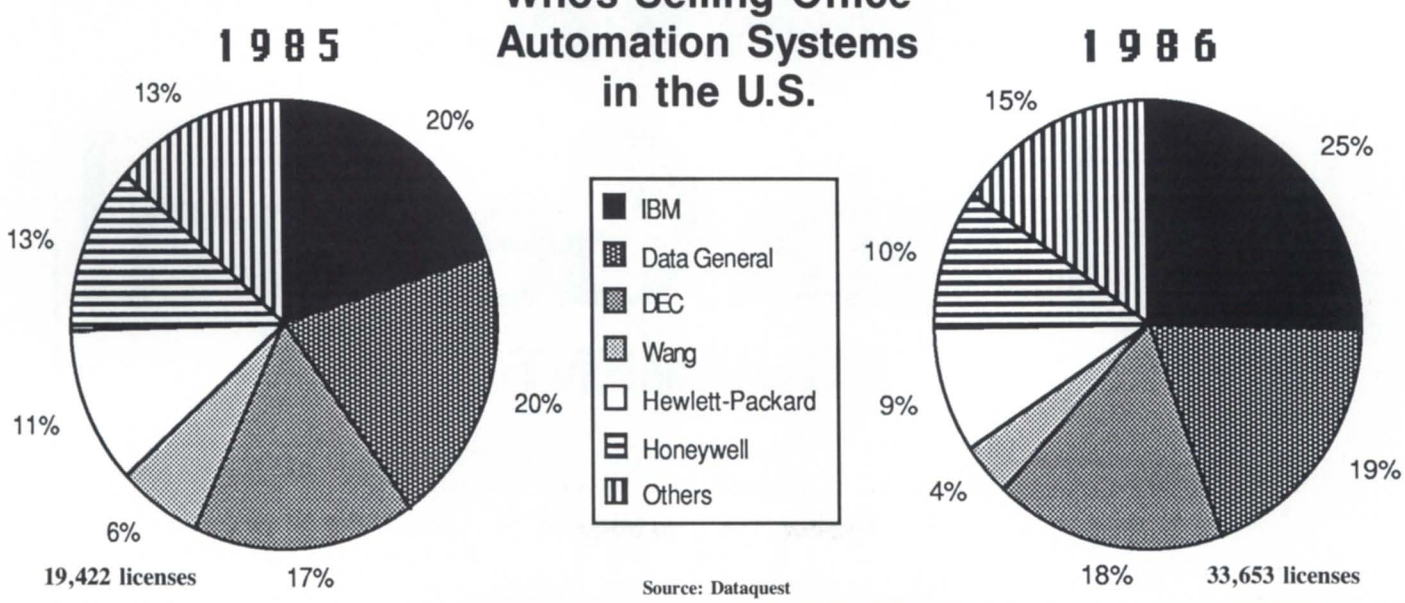
■

When IBM bought Rolm Corporation in 1984, one of the complications was Rolm's Mil-Spec division, which built hardened versions of DG computers for military use. It was a $75 million-a-year business, and the Justice Department wouldn't let IBM keep it. But when Loral Corp. bought it last summer for $100 million, DG objected that Rolm didn't have the right to transfer the license.

In January, DG and Loral announced a 10-year agreement covering existing computers and future DG products. The two companies will also cooperate on sales and marketing for government and military customers.

■

INFO, the fourth generation language marketed by Henco, has its own users group. Since INFO is now available for DG systems, the group asked *Focus* to announce they will hold their national conference on April 6-9, at the Shoreham Hotel in Washington. The keynote speaker will be Rear Admiral Grace Hopper. For more information contact Jim Dennis, the group's president elect, at 911 Douglas Street SE, Palm Bay, FL 32907; 305/729-7422.



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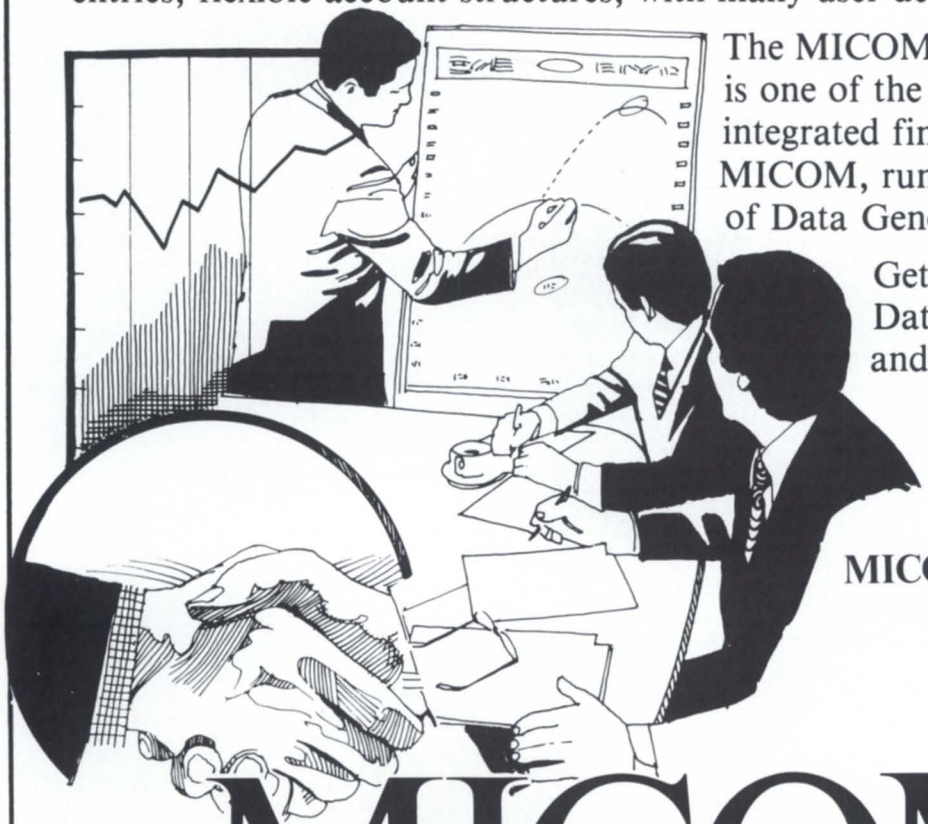

