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The Magazine of the North American
Data General Users Group

December 1985

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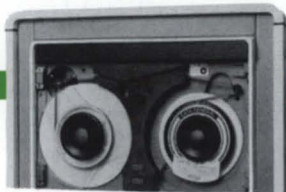
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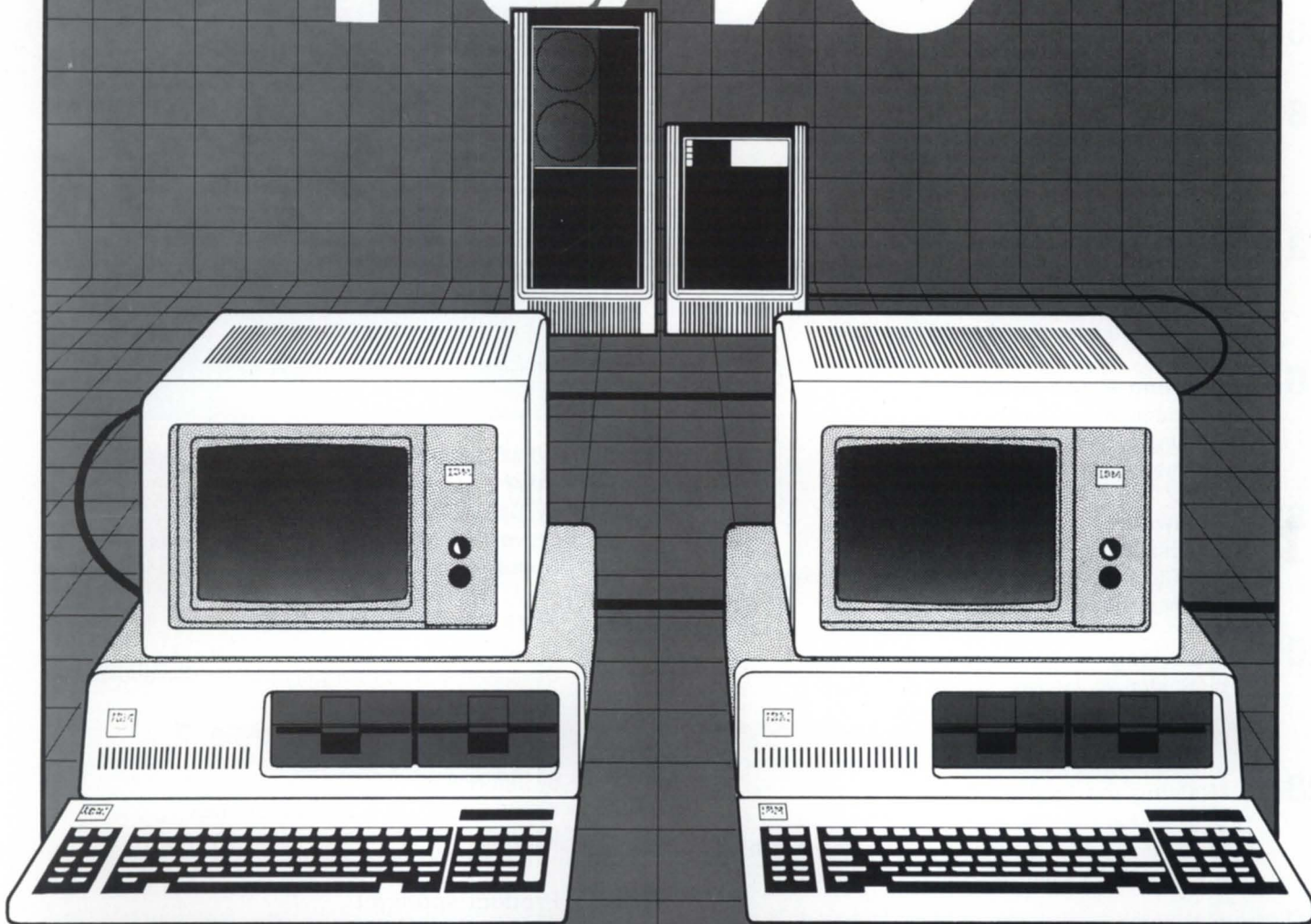
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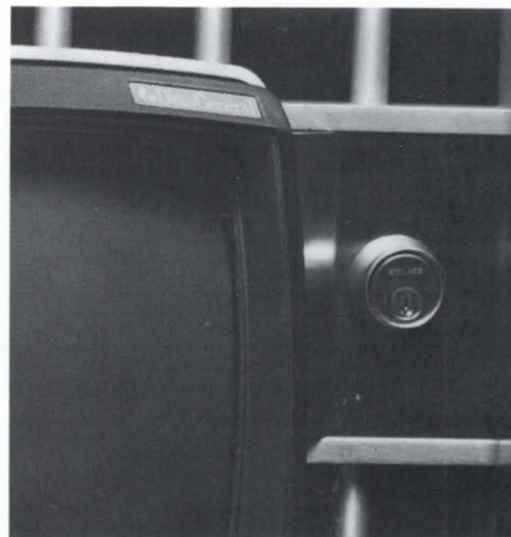
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Brief notes from the DG community

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WordPerfect sprints to the finish.

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Making the connections

One of the greatest joys a parent can know is to watch a new baby developing, month by month. Fortunately, that sort of pleasure is also derived from the birth of a successful new magazine.

The staff of such a new publication is privileged to witness daily the same sort of intellectual and physical growth an infant demonstrates. The effect is electric. Both the magazine and the infant begin to establish a rapport with the environment. They respond to it, and in that response lies the seed of more growth. Connections are made, interactions improve, development accelerates.

With the December issue, its fourth, *Focus* is already showing signs of being a healthy youngster. Apparently the readers of *Focus* agree. It is gratifying to answer more and more questions, such as "How can I get a subscription to *Focus*?" [join NADGUG], "Would you be interested in an article on . . . ?" [often we are], and "How do I go about responding to an article?" [by writing a letter to the editor or even another article]. Questions on when a rumored product might be released. Questions on how a useful product may best reach the attention of Data General users. On and on. We love all these questions.

Why? Because they demonstrate that *Focus* is beginning to fulfill its mission: to serve as a conduit between people who have ideas and would like to share them, between people with solutions to problems and people with problems that still need solving. One of the more delightful aspects of ideas is that, unlike with other media of exchange, both parties come away richer.

We at *Focus* are happy to share in the *community* of Data General users. I emphasize the word "community" because recent events have overwhelmingly demonstrated the value of group communication, among DG users, Data General itself, and suppliers of DG-compatible products. Computers, for all their speed and prodigious memory for tiny details, ultimately need people to communicate—with each other, with the computers. If a tree falls in the forest and no one is there to hear it,

is there sound? If a computer generates data and no one is there to interpret, is there knowledge? No.

No communication or community exists without people. Now we have more of all three in NADGUG. More means of communication, more people, more community. The sense of vital excitement that abounded at Conference '85 can be sustained all year long for all members—through *Focus*, through NADGUG's bulletin board, and through the network of interpersonal contacts they enhance.

This month's issue communicates on a wide range of topics, all of which arose because DG users expressed strong interest. We want several articles in every issue to appeal to each reader. We want to catalyze the interaction of readers. We believe the December issue will achieve those ends.

One theme this month is the increasingly serious problem of computer security—hence, the symbolism of the cover. Another is Data General's recent efforts to respond to user needs. A third involves the use of DG equipment in a highly technical environment—the world of nuclear physics. And, of course, we include the usual informative columns that address elements of the big picture within the minicomputing world. To our fold of regularly contributing editors we welcome Charlene Kirian, who will address office automation. This month Charlene discusses implementation of in-house training programs.

It has been gratifying to see the infant *Focus* mature with each issue, to see it respond better to the needs of Data General users. Of course, to continue that progress, we depend on you, the readers, to communicate to us your needs, likes and dislikes, comments, questions, and criticisms.

NADGUG, and therefore its community of members, has not only come of age, but has also become a parent. The offspring, *Focus*, will be a reflection of the interests of that community. We look forward to sharing in the future. Δ

—J.H.

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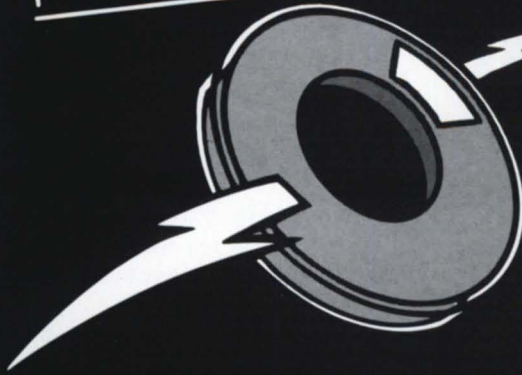
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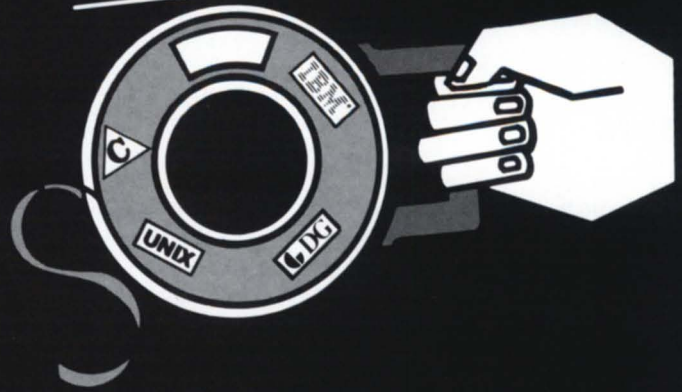
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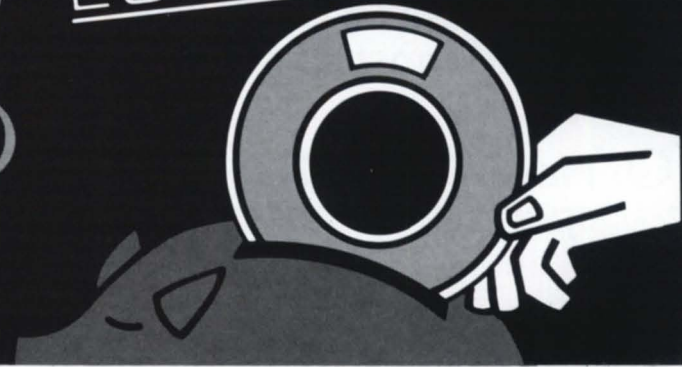
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Circle 16 on reader service card

Letters

The scenario Jim Siegman described in his article (*Focus*, October 1985) does not happen in AOS/VS rev 6.02. I typed in the macro listed on page 28. It was *not* executable because of an error—the third line from the end with the [!size] pseudo-macro in the

comment required an argument (I removed the brackets that enclosed it). In none of the cases was I able to “proc” a son CLI process with the methods you proposed. I was never able to get around the message:
ERROR: UNMATCHED [(<

First, the tests that require user input should be made as follows:

```
[!equal, (!!Read Do you want to scan the news bulletin?.,),)(y)]
```

The [!Read] should be within the test enclosed in parentheses. This not only reduces the number of commands and makes it more efficient; it reduces the chance of getting to the CLI inadvertently, with fewer commands to get an error message on.

Second, the true fix to your dilemma is: after the first push, place the command CLASS1 IGNORE, making the assumption if they answer incorrectly to perform the default command, such as typing out the news file.

Here is the macro that should fix the problem:

```
Comment CHECK_NEWS.CLI—10/21/85—Macro command
[!equal,(!!logon),console]
push
prompt pop : comment in case it aborts!
CLASS1 IGNORE
string/k
string [!path news.text]
[!neq,(!!string),]
    [!neq,(!!size [!path news.text],0)
        string/k
        dir/i
        [!equal,(!!file =last_news__check),]
            write/l=last_news__check none
    [!end]
    string [last_news__check]
    push
    string [!path news.text]
    [!neq,(!!string),(!!string/p)]
        write
        write *** THERE IS NEW NEWS&
            IN THE BULLETIN ***
        write
    [!end]
    pop
    string/k
    [!equal,(!!Read Do you want to scan the&
        news bulletin?.,),)(Y)]
        char/on/pm
        type news.text
        char/off/pm
        comm (!!Read Hit <NEW-LINE> to&
            continue . . .)
        delete/2=warning last_news__check
        write/l=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
```

Incidentally, what benefit does this macro have? As it is written, if the same news file is changed, the macro will not detect it.

M. Brent Fuller
Systems Engineer II
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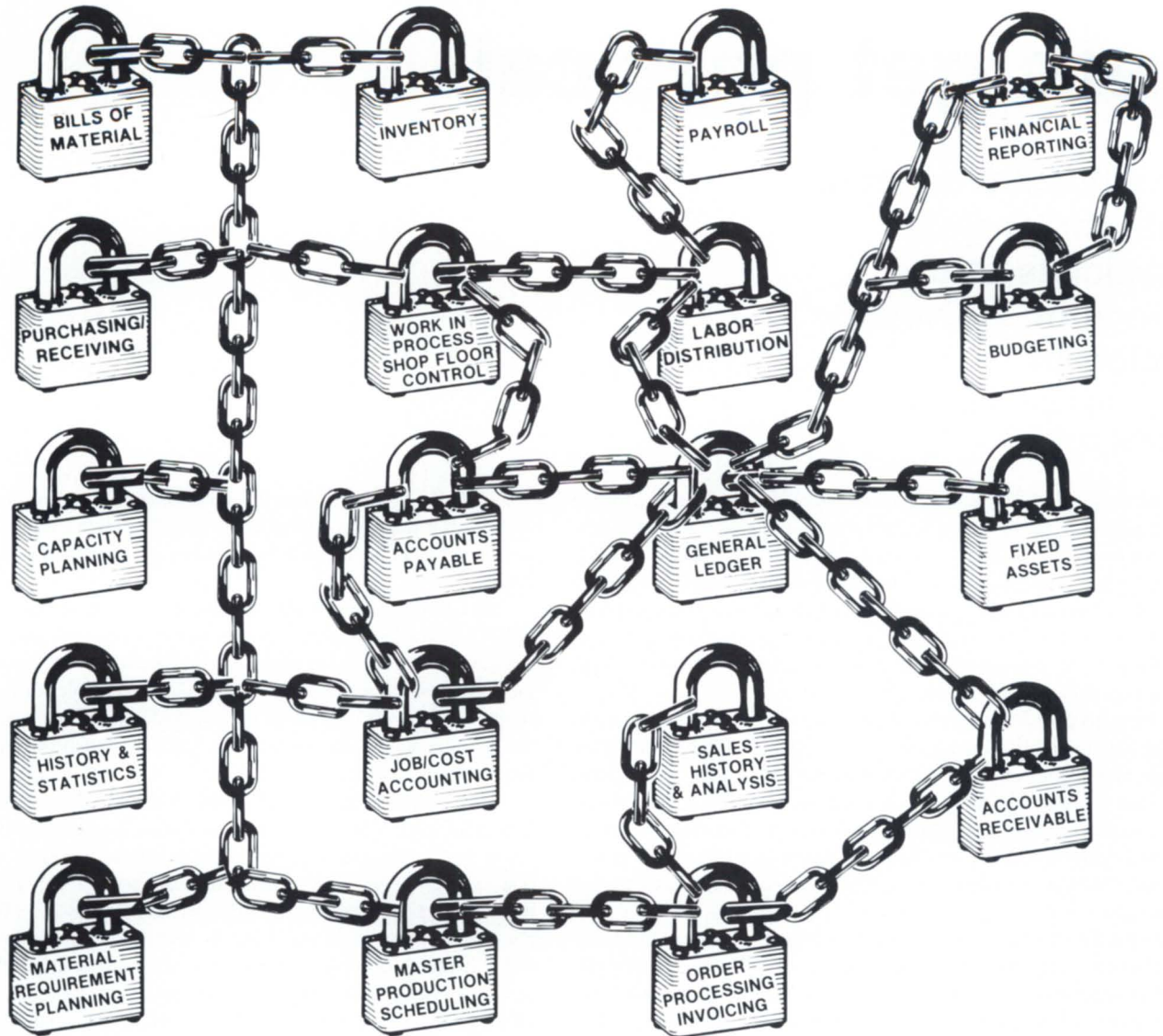
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Let's get physical

An MV/4000 collects data for nuclear physicists at the Princeton University cyclotron

by Dr. Richard T. Kouzes
Special to Focus

The Princeton University Cyclotron Laboratory is a facility for the investigation of nuclear physics phenomena at low energies. A cyclotron is a particle accelerator, commonly known as an "atom smasher," which brings atomic particles such as protons to velocities of up to a third of the speed of light. These energetic particles are used to probe the atomic nucleus for manifestations of the weak and strong forces. At Princeton, basic research is carried out in nuclear spectroscopy, weak interaction studies, and nuclear astrophysics.

Data acquisition in nuclear and high-energy physics typically consists of high-rate sampling of multiparameter information. Transfer rates are usually in the range of 1,000 to 100,000 random "events" per second, with each event consisting of one to hundreds of different parameters. These requirements have led to the development of an instrumentation standard called CAMAC, or Computer Automated Measurement and Control. CAMAC is widely used in physics, medical applications, and industrial control.

During the 15 years of operation of our present cyclotron, the diversity of experimental work has steadily increased, making new demands for data acquisition and analysis. In 1976, the Sigma 2 computer that had been used for 7 years was replaced with a system based on a Data General Eclipse S/230 computer. This system is now being replaced with one based on an MV/4000 for data acquisition utilizing CAMAC, tied via Ethernet to an MV/10000 analysis computer.

The CAMAC standard. The designers of a computer-based data acquisition system must carefully consider the selection of the hardware that will interface the external world to the computer. Important factors include the number of data parameters per "event," the rate at which events occur, the nature of the signals being sampled, and the cost and expandability of the system. Among the modern standards to be considered for acquisition hardware are CAMAC, FASTBUS, GPIB, MULTIBUS II, and VME.

CAMAC (IEEE 583) is a high-speed modular data acquisition standard extensively used in physics and other disciplines. Over 60 companies manufacture modules for assembly of acquisition and control systems in CAMAC, and parallel interfaces are available to virtually all computers.

FASTBUS (IEEE 960) is a very high-speed modular data acquisition standard used in large physics systems as an enhancement or replacement for CAMAC systems when there is a need for very high data rates, many data channels, or distributed intelligence.

GPIB (IEEE 488) is primarily an instrumentation bus useful for small systems at low to intermediate data rates. The wide usage of this interface in measurement instruments makes it attractive for many applications.

MULTIBUS II and VME are modular computer buses especially useful for small standalone systems in which integral microcomputers and memory are needed in addition to the data acquisition modules. Interfaces to many computers and CAMAC are available. Data General's support of CAMAC and GPIB would significantly benefit data acquisition users and eliminate the need for developing their own limited data acquisition hardware.

ANSI/IEEE Standard 583-1982, "Modular Instrumentation and Digital Interface Systems (CAMAC)," defines a standardized instrumentation system designated CAMAC. The standard defines a data bus (Dataway), together with modular units that are available from over 60 manufacturers representing more than 2,000 modules. Modules are plugged into crates that are joined by serial or parallel data highways, and ultimately to a computer via a serial or parallel interface. Such interfaces are available for virtually all computers including Data General, DEC, IBM, Gould, HP, Control Data, Modcomp, and Prime. Interfaces are also available to connect crates to GPIB, RS-232, and VME.

CAMAC operates on a 1-microsec Dataway cycle, which allows for very high-speed data transfers. The Dataway is parallel with 24 read lines, 24 write lines, 43 control lines, 24 interrupt lines, and 14 power lines. The addressing capability in a system allows for 7 crates on a parallel highway or 62 crates on a serial highway. A crate can hold 25 modules (2 of which are usually used for a crate controller), with 16 subaddresses within a module and 32 function codes possible.

An instrument system may consist of a single crate containing a few modules or of dozens of crates on a serial highway covering a large geographical area. CAMAC has found widespread acceptance in nuclear and high-energy physics, medical imaging, space exploration (e.g., on the space shuttle), power plant control, accelerator control, and wind tunnel testing, to name just a few.

Typical costs for a system are approximately \$1,500 for a crate, \$1,000 for a controller, and about \$1,000 per module. CAMAC is thus cost effective, even for a simple system, especially when alternatives cannot match the speed performance that is possible.

The S/230 system. The computational needs of the cyclotron laboratory divide into two areas, each involving different hardware and soft-

Data acquisition in nuclear and high-energy physics typically consists of high-rate sampling of multiparameter information

ware features. The first task is data acquisition, which requires high-speed real-time processing capability with the availability of interactive replay of event data. The second is scientific calculation, which requires large memory and disk space and high-speed floating-point processing. In addition, convenient multiuser program development facilities are required.

Our Data General 16-bit Eclipse S/230 has 256 KB of memory, 80 MB of disk storage, and two 800 BPI tape drives with a data acquisition interface of in-house design and construction, and eight analog-to-digital voltage converters (ADCs). This one machine has been used for all of the Cyclotron Group's computational and data-taking requirements since 1976. For data acquisition, the S/230 is primarily limited by the number of parameters per event (eight), the memory available for histograms (16K words), and the number of simultaneous experiments that can be handled (one). A CAMAC interface was added to this system 2 years ago to enhance its acquisition flexibility.

For computation, the most important limitations of the S/230 system are program size, available disk space, and the lack of efficient multiuser timesharing. We have used Wild Hare's MTSS timesharing system under RDOS with great success for several years to make the system available to five simultaneous users, but it is clear that we need to move to the flexibility and power of a 32-bit system.

ACQUIRE data acquisition program. The data acquisition program used with the S/230 system is ACQUIRE. The program is based on DERIVE, the data acquisition program developed by the author for the Indiana University Cyclotron Facility. This program is specialized for the data-taking needs of a nuclear physics laboratory, although it could function in many scientific applications.

With CAMAC, ADCs are the most common source of data, although counters and time-to-digital converters are also used. ACQUIRE allows for the creation of up to 40 one- and two-dimensional histograms for sorting ADC data with zero offsets, variable gains, and up to 10 side conditions (gates) per array. Event mode recording of data on tape for later processing is provided as an option. Other options include printing, plotting, data analysis, dumping to tape, logging of commands, and entering repeated command sequences.

Data rates are mode dependent, but are typically limited to between 1 and 20,000 events per second. An important feature of this data acquisition system is the ability for experimental control by the computer via CAMAC digital-to-analog converters (DACs). ACQUIRE is also the basis of the acquisition software for our new system.

Requirements of the new system. A few simple criteria were established for selecting the basic configuration for our new system:

1. Two independent processors should handle the computation and acquisition, coupled by a communications link.
2. The data acquisition should be CAMAC based.
3. The computational machine should be a 32-bit multiuser system with significantly improved capabilities over the S/230.
4. Since we lack manpower, hardware and software development should be minimized.
5. Because of the manpower limitation, the two processors should run compatible operating systems.
6. Future expandability and acquisition enhancement options are essential.

After evaluating our acquisition and analysis needs and the available hardware from the two vendors we considered (DG and DEC), we arrived at the configuration seen in Figure 1. All data-taking responsibility is placed in an acquisition processor system with one or more CAMAC stations, while the host computer handles computation, analysis, and data transfer tasks. The system consists of two 32-bit computers with higher computational speed than our present S/230, far greater memory and storage capacity, and powerful multiuser, virtual memory operating systems.

These two processors are tied via a high-speed Ethernet communications network that allows access to all peripherals from either machine. A two-machine system is essential to prevent the acquisition and computational tasks from interfering with one another as on the S/230.

The final configuration for the host MV/10000 computer includes 4 MB of memory, hardware floating point, a writable control store, a 354 MB disk, two dual-density tape drives, a printer, a plotter, and 24 communication lines. An array processor is included for future computational and analysis needs.

The acquisition processor, an MV/4000, has 2 MB of memory, hardware floating point, a writable control store, a 354 MB disk, and a tape

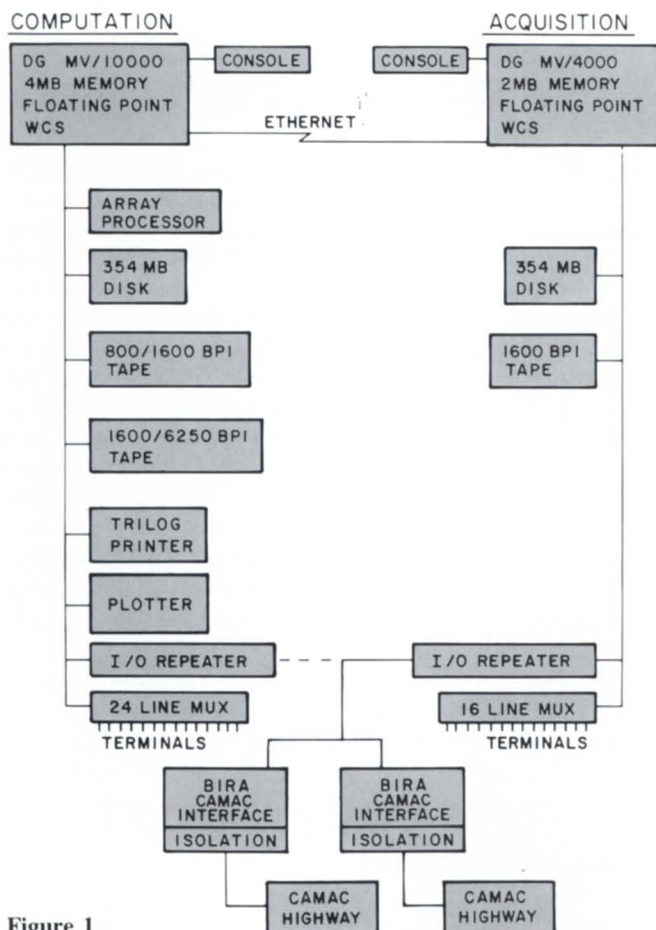


Figure 1

With the writable control store, we have seen speed improve by a factor of four on our S/230

drive. The system is equipped with two acquisition stations. Each station consists of a CAMAC crate with controller and acquisition modules, an intelligent preprocessor, and a graphics terminal.

A variety of possibilities is available for enhanced acquisition performance. These include use of intelligent CAMAC preprocessors, use of the writable control store, and use of parallel processors internal or external to the system.

With the writable control store, we have seen speed improve by a factor of four on our S/230. A factor of two should be possible in a 32-bit system. The gain is less because of cache memory and the pipeline nature of the new generation of machines. An intelligent CAMAC preprocessor (Event Handler) will shortly take over the module-dependent command operations plus perform data compression and DMA transfer, while the MV/4000 processor carries out the complex sorting, histogramming, and event mode recording functions.

It is important to realize that the maximum data rate in complex experiments is always limited by the speed of the sorting software. Maximum data rates depend on the number of parameters and the complexity of sorting, but given the speed of present processors and the I/O bandwidth, we anticipate that speed will ultimately improve by a factor of two over our S/230 hardware/software system.

DG versus DEC. In designing the system, we considered two equivalent system configurations: two Data General Corporation MV/4000s and two Digital Equipment Corporation VAX/750s. Table 1 shows a comparison of Whetstone benchmarks for various systems as reported by Data General, and Table 2 shows three computational comparisons that we and others have made.

The VAX/750 has two advantages: It is used extensively in physics labs around the world, and data acquisition software is available from other laboratories. Its biggest disadvantage is a poor price/performance ratio. The MV/4000 has a better price/performance ratio and is of the same family of processors as the S/230, which makes software transfer to the new system easier. The implementation of CAMAC hardware and software is of similar difficulty on both machines.

We chose Data General for several reasons, including the author's familiarity with DG and the substantial discount their sales representative was able to obtain on a more powerful system. Instead of two MV/4000 processors, we were able to purchase an MV/10000, and Data General donated an MV/4000. Our decision was a difficult one because of the commitment of effort to either system that is required.

Table 1
Comparison of Fortran Double-Precision Whetstone Benchmarks on Various DG and DEC Machines with Floating-Point Hardware (Source: Data General)

Machine	KWIPS
VAX/730	200
MV/4000	390
VAX/750	420
VAX/780	720
MV/8000	990
MV/10000	1900

Table 2
Timing Comparisons for Various DEC and DG Machines Running Computation Codes

Machine	Time (In Seconds)
a) SIEVE, locating prime numbers, 100 iterations in Fortran	
S/230	51
MV/4000	31
VAX/750	29
MV/8000	22
MV/10000	12
b) LIRA, a large Fortran code for sorting high-energy physics data	
VAX/750	715
VAX/780	450
MV/8000	385
MV/10000	189
CDC Cyber	73
c) Linear equation solution in Fortran*	
CDC Cyber 176	0.148
IBM 3033	0.390
MV/10000	2.26
VAX/780	5.28
VAX/750	6.87
MV/8000	8.80
Ridge 32	10.00
IBM PC/XT	98.90

*From J.J. Dongarra, Argonne National Laboratory, Technical Memorandum 23 (August 1984)

The MV/10000 has about three times the performance of the VAX/750 and the MV/4000. Data General MV/ machines perform direct memory access (DMA) I/O via the burst multiplexor channel (BMC) or the data channel (DCH). Programmed I/O (PIO) is used for individual word transfers and for setting up DMA transfers. Fast disks and tapes use the BMC, whereas other devices, including the BiRa CAMAC interface, use the DCH and PIO. Table 3 shows these I/O speeds for the MV/4000 and MV/10000. The I/O bandwidth of the MV/4000 DCH is 2.5 MB/sec inbound, whereas that of the DEC Unibus is 1.5 MB/sec.

There are two choices available for parallel processors with DG hardware. One is a DCU/200 board, which is a Nova processor that can share memory with the host Eclipse processor. The other is DG's AP2000 array processor with a 512 KB memory and its own high-speed I/O port. Our initial experience with the AP2000 shows that it will be very useful for a limited set of computational problems (a larger local memory would improve its usefulness). These options, plus writable control store, allow for future enhancements to data acquisition throughput.

Table 3
Input/Output Rates (in MB/sec) for MV/4000 and MV/10000 Data Channel (DCH) and Burst Multiplexor Channel (BMC)

Machine	DCH	BMC
MV/4000 outbound	1.25	5
MV/4000 inbound	2.5	5
MV/10000 outbound	1.4	10
MV/10000 inbound	2.0	14

The MV/10000 has about three times the performance of the VAX/750 and MV/4000

Should we need even higher acquisition speed, we simply can move the CAMAC crate to the MV/10000 system and gain the factor in processor speed. The writable control store on the MV/10000 has already been a worthwhile investment. We have seen time improved by a factor of two in functions such as square root since the release of the Intrinsic Instruction Set.

Implementation. The MV/10000 was delivered in October 1984. By December, most of our standard analysis programs had been implemented on the new machine, including most of ACQUIRE. The MV/4000 was delivered in March 1985, when the debugging of the CAMAC driver started. Software implementation always takes longer than anticipated, of course.

Surprisingly, the CAMAC hardware performed from the instant it was plugged together. The Data General I/O bus repeater extends the MV/ backplane to the BiRa DMA CAMAC controller, and the CAMAC parallel highway connects crates to the BiRa controller. Additional BiRa controllers can be daisy-chained on the same I/O bus repeater.

A Fortran V CAMAC test program (CAMTEST) and the Fortran V version of ACQUIRE were moved to the MV/ from the S/230. Recompile of a Fortran V program is in general the only necessary step to move software between these machines—compatibility really works. The assembly CAMAC driver used by both of these programs had to undergo slight modification. For example, the RDOS system call .SYSTEM/.IDEF had to be replaced by ?IDEF on the MV/. Also, the Fortran-compatible entry into the assembly routine (three lines of code) had to be changed.

The only major effort to get the Fortran V version of ACQUIRE running was to write an MTDIO subroutine to handle mag tape I/O, since the RDOS MTDIO routine was unavailable. In general, we have found moving a Fortran V program between machines to be trivial. CAMAC acquisition was tested within 1 month of delivery of the MV/4000.

Using the CAMTEST program and ACQUIRE, we have made some measurements of data rates on the S/230, MV/4000, and MV/10000 (see Table 4). None of these routines are optimized, and ACQUIRE does not yet make use of DMA, since to date we have not had an Event Handler in the crate. Most of these tests were made with an interrupt received on every event, which produces significant software overhead from the AOS/VS interrupt context switch.

We found the time under AOS/VS on an MV/4000 from an interrupt to the interrupt acknowledge to be 190 microsec. Presently, a CAMAC read operation on an MV/4000 takes 15 microsec using PIO. The total time in ACQUIRE to enter and exit the interrupt handler, including saving the stack and doing the CAMAC read, is about 400 microsec. The singles rates of about 50 kHz on the MV/4000 as it histograms a single array in optimized assembly code using CAMTEST are reasonably good.

ACQUIRE, which uses a very generalized sorting algorithm with a present rate limit of only 2 to 3 kHz, will gain significantly from the anticipated final DMA software/hardware. The DMA test shown using CAMTEST was made with a CAMAC memory module in conjunction

Table 4
Preliminary Maximum Data Rates (in kHz) Using Programmed Input/Output for CAMAC Acquisition on an S/230, an MV/4000, and an MV/10000, with a Repetitious Pulser into a Lecroy 3512 ADC

Test	Machine	Maximum
ACQUIRE—Generalized sort algorithm and programmed I/O with interrupt on each event	S/230	2.9
	MV/4000	3.3
	MV/10000	6.4
CAMTEST—Assembly program I/O with interrupt on each event	S/230	60
	MV/4000	50
	MV/10000	63
CAMTEST—DMA with 128 words/block, polled data ready, interrupt on done	S/230	60
	S/230 (No sort)	115
	MV/4000	71
	MV/10000	96

Note—All tests histogrammed data into one array except as noted by "No sort."

with the ADC. These DMA results, which show only a 50 percent speed enhancement, are very preliminary and will be improved.

In general, conversion of a Fortran V program to Fortran 77, which can make use of the large address space of the MV/, is easy. It requires changes to only a few statements, such as OPEN. Several large F77 programs from other labs have been put on the MV/. For example, the large code DWUCK was put on the machine with a change to only two OPEN statements. Other F77 programs from VAX systems have required more extensive, but usually simple, modification. For example, Data General F77 doesn't have TYPE or ACCEPT. The next F77 revision from Data General (rev 3.0) will improve compatibility by supporting some of these statements (e.g., BYTE).

The F77 version of ACQUIRE has received substantial improvement over its F5 counterpart. A lot of effort has gone into cleaning up the code and extending its features. The assembly code for the CAMAC driver had to be updated to use the extended addressing instructions of the MV/. There were a few problems to overcome in handling system calls, largely due to inadequate documentation. For example, one cannot ?IMSG before ?IDEF. By April 1985, CAMAC acquisition on the MV/4000 (and the MV/10000) was possible using the F77 code.

Summary. We have presented a system with capabilities to meet our future computational and acquisition needs. Program development time has been reduced significantly due to the more effective user environment of AOS/VS, and computational speed has been enhanced by a factor of three or more. Δ

This work was supported by the National Science Foundation. Dr. Richard T. Kouzes is a research physicist at Princeton University, where he conducts research in nuclear physics and instrumentation. He is a member of the IEEE Technical Committee on Computer Applications in Nuclear and Plasma Sciences. He may be reached at Princeton University, Department of Physics, Jadwin Hall, P.O. Box 708, Princeton, NJ 08544; 609/452-4425.

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Breaching a sensitive topic

Some clues for staying ahead of the perpetrators, and more tidbits from Conference '85

by Brian Johnson
Contributing Editor

:CONTEST.RESULTS

The results of the Great AOS/VS Security Breach contest are in. The winner is John Kramer of Concepts Automation, Inc., in Sterling, VA. A can of real Coca Cola has already been dispatched in John's direction.

To refresh your memory, the object was to log onto AOS/VS under any username (so OP wouldn't know who it was), and with SUPERUSER privileges, but without a privileged-logon record being written to the SYSLOG file.

Now, normally I wouldn't publish a way to break into any system, but in this case a quick and easy solution exists to subvert any potential perpetrators:

```
) ACL :UTIL:EXECVS.PR +,E
```

Put down the magazine and do the command now. Remember, perpetrators also have subscriptions to *Focus*.

Rather than give a cookbook description of how to break into AOS/VS (in case a perp got his *Focus* early), I'll describe the method in general terms.

The first step for our hypothetical perp would be to produce a text listing of :UTIL:EXECVS.ST so he could see all the nice, descriptive entry points like "VALIDATE__USER". Next he would write a little program to ringload :UTIL:EXECVS.PR into an inner ring. Using the debugger, he would run his little program and change the appropriate code sections in the inner ring using the symbols he found in the .ST file. Any changes he made would be reflected in :UTIL:EXECVS.PR and in the real EXEC process's address space.

The perp would need to subvert password checking and force all privileges without a

privileged-user log record being written. Then he would just log off and log back on as any other valid username (it must exist), and he would find himself with all privileges.

Luckily, taking advantage of this technique is not as simple as it sounds. You need to know assembly language to do it, so that narrows the field of potential perpetrators considerably.

There are two reasons why this subversion of the AOS/VS security system works: DG software products are shipped with poor ACLs, and the AOS/VS debugger allows modification of the whole address space based on the ACL of the original ring 7 .PR file.

Unfortunately, making your system as secure as possible involves a lot more than just changing the ACL of EXECVS.PR. Maybe some day I'll write a book on the subject . . .

:VESTIGIAL

My plea in the September issue for a copy of "How To Goad & Levitate Your CHAOS System" was rewarded. Susan Massaro, a local legend in DG's Wayne, NJ, office, came up with a copy. Perhaps we can get it published in some future issue of *Focus*. It's pretty humorous stuff.

I have an aversion to publishing macros due to the problems with typos during typesetting and the constraints of column inches. The macro I included in the October column reinforced my aversion. Luckily it was only an example. In case you didn't figure it out, the lines beginning " ; COMMENT . . . " were appended to the preceding line and did not refer to the following line as it appears. [Oops. Sorry.—Ed.]

:NADGUG:85

I promised the assembled multitude at the AOS/VS System Manager's Roundtable in Boston that I would summarize the results of the conference session in a future column. The future is now.

First of all, I'd like to extend my thanks to DG, which made Louise Gerhart (Networking), Skip Richards (CEO), and Jim Hassey (OS) available for the panel. In addition, Mike Travis of the U.S. Forest Service was on the panel as a representative of the Huge Numbers of Systems SIG.

Backup/restore strategies were a hot topic. A few users indicated that some minor problems with DUMP__II/LOAD__II still exist. The general feeling was that the product is "quirky," especially with respect to UDAs and templates.

Some grumbling about labeled tape occurred, but I'm not sure whether the comments were aimed at AOS/VS or at the ANSI and IBM labeled tape standards committees. I suspect the latter. As an aside, the subject of the /SPECIFIC switch came up, and it was noted that perhaps the source of any confusion is the fact that the switch allows loading of a specific tape file on a multivolume, multivolume tape set. It was not intended to allow starting at some volume other than the first volume in a multivolume, single-file tape set. One user pointed out that a third-party dump/load program is available that affords some measure of error recovery in case of tape errors and that allows starting with other than the first volume.

A show of hands gave the following: about 15 percent use labeled backups, about 75 per-

Several users expressed a need for an easier way to handle assigning and managing large numbers of usernames

cent use unlabeled, and 10 percent go both ways. Some problems were described with EBCDIC tapes, but no corroboration was found. The perennial problem of how to handle garbage collection (dumping files according to time-since-last-use) reared its ugly head again: no easy solution seems imminent.

The need for a simple Operator/System interface, from the UP macro through controlling EXEC and the other servers, was voiced. This would allow the same people who use CEO to also run the system without learning the CLI. Not a bad idea.

A show of hands indicated about 90 percent of the users were happy with the high-level (i.e., nontechnical) documentation that is provided with the software.

A lot of problems concerning nonstandard peripherals were voiced, especially third-party printers with CEO and the ever-present lust-

ing for foreign tube support in everything from SED to CEO. No easy solutions were apparent.

Many problems with terminal/printer hookups were described, especially printers (how to sysgen them, how to cable them, what causes overruns, and on and on). There were so many problems that I offered to chair an informal meeting of the Printer SIG at the lunch immediately following the session. The meeting drew about 10 users. The proceedings of that subconference are available by sending a SASE to the address below.

Some RAC issues surfaced. A show of hands indicated about 50 percent use it, primarily to save on FS contract costs. A few users voiced qualms about security, but it was pointed out that the device can be turned off easily when not actually in use.

Several users expressed a need for an easier way to handle assigning and managing

large numbers of usernames (like en masse password changing), even taking into account the Q command in PREDITOR.

Some easier means of intersystem file transfer was requested, and some recurrent problems with BLAST were cited.

John Quinn mentioned that a goodies tape was available from him at Multi-Planar Diagnostic Imaging, 2730 Pacific Coast Highway, Torrance, CA 90505.

:THANKS

On behalf of NADGUG and the panel members, I'd like to thank everyone who showed up. I hope you got something out of it. That was the point. Δ

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The main point is not to push too much material at one time

Charting a new course

Training can make or break an office automation system

by Charlene A. Kirian
Contributing Editor

Being the official and *only* CEO trainer at my company, I spend most of my time preparing training materials, setting up classes, and working with current users who have questions. I have found over the last two years that there are good and not-so-good methods of training. I would like to share some of my experiences; maybe they will help you with your own training programs.

Training courses. The programs our company offers are: (1) secretarial/clerical, (2) advanced word processing, (3) managerial/professional, (4) executive, (5) refresher, and (6) enhancement training.

- The secretarial/clerical course covers electronic mail, calendar, filing, basic editing, and printing techniques. It usually is spread over four half-day sessions involving both lecture and lab. I use an Electrohome projector to display the terminal screen image on a screen in front of the class. After the lecture, I schedule about an hour of lab work. It is important to stress the lab exercises for practical experience. On several occasions, I have taught this course with the students sitting at terminals during the lecture, trying functions as they are discussed. Although this is a very effective tool for learning, the size of the class is limited by the number of terminals available at one time.

- The advanced word processing course is directed toward people who do word processing during most of the workday. It concentrates on the more advanced editing and

printing techniques, list processing, manipulation of columns, and user-defined commands. We offer it monthly as a three-hour lecture and discussion period, including demonstrations on a live system.

- The managerial/professional course is geared toward people who make lighter use of word processing. The basics of electronic mail, calendar, filing, editing, and printing are taught in a three-day course for three hours per day, with students at terminals. I've run into difficulties teaching this course because of the type of students involved. They are usually very receptive to the training but tend to want to jump ahead on their own. The problem with this is that I end up repeating my instructions so many times that no one really gets ahead. I think the key to this problem is to maintain control and insist that students listen to your instructions, then do what you ask (not always an easy job!).

- The executive training program is an overview of the CEO system. It is taught on a one-to-one basis for approximately three hours, sometimes spread over several days, as time permits. To avoid interruptions, it is best to train individuals outside their usual work areas. If they are willing to learn the system, this is probably the easiest group to work with. However, if they really don't want to be there, it becomes very difficult to keep their attention. You must make the training sessions as interesting and fun as possible.

- A refresher course is offered on an "as needed" basis. It is for users who were trained

earlier and have not used the system regularly, or users who just need some additional help. It covers basic and advanced editing and printing and a review of user commands. It is offered as a lecture with labs in a three-hour session.

- Enhancement training is available before installing new software that requires additional or upgraded training. If the enhancements are not too involved, a demonstration of the new features with accompanying documentation is given in the auditorium for a large group with the Electrohome projector. If detailed instruction is needed, separate classes are scheduled.

After the students have finished the course, they are awarded certificates of completion. They can do whatever they want with them (I never ask!). A copy is sent to their personnel file for a permanent record.

I often call upon several in-house training assistants to aid in teaching new employees. These assistants are support personnel who have been granted time by their supervisors to train new employees on an on-call basis. It works very well and has proved to be cost efficient. Additional staffing is not necessary to fill in the gaps when I'm not available.

Tips and techniques. One of the most difficult problems I've had is trying to train someone who just can't seem to comprehend any of the concepts. This can be for various reasons—fear of automation, or refusal to change to a different system. For these special

*To keep myself up to date, I attend
Data General courses*

people, it is necessary to take extra time and effort to make it as easy as possible, without bringing them to the point of total frustration. Sometimes, you need to just back off for a while and try at a later time with a different approach—maybe even a different teacher. These are the times when you wonder where and when you failed. But there are no easy answers. You must evaluate what you have done, and where you might improve. The old saying "You learn by your mistakes" holds true. But keep plugging away, because it gets better each time!

To keep myself up to date on everything, I attend Data General courses. This makes me the *most* knowledgeable person around about the different features. That's very important. You have to know what you are doing to be able to teach someone else. There is always someone who will ask you questions just to test *your* knowledge! If you don't know many of the answers, then you had better get yourself into a class to learn! Effective trainers must be prepared (sorry for borrowing the Boy Scout motto), or they will lose the confidence of the class.

The main point I should stress is not to push too much material at one time. Let them use what you have taught them, and then go back and follow up to find weak points. It saves much frustration for everyone involved. If additional training is necessary, don't be afraid to let someone know. This can get sticky, however, if not handled properly. Take an approach that lets users think you have some additional information that may make their jobs easier. Who can turn down an offer like that?

Reference manuals. The materials I use in my classes were developed mostly in house. I have just completed a manual that is available from our in-house library for our CEO users. It consists of three sections. The first covers standards and procedures within our company, with the specific information that is necessary to log on or maintain an account.

The second is a reference section with guides for word processing functions, calculator, list processing, and user-defined keys and commands. This section is arranged in a reference format stating the function key used, results, and step-by-step instructions. I have

tried to keep it simple without being too wordy. It also includes an easy reference for moving around within a document and a checklist of things to do before calling for help in case of printer problems or lockups.

The last section is the *Getting Started with CEO* manual produced by Data General. It is a handy book that enables first-time users to sit down to try using the system on their own. It does not eliminate the need for additional training, but does allow the user to learn some of the easier functions within the system.

I recently acquired a copy of the new manual *CEO at a Glance*. It's great! It serves as an excellent reference tool for anyone from an executive to a heavy-duty word processing user. It is clear, concise, and, most of all, accurate. My compliments to Data General on this document!

Follow-up. To evaluate the training program you have, you must follow up with the

people who have been trained. Find out what they still don't know, what they use, what they don't use, and what they still need to know to become proficient users. Use this information to build on the programs you have established.

I've found these methods to be effective in my training program. There are probably other things I have not mentioned, but this will give you a little insight into what I have found useful. I'll be glad to share any of my ideas if you write or call me. Until next time, let me know if you have any topics you would like covered. Your ideas are what will make this column useful. Δ

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

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Knowledgeable users may try any of a variety of nefarious techniques to break out of macros

Forewarned is forearmed

The CLI was designed to provide convenience, not menu security

by Tom Gutnick
Special to Focus

Are there holes in the CLI? In the October issue of *Focus*, Jim Siegman commented on a potential security problem with the CLI, and I felt that others might appreciate my thoughts on the subject.

In one of my roles at Data General, I conduct a seminar on system security under AOS and AOS/VS. (I have also developed a security audit service, which is now available through DG's Systems Engineering organization.) One section of the seminar deals with the design of application software. I always mention that, if you want to keep users from directly accessing the CLI, you cannot implement your menus (or anything else requiring user input) as CLI macros. I point out that knowledgeable users may try any of a variety of nefarious techniques to break out of macros. These include some techniques that Jim described in his article, such as entering "; CHAIN CLI" in response to a [!READ].

I was approached during a break by one of the seminar participants. He is the ADP security officer at one of the Federal defense agencies, and he was rather concerned. "When we put together our system, we used macros instead of programs for all our menus. We saved about \$50,000, and our contractor [a large company with considerable Data General expertise] absolutely guaranteed that

this was safe."

"Well, I'll guarantee you that I can always break out to the CLI, probably in about ten seconds," I answered.

"But they set PROMPT to BYE and CLASS1 and CLASS2 to ABORT."

"Ten seconds," I said.

His hair turned noticeably grayer.

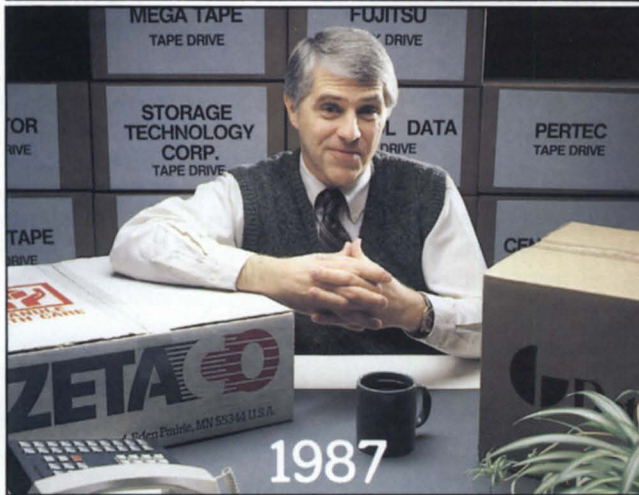
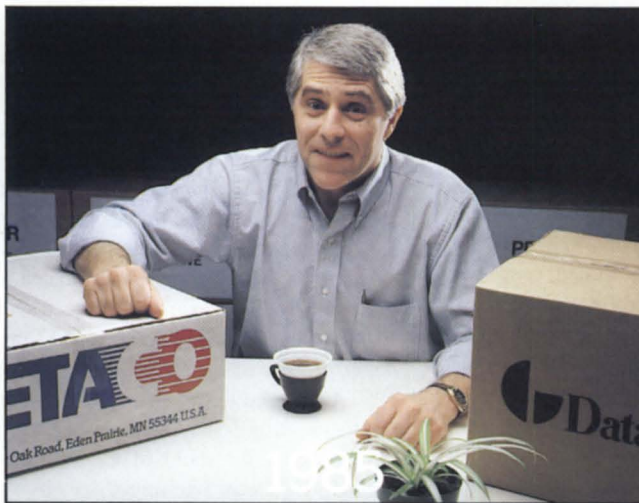
I do not consider this "problem" with the CLI to be a genuine deficiency. The only real problem with the CLI is that it is not a high-level programming language. It was never intended to be, nor is it likely to be. The ability of users to break out of a macro is a consequence of the way the CLI functions: the CLI expands a command line completely, making all macro and pseudo-macro substitutions, before it executes any of that line. Although this aspect of the CLI is inconvenient in the context of security, it is very convenient in other contexts: thus are we able to bring the contents of a text file into a command line, and even implement our own "pseudo-pseudo-macros." Although it might be theoretically possible to modify this feature of the CLI, such a change would undoubtedly cause countless macros to no longer work correctly.

So the question remains, how can we implement a menu system that keeps users

from entering the CLI? You may not like my answer: implement your menu systems in a high-level language. But this really isn't as bad as it sounds. Even your rookie entry-level programmers should be able to write and debug menu programs very quickly, in just about any programming language, and you'll end up with much more reliable validation of user input than is possible within a CLI macro. (Of course, some good tools, such as the Screen Generator Utility, make it even easier.)

If your site is one where security is not an overriding concern, you might not care if users can get to the CLI; by all means, go ahead and use CLI macros. They're straightforward, convenient, and inexpensive to implement. But if security is a top priority for you, then you need to put some time into developing a secure alternative. You can't say you weren't warned. Δ

Known to many NADGUG members as the first editor of the AOS & AOS/VS SIG Newsletter, Tom Gutnick is now a systems engineering specialist at the Data General office in McLean, VA. He may be reached at Data General Corporation, 7927 Jones Branch Drive, Suite 200, McLean, VA 22102; 703/827-9669.



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Watchdog

by Sharon Lindley, Robert McKosky, and John Chapman

With ever increasing concern over security, users of computer systems are becoming more sensitive to unauthorized access. A primary problem on any computer system is that of users' leaving their workstations unattended while still connected to the system. This is a concern for two reasons: it ties up resources unnecessarily, and it opens the way for unauthorized access to the system. Some systems are equipped with an automatic time-out option. The Data General MV/10000, however, does not have this feature. Here, we describe the process activity monitor and process terminator tasks developed for the Shuttle Management Information System (SMIS) at Marshall Space Flight Center's Shuttle Projects Office.

System description. The Data General Eclipse MV/10000 runs under AOS/VS. AOS/VS is a multitasking, multiprogramming, demand-paged, virtual storage operating system. It can support users on a time-sharing basis, run batch jobs, or perform control applications on a real-time basis. The user communicates with AOS/VS from the master console, via the CLI (Command Line Interpreter). AOS/VS is unique to 32-bit Eclipse MV/ computers, and has the capacity to run up to 256 processes at a time. The MV/10000 process tree begins with AOS/VS, designated as Process IDentification number (PID) 0. AOS/VS assigns a PID to each process. AOS/VS has two sons, PMGR (PID 1) and OP (PID 2). PMGR is the peripheral manager. OP is the "master

process," because it is operable only from the master console.

EXEC, a son of OP, runs as PID 3. All user processes are sons of EXEC. Most system processes are sons of OP. The printer queues are sons of EXEC. System processes include peripheral controllers, data base management systems, communication packages, and Comprehensive Electronic Office (CEO).

Problem overview. The goal for SMIS was to develop a task or CPU activity and terminate any inactive user process, including modems. During development it was decided to design two tasks that could run independently, the monitor and the process terminator. The process terminator would accomplish two goals. First, it would increase system security by decreasing the chance of unauthorized access to the system. Second, it would release limited resources back to the operating system. The process monitor would provide a quick and easy reference to the system activity.

There were three basic problems to be solved. First, there needed to be a way to ensure that process trees with only inactive terminal sons would be terminated. Second, the CEO clock updates indicated that the process tree of a CEO user was active when, in fact, it was not. The third problem consisted of exceptions to the rule: For various reasons, certain users would never be terminated.

Solution overview. The two tasks developed were PIDACT, the process monitor, and ERP, the process terminator. PIDACT (see listing) provides a visual display of the status of each PID. ERP can be activated or deactivated at any time. If a user is found to be inactive, then he or she is warned. After a selected number of warnings, the process tree is terminated. A VIP table, called VIP.DAT, which can be modified by

a text editor, was designed to ensure the nontermination of selected users.

Both PIDACT and ERP solve the three problems mentioned in the above section in the following manner. To ensure that only inactive process trees are terminated, the process tree is traversed. This traversal enables the task to find the terminal son and father process of the tree. Then system call ?PSTAT is used to traverse the process tree. Next, to ensure that CEO processes are terminated, a threshold of CPU time was needed. This was determined by observing and testing the processes. We found that 5 milliseconds per minute is a good threshold for SMIS. Almost all other activities require more time. For example, pressing a NEW LINE takes about 6 milliseconds.

The remaining system calls needed for PIDACT and ERP are: ?SEND, used to send messages to an inactive PID; ?RUNT, which gets the run-time ticks of a process; ?GPRNM, used to get the program path name of a process; and ?GUNM, which gets the owner (user name) of the father process. ERP uses one other system call, ?TERM, which kills a process. ?TERM is the only privileged system call used. It requires superprocess privileges.

Applications. The process activity monitor is called PIDACT. PIDACT divides the processes into four groups: father process, or OP; active process; inactive terminal son; unassigned pid.

These divisions allow the system manager to easily monitor system activity. On the screen, the father process, or OP, appears in normal video, active processes are blinking, inactive terminal sons appear in reverse video, and the unassigned pids are shown as zeros. The pids and user names of those users logged on are shown on the right-hand side of the screen. The screen is also date and time

Listing 1. PIDACT.F77 and its eight subroutines are listed below. Complete print-outs of these listings and the other routines developed by the authors are available.

```

PIDACT.F77
*****
PROGRAM PIDACT
C
C      DISPLAYS ACTIVE PID NUMBERS CONTINUOUSLY
C      ON SCREEN BASED UPON CPU TIME
C
C      INTEGER*4 ITIM(256), ICPU(256), IDIS(256), USE(256)
C      INTEGER*4 ETIME, CPUTIM, IERR, CNT(4)
C      CHARACTER MODE*6(256), BLK*2, REV*2, DIM*2, NRM*4, NUL*2
C      CHARACTER UNM*32, TMDT*18
C
C      INITIALIZE THE FOLLOWING ARRAYS
C      ICPU - CONTAINING LAST CPU TIME
C      ITIM - CONTAINING LAST ELAPSED TIME
C      IDIS - CONTAINS PID NUMBER IF ACTIVE
C
C      DATA CNT/4*0/
C      DATA ICPU/256*0/, ITIM/256*0/, IDIS/256*0/, USE/256*0/
C
C      SET PROGRAM LIMITS AND FLAGS
C
C      IMIN=1          !MINUTE UPDATE TIME
C      IFIRST=0       !INITIALIZE FIRST LOOP FLAG
C      IMINCPU=5*IMIN !SET CPU MINIMUM CPU ACTIVITY
C
C      INITIALIZE DISPLAY CHARACTERISTICS
C
C      NUL='<000><000>' !NULL CHARACTERS
C      BLK='<216><000>' !CHARACTER BLINK ON
C      REV='<236><304>' !REVERSE VIDEO
C      DIM='<234><000>' !CHARACTER DIM ON
C      NRM='<217><236><305><235>' !BLINK OFF/REVERSE OF/DIM OFF
C
C      PUT UP FORM
C
C      CALL PIDFORM
C

```

```

C          PERFORM FOR ALL POSSIBLE PIDS
C
100 DO I=1,256
C          GET ELAPSED TIME AND CPU TIME FOR
C          THE SELECTED PID
C
C          K=I
C          CALL RUNTM (K, ETIME, CPUTIM, IERR)
C
C          CHECK IF PID IS IN USE
C
C          IF (IERR.NE.0) THEN
C
C              PID IS NOT IN USE - SET DISPLAY TO
C              PID NO. AND SET MODE TO DIM
C
C              IDIS(I)=I          !USE ACTUAL PID NO.
C              MODE(I)=NRM//DIM   !SET MODE TO DIM
C              ICPU(I)=0          !CPU TIME
C              ITIM(I)=0          !ELAPSED TIME
C              IDIS(I)=0          !DISPLAY PID
C              USE(I)=0           !USER NAME ARRAY
C              CNT(4)=CNT(4)+1    !UPDATE UNUSED CNT
C
C          ELSE
C
C              PID IS IN USE GET THE FATHER'S PID
C              WHICH IS CLOSEST TO OP.EXEC
C
C              K=I
C              CALL PDAD (K, IDIS(I))
C              USE(IDIS(I))=1      !UPDATE FOR USER DISP
C
C              IF (ICPU(I)+IMINCPU.LT.CPUTIM .OR.
C                  CPUTIM.LT.ICPU(I) .OR.
C                  ICPU(I).EQ.0) THEN
C
C                  A CHANGE IN CPU TIME HAS OCCURRED
C                  OR A NEW PROCESS HAS TAKEN THIS PID
C                  OR THIS IS THE INITIAL RUN
C                  UPDATE ELAPSED TIME, CPU TIME
C                  AND DISPLAY FIELD
C
C                  ITIM(I)=ETIME          !UPDATE ELAPSED TIME
C                  MODE(I)=NRM//BLK       !SET BLINK MODE ON
C                  CNT(2)=CNT(2)+1        !UPDATE ACTIVE COUNT
C
C              ELSE
C
C                  NO CHANGE IN CPU TIME
C                  CHECK IF THIS PROCESS HAS ANY SONS
C
C                  K=I
C                  CALL PIDSON (K, IFLG)
C
C                  IF NO SONS AND NOT OP THEN REVERSE VIDEO
C                  ELSE MAKE DISPLAY NORMAL
C
C                  IF (IFLG.EQ.0 .AND. IDIS(I).NE.2) THEN
C                      MODE(I)=NRM//REV   !PID HAS NO SONS
C                      CNT(3)=CNT(3)+1    !UPDATE INACTIVE COUNT
C                  ELSE
C                      MODE(I)=NRM//NUL   !PID HAS SON(S)
C                      CNT(1)=CNT(1)+1    !UPDATE FATHER COUNT
C                  ENDIF
C
C              END IF
C
C              ICPU(I)=CPUTIM              !UPDATE CPU TIME
C
C          END IF
C
C          END DO
C
C          DISPLAY CURRENT ACTIVE PIDS
C          IN MATRIX FORM ON SCREEN
C
C          DO I=1,241,16
C
C              M=I/16+1                    !CALC ROW INDEX
C
C              CALL CURPOS (M,5,0)         !POSITION CURSOR
C              WRITE (*,300) (MODE(K), IDIS(K), K=I, I+7)
C
300          FORMAT ('#',16(A6,I4))
C
C              CALL CURPOS (M,43,0)       !POSITION CURSOR
C              WRITE (*,300) (MODE(K), IDIS(K), K=I+8, I+15)
C
C          END DO
C
C          DISPLAY ACTIVE USER NAMES
C
C          PRINT *,NRM
C
M=1          !INITIAL ROW POSITION
N=75        !INITIAL COLUMN POS
DO I=1, 256
IF (USE(I).EQ.1) THEN
K=I
CALL UNAME (K, UNM)
IF ((I.GT.2 .AND. UNM(1:3).NE.'OP ') .OR. I.LE.2) THEN
CALL CURPOS (M,N,0)
WRITE (*, 400) I, UNM(1:8)
FORMAT ('#',I5,1X,A8)
M=M+1
IF (M.GT.22) THEN
N=N+14
M=1
END IF
END IF
END IF
END DO
C
C          BLANK OUT ANY UNUSED FIELDS
C
C          DO WHILE (N.LT.120)
C          CALL CURPOS (M, N, 0)
C          WRITE (*, 500)
C          FORMAT ('#', ' ')
C          M=M+1
C          IF (M.GT.22) THEN
C              N=N+14
C              M=1
C          END IF
C          END DO
C
C          UPDATE TIME/DATE DISPLAY
C
C          CALL TIMDAT (TMDT)
C          CALL CURPOS (0,96,0)
C          WRITE (*, 600) NRM, TMDT
C          FORMAT ('#',A4,A18)
C
600          UPDATE DISPLAY COUNTS
C
C          DO I=1,4
C              M=I+18
C              CALL CURPOS (M,32,0)
C              WRITE (*,FMT='('#',I3)') CNT(I)
C              CNT(I)=0          !RESET COUNTERS
C          END DO
C
C          ZERO OUT USER DISPLAY TABLE
C
C          DO I=1,256
C              USE(I)=0
C          END DO
C
C          CHECK FOR INITIAL RUN CONDITION
C          DO NOT DELAY IF ONLY RUN ONCE
C
C          IF (IFIRST.EQ.1) THEN
C
C              SET UP TO DELAY 5 MINUTES
C
C              CALL MDELAY (IMIN)
C
C          END IF
C
C          IFIRST=1          !SET INITIAL PASS DONE
C
C          DO FOREVER
C
C              GOTO 100
C
C          END
C          %INCLUDE "CURPOS.F77"
C          %INCLUDE "RUNTM.F77"
C          %INCLUDE "PDAD.F77"
C          %INCLUDE "PIDSON.F77"
C          %INCLUDE "MDELAY.F77"
C          %INCLUDE "PIDFORM.F77"
C          %INCLUDE "UNAME.F77"
C          %INCLUDE "TIMDAT.F77"
C
CURPOS.F77
C*****
C          SUBROUTINE CURPOS (N1, N2, IBLK)
C
C              THIS SUBROUTINE WILL PERFORM
C              CURSOR POSITIONING FOR THE
C              DATA GENERAL 410 AND 460 TERMINALS
C              WHERE N1 IS THE ROW AND N2 IS THE COLUMN
C
C              THE VALUE IBLK IS A FLAG WHICH INDICATES

```

FOCUS ON: SECURITY

```

C          THAT THE SCREEN IS TO BE ERASED BEFORE
C          THE CURSOR IS TO BE POSITIONED
C
C          CALLING PROGRAM SHOULD OUTPUT AFTER CALL
C          IN THