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

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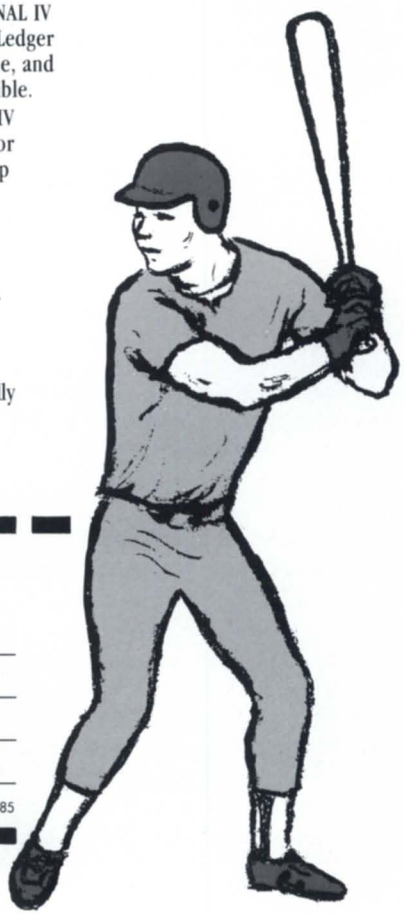

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Focus, the Magazine of the North American Data General Users Group (ISSN 0883-8194) is published monthly by the North American Data General Users Group (NADGUG) in cooperation with Turnkey Publishing. Editorial and Business offices are located at 5332 Thunder Creek Road #105, Austin, Texas 78759 (Post Office Box 201930, Austin, Texas 78720), phone 512/345-5316.

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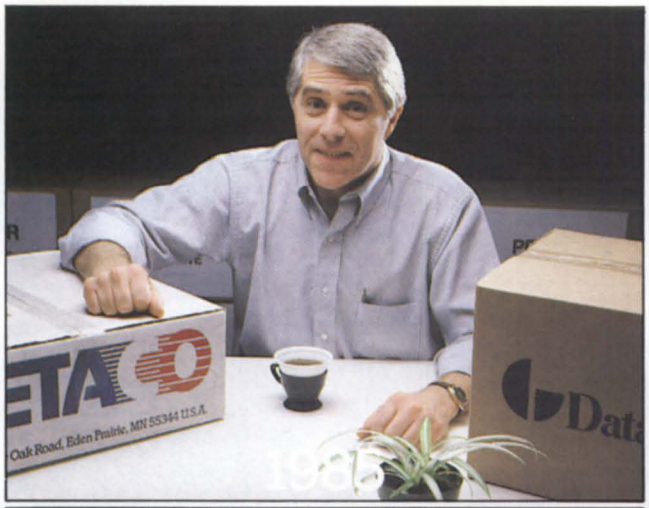
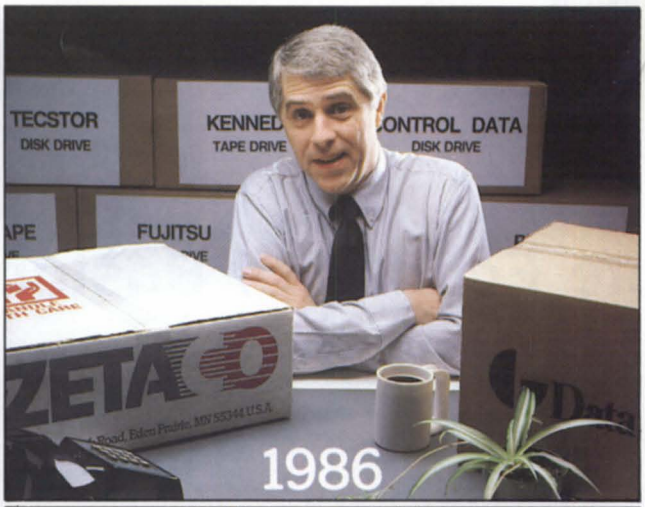
Focus Magazine is distributed to members of the North American Data General Users Group. Membership fees: Individual members $20 per year, Organization or Installation members $100 per year. Address all correspondence to Focus Magazine, c/o Turnkey Publishing, P.O. Box 201930, Austin, Texas 78720.

Third-class postage paid at Birmingham, Alabama. Postmaster: send Form 3579 (change of address) to Subscription Department, Turnkey Publishing, P.O. Box 201930, Austin, Texas 78720.





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More Echoes of Boston

From worry, to relief, and finally to pride, Calvin Durden's face showed an undercurrent of emotion as he monitored the registration desk at Conference '85. As the incoming vice president and outgoing meetings chairman of NADGUG, Calvin was watching the totals from a perspective one gets only by spending two years planning for an event. There were the obvious financial concerns: what if registration was too low to satisfy the hotel's minimums, for example? But more than that, there was the concern that if registration was low, then people would get less of what they came for: ideas, sharing, information, and contacts.

To Calvin and others, the registration statistics seemed to signify more than just the number of Data General users in attendance. In some sense we saw them as a barometer—a high reading would indicate fair skies and a continuing positive trend, while a low reading could mean stormy days ahead.

Hindsight says we didn't need to worry. By Monday evening it was clear that there would be enough attendees to match the showing of the 1984 conference in San Diego. By Tuesday noon Calvin was announcing to anyone who would listen that Conference '85 would not only surpass last year's mark, but would surpass it by something like 20 percent. As the meeting wound down on Thursday, it was still too soon to set an official total, but educated guesses put it at around 720.

That number by itself is not terribly meaningful. Compared to the showing at a DEC User Society meeting, 720 is just not very impressive. But when we look at expanding attendance as only the most obvious part of a four-year trend, it says much more. While each successive national meeting has drawn more members, the numbers are only part of the story. Along with growth in numbers has come more user involvement both locally and nationally, increased autonomy for the national organization, and expanded services for members. An organization like NADGUG doesn't compile a four-year history of 20 percent growth unless members feel that they are getting a good return on the time and energy they are investing.

Therein lies the key. If more people are participating, then the organization can provide more of what its members want. And if more people are getting what they want from the organization, more of them will be ready to invest their efforts toward shared goals. Once the upward spiral is established, it tends to sustain itself, provided that the organization remains responsive to its members.

The trend seems to say that NADGUG has reached a critical point. The evidence of growth was all around at Conference '85. For the first time, there were more people willing to make technical presentations than there were time slots to accommodate them. The exhibit area featured twice as many companies as last year, and much more than twice as much traffic around the booths. Even the annual NADGUG business meeting drew a healthy crowd. These are very positive signs. They indicate that people were getting what they came for.

Whether NADGUG can sustain that growth will depend on how successfully it can recruit new leaders to maintain the organization's responsiveness. Good leadership for a volunteer organization is a very fragile thing. Sustaining it means that current leaders must constantly cultivate a new guard to fill the posts that become vacant with alarming frequency. Brad Friedlander said as much two years ago when he handed over the presidency to Mort Kahl. Incoming President Rene Dominguez likewise stresses how important it is to have a continuous renewal of leadership at both the national and local levels. The current leadership undoubtedly understands that securing NADGUG's growth will require that they entrust it to others.

And who are the others? We are—any of us who liked what we saw in Boston, or who have enjoyed the informal sharing of a Regional Interest Group, or who recognize that NADGUG provides an excellent means of professional development. Ultimately, the small steps we take to become more involved with other users will provide the fuel to keep NADGUG growing.

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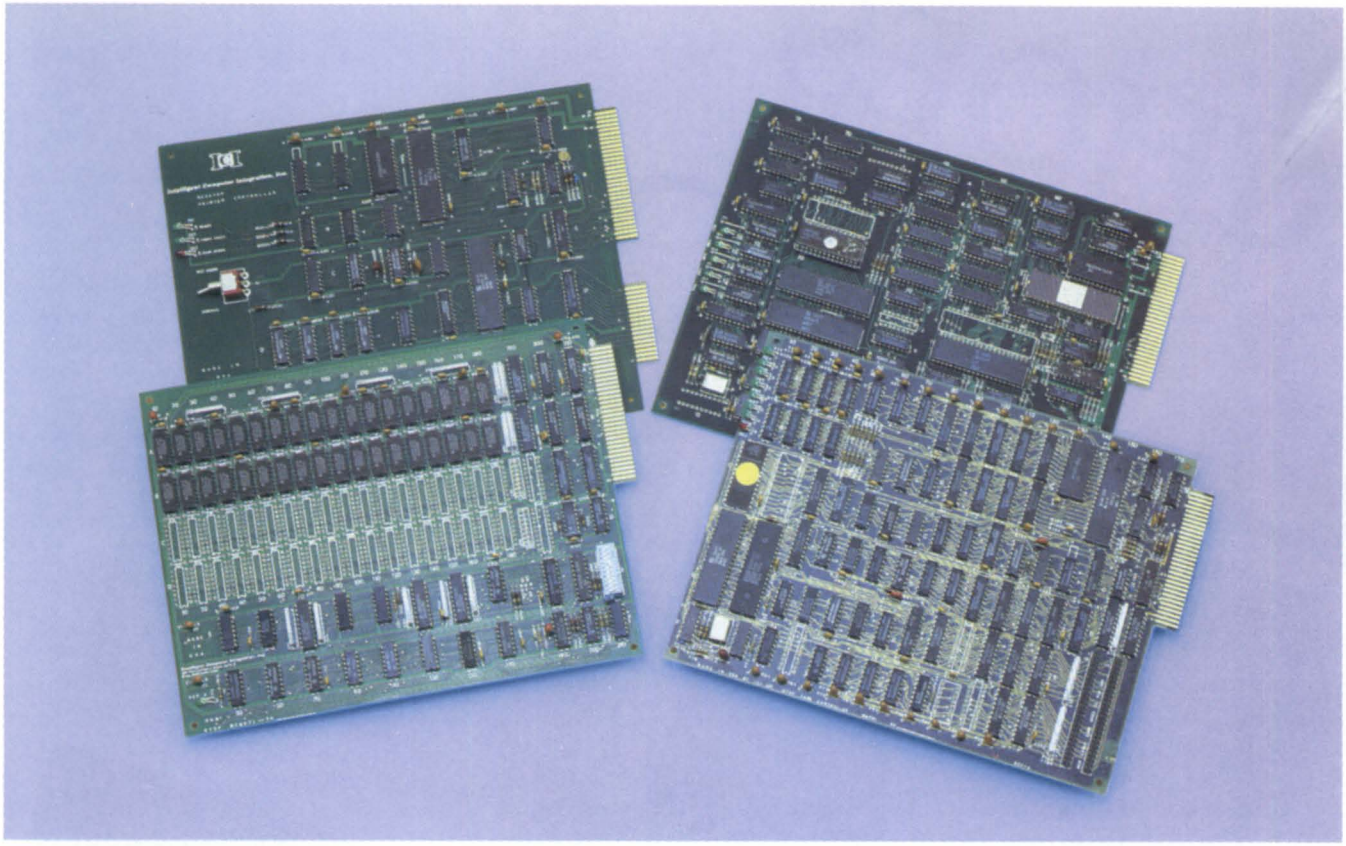

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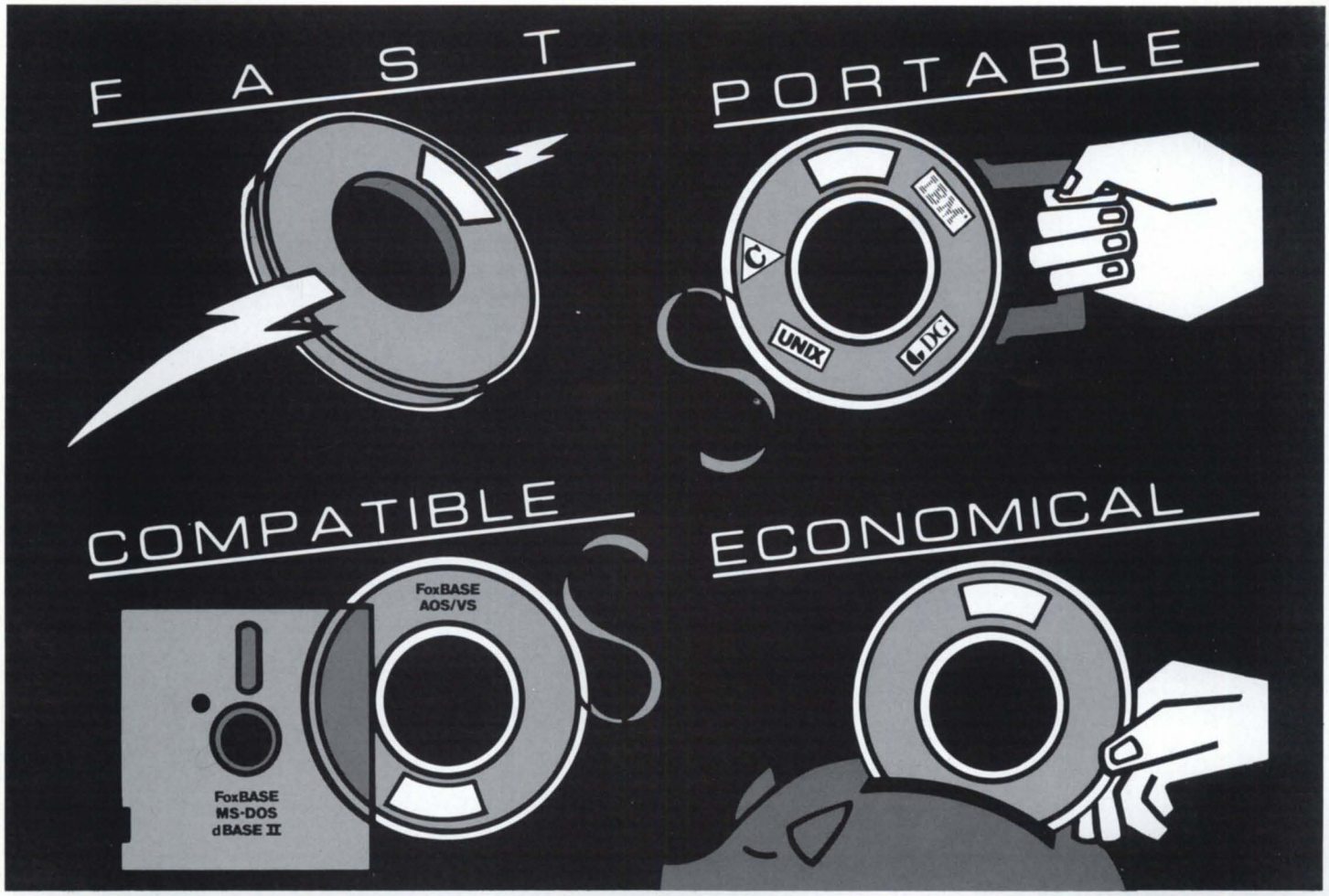

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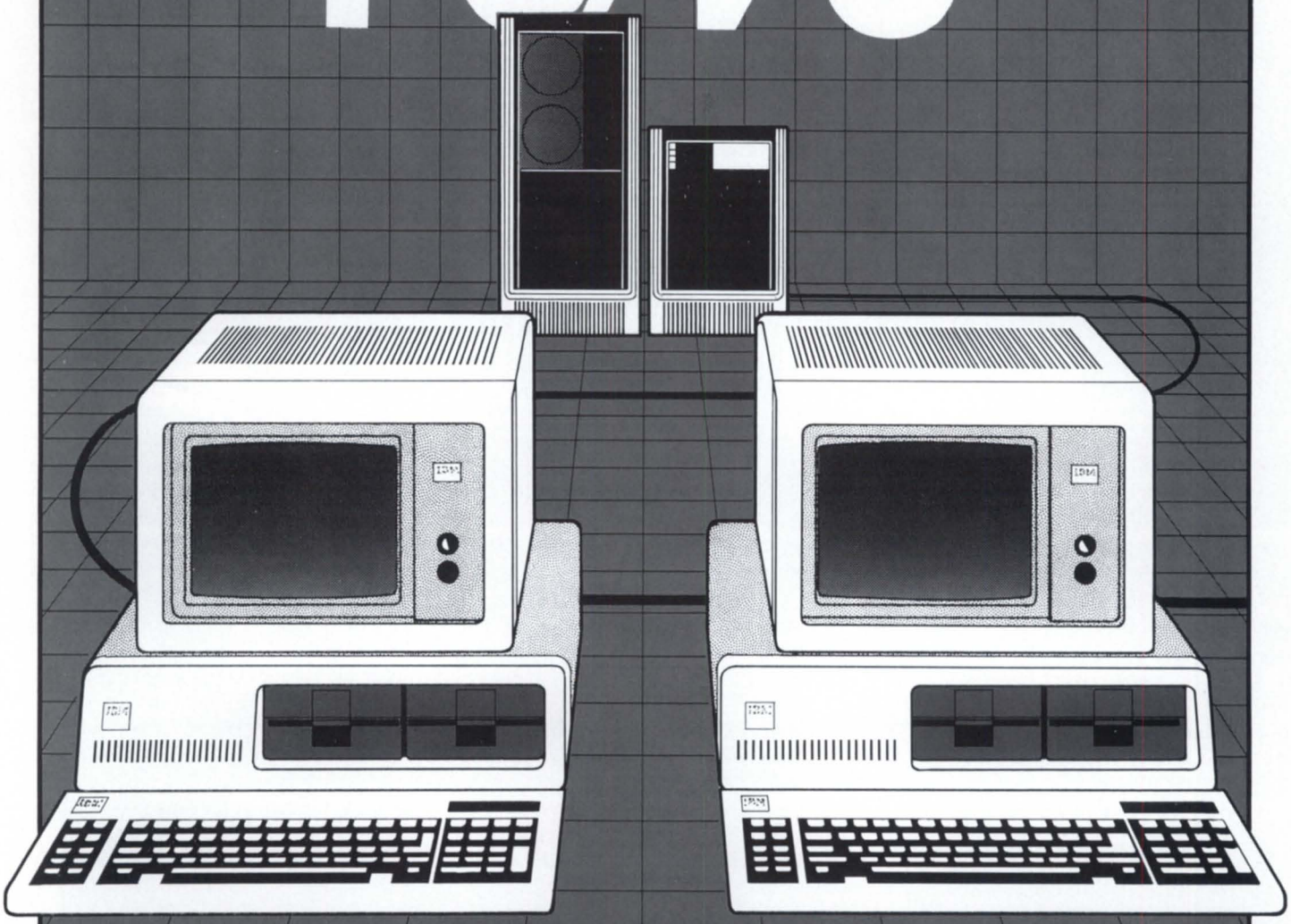

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Electrifying Results

by Carole Kellett
Special to Focus

The power is out somewhere within the 400 square mile area served by Wheat Belt Public Power District in Nebraska. Consumer calls stream in, and the search for the source of the problem begins. But now it doesn't have to be a random search. The utility system's troubleshooters can trace the problem circuit by using "Trouble," an operations software package developed by Miner and Miner, a Colorado-based engineering firm that plans and designs electrical power systems.

When Trouble is fully implemented, troubleshooters will be able to pinpoint a given consumer (of the approximately 4,000 that Wheat Belt serves) on a substation area display map, along with a detail map of the consumer's substation area. Other information stored on each consumer includes a location number, the appropriate substation name, circuit number, and the customer's name, address, and phone number. Matching this information with the trouble reports, the troubleshooter will then be able to dispatch the correct equipment to the problem area.

However, the trouble doesn't always stop there. Identifying all of the power lines affected, selecting the best circuit to open or close to isolate the problem, and minimizing the possible negative results of rerouting currents (such as overloading another line) would normally involve a trial and error process. In a complex electrical power system, trial and error can easily produce further problems.

Miner and Miner's Trouble software was designed to reduce the guesswork in situations like this. However, the software needs data, and the data has to be current and accurate. Keeping consumer and circuit information properly updated requires a flexible data base management system that can store information easily, access it quickly, and link it as needed.

Originally, Miner and Miner incorporated a network data base management system, but found that it did not lend itself to what-if possibilities or branching types of information. The link structure had to be predefined, and could not easily be changed. Stand-alone records were only tied together when digitized. Under the direction of software development manager Jim Wright and software engineer Waynette Nell, Miner and Miner is now replacing the earlier DBMS with InFoCen, a relational DBMS developed for use on Data General systems by 3CI, a Colorado-based software company. InFoCen's network facility, unlike that in many other DBMS products, provides structured but flexible links between data records. Links in InFoCen are defined by the user at the time the Network command is initialized. The user identifies at which record the link is to begin, the items to be linked, and the link direction. Once created, the links can be changed with any of three different commands.

Miner and Miner relies on a Data General MV/4000 with 4 MB of internal memory to make the system work. Peripherals include a 602 Winchester disk drive, a tape drive, and a printer. Wheat Belt can access the system 24 hours a day via its three on-site terminals, which are phone-connected to the MV/4000. Wheat Belt also has a printer for hard copy, when needed.

Miner and Miner's projects include fault current analysis (used to analyze power failures) and load flow analysis (used to predetermine optimum circuit loads). The programs can produce digitized circuit designs that include symbols for a variety of power-related structures such as substations, lines, and circuits. The network of structures may then be used in engineering analysis and cost studies.

The firm is faced with questions such as: What is the best switch to reset to fix a short in a power line at any given circuit? What is the impact of switching a power source to a different substation? Which equipment would be most cost-effective for installation at a given power point? What is the optimum size of conductors to meet the present and future power needs of the community? What are the ramifications of changes in the electrical current directions?

They can answer such questions by linking and relinking data records to simulate changes in the power system. The computer simulation can identify the resulting loads on power lines or circuits, and how consumers would be affected.

The accompanying figure provides an example. The points represent consumer groups, the lines represent power lines, and the squares represent power sources. Each entity is stored as a record within a data set. Each record is assigned a unique item value for record identification. Another item is used to identify the record type (e.g., point, line, or power source). Additional "link" items can establish the network of links between records.

In the present example, an individual record is linked only to those other records that represent the points, lines, or power sources to which it is directly connected. A point is only directly connected to a line, but lines connect directly to both points and power sources. Thus, PAO, a power source, is linked to power lines LAE1 and LAS1. Line LAE1 is linked to consumer group PAE1, line LAS1 to PAS1, and so on.

After the network of links is established between records, actual values in a link may be traced in either direction (to the power source or away from it). Potential loads for the consumer groups, for example, could be based on consumer billing records that are linked to the consumer group.

The different levels of the link may be thought of as branches of a network. Link values may be obtained at one or more levels of the link using the Traverse command to create a subset of those values. A traverse at

Keeping consumer and circuit information properly updated requires a flexible data base management system that can store information easily, access it quickly, and link it as needed

one level would create a subset containing only the records representing the structures closest to the starting point. A traverse at all levels would create a subset of all the records that are linked to the starting point, whether the link is direct or indirect. By using the Unlink command, it is possible to simulate the effect of breaking an actual power circuit.

In Miner and Miner's data base, three types of links are used: power source to line, point to line, and line to point. Approximately 1,000 points will be entered in an InFoCen data set, with a manageable number of items associated with each point for analysis. In addition to the record identification, type, and link, the items will include point loads, line kilovolts, line length, substation name, consumer number, and analysis of line-installation costs.

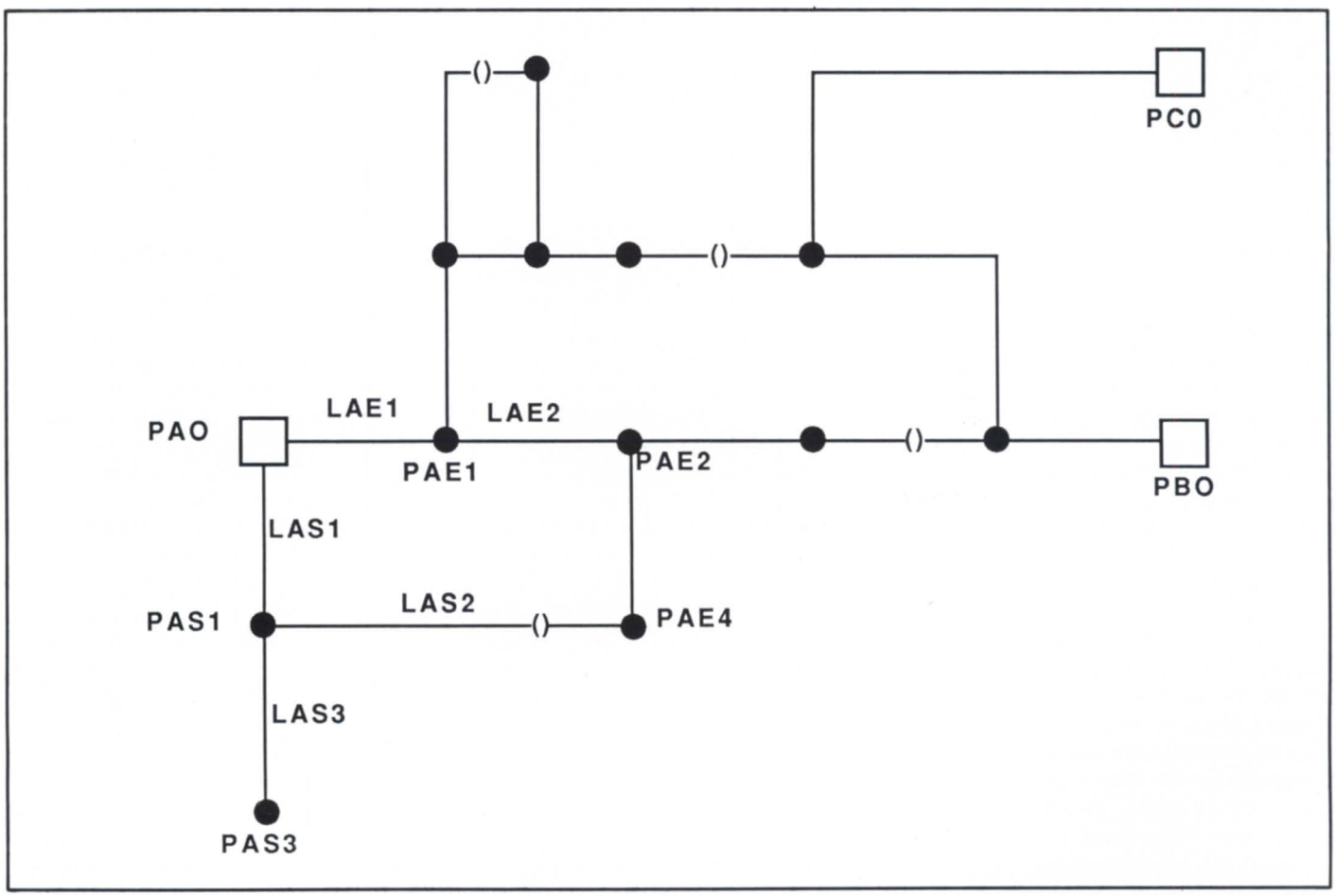
Digitized maps allow the user to prepare files that give X and Y coordinates for the locations of the points, lines, and power sources in the data base. Using the Import function in InFoCen, the location values can be loaded and associated with the appropriate records. Once the map points are loaded, they can be manipulated with InFoCen commands like Link, Unlink, Network, and Traverse. For example, a traverse could create a subset of map points that could be exported to an outside file and read by an application program to recreate portions of the map as needed.

According to Wright and Nell, the conversion process from Wheat Belt's old system is still ongoing. Wheat Belt currently uses the system primarily for planning. Eventually, the fault current program frequently will troubleshoot for line problems, once all the data has been entered into the data base.

Nell says that the project is "a sort of joint venture. Wheat Belt is our test site. They're letting us use their actual data and are providing feedback on what they think of the system."

Wright adds that implementation will continue until everyone is satisfied: "You can always add another analysis program." Once the system is fully operational, Miner and Miner will sell it to other electric cooperatives on a time-sharing basis or, if the co-ops have the proper equipment, directly. Δ

Carole Kellet writes for 3CI, the Fort Collins, Colorado, company that developed InFoCen. She can be reached at 303/223-2722.



UPs and Downs

by Brian Johnson
Contributing Editor

Contest Corner. This month's column is being written the week before NADGUG, so no entries in the Great AOS/VS Security Scam Contest have been received. If you hurry you might see your entry here next month. If you're not sure what I'm talking about, refer to my September column.

This month we're going to take a look at the UP macro. The primary purpose of the UP.CLI is to start the normal timesharing environment in an orderly fashion after a system boot. The key word here is "orderly."

In general, you don't want your UP macro to reference specific physical devices (except for disks and tapes), and you want to hide as many of the details as possible in other macros, which the operator can also use after the system is up. If your UP macro is about the same level of complexity as a General Ledger program, then you've got a problem.

The first step is to move a copy of UP.CLI from :UTIL to the root. It's always a good idea to avoid editing DG-supplied macros, so you will have something to go back to if you need to start over.

Default Searchlist. The first order of business is to establish the default system searchlist. Whatever is set when a server is PROC'ed up becomes its searchlist also. For most processes, your local utilities directory (let's call it :LUTIL) and the system utilities directory (:UTIL) are all that are required.

You've probably noticed that the virgin UP macro also includes the root directory. This is a holdover from the old days when several pieces of software that provided the ability to push to the CLI referenced it as "CLI.PR" instead of ":CLI.PR". This oversight was rectified by almost every product group long ago. However, from time to time some new product shows up which attempts to PROC up "CLI.PR" instead of ":CLI.PR".

My advice is to set the searchlist to :LUTIL :UTIL (minimal searchlists have performance advantages) and deal with the errant products separately in their "private" UP macros.

SYSID. The next order of business is to set the system id. The only real restriction is that you set it before PROC'ing up anything which uses it (like EXEC).

SYSLOG. Ideally, you want the SYSLOG started as early as possible so that it's armed and ready when the servers start to grab memory. If you happen to have a marginal memory board this will allow the errors to be caught earlier.

If there are any of you out there who don't start SYSLOG because you think it affects system performance, I suggest you do a little arithmetic. Take the size of :SYSLOG at the end of a normal day and divide it by 7 MB. This will give you the percent of the I/O to your system disk attributable to logging. If you get more than one percent I'd be amazed.

There are two other reasons for keeping a log: field service can use it to get hardware error histories, and you can use it to collect system performance info (we'll cover this in a future column).

Anyway, I suggest you rename any existing SYSLOG to something that includes the time and date, move it to someplace convenient (e.g., :UDD:OP:OLD_SYSLOGS) for later analysis, and do a SYSLOG/START.

Peripherals. At this point you want to initialize any public disk units. If you don't run a labeled-tape-only shop, then you also want to change the ACL's of the tape units (ACL @MT+,WAR) to allow direct user access. If you're one of those slothful types who prefers CHAR commands to sysgens, now is also the time to diddle your device characteristics. I suggest you do it with a DIDDLE.DEVICES.CLI macro.

EXEC. A word of caution: at this point PID 2 is at priority 1. Assuming that most of your users run at swappable priority 2 (I recommend it), then you probably also want the servers fired up at swappable priority 2. Otherwise, the servers can cause poor response time for interactive users during periods of heavy server CPU activity. I suggest you add "PRI 2 2" just before you fire up the first server and put a "PRI 2 1" down at the end of the UP macro.

Traditionally, EXEC is PROC'ed up at this point on PID 3. Who are we to flaunt tradition? The example PROC command in the virgin UP.CLI works just fine, but should be preceded by XEQ QCMP/YES to repack the queue and delete any vestigial queued output files. I suggest an UP.EXEC.CLI macro to hide the details.

Note, however, that now is not the time to start the spoolers and batch streams, and enable consoles. It's quite possible that batch jobs could start and users could log on before any servers they need are started (like INFOS), and before any database recovery is complete.

Servers. If your system uses servers (INFOS, COMLOG, DBMS, XODIAC, CEO), now is the time to fire them up. The

preferred method is to have a macro called UP.server.CLI in :LUTIL for each one. In this way, any special searchlist requirements and PAUSE's can be handled separately for each particular server. Each server macro should preserve the environment across the call (DG's do), using PUSH, PROMPT POP, and POP.

The Rest of the Story. Sometimes it's convenient to stop the UP macro at this point to do things like run IRECOVER in case you're rebooting after a less than graceful shutdown. A nice way is to simply ask the operator, "Full or partial [F/P, default is P] ?"

Spoolers, Users, and Batch. Now is the time to let the screaming hordes onto the system. You can make your life much easier if you segregate each section of this part into a series of macro references. I like macros of the form UP.thing.CLI, where "thing" is CONSOLES, LPT, LQP, BATCH, NETWORK, etc.

Each of these mini-UP macros should be made up of references to other macros of the form command.queue.CLI. "command" is CREATE, START, PAUSE, RESTART, STOP, FLUSH, etc., corresponding to the applicable primary EXEC command. "queue" is BATCH, LPT, LQP, SNA, HAMLET, etc.

How many times have you typed out UP.CLI to see how to start up a printer, or found at least 20 different macros for diddling queues? This eliminates the problem, and makes sure that there is one and only one macro for each of the commonly-used functions.

I'm not a fan of EXEC's ENABLE/ALL, with the possible exception of a system that has no 20 mA lines, and terminals on every physical port. Instead, I use UP.CONSOLES.CLI, which invokes ENABLE.LOCALS, ENABLE.DIALUPS, etc.

Last but Not Least. Back in the old days (1978?) there was a small design oversight in AOS: if you typed ^C^B at PID 2 it shut the system down. As a temporary crock, an EXECUTE CLI was added to the end of the UP macro to provide some measure of protection. Not only has the crock persisted to this day, but the AOS/VS porters even copied the crock into the AOS/VS UP.CLI macro without thinking.

Get rid of it, or, better yet, replace it with CHAIN LOCK__CLI. Δ

B.J. is the President of B.J. Inc., a San Francisco-based consulting practice. He can be reached at (415) 550-1444.

A Sample UP.CLI

```
[!EQUAL,[!PID],2]
  SEARCHLIST :LUTIL :UTIL
  SYSID BJ INC
  UP.SYSLOG
  ; COMMENT Renames and saves any existing SYSLOG
    ; COMMENT before starting a new one
  DIDDLE.DEVICES
  ; COMMENT Set tape ACL and reset console CHARs
  UP.DISKS
  ; COMMENT INITs permanent LDUs
  PRIORITY 2 2
  UP.EXEC
  ; COMMENT Contains X QCMP/YES and
    ; COMMENT PROC/DEF/NAME=EXEC/DIR=@ EXEC
  UP.COMLOG
  UP.INFOS
  UP.DBMS
  UP.NETWORK
  [!EQUAL,([!READ Full or Partial |F/P default is P| ? ]),(F)]
    UP.LPT
  ; COMMENT Contains START.LPT and CONTINUE.LPT
    UP.LQP
  ; COMMENT Contains START.LQP and CONTINUE.LQP
    UP.CEO
  ; COMMENT Contains CEO.QMA START etc...
    UP.BATCH
  ; COMMENT Contains CONTINUE.BATCH
    UP.CONSOLES
  ; COMMENT Contains ENABLE.DIALUPS
    ; COMMENT and ENABLE.LOCALS
  [!END]
  PRIORITY 2 1
  CHAIN LOCK__CLI [!ELSE]
  WRITE Nice try Bozo. Ya gotta be PID 2 to fire this mutha up. [!END]
```

The Special Systems Group's capabilities range from simple hardware modifications to complex engineering development projects

You Want What?

DG Special Systems provides customized solutions for special customer requirements

by Paula Jacobs
Special to Focus

As a broad-based supplier of systems solutions, Data General offers customers a full range of hardware and software products. But what if your needs go beyond Data General's standard product line? What if you require specialized products for a unique application? For example, a customized CPU? Or a high-speed interface? Or maybe special packaging?

Data General's Customer Services Division extends the company's product line and provides solutions to special problems. To complement Data General's standard product mix, the Division's Special Systems Group enhances standard Data General products with customized hardware products and services.

According to David Wilson, Director of the Special Systems Group, "Our organization is a resource to Data General customers when their needs go beyond the standard product line. We provide our customers with the products they need to help Data General's product lines more perfectly fit their application needs."

The Group's capabilities range from simple hardware modifications to complex engineering development projects. Products include special peripheral controllers, processors, peripheral and communication switches, terminals, and high-speed communication controllers with special protocols. Also available are services such as system burn-in, special testing, and system integration. To support its hardware, the Special Systems Group designs software, including diagnostics, operating system drivers, and custom microcode.

Initially, most products are developed to satisfy a specific customer requirement. Some of these products prove to have broader marketing appeal, and later become "standard specials" available to other Data General customers.

"We are," says Wilson, "more than just a hardware design organization. All of our products are manufactured at our facility in Southboro, Massachusetts. Furthermore, our products are all backed by Data General's Field Engineering, with additional post-sales support available from the Special Systems Technical Operations Group."

The Special Systems Group services Data General customers who understand the application problem and the technical solution, as well as those who require complete application assistance.

Some customers bring both the technical problem and the appropriate solution to the Special Systems Group, but lack the appropriate hardware resources. For these customers, major attractions are Special Systems' complete hardware design/manufacturing resources and access to Data General's corporate resources. For example, a Data General customer came to Special Systems for a high-speed communications processor that would accelerate system performance. Since the customer's system was configured with multiple data communication lines, higher throughput to data communication lines was essential. To meet this need, the Special Systems Group produced a high-speed DCU (Data Control Unit), and thereby increased processing power by a factor of four.

When complete application assistance is required, Special Systems' engineers and application specialists help customers gain insight into the technical problem and define product specifications. In this situation, customers benefit from the Group's extensive technical expertise across the entire Data General products line. For instance, when a Data General customer required a high-speed multi-mode magnetic tape for non-real time analysis of data, the Special Systems Group was able simply to recommend an existing Special Systems product.

In many instances, the problems presented to the Special Systems Group are rather esoteric, and the solutions have only a limited market appeal. But Special Systems serves all of Data General's market areas, and is in constant contact with Data General customers. "Therefore," notes David Wilson, "as unique as the problem may appear, it is most likely that Special Systems has already solved

When a large retail chain decided to automate its stores, a terminal was required for turnkey point-of-sale applications

a similar problem. If not, our group is fully equipped to undertake new and exciting challenges."

The cases below illustrate the scope of Special Systems' application solutions and how the Special Systems Group has met some rather unique customer requirements, including products for:

- DC/DS/SC Distributed Family of Workstations, microNova, and Nova computer systems;
- microEclipse, Eclipse, and Eclipse MV/ Family computer systems; and
- Desktop Generation computer systems.

Special-Purpose Interfaces and Communications Devices

Among the Special Systems Group's particular strengths are special-purpose communication devices and custom interfaces, as well as special protocols or down-line loaders for standard Data General products. These products range from specialized interfaces for array processors to communication boards that can be used in more general applications.

Consider the following examples. A medical OEM approached the Special Systems Group to interface a pyrometer device to a Desktop Generation computer used in detecting breast cancer. The Special Systems Group designed an analog-to-digital interface, as well as a plastic shroud for the terminal. The Group also provided complete electrical, mechanical, and software packaging.

In another instance, the Special Systems Group provided a hardware interface to an Optical Character Reader (OCR) used for automated text translation. In addition to overcoming the hardware interface problem, Special Systems solved a performance problem by converting algorithms to microcode.

When a major airline wanted to supply travel agents a system that would integrate a computerized reservation network with an office automation package, the Special Systems Group provided the PARS interface board. With the board, travel agents can use a Data General computer to directly access the airline reservation network.

A computer service bureau uses multiple Eclipse MV/ Family computer systems for data processing applications. Since high reliability is a major concern, it was necessary to implement a system that could support data redundancy and dual data paths. To meet this need, the Special Systems Group provided the Radial Multiprocessor Communication System (RMCS), a high-speed interconnect system that enables Data General computer systems to communicate with each other. The RMCS architecture allows each computer in the network to operate independently, thus ensuring network availability.

Finally, for a Data General customer with multiple synchronous and asynchronous terminals in a polled environment, the Special Systems Group designed an interface board that allows communication with a Data General system at high baud rates.

Special Processor Options

Often, customers bring requests for special processor options, including board modifications and new system designs. The Special Systems Group has also met customer requirements for custom microcode that significantly enhances CPU performance speed.

For example, when a Data General customer required increased I/O throughput, the Special Systems Group changed the BMC channel for a microcode to hardware implementation. This modification more than doubled the basic I/O data handling ability.

Additionally, the Special Systems Group has designed a number of customized CPUs to exacting customer specifications, including increased main memory capacity. For example, by modifying a standard Nova R/C computer system, the Special Systems Group increased main memory capacity to 128 KB of CMOS main memory backed up by lithium battery. This modification enables programs to remain in memory, allowing information to last without reloading for several months, even when the power goes down.

Peripheral and Communications Switches

To help customers flexibly reconfigure systems, the Special Systems Group has provided a variety of peripheral and communication switches. For example, in a redundant system environment, target

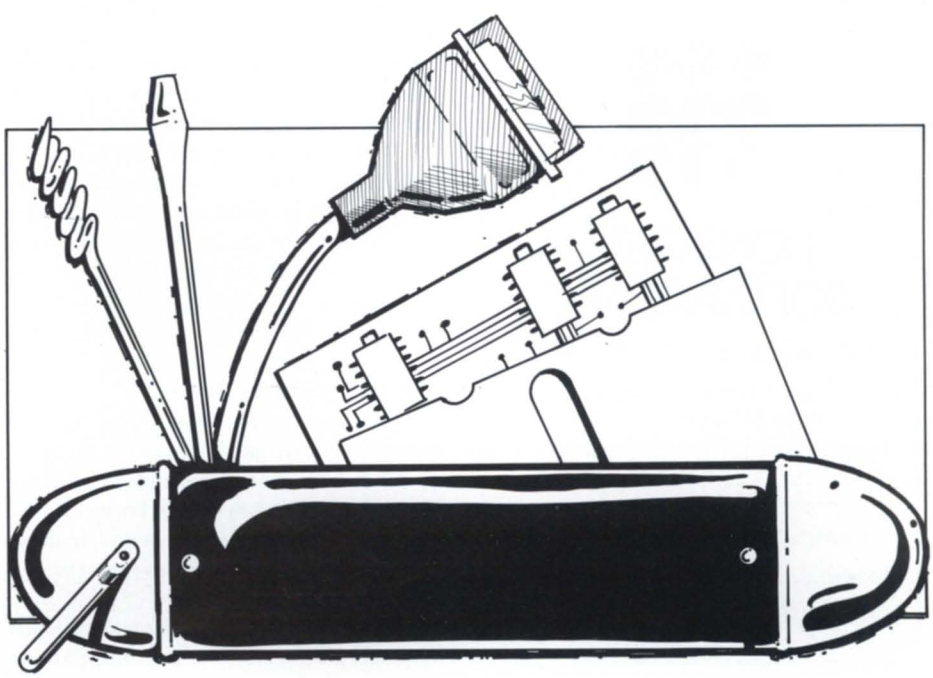


ILLUSTRATION BY ANDREW SALDAÑA

In several instances, the Special Systems Group has met customer needs for earthquake-resistant equipment

information must be simultaneously processed in both systems. Special Systems provided a modified communication switch that allows simultaneous transmission of incoming information, yet selects only the primary CPU for outgoing transmission.

Special-Purpose Terminals

Another area of Special Systems' expertise is that of display terminals. In response to customer requirements, the Special Systems Group has modified standard Data General Dasher terminals with firmware, hardware, display, packaging, and keyboards.

For example, a hospital, using a data retrieval package, required a firmware modification to a standard Data General Dasher D210 terminal. The Special Systems Group modified the firmware to permit reverse video and underscoring.

In another case, a leading manufacturer required terminals for process control in a harsh factory-floor environment. This meant, of course, that the terminal would have to withstand extreme operating temperatures and be protected from foreign matter. The Special Systems Group designed the totally sealed Industrial Terminal with a built-in environmental conditioning unit and sealed membrane keyboard offering protection from harmful elements such as condensation, seepage, dust, and dirt.

When a large retail chain decided to automate its stores, a terminal was required for turnkey point-of-sale applications, including inventory control, credit checking, pricing, and report generation. A basic requirement was a display terminal with an interface to a cash drawer controlled by the host CPU. The Special Systems Group provided a cash drawer that incorporates a drawer-release keylock and a removable plastic money tray.

Special Peripheral Devices

Customers bring to the Special Systems Group requirements for a wide range of peripheral devices compatible with Data General computer systems. To meet these unique needs, the Special Systems Group has offered printers, bar code devices, and disk subsystems.

In one instance, a government customer required a computer system for operational support and information management. Special Systems provided a MIL-STD-1397 peripheral interface and two different magnetic tape interfaces. Additionally, the Special Systems Group designed special cabinetry for the total system, including a processor.

Another Data General customer wanted to limit access of unauthorized personnel to the computer room, without restricting their access to the line printers. Special Systems responded with its Long-Line Printer, which can be located up to 500 feet from the CPU. Furthermore, since this printer is available with a quietized cabinet, the customer was able to locate the printer within the office environment.

Special Packaging and Services

The Special Systems Group has also met unusual customer requirements for special packaging and services such as keylocks, military-type cabinetry, cabinet modifications, cabling, and wiring.

When custom cabinetry was required for a mobile medical system, the Special Systems Group met mobile operation requirements by modifying the equipment to improve its shock and vibration characteristics.

In several instances, the Special Systems Group has met customer needs for earthquake-resistant equipment. These include leveling pads on computer cabinets and safety covers on power and control switches.

These are just some of the customized application solutions the Special Systems Group has provided to help Data General meet all of its customers' needs. In each case, the Group's application and marketing specialists have worked with Data General customers to provide the application solution best suited to the particular situation. Many of the application-specific solutions described here can also be adapted for more general requirements. Δ

Paula Jacobs writes for Data General Special Systems Group. For additional information, contact the Special Systems Group, MS 6-1, Route 9, Southboro, MA 017772; 617/480-7150.

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Supreme Court leaves many questions in Digidyne case undecided

by John Hartzell
Focus Staff

In what many consider a landmark case for the computer industry, the U.S. Supreme Court's recent denial of a writ of certiorari in *Digidyne Corp. v. Data General Corp.* brings to a close the issues phase of a controversy that began in the late 1970s.

In refusing to grant certiorari, the Supreme Court let stand a decision of the U.S. Ninth Circuit Court of Appeals. That decision apparently invalidates Data General's policy of refusing to license operating systems unless those systems are to be run on Data General CPUs and unless licensees also purchase a minimum amount of Data General hardware (''minimum equipment configuration,'' or MEC).

Facts and Issues. *In re Data General Corporation Antitrust Litigation*, as the case was originally called in the Northern District, focused primarily on Data General's refusal to license its copyrighted RDOS (Real-time Disk Operating System) software to run on CPUs other than Data General's own Novas. Data General justified this policy by reasoning that not to do so would allow Data General's hardware-manufacturing competitors to reap the benefits of DG's expensive software research and development.

Digidyne and Fairchild manufactured ''Nova emulators,'' CPUs that mimicked the operation of Data General's Novas and that were compatible with RDOS. A popular, if somewhat pejorative, term for such products in the computer industry is ''knockoffs.'' As plaintiffs, Digidyne and Fairchild alleged that Data General's marketing tactics violated antitrust laws by ''locking in'' DG's customers through the aforementioned tying together of the sale of RDOS and Novas. In short, the plaintiffs claimed that sales of their own CPUs suffered greatly because Data General customers were forced to continue buying from Data General.

A point critical to the suit was the sort of customer that patronized Data General. A large percentage of DG's clients were (and still are) Original Equipment Manufacturers, or OEMs. Digidyne and Fairchild pointed out that OEMs, as value-added resellers, allocated significant financial resources in developing applications software to run on CPUs. They also pointed out that such applications software does not actually interface with the CPU, but with the operating system resident on the CPU. Hence, applications software, at least in the late 1970s, was largely operating system-specific.

Thus, when an OEM obtained an RDOS license, it also had to buy one or more Novas. The OEM added its applications software (and often its own hardware) to the system and then resold the package to an end user. Having expended a relatively large amount of money in developing its software, the OEM arguably would be reluctant to develop parallel software to operate on other operating systems, and hence on other CPUs. According to Digidyne and Fairchild, the OEM would be locked into buying the operating system on which the OEM's applications programs ran. To obtain RDOS, the OEM would have to buy a Nova. The plaintiffs maintained that every Nova sold under those circumstances was a potential sale of their own CPUs lost to an illegal competitive tactic.

Data General countered that such a line of reasoning was invalid, but that even if it were valid, there were successful alternatives to RDOS and that even conversion software was available (Jack C. Provine, of Miller, Starr & Regalia in San Francisco, recalls that witness after witness refuted that latter claim). Data General pointed out that third parties manufactured operating systems very similar to RDOS and that some of these operating systems even predated RDOS. Data General contended that these other operating systems would function well on plaintiffs' CPUs and that OEMs therefore were not constrained to deal with Data General, but had the legitimate option of obtaining CPUs and operating systems from other sources.

In light of the foregoing positions taken by Data General, on the one hand, and Fairchild and Digidyne, on the other, and in light of Judge Orrick's positing that certain facts were uncontroverted, the trial proceeded on the single issue of whether or not Data General had sufficient economic power in the operating systems market (the tying product) to restrain competition in the CPU market (the tied product). That single issue produced a long trial and an even longer series of appeals.

The Trial. Prior to trial, both sides had opted to have a jury act as the trier of fact. Immediately before testimony began, however, Data General expressed its willingness to accept a bench trial. Plaintiffs did not concur, and a jury of 10 was impaneled in one day (seven women and one man eventually delivered the verdict).

Although Judge Orrick could have impaneled a jury of experts, he chose not to. He expressed the opinion that such a jury might bring prejudices to the case that would interfere with the service of justice. As a result, the jury that was chosen was relatively unsophisticated with respect to computers and represented a cross-section of American occupations—a mechanic (later elected foreman), two homemakers, a bottling plant employee, a part-time freelance photographer and school crossing guard, a switchboard operator, two secretaries, a loan processor, and a draftsperson.

Thus, before the jury could evaluate the issues, they had to become reasonably familiar with the complex world of computers, especially the jargon. Both plaintiffs and defendant mounted impressive educational campaigns. Expert witnesses, including a Nobel prize winner, were brought in to teach the jury about computers. Much of the education addressed the relationship among CPUs, their operating systems, and the applications software that runs on such systems.

Once the formal education process had ended, the trial on the merits began. Plaintiffs attempted primarily to prove that Data General exercised considerable economic power within relatively narrow software and hardware markets. They provided evidence of Data General's power over price and of the uniqueness and desirability of RDOS. Plain-

tiffs contended that these factors combined to give Data General a competitive advantage in the CPU market.

Data General sought to prove that its bundling of software and hardware did not confer an illegal advantage under antitrust law. In doing so, Data General's attorneys presented evidence that defendant's price structure in both the hardware and software markets was competitive; that OEMs were locked in only insofar as their applications programs were more or less convertible to other operating systems, a decision made by the OEM, not by Data General; and that Data General relied on the good will of its old customers to aid in acquiring new customers.

Much of the trial testimony focused on two areas: the width of the relevant markets and the definition of sufficient economic power within those markets.

In tying cases, two tests are commonly used to evaluate the sufficiency of economic power within relevant markets. The first of these is a traditional market share analysis, as employed under the Sherman Act. In the past, federal courts have held that approximately a 10 percent minimum is required, but this number apparently can fluctuate with type of product and nature of the industry. The second test is that of the "uniqueness" of the tying product. Uniqueness has been defined in legal, economic, and physical terms.

In a determination of economic power, uniqueness may encompass any situation in which competitors are prevented from offering a distinctive product themselves. This has been interpreted as extending to the desirability of a product in the eyes of potential customers or to a product's characteristics.

At trial, plaintiffs presented evidence that Data General's RDOS was a unique product that, through its own superiority, was highly desirable to OEMs. Testimony for plaintiffs indicated that many considered its high functionality and speed relative to that of other operating systems to be so desirable that they would suffer having to acquire a Nova just to obtain RDOS, rather than settle for an allegedly lesser operating system. (It is ironic that the fact that RDOS was considered to be a quality product actually worked to Data General's disadvantage in this case!)

With respect to the other big issue receiving much testimony—that of the width of the relevant markets—each side's strategy was obvious. Plaintiffs sought to define relatively narrow markets, whereas defendant defined broad ones: the narrower the markets, the easier it would be to conclude that Data General had sufficient power in the tying (software) market to restrain competition in the tied (hardware) market.

Among those testifying as to how constrained they felt within the market were several OEMs. Those who resented Data General's policy said they felt highly constrained. One suggested that even though he had to buy a Nova to obtain RDOS, the best use he could think of for the CPU was as a boat anchor. Others, who suggested that the policy played a minimal role in their CPU-purchasing decisions, were happy to have a reliable source for what they felt was a dependable product (the Nova CPU).

To ascertain whether or not the jury had understood the mountains of testimony and was basing its verdict on proper considerations, Judge Orrick put the question of Data General's economic power within the respective markets in a "yes/no" form and then supplemented that question with a series of interrogatories. These interrogatories addressed the issues of market definition and economic power. Among them was a question asking the jurors to define the markets for Data General's software and CPUs.

Judge Orrick permitted the jury to accept plaintiffs' narrow definitions or defendant's broad ones, or to define these markets themselves. Although in defining the software market the jurors chose a middle ground between the two extremes, their definitions were closer to those of defendant. The jury defined the relevant hardware market as that of all "general purpose minicomputers and microprocessors," but not mainframe computers (as urged by defendant).

Although the jury tended toward Data General's definitions of the relevant markets, the matter did not end there. Tying cases countenance the possibility that within broad markets may exist well-defined, economically significant submarkets within which a company may be insulated from competition. The jury did define such submarkets, in essence agreeing with plaintiffs' definitions. The result was that the jury rendered a verdict for the plaintiffs.

Judgment n.o.v. When Judge Orrick subsequently overturned the jury decision, he caught many pundits by surprise, although there were numerous supporters of his action. Orrick disagreed with the jury on several counts. In essence, he said that no reasonable juror could find as these jurors had found on the basis of the evidence presented at trial.

First, he disagreed with the jury's finding of submarkets within which Data General exercised undue economic power. He wrote that the broader definition of the relevant markets first provided by the jury was "the only reasonable definition on the basis of the evidence presented." Furthermore, he stated that the evidence had demonstrated "a broad, dynamic, highly competitive market in which numerous ... vendors compete to offer original equipment manufacturers ... all-purpose computer solutions designed to meet a variety of end-user needs." He added that the evidence showed that "this general market is characterized by a wide range of competitive hardware offerings, intense price competition, ease of entry and rapid growth."

Second, Orrick held that, even if the relevant submarkets actually existed as the jury had defined them, the evidence did not show that Data General had sufficient power in the software market to restrain competition in the hardware market and that the "customer has available to him a variety of competitive alternatives." Orrick declared that lock-in, as described above, was not a source of market leverage.

Third, Judge Orrick disagreed with the jury's finding that Data General's software was so unique that it gave an inherent advantage over its competitors. He said that plaintiffs had failed to show that Data General's operating system was "so unique" that competitors were unable to offer their own version of the program.

Ninth Circuit Reinstates Jury Verdict. Digidyne and Fairchild, of course, appealed Judge Orrick's granting of judgment n.o.v. On review, the Ninth Circuit Court of Appeals reinstated the jury's finding against Data

General. The appellate court did agree with certain aspects of Orrick's decision: his granting of summary judgment in holding that RDOS and Nova were separate products, that plaintiffs were damaged by the tie-in policy, and that no legitimate business considerations proffered by defendant justified the tie-in.

But, in overturning Orrick, Chief Judge Browning, writing for the Ninth Circuit, declared that the lower court judge was mistaken in believing that the legality of a tying arrangement must be tested by the seller's economic power throughout the market for the tying product and the resultant degree of restraint of competition in the tied product market considered as a whole.

Browning indicated that "monopoly" power by a seller would be sufficient to establish illegality per se, but that a rule of reason approach could do likewise, absent a showing of such monopoly power. His opinion states that the proper inquiry in reviewing the jury verdict was "whether the jury reasonably could have concluded defendant's RDOS was sufficiently unique and desirable to an appreciable number of buyers to enable defendant to force those buyers also to buy a substantial volume of defendant's NOVA instruction set CPUs they would have preferred not to buy."

Browning also stated that "the question is not whether other operating systems with which RDOS competed were as good as RDOS or better in the eyes of some buyers, but rather whether RDOS, available only from the defendant, was sufficiently attractive to some customers to enable defendant to require those who wished to obtain it also to buy from defendant NOVA instruction set CPUs they might otherwise have purchased from others."

Chief Judge Browning also addressed the impact of the copyright extended to RDOS. He wrote: "The RDOS copyright established both the distinctiveness of RDOS and a legal bar to its reproduction by competitors." He then cited federal case law to the effect that requisite economic power is presumed when a tying product is patented or copyrighted.

The line of reasoning appears to be: Issuance of a copyright extends a legal monopoly of sorts to the holder of the copyright. The item covered by the copyright must meet strict standards of definition and uniqueness. Therefore, in a case such as this one, an attempt to essentially expand the definition of the item covered by the copyright, by tying another item to the copyrighted item, violates the extent of the legal monopoly as defined by the terms of the copyright. Apparently, the courts will not look kindly on such arrangements.

Perhaps most significant among the Ninth Circuit's reasons, stated or otherwise, for overturning Orrick is probably the fact that appellate courts resist denying the jury's role as triers of fact. History shows that, if the jury had found for Data General and Orrick had then overturned that verdict, there is a strong likelihood that the appellate court would have

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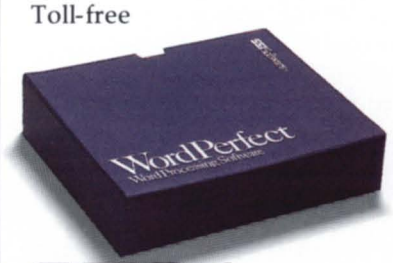

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reinstated it on the grounds that a reasonable juror could have concluded so from the evidence presented at trial.

Similarly, had plaintiffs agreed at the last minute to try the case to the bench, rather than to a jury, and Orrick had found for Data General, there is every likelihood that the appellate court would have agreed with Orrick. These are moot suppositions, but interesting nevertheless.

Denial of Certiorari by Supreme Court. Data General appealed the Ninth Circuit's conclusion to the U.S. Supreme Court. In June of this year the Court refused to grant certiorari, that is, refused to open the case to full review and oral arguments. The effect is to let the Ninth Circuit's (and, hence, the jury's) decision stand. The case returns to the Northern District of California for the second portion of the trial, to assess damages.

There was, however, a dissent, filed by Justice White and joined by Justice Blackmun. White wrote that the "Court of Appeals' decision in this case is suspect on several grounds [A] particular tying arrangement may have pro-competitive justifications, and it is thus inappropriate to condemn such an arrangement without considerable market analysis." He continued, "Anticompetitive forcing only exists if consumers are forced to buy a tied product as a result of the sellers' market power, not simply because of the desirability of the package."

Justice White concluded, "In the highly competitive, multi-billion dollar a year computer industry, bundling of software and hardware...is somewhat common, and any differentiated product is especially attractive to some buyers. The reach of the decision in this case is potentially enormous, and as the United States strongly urges us to do, I would grant certiorari to address the substantial issues of federal law presented."

The fact that the Supreme Court denied certiorari should not be taken to mean that the majority agree with any or all of the lower court findings, although they may. There are numerous reasons for refusing to grant certiorari. For example, the Court may be waiting until a "better" case is appealed, a case that will address as many of the issues as profoundly as possible. Or, the Court may simply have chosen to honor the findings of the jury as triers of fact. Finally, the Court may simply have chosen to let the case stand for a narrow principle, a fact that would come to light as future decisions are handed down.

Back to the Northern District of California. Attorneys for *Digidyne v. Data General* are now preparing to return to court to determine the issue of damages. By the time that portion of the trial gets underway, it is highly likely that Data General's motion for a rehearing before the Supreme Court will have been acted upon. (Almost always, such second motions are rejected, but if the unexpected happens, the damages trial will be delayed until the Supreme Court has disposed of the appeal.)

Plaintiffs' counsel estimates that considerably larger sums than were first mentioned will be sought in the damages portion of the trial. The primary reason is that their original figures supposed that the negative effects of Data General's tying arrangement on their clients' businesses would have dissipated by 1986. Because the case has dragged on so long, however, they now estimate that those effects will not disappear until the end of this decade.

Counsel for Data General, on the other hand, predict that any damages awarded will be minimal. Stephen Steinberg says that "even if the decision is not overturned, no damages will be awarded because Digidyne and Fairchild were not damaged."

Attorneys for both sides insist that at this time (late August of 1985) no discussion of settlement is underway.

Effects on the Computer Industry. Whether or not the decision, as delineated by the Ninth Circuit, will have a major impact on the computer industry is not known.

Jack Brown, counsel for plaintiffs, contends that the decision here will have no effect on the computer industry. Asked if the bundling of AppleDOS with Apple computers and PC-DOS with IBM computers was not an arrangement similar to that of Data General, Brown responded that every case turns on its own set of facts and that the facts in computer cases are often so complex that it is difficult to compare different cases.

Brown feels that Data General's behavior was unique, that other manufacturers would not behave as Data General did. Other counsel for plaintiffs agree with the Ninth Circuit's statement that Data General should recover its software development costs through means other than a tying arrangement, such as simply selling its operating systems for a higher price.

Steinberg says he fears that, if allowed to stand, the decision will have a tremendous impact on the computer industry, that it will undermine all software/hardware bundling arrangements, which have been a staple of the computer industry. He contends that this decision actually contravenes the policy that lies behind antitrust laws: "The antitrust laws are designed to promote efficiency and competitiveness, and people are just not going to want to go out and spend millions of dollars creating operating systems—or anything else—if they must license it to their competitors or their competitors' customers."

Those who decry the decision in *Digidyne v. Data General* also contend that courts are insufficiently educated in the intricacies of computers. The argument is that a CPU without an operating system is merely a hunk of iron. The two functioning together are the computer, and it requires both for the computer to process data via an applications program. This view disagrees with the lower courts' findings that RDOS and Nova are separate products.

There are some interesting follow-ups to the case. First, the controversy centered on RDOS and Nova CPUs. At the time that all the suits were brought, these were hot items in the industry. Now, however, RDOS and especially the Nova have been surpassed by several layers of technology. Steinberg says that "this is a case that relates to things that happened in the 1970s, so it's not sexy in that respect."

This may have an effect on the damages issue and on future, similar lawsuits. The points at issue in greatly protracted litigation such as this can easily become moot in the highly volatile computer industry. And it is difficult at best to recreate a monetary scenario for assessing damages in an industry that has seen such tremendous changes in computer-power pricing in just a few years. Δ

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Programmers have now decided they love AOS and AOS/VS because they do what all operating systems should do: they make programmers' lives easier

Your Move

by George Henne
Contributing Editor

If you're like most of the Business BASIC users I know, you're running on some sort of Nova or Eclipse, and you're still using RDOS. I could have said *good old RDOS*, but that sounds a bit patronizing for RDOS, and I don't really mean it that way. RDOS is still a good operating system, and it was great for its time. But times change, and RDOS has been left behind by DG's newer operating systems.

RDOS, the "Real Time Disk Operating System," has been around nearly as long as Data General. It was designed in the days when we tried to write systems that could get by with 48K of memory because that would save us a few thousand dollars. And once we got to 64K, that was the end. We knew that 16-bit machines would never go beyond that—and besides, what possible use could there be for more memory?

AOS, the "Advanced Operating System," came along in the mid-seventies to answer just that question. It featured clever buffering, fancy scheduling, and lots of other goodies. But we bit-pickers were suspicious. We knew those features belonged in our application software, and not in the operating system.

We felt vindicated when AOS didn't seem to work that well. The zillions of lines of new code hadn't been debugged, and the operating system seemed to use up all that extra memory for itself. It even had trouble when we gave it a full half megabyte!

Meanwhile, RDOS chugged along. A new rev used a paging mechanism to go to 256K, and eventually to two megabytes. It worked, and was almost totally dependable. Its faults were like cracks in old leather: deep with history and tradition. Some still say that if Data General hadn't been so restrictive with its licensing, RDOS could have become the standard for micros when they happened, instead of MS-DOS or CP/M. Interesting thought . . .

Today, AOS and its 32-bit cousin AOS/VS have grown up. The code works well now. Of course, it still loves memory, but two and four megabyte boards are comparitively cheap and available. Programmers have now decided they love AOS and AOS/VS because they do what all operating systems should do: they make programmers' lives easier.

The most important point in this tale is that AOS and AOS/VS now have the ability to deliver performance far beyond what RDOS could ever have been modified to do. For the future, AOS/VS has the potential for even more improvement.

So what does all of this have to do with BBASIC? Well, studies seem to indicate that as many as a third of us are looking for some sort of upgrade in any given year. Quite simply, AOS/VS systems now deliver by far the best price performance in the Data General line. It would be foolish not to consider it seriously in our upgrade plans.

The design of AOS/VS and the MV/ series hardware are well suited for running BBASIC. The people who brought the language to AOS/VS also deserve credit for taking full advantage of the increased power of the operating system. For example, RDOS Business BASIC does its own terminal handling, for the simple reason that when it was being written, the RDOS terminal drivers couldn't do the job well enough. However, in AOS and AOS/VS this work is done by the PMGR, a part of the operating system that is far more powerful than anything attempted in RDOS.

The end result is that on identical machines running under different operating systems, AOS BBASIC has been clocked running almost 50 percent faster than RDOS! There are several reasons for this.

To begin with, AOS and AOS/VS were designed for true multiprocessing. Without the limitation of a 64K address space, more than one job can be active at a time: jobs are much less often "locked out" while waiting for other jobs to finish their system calls.

The AOS terminal handler also downloads a lot of work onto the IAC or DCU. In RDOS, every character coming or going to a terminal is a separate system call. You can imagine what a display at 9600 baud must do to the CPU. An IAC allows a single system call to send a whole burst of data. This is no magic: an IAC-16 has a complete 16-bit CPU on board to do the work, relieving the main CPU.

There are many other reasons as well. More memory can be used for more buffers, cutting down on disk accesses in heavily used files. Larger available space for programs cuts down on CHAIN statements and allows more complex programming. Larger disk blocks being read and written (2048 instead of 512) speed up disk operations, especially index files.

So, you're sold on moving to AOS or AOS/VS. Now comes the hard part. What sort of machine should you upgrade to? The local Data General sales representatives are helpful, but they're usually better informed about CEO than about the options for your upgrade. As usual in the computer business, there are several answers, and none of them is obviously right. So let's look at a couple of situations.

Suppose, first, that you've got a typical small system: a Nova with 25 megabytes of disk, floppy backup, and about 5 terminals. The rumors say that Nova BBASIC will soon go Category C, which would mean it would no longer receive any significant Data General support. Besides, you're bursting at the seams. The accounting department wants 3 more terminals, and you're out of disk.

There are several ways to go. I've outlined two of them in figure one. The prices are mostly for comparison, so you may need some different equipment at your own site. Also, I've ignored details such as cabinetry, battery backup, installation charges, etc.

Upgrading to the MV/4000-DC would put your software on the newest member in Data General's 32-bit family. We recommend the streamer tape over the cartridge because it's just a bit more expensive and a whole lot more practical. We don't know any good reason for the diskette drive, but as far as we know it comes with the system, and can't be deleted. You should also be aware that the IAC-16 used on the MV/4000-DC supports only RS-422 and 20 milliamp connections, not RS-232. This means you'll probably have

We don't know what the limit for BBASIC terminals on an MV/4000 is yet, but we're certain it's somewhere over 30

problems hooking up peripherals. Non-DG printers and modems are certain to be a headache.

On the other hand, the MV/4000-DC will give you a big boost in performance. Even after the increased disk space AOS/VS will use, you'll have twice as much disk. The speed of almost everything will increase dramatically. Without further expansion, you'll be able to go up to 16 terminals and printers.

If you don't want to replace your printers and terminals, and you want lots more growth potential, you should consider the second choice. The MV/4000 is about 40 percent faster than the DC, and sits in a more conventional-sized cabinet. It can support RS-232, solving the peripheral connection problem. Once again, however, we've exchanged the disk and switched to tape for backup. The 25 megabyte drives are slow, and diskette always was a silly way to back up.

The MV/4000 lets you plug in almost anything Data General sells: multiple disk drives (up to 592 megabytes each), tape drives that write out 6250 bits per inch at 125 inches per second, and lots more terminals. It can even run CEO. We don't know what the limit for BBASIC terminals on an MV/4000 is yet, but we're certain it's somewhere over 30.

But what if you already have an Eclipse S/140 with enough disk and tape capacity? Unlike the Nova, an Eclipse can be upgraded to run AOS. How do the costs of doing this compare with replacing the CPU with an MV/4000? Again, I've outlined the financial aspects of two of your options in figure two.

Don't ask me why an RDOS to AOS Upgrade license costs more than an AOS/VS Business BASIC license: I don't know. If you can make a deal with an OEM, you may save some money by getting Subsequent Licenses instead of Initial Licenses.

The S/140 is a real workhorse. Under AOS, it runs 25 terminals very nicely. We've sold a lot of them over the years, but we find when our customers move out of RDOS, an MV/4000 is probably a better deal. As figure two shows, it's not much more expensive than upgrading the S/140. Plus, you might get enough from selling your old S/140 to make this option still more attractive.

We think you get a whole lot more value with the MV/4000 because you are buying more modern equipment, instead of non-tangible (and non-negotiable) software licenses. Of course, the MV/4000 brings you into the mainstream of Data General's 32-bit technology. It includes a BMC (Burst Multiplexor Channel) for higher disk performance, and is an all-around faster machine than the S/140. BBASIC benchmarks rate it about twice as fast as the RDOS S/140.

There are of course many other considerations in the conversion. Who's going to do the conversion? It should be straightforward, but what if the people who wrote the original programs used undocumented tricks and weird RDOS system calls? What if the programs don't exist anymore (and only OPTIMIZED versions are left)? What if the programmers are gone? How do you learn about AOS/VS?

These problems could give you some extra grey hairs, but they are not insurmountable. If they don't crop up at your site, even better. In any case, all of the users we know who have done the conversion have been extremely happy with the results, and feel the effort of conversion was well worth it. Δ

George Henne is Vice President of MICOM Computer Systems, and has installed a large number of Business BASIC systems on many configurations during the past 7 years. Send Business BASIC questions or comments to him at MICOM Computer Systems, 575 Madison Avenue, Suite 1006, New York, NY 10022, or call 416/445-4823.

Figure 1: Upgrade from Nova

Option One	
MV/4000 DC with 2 MB memory	46,640
IAC-16 multiplexor for 16 terminals	
70 MB disk drive	
737 KB diskette drive	
1600 BPI Streaming Tape	
AOS/VS Operating System for DC	230
AOS/VS Business BASIC License	1,500
AOS/VS Business BASIC Services Package	1,430
	49,800
Option Two	
MV/4000 with 2 MB	34,100
Including AOS/VS License	
IAC-16 lines for RS232 or 20ma	5,500
73 MB disk drive	18,000
1600 BPI Streaming tape drive	6,800
AOS/VS media and manuals	380
AOS/VS BBASIC License	1,500
AOS/VS BBASIC Installation Package	1,430
	67,710

Figure Two: Upgrade from Eclipse

Option One	
2 MB add-on memory	19,000
IAC-16 RS-232 and 20ma	5,500
AOS Initial License	8,030
AOS Business BASIC Initial Upgrade License	3,150
	35,680
Option Two	
MV/4000 with 2 MB	34,100
Including AOS/VS License	
IAC-16 lines for RS-232 or 20ma	5,500
Cables for disk and tape	1,320
AOS/VS Media and Manuals	380
AOS/VS BBASIC License	1,500
AOS/VS BBASIC Installation Package	1,430
	44,230

[!READ] and System (in)Security

by Jim Siegman
Contributing Editor

Many AOS and AOS/VS system managers want to insulate their users from the horrors of the CLI, and also protect the system from unwanted CLI commands. The typical approach is to set up a turnkey style startup macro which features a chain to the applications system. An example of a minimal system startup macro might be:

```
prompt bye
dir :production:data
searchlist :macros :util :production:programs
chain logon.pr
```

Note that the very first line changes the CLI prompt to "BYE". This will log a person off the system in the event of an error or a control-A or anything else that might possibly put the user in the CLI. This is quite effective and is possibly the easiest way to secure the system through the CLI.

However, most of the sites I have seen have built extra features into their startup macros. One frequent enhancement is a "news bulletin" feature. The system startup macro then looks like this:

```
Comment—USER_STARTUP_6/26/85_Standard initial IPC DEFACL_OWARE
DIR :PROD
[!EQ,([!LOGON]),(CONSOLE)]
  prompt bye
  check_news
  chain logon.pr
[!END]
```

Again, this is a fairly typical startup macro that checks [!logon] so that the protection and other terminal-related matters are not processed for batch jobs.

But note what happens with the macro command "check_news" (listed below). The purpose of this macro is to allow the user to scan the news bulletin after first checking to see if they have already viewed the current version. This is done by resolving the pathname of :MACROS:NEW.TEXT which is a link to another text file. If the path name has changed, then a message is displayed, indicating that new news has been added to the bulletin. (This also redundantly checks [!logon] because it is used by a number of different startup macros.) There are two [!read] CLI pseudo-macros used in check_news.cli. One gets the Yes/No response from the user to see if the new bulletin should be displayed, and the second allows the operator to continue when ready.

```
Comment CHECK_NEWS.CLI—7/25/85—Macro command—
[!equal,[!logon],console]
  push ; prompt pop ; comment prompt pop in case it aborts!
  string/k
  string [!path news.text]
  [!neq,[!string],]
    [!neq,[!size [!path news.text]],0]
      string/k
      dir/i
      [!equal,[!file =last_news_check],]
        write/1=last_news_check none
      [!end]
        string [last_news_check]
      push
      string [!path news.text]
      [!nequal,[!string],[!string/p]]
        write
        write *** THERE IS NEW NEWS IN THE BULLETIN ***
        write
      [!END]
      pop
      string/k
      string ([!Read Do you want to scan the news bulletin?,,])
      [!equal,[!string],Y]
        char/on/pm
        type news.text
        char/off/pm
        string [!read Hit <NEW-LINE> to continue . . .]
        delete/2=warning last_news_check
        write/1=last_news_check [!path news.text]
      [!end]
    [!end] ; comment—end of [!size] = zero check
  [!end] ; comment—end of null [!string] check
  pop [!end] ; comment—end of [!logon] check
```

This, however, has just created a potentially dangerous security breach. The people who are being "protected" from the CLI can now reach the CLI if they know how. Although the prompt is still set to BYE, the two [!read] calls introduce potential trouble.

Look first at the string "[!read Hit <NEW-LINE> to continue . . .]." Suppose you were to respond to the macro with ";x cli" instead of the intended <new-line>. That line of the macro would be interpreted as "string ;x cli" and a new CLI process would be created as a son to the process having "BYE" as its prompt.

Unfortunately, there is no easy solution to this. You can change it so that it resembles the other [!read] by adding parentheses as follows:

```
string ([!read Hit new-line to continue . . .])
```

This has the effect of turning a ";x cli" response into:

```
string (;x cli)
```

which generates an unmatched parenthesis error, in turn causing the first CLI to stop and execute the prompt. But what happens if the user responds");x cli ("? You will still have the same problem.

This can be partially controlled by setting the maximum number of sons. But that would create a new problem, because the applications have to be able to create varying numbers of sons. Another approach would be to replace that troublesome line with:

```
push
char/on/pm
write ^Q to continue . . .
write [!ascii 214]
pop
```

Then you could use page mode to generate the pause for the operator. It still seems like there ought to be a better way. This substitution wouldn't do anything for the first [!read] which needs only a yes/no response.

Does anybody out there have a solution to this? Send comments or ideas to me in care of the editor and I will review them in the near future. I hope we can come up with an acceptable and easy-to-use solution. Δ

Jim Siegman is chairman of the NADGUG publications committee. He invites readers to send comments and questions in care of Focus Magazine, 5332 Thunder Creek Road, suite 105, Austin, TX 78759, or call 512/345-5316.

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Conference '85 Highlights

With only a few days between the end of Conference '85 and *Focus'* press deadline, there was little time to do more than compile a few of the significant developments at NADGUG's annual meeting. Here, with the editor's apologies, is the box score. Look for more coverage in the November issue.

NADGUG Business

NADGUG's Executive Board met all day on Sunday, August 25, in a frenetic effort to complete most of the planning and make most of the decisions for the next year. The Board consists of elected officers, committee chairpersons, and representatives from Special and Regional Interest Groups. Its main purpose is to sift through mounds of details to arrive at policy recommendations and reports for the annual Business Meeting.

Despite its best efforts, the Board was not able to adjourn until well after five o'clock Sunday evening. And even then, there were some items that weren't completed until just before the formal report to the Business Meeting. The reason was an unusually full agenda including the following:

• As NADGUG and its conferences have grown, so has its treasury. Outgoing Treasurer Calvin Durden reported that the group's bank account stood at $163,178.97 at the end of July. That figure is expected to decline during the coming months due to the start-up costs for *Focus,* and then gradually return to its current level.

• The budget for the next year calls for revenues of $65,000 and expenses of $105,000. Revenues are derived primarily from memberships. Scheduled expenditures are as follows: $10,000 for the conference deficit; $200 for bank fees; $1,000 to defray expenses for an on-line bulletin board system for members; $15,000 for software to manage member records and conference registration; $5,000 for publishing a membership roster; $7,500 for telephone expenses; $1,500 for Executive Committee expenses; $5,300 for the RIG/SIG Committee; $1,000 for the Planning Committee; $40,000 for the Publications Committee (including start-up expenses for *Focus*); $7,500 for support of RIG and SIG activities; $3,000 for the Meetings Committee; and $500 for miscellaneous expenses.

• The 1986 conference will take place in Orlando, Florida. Scheduled for mid-August, the '86 meeting will be billed as a shirtsleeve conference. Families will be welcome, and Calvin Durden threatens to use scissors on any necktie he sees. The site of the1987 meeting was set for Las Vegas, and Philadelphia is the likely site for 1988. The meetings committee hopes to have plans made four years in advance to accommodate the increasing needs of NADGUG's growing conferences.

• Joyce Carter, the RIG/SIG Committee chairwoman, reported that there are now 24 active Regional Interest Groups, and 13 Special Interest Groups. There are also 7 unaffiliated international DG user groups. The committee is supporting RIGs and SIGs with how-to information, start-up funding, free registrations for annual meetings, and help with meeting planning.

• Publications Committee Chairman Jim Siegman is forming an editorial advisory board to coordinate policies and coverage in *Focus.* He is also handling the distribution to RIGs of the videotapes that were made of selected sessions from Conference '85.

• Data General pledged its continuing support for NADGUG. DG currently supplies staff, office space, computer support, and financial backing for the user group.

• Two new officers were elected. Calvin Durden is the new NADGUG vice president, and Donald Clark will assume the office of Treasurer. Rene Dominguez automatically advanced from vice president to president.

• The Planning Committee set several new projects in motion. John Brudz, as outgoing president, becomes the new Planning Committee chairman. He will coordinate the selection and installation of new membership software, the establishment of a NADGUG member bulletin board, and the preparation of a membership roster.

• Doug Kaye will open up his company's on-line bulletin board for use by NADGUG's members. Several hundred members are already using the Rational Data Systems bulletin board as a means of staying in touch and answering each other's questions. Any member with a terminal and a modem can log on by calling 415/924-3652.

• New business: David Novy will head up an ad hoc committee to study dots. This was not a joke: at past meetings members could put colored dots on their badges to help identify themselves to other members with similar interests. Because of the proliferation of dots, the practice was not observed this year. Many members want it back, so Novy will figure out how to do it without introducing too much confusion.

Keynoters

Dr. Hideo Aiso spoke on two subjects. As a leader of Japan's fifth generation computer project, he provided an impressive overview of how Japan has structured its basic research on information processing technologies into an interlocking series of programs that began in1966. Just as impressive for many NADGUG members was Dr. Aiso's description of the activities and growth of the Nippon Data General Users Group.

Dr. Aiso, who serves as the president of NGUG, explained that the group was founded in 1981, but already has more than 1,000 members. It publishes a quarterly journal and sponsors several meetings each year. In a farewell note to John Brudz, Dr. Aiso raised a fascinating possibility: "I hope the activities of NADGUG keep growing, and the friendship between our two DGUG's [increasing]. . . . I believe we can host an International Joint Conference for all DGUG's in the near future."

DG President Edson D. de Castro didn't travel nearly as far to get to the conference. After the Wednesday banquet he ignored his prepared speech, and instead launched ito an impromptu dissertation on one of his favorite subjects: surviving the changes that are overtaking the computer industry. De Castro explained why he thinks that IBM and Data General are the only good bets to survive into the next century.

Session Tapes Available

As with the previous two conferences,

NADGUG contracted with a professional audio-visual service to tape record selected sessions from Conference '85. Although at first the audiotapes started as a comparatively inexpensive way of keeping a record of the conference proceedings, they have evolved into a popular way for members to get more benefits from the conference.

All NADGUG members can order copies of the tapes, regardless of whether they attended the conference. Following is a partial list of the sessions that were taped, along with cassette numbers for each of the sessions. Other audiotapes will become available as the presenters complete the necessary permission forms. Members can place their orders or get more information by contacting the vendor at the address listed below.

- Guest Speaker Dr. Hideo Aiso, president of Nippon Data General Users Group and professor of Engineering, Keio University —#1DG5
- AOS/VS and User Facility Security, Tim Reiter, Data General Corp. —#2DG5
- Intro to Programming Your D410/D460, Joseph Cannata, Data General Corp. —#3DG5
- Atlanta Service Center Workshop, chaired by Gerry Cromwell, Data General Corp., with Jim Foxworthy, Troy Taylor, and Denny Mack —#4DG5
- Security Options for Data General Users, Patti Johnson, Data General Corp. —#5DG5
- The Evaluation, Selection, and Operation of Equipment for Academic Computing, Dr. Thomas C. McMillan, Radford University —#6DG5
- Enhancement of the MV/10000, Steve Staudaher, Data General Corp. —#7DG5
- An Academic Computing Model in a Data General Environment, Monny Sklov, Ph.D., and Jacqueline M. Dawley, Ph.D., University of San Francisco —#8DG5
- Conversion of a Real-Time System—From Data General Computers to Data General MV/10000 Computers, Linda A. Dietz, Rockwell Hanford Operations —#9DG5
- Moving Business BASIC to the AOS/VS World, George W. P. Henne, MICOM Computer Systems —#10DG5
- Software Testing: A Practitioner's Viewpoint, Patricia W. Daggett, Data General Corp. —#11DG5
- MCSnet—A Network Featuring X.25 Communications Between an MV/8000 and a VAX/750, Bruce E. Weeks, Boeing Commercial Airplane —#12DG5
- Navy Standard Benchmark System, Robert F. Depin and William E. Hey, Navy Data Automation Facility —#13DG5
- EXSYS—An Expert System for Software Development, Roger Nixon, Exsys Inc. —#14DG5
- WordPerfect/CEO Integration, Pete Peterson, Satellite Software International —#15DG5
- Designing and Writing Interactive Programs Using AOS CLI Switches and Arguments, John A. Grant, Geological Survey of Canada —#16DG5
- The Cobbler's Children: The Pitiful State of CAT and CAI for Computer-Related Products, Michael D. DeVine, CS Laboratories, Inc. —#17DG5
- Implementing Accounting Software: Integration and Office Automation, Gary Layton, Computer Associates —#18DG5
- Small Aperture Satellite Earth Stations Bring a New Dimension to Office-Oriented Data Communications Networks, Tom Anderson, Equatorial Communications Co. —#19DG5
- Corporate Technical Publishing Automation, Soto M. Flouris, Intercon Associates —#20DG5
- Gross Profit Control in Manufacturing, David N. Sneed, Sandy Hook Scientific —#21DG5
- Comparing Powerhouse and DNA-4 As Applications Prototypers, Michael Reddy, Ph.D. —#22DG5
- Fourth Generation Software Tools for Data General Equipment, Tom Koulopoulos and John Holman, Henco Software Inc. —23DG5
- Case History: Computer Aided Process Control at the Rainbow Park Regional Water Treatment Plant, Thomas M. F. Doyle, Fremont Sanitation District —#24DG5
- Data General Windowing, Walt O'Brien, Data General Corp. —#25DG5
- Standard File Maintenance Reporting, William R. Topoly, Webber Gage Division of the L. S. Starrett Co. —#26DG5
- Data Definition in GENISYS, Sue M. Dintelman and Tim Maness, DMS Systems, Inc. —#27DG5
- AOS & AOS/VS System Manager's Panel, chaired by Brian Johnson, B.J. Inc. (two tapes) —#28DG5 and #29DG5
- Nerco Minerals Communications Network, Mark W. Espe, Nerco Minerals Company —#30DG5
- Automated Configuration Management, Kevin Nix, Softool Corp. —#31DG5
- SIR/DBMS, The Intelligent Relational System, Barry Robinson, SIR, Inc. —#32DG5
- A Process Activity Monitor for AOS/VS, Sharon Lindley and Robert A. McKosky, Rockwell International —#33DG5
- Network Management Using Relational DBMS Technology, Carol Kellett, 3CI and Jim Wright, Miner & Miner, Consulting Engineers, Inc. —#34DG5
- Leasing: Overcoming Budget Roadblocks, George Doble, Data General Corp. —#35DG5
- Data General's Communications Products Strategy, Brinton E. Baker, Data General Corp. —#36DG5 Δ

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Workstation Broadens DG's Business Offerings

Westboro—Data General chose late July to announce a medley of new products that integrate departmental and personal computing in business environments. The products included the Dasher/One intelligent workstation, CEOwrite word processing for MS-DOS, and a version of the MV/4000-DC that doubles the number of possible users to 32.

The centerpiece of the new products was the Dasher/One, which was billed as the first in a series of intelligent workstations. It offers standalone computing power along with CEO integration and MV/ Family compatibility. Like the Data General/One, the Dasher/One supports MS-DOS, which means it can run most of the personal software available for the IBM PC. The workstation's MV/ Family compatibility means it can also connect to a departmental system to share peripherals, applications, and information.

The Dasher/One sports a small footprint, a tilt-swivel display, and a choice of screen resolutions. Two models are available, with both providing resolution of 640 by 200 pixels in graphics mode. However, the Model 2 is capable of 640 by 400 pixels in text mode. There is also a choice of keyboards: either PC AT-style or CEO-style. Both keyboards are available in a variety of foreign language fonts.

The new workstation is available with a memory range of 256 to 640 KB. The standard Dasher/One offers three 4-inch by 4-inch expansion slots and a a single 3.5-inch floppy disk drive, with options for a second floppy drive or a 10 MB 3.5-inch hard disk drive. Also standard are two I/O ports: an asynchronous RS 232/422 communications port with modem control, and a parallel printer port.

The Dasher/One is available in six models. With 256 KB of memory, one 3.5-inch diskette drive, and the 640 by 200 resolution screen, the starting price is $2,100.

CEOwrite, a word processor for the Dasher/One, the Data General/One, and other IBM PC-compatible machines, brings the capabilities of Data General's CEO software to the MS-DOS environment. It implements the standard CEO user interface via function keys, mnemonic commands, or pull-down menus. A single keystroke can invoke the

CEO Connection, DG's link to the CEO document exchange, conversion, and retrieval facilities of a host MV/ Family computer.

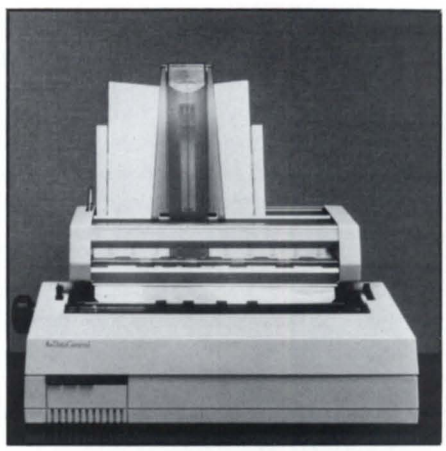
CEOwrite includes standard features such as the following: glossary, split-screen editing, column editing and printing, horizontal scrolling, proportional spacing, forms merge, hyphenation, print from anywhere, table of contents, international languages, stored keystrokes, screen sorting, paragraph numbering, and on-line help. CEOwrite is priced at $395.

The upgraded MV/4000-DC is said to support as many as 32 users at a cost per workstation of less than $5,000. It supports up to 8 MB of main memory and 240 MB of disk storage. Options include up to two 730 KB diskette drives, a 15 MB tape cartridge drive or 1600 bpi reel-to-reel tape drive, and an interface for up to six synchronous communication lines.

An MV/4000-DC system with 4 MB of main memory, 22 workstations, Ethernet transceiver and cable, two 120 MB disk drives, diskette drive, three letter-quality printers, AOS/VS, and CEO software would be priced at $107,448, or $4,884 per workstation.

Data General also introduced a letter-quality printer, Model 4467, for use with the Dasher/One. Printing 20 fully-formed characters per second at 10, 12, and 15 pitch, the new printer supports attributes such as bold, underline, subscript, superscript, proportional spacing, and variable line and character spacing. It supports a variety of type fonts with a large choice of international 100-character print wheels.

Options for the Model 4467 include a bi-directional forms tractor, a single-bin continuous automatic sheetfeeder, and a single-bin automatic sheetfeeder. Single and multi-strike ribbon cartridges are available. The printer is priced at $650. Δ



New 4GL Option for North American Users

London—Cybertek Computing, Limited has opened an office in Summit, New Jersey to market its CQCS fourth generation software to Data General users in North America. CQCS, which was developed in the United Kingdom, consists of three modules: Cyberquery (a query system and report writer), Cyberscreen (a screen generator), and Cyberwriter (a text processor).

According to Cybertek, CQCS can retrofit existing INFOS applications to provide relational capability, yet runs more efficiently than COBOL. The Cybertek announcement says that CQCS allows any INFOS files to be used directly, supporting both indexed sequential and DBAM structures. CQCS can be installed on Data General systems running under AOS or AOS/VS.

The Cyberquery module can design and produce business reports much more quickly than conventional programming. According to Cybertek, ad hoc reports can be produced by the end users themselves. Definitions of files, items, fields, and access paths are all based on an integrated data dictionary. Report formatting, layout, and pagination are all automatic. Password protection provides security down to the field level.

The Cyberscreen module enables users to design screens using records from several files. Because the display at the terminal becomes the screen layout, it takes only minutes to produce a new screen, and seconds to amend it. Cyberscreen can invoke and/or be invoked by other programs. It can define and update DBAM structures, which allows it to work with existing applications. Screens, fields, and files can be protected from unauthorized viewing or alteration.

The Cyberwriter module shares the data dictionary with Cyberquery and Cyberscreen. It can generate personalized letters, labels, and pre-printed documents integrating data from many different files. Variable elements from INFOS files and the keyboard can be mixed with user-specified templates. Δ

Cybertek Computing, Limited, 110 Summit Avenue, Summit, NJ 07901; 201/273-0250.

Sales and Marketing Software for DG/1

Louisville, KY—Key Systems, Inc., has introduced a version of its Prospecting software in 3.5-inch diskette format for the Data General/One. Prospecting is designed to

increase the efficiency of sales and marketing professionals.

According to Key Systems, the software stores, searches, and analyzes information about customers or prospects and their product interests. It can print personalized letters using letter files created by most word processors, as well as envelopes, cards, labels, status reports, and marketing analysis reports. Other features include multi-user capabilities, password protection, and file searching. Prospecting for the DG/1 is priced at $395 retail. Δ

Key Systems, Inc., 512 Executive Park, Louisville, KY 40407; 800/223-5637.

Execucomp Updates Direct Marketing Package

Indianapolis—Execucomp, Inc., has introduced a new revision of Name Base, a marketing-oriented software system with components for the marketing, financial, and product aspects of a business. The company's announcement describes Name Base as a control system designed for companies using direct marketing and/or telemarketing techniques. Name Base runs on Data General equipment under AOS or AOS/VS.

Name Base consists of three components: the Marketing Control System, the Product Control System, and the Financial Control System. The software is designed to let users build and maintain a data base of customers and prospects, and to target and/or measure the effectiveness of specific direct mail and telemarketing promotions for particular types of customers. The vendor says that the software continuously updates its statistical data bases to provide sophisticated marketing/sales analyses.

System features include on-line telemarketing, order entry, order processing, inventory control, credit checking, pricing/discounting, out of stock notifications, return/refund processing, credit card processing, cash with order controls, media/source code tracking, financial reporting, and budget control.

Current users of Name Base range from direct mail and catalog supply companies to electronic component and peripheral manufacturers. Δ

Execucomp, Inc., 620 Belmont Ave., Indianapolis, IN 46221; 317/639-2289.

Contrary to popular belief, it is possible to patch SED so that it can be used on foreign terminals in full screen mode

Visible Means of Support

Getting AOS/VS to support foreign terminals has been an elusive goal

by Tim Maness
Contributing Editor

This month I want to share a solution for a problem that has been a pet peeve for me—and perhaps for any other user who wants to use non-DG terminals on their MV/ system. AOS/VS is not terminal independent; that is, it does not gracefully support non-Data General terminals. You can buy many software packages—including editors, spreadsheets, data base systems, etc.—that support different terminal types. These software packages generally solve the problem of terminal independence by making use of a definition file that explains how each terminal implements various features.

As a software developer I would certainly prefer having the system worry about the details of talking to terminals so that I could move that complexity out of my software. Some other operating systems do provide support for this type of independence. For example, Unix uses a file with the description of different terminal types (the termcap file). Will AOS/VS ever have this functionality? We can always hope, but in the meantime, it is possible to at least make your foreign terminals and AOS/VS coexist peacefully.

With hints provided in an AOS Newsletter and some experimentation and time spent with the debugger, I found it is possible to patch AOS/VS to allow non-DG terminals to be used with CLI. And contrary to popular belief, it is also possible to patch SED so that it can be used on foreign terminals in full screen mode.

All serial asynchronous character I/O is handled by the peripheral manager (PMGR), which always runs as PID 1 on AOS/VS. The PMGR uses a set of "Terminal Dependent Function Tables" (TDFTs) that specify the appropriate control sequence to output to a device when a terminal-dependent control function is to be performed. There is one TDFT for each CRT type (CRT1 to CRT16). Currently supported functions include: HOME, CURSOR LEFT, CURSOR RIGHT, ERASE EOL, CURSOR UP, CURSOR DOWN and WRITE CURSOR ADDRESS.

A TDFT looks like figure one. CSI stands for "control sequence introducer". These 6 bytes can be output to the terminal, if needed, to indicate that a control sequence follows. The function cells contain the information needed to perform the specified function. Bits 2 through 7, if set, indicate that the function character is to be preceded by CSI 1 to CSI 6, respectively. The function byte is contained in bits 8 through 15. Bit 1, if set, indicates the next word following is the address of a routine to call after any CSIs and the function byte have been output.

For TeleVideo terminals (models 910+, 912c, 920) the TDFT entry needs to be set as shown in figure two.

The PMGR supports a lot of different types of devices: IOP, IAC, MCP1. Because of this, the contents of the patch, and even which program to patch, will differ from one hardware configuration to another. If your machine has IACs, you need to patch :IACRS.PR. If it has an MCP1, the program to patch is :ALPHARS.PR. For systems with an IOP, patch :LIPMGR.PR.

As a software developer, I certainly prefer having the system worry about the details of talking to terminals so that I can move that complexity out of my software

Armed with the foregoing information and a little determination you can patch the PMGR so it will support almost any type of terminal. This will allow all of the nice screen edit cursor control features of CLI to work—a big improvement over telling CLI you have a hardcopy device.

I have included three patch files with my column this month. The first defines TeleVideo terminals (models 910+, 912c and 920) as CRT7. It also defines DEC VT100 terminals (or any terminal that implements ANSI X3.40-1977, X3.41-1974, X3.64-1979 standard commands) as CRT8. Many terminals now have an ANSI mode. The patch shown is for systems with IACs.

Use the patch utility to install this patch (assuming IACRS.PATCH is the file that contains the patch) as follows:

```
X PATCH/T =:IACRS.PR/&
P= IACRS.PATCH/I
```

After installing the patch you need to bring the system down and reboot it for the change to be effective.

Patches like the above permit non-DG terminals to make use of all of the PMGR screen edit I/O functionality, but because DG utilities like SED, etc., were written specifically for DG terminals, they won't work on foreign terminals even after the PMGR has been patched. However, it is possible to make other terminal-specific versions of SED. The second patch file allows SED to work in full screen mode on the TeleVideo 910+, 912c, and 920 terminals. To install this patch, make a copy in :UTIL of SED.PR and SED.ST. Call them TVISED.PR and TVISED.ST, respectively. Then run the patch utility:

```
X  PATCH/T=:UTIL:TVISED.PR/&
P=TVISED.PATCH
```

The TVI consoles need to have the following CLI characteristics for your new TVISED to work:

CHAR/CRT7/NAS/WRP/CPL=132

The final patch file allows full screen SED to work with DEC VT100s and other ANSI terminals. The instructions are similar to those for TVISED. That is, make a copy of SED.PR and SED.ST called ANSISED.PR and ANSISED.ST. Then apply this patch to ANSISED.PR. ANSI terminals need to have the following CLI characteristics for your new ANSISED to work:

CHAR/CRT8/WRP/CPL=132

These patches will help you get your foreign terminals talking to AOS/VS. If you are interested in similar patches for IOPs or MCP1s, just drop me a line and I'll send them to you. Δ

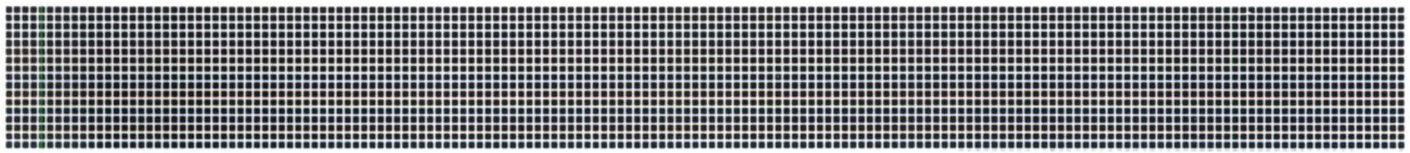
Tim Maness is president of DMS Systems, Inc., a software development firm specializing in data base management. He may be reached at 740 East 3900 South, Salt Lake City, UT 84107; 801/268-6671.

Figure one

Maximum function number supported	
Not used	
Not used	
CSI 1	CSI 2
CSI 3	CSI 4
CSI 5	CSI 6
Function cell for HOME	
Function cell for CURSOR LEFT	
Function cell for CURSOR RIGHT	
Function cell for ERASE EOL	
Function cell for CURSOR UP	
Function cell for CURSOR DOWN	
Function cell for WRITE CURSOR ADDRESS	

Figure two

9	
0	
0	
ESC	0
0	0
0	0
	^^
	^H
	^L
1B2 (set bit 2)	T
	^K
	^J
1B1 1B2	=



First Patch File

```
; Patch for :IACRS.PR, AOS/VS rev. 5.05
; Define CRT7 as TVI912c, TVI910+, TVI920 and CRT8 as any terminal
; that implements ANSI standard commands.

%USERFILE
; LOCATION      OLD VALUE NEW VALUE

; Change the device table so it knows about crt7 and crt8
DEVTB+7           [DCRT3]          [DCRTP]
DEVTB+10          [DCRT3]          [DCRTP+32]

; Define CRT7 terminal dependent functions
DCRTP             0                11
DCRTP+3           0                15400
DCRTP+6           0                36
^+1               0                10
^+1               0                14
^+1               0                20124
^+1               0                13
^+1               0                12
^+1               0                60075
^+1               0                [DCRTP+20]

; CRT7 write cursor address routine
DCRTP+20          0                104750
^+1               0                [LDA 0 45 2]
^+1               0                [ADDI 40 0]
^+1               0                []
^+1               0                [JSR @ABOCHR]
^+1               0                [LDA 0 43 2]
^+1               0                [ADDI 40 0]
^+1               0                []
^+1               0                [JSR @ABOCHR]
^+1               0                [POPJ]

; Define CRT8 terminal dependent functions
DCRTP+32          0                11
DCRTP+35          0                15533
DCRTP+40          0                30110
^+1               0                30104
^+1               0                30103
^+1               0                30113
^+1               0                30101
^+1               0                30102
```

```
^+1             0               60133
^+1             0               [DCRTP+52]

; CRT8 write cursor address routine
DCRTP+52        0               [SAVE 4]
^+1             0               []
^+1             0               [STA 1 1 3]
^+1             0               [STA 2 2 3]
^+1             0               [LDA 1 45 2]
^+1             0               [INC 1 1]
^+1             0               [XOR 0 0]
^+1             0               [MOV 0 2]
^+1             0               [ADDI 12 2]
^+1             0               []
^+1             0               104750
^+1             0               12
^+1             0               120
^+1             0               [JMP DCRTP+73]
^+1             0               [SUB 2 1]
^+1             0               [INC 0 0]
^+1             0               [JMP DCRTP+64]
^+1             0               [ADDI 60 0]
^+1             0               []
^+1             0               [ADDI 60 1]
^+1             0               []
^+1             0               [STA 1 3 3]
^+1             0               [LDA 1 1 3]
^+1             0               [LDA 2 2 3]
^+1             0               [JSR @ABOCHR]
^+1             0               [LDA 0 3 3]
^+1             0               [JSR @ABOCHR]
^+1             0               [XOR 0 0]
^+1             0               [ADDI 73 0]
^+1             0               []
^+1             0               [JSR @ABOCHR]
^+1             0               [LDA 1 43 2]
^+1             0               [INC 1 1]
^+1             0               [XOR 0 0]
^+1             0               [MOV 0 2]
^+1             0               [ADDI 12 2]
^+1             0               []
^+1             0               104750
^+1             0               12
^+1             0               120
^+1             0               [JMP DCRTP+126]
^+1             0               [SUB 2 1]
^+1             0               [INC 0 0]
^+1             0               [JMP DCRTP+117]
^+1             0               [ADDI 60 0]
^+1             0               []
^+1             0               [ADDI 60 1]
^+1             0               []
^+1             0               [STA 1 3 3]
^+1             0               [LDA 1 1 3]
```

```
^+1             0               [LDA 2 2 3]
^+1             0               [JSR @ABOCHR]
^+1             0               [LDA 0 3 3]
^+1             0               [JSR @ABOCHR]
^+1             0               [XOR 0 0]
^+1             0               [ADDI 110 0]
^+1             0               []
^+1             0               [JSR @ABOCHR]
^+1             0               [RTN]

; Remember you need to restart the system for the patch to work.
; End of IACRS.PR patch
```

Second Patch File

```
; This patch assumes that the PMGR has been patched so CRT7
; is TVI.

; Make sure your TVI consoles have the following characteristics:
; CHAR/CRT7/NAS/WRP/CPL=132

%PROGRAM
; LOCATION      OLD VALUE           NEW VALUE

; Fixup erase_line and form_feed, get rid of underscore and dim
initialize+40   [WLDAI 205400,0]        [WLDAI 415524,0]
^+1             []                      []
^+1             []                      []
initialize+46   [WLDAI 206000,0]        [WLDAI 215000,0]
^+1             []                      []
^+1             []                      []
initialize+62   [WLDAI 212000,0]        [WLDAI 12000,0]
^+1             []                      []
^+1             []                      []
initialize+70   [WLDAI 212400,0]        [WLDAI 12400,0]
^+1             []                      []
^+1             []                      []
initialize+120  [WLDAI 216000,0]        [WLDAI 16000,0]
^+1             []                      []
^+1             []                      []
initialize+126  [WLDAI 216400,0]        [WLDAI 16400,0]
^+1             []                      []
^+1             []                      []


; Since we changed form feed above, fix things up so the join and
; split commands work correctly
CLOSE_EDITFILE+654              [LPEF form_feed,0]  [LPEF patch_area+35,0]
^+1                             []                  []
^+1                             []                  []

patch_area+35                   0                   1
^+1                             0                   6000
```

```
; Force sed's internal screen width to always be 80
set_sed characteristics+130     [WANDI 377,0]       [NLDAI 120 0]
^+1                             []                  []
^+1                             []                  [WBR .+2]

; End of TVISED patch
```

Final Patch File

```
; This patch allows sed to work in full screen mode with any
; terminal that supports ANSI commands.

; This patch assumes that the PMGR has been patched so CRT8
; is ANSI.

; Make sure your ANSI consoles have the following characteristics:
; CHAR/CRT8/WRP/CPL=132

%PROGRAM
; LOCATION      OLD VALUE           NEW VALUE

; Fixup erase_line, form_feed, underscore and get rid of dim
initialize+40    [WLDAI 205400,0]          [WLDAI 5,0]
^+1              []                        []
^+1              []                        []
initialize+46    [WLDAI 206000,0]          [WLDAI 0,0]
^+1              []                        []
^+1              []                        []
initialize+62    [WLDAI 212000,0]          [WLDAI 22,0]
^+1              []                        []
^+1              []                        []
initialize+70    [WLDAI 212400,0]          [WLDAI 14,0]
^+1              []                        []
^+1              []                        []
initialize+120   [WLDAI 216000,0]          [WLDAI 12,0]
^+1              []                        []
^+1              []                        []
initialize+126   [WLDAI 216400,0]          [WLDAI 12,0]
^+1              []                        []
^+1              []                        []

; Since ANSI command sequences are longer than two characters we
; have to put them somewhere special
patch_area       0                         4
^+1              0                         15533
^+1              0                         31112
patch_area+5     0                         3
^+1              0                         15533
^+1              0                         45400
patch_area+14    0                         4
^+1              0                         15533
```

```
^+1                 0                                30155
^+1                 0                                4
^+1                 0                                15533
^+1                 0                                31155
^+1                 0                                4
^+1                 0                                15533
^+1                 0                                32155
^+1                 0                                3
^+1                 0                                15533
^+1                 0                                44000
patch_area+32       0                                4
^+1                 0                                15533
^+1                 0                                45015

; and change the routine that uses them
write+7             [XPEF @-14 3]                    [XJMP patch_area+50]
^+1                 []                               []

; the extra code to deal with them
patch_area+50       0                                [WPSH 2 2]
^+1                 0                                [XLEF 2 @-14 3]
^+1                 0                                []
^+1                 0                                [XNLDA 0 0 2]
^+1                 0                                []
^+1                 0                                [WSEQI 0 0]
^+1                 0                                []
^+1                 0                                [WBR patch_area+72]
^+1                 0                                [XNLDA 0 1 2]
^+1                 0                                []
^+1                 0                                [XLEF 1 patch_area]
^+1                 0                                []
^+1                 0                                [WADD 0 1]
^+1                 0                                [WPOP 2 2]
^+1                 0                                [WPSH 1 1]
^+1                 0                                [LJMP write+11]
^+1                 0                                []
^+1                 0                                []
^+1                 0                                [WMOV 2 1]
^+1                 0                                [WPOP 2 2]
^+1                 0                                [WPSH 1 1]
^+1                 0                                [LJMP write+11]
^+1                 0                                []
^+1                 0                                []

; Since we changed form feed above, fix things up so the join and
; split commands work correctly
CLOSE_EDITFILE+654                  [LPEF form_feed,0]  [LPEF patch_area+35,0]
^+1                                 []                  []
^+1                                 []                  []

patch_area+35                       0                   1
^+1                                 0                   6000

; Force sed's internal screen width to always be 80
set_sed_characteristics+130         [WANDI 377,0]       [NLDAI 120 0]
^+1                                 []                  []
^+1                                 []                  [WBR .+2]

; End of ANSISED patch
```

SYSTEMS / PERIPHERALS / PARTS
BUY / SELL / TRADE

THE SERIOUS WORD IS SAVINGS

Still worried about buying used DG equipment? READ ON—

This is part two of the SAGA, describing how a DG user saves time, money and sanity by buying a used terminal from TBS. Now, in my best Alistair Cooke manner, I will describe how, in the previous episode, an astute buyer found the terminal he wanted, sent in his check and purchase order and sat back to await fast delivery of his terminal. We tested the CRT, found it OK, packaged it safely and had it ready for shipment by United Federal Courier within 24 hours of receiving the order.

In this case the item arrived in good working condition. There have been times during our 8-year history, however, when the freight company has partially or totally destroyed a shipment. If this should happen to you, we think you should know what will happen to your money.

Legally, once the unit leaves our dock, the customer owns the item; however, the customer needs a working unit, not a box of scrap. If we have another unit in stock we ship it immediately. If not, we return the customer's money. In most cases shipping damage is minor. When this happens, we pay to have the item shipped to a nearby repair centre and returned directly to the customer. If we have a duplicate unit in stock, we ship that one to the customer and have the repair centre send the initial unit back to us.

The other thorny problem of used equipment is DG maintenance. Unless we state otherwise, all equipment is guaranteed for DG maintenance. This means that DG inspects, installs and tests the part at the customer's expense. If DG finds that the item needs work, TBS will pay to have that part shipped, repaired and returned to the customer. Again in cases of extreme urgency, we may ship a new part directly to the customer, stock permitting.

Our ultimate goal is to give the customer what he paid for, or refund his money.

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Data General wasn't even mentioned in *The Wall Street Journal's* recent essay on the trend among certain computer makers towards reduced instruction set computing, or RISC. The article, which appeared in the August 23 edition, went to some pains to explain how companies like Pyramid Technology, Ridge Computers, and especially Hewlett-Packard, are betting a good portion of their Research and Development budgets on the idea that the stripped-down efficiencies of RISC will deliver better price-performance in the near term. Even IBM and DEC are getting in on the act with projects dubbed Quicksilver, Titan, and Nautilus. Perhaps it was just a coincidence, but when DG President Edson D. de Castro addressed the NADGUG banquet five days later, he noted pointedly that DG's Nova deserves credit as the first reduced instruction set computer.

John Ferry is well-known as a Business BASIC user in the Cleveland area, but in recent months he is gaining notoriety of another sort. Ferry is launching a business as a gambling consultant, although that's not quite the way he phrases it. It seems that in Ohio it is legal for non-profit organizations to host casinos as fund raisers several times a year. Ferry's business venture aims to help the fund raisers raise more funds through better management. He recently took a working vacation to Las Vegas, where he purchased casino-grade equipment to offer as part of his management package. With his phone ringing constantly, Ferry insists that this is serious business: he says he has 100 books on casino management in his reference library, and is now working on programs to analyze profit and loss and optimize rules. Incidentally, he's willing to share his blackjack simulations—call him at Ferry Brothers, 216/267-6636.

Three past-presidents of NADGUG discovered one of the side-benefits of Data General's comparatively new presence in the retail computer market: the company now has a product that it can afford to give away. At the Conference '85 banquet, John Brudz, Mort Kahl, and Brad Friedlander were each rewarded for their labors in NADGUG's behalf with a complete Data General/One system (including carrying case). Making the presentations was Frank Keaney, vice president of North American Sales, who said he had to leave the banquet early in the interest of preserving his marriage. It may have been the shortest Keaney speech on record—not even one joke at Brad Friedlander's expense.

Chuck Colombo didn't get a DG/1, but he was very pleased indeed with his new briefcase. It was a gift from NADGUG in recognition of the four and a half years he has served as the group's executive secretary. Colombo didn't know what he was getting into when he accepted the job in 1981. Within three days he was in San Francisco negotiating with hotels over the details of the '81 conference. Leaving NADGUG and DG will be "a real career shift" for him—he's entering a two-year master's degree program in social work at Boston College. "Crisis intervention was an important part of my job for NADGUG, and that's what I'm zeroing in on. My goal is to be a therapist/consultant with industrial relations and employee assistance." Good luck, Chuck. We'll miss you.

Jim Siegman sends these words to live by: "A lack of planning on your part does not constitute an emergency on my part." Siegman recently joined the McDonnel Douglas organization as a field service representative for Unigraphics CAD/CAM systems. Because the systems use Data General equipment, Siegman can continue with his various NADGUG posts—it will just be a little harder to track him down.

It wasn't just an illusion. The exhibit area at Conference '85 was easily twice as big and twice as busy as any previous NADGUG meeting. It took a toll on the staff, however—at one point Phyllis Danielli, the exhibit organizer, was asked if she was Phyllis. "No," she replied. And the Data General personnel who always seemed to be hanging around the Unigraphics booth were actually filling in for McDonnel Douglas' regular exhibitors, who were engaged at a different show. As major users of Unigraphics, the DG people were well-qualified to show the systems.

More words to live by: "Ada programmers stand on the shoulders of other Ada programmers, whereas FORTRAN programmers stand on the toes of other FORTRAN programmers"—contributed by Edward Berard of EVB Software Engineering.

SAS Institute has been a Data General Independent Software Vendor for some time, but so far has brought only two of its products—Base SAS and SAS/Graph—to DG environments. According to a SAS spokeswoman, the delay is due to a problem with dynamic loading on the MV/ series. She expects the problem to be resolved in early 1986.

3CI, the Colorado software house, announced record revenues and profits for the fiscal quarter that ended June 30. Revenues of more than $400,000 came from license agreements with Control Data Corporation, Ultrasystems Defense and Space Systems, Inc., County of San Diego, United Coupon Clearing House, TEM Associates, Inc., Scanlon and Associates, Inc., the Federal Aviation Administration, and the Naval Submarine Medical Research Laboratory.

Data General is assembling System Suppliers and Authorized Distributors for the Seventh Annual Worldwide System Suppliers Conference, to be held in Washington, D.C., October 6-9. The meeting is billed as an opportunity to share ideas, marketing strategies, and information on new products, while promoting better communication between DG and the suppliers.

Meanwhile, the System Supplier Program, led by Richard A. Farwell, is taking over the responsibility for DG's Desktop Generation Dealer Program. The change recognizes that the Desktop dealers who were successful were not like traditional retail dealerships: they learned the application packages, promoted them to prospects, installed total systems, and provided enough handholding to make satisfied customers. The dealer network will be called VADs, for value-added dealers; dealers, unlike suppliers, will not be expected to develop or own the software they sell.

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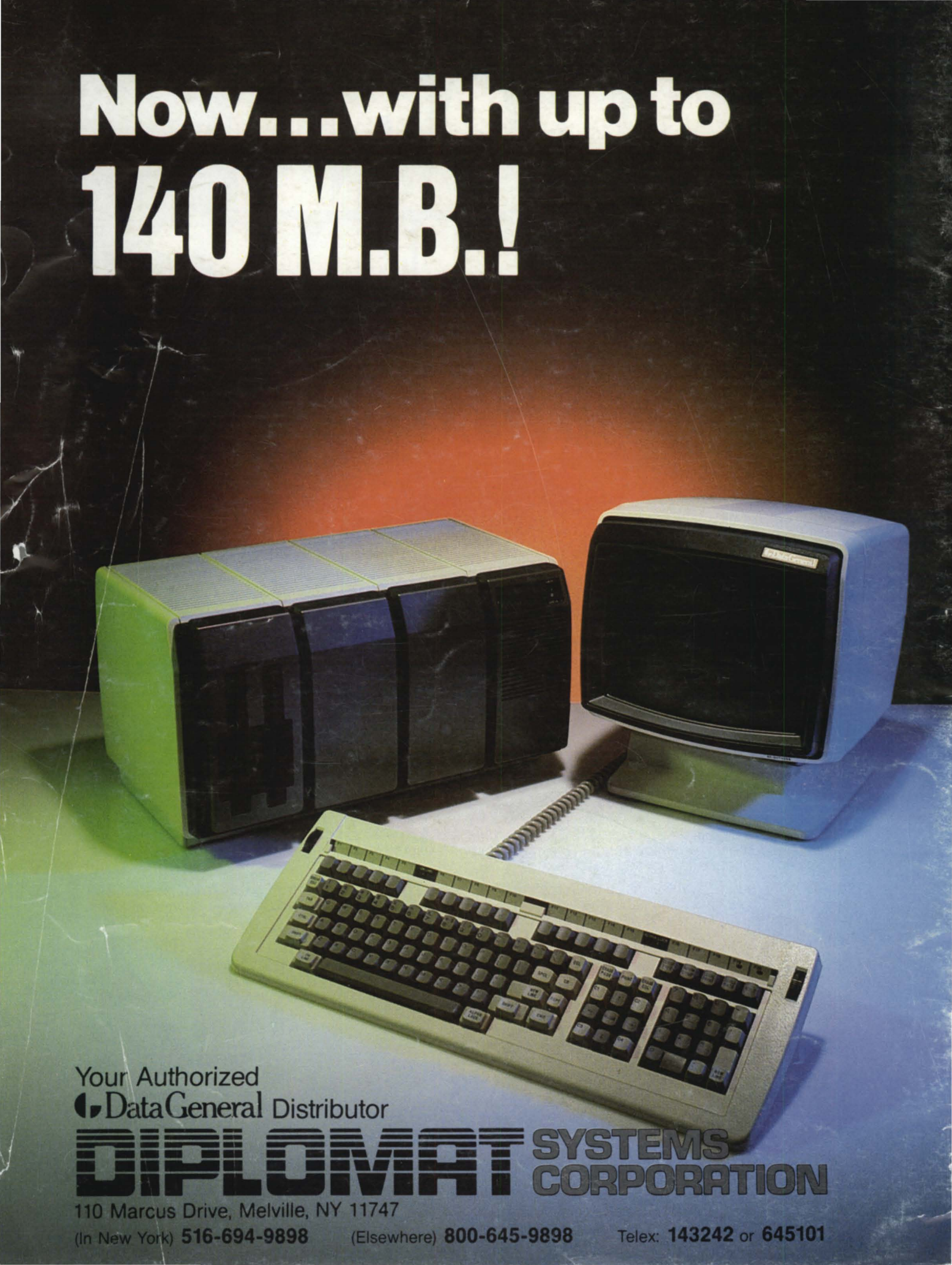

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