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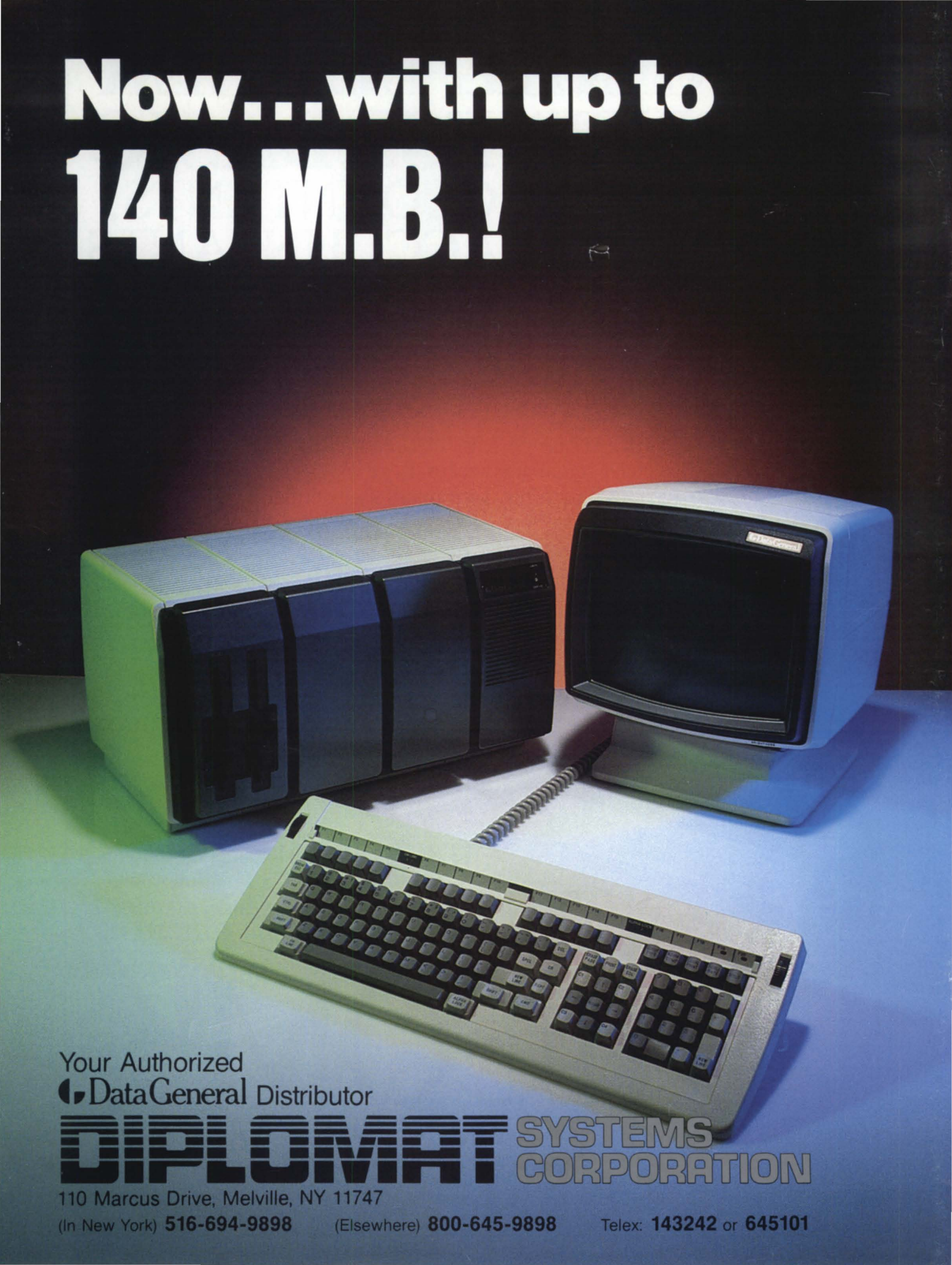

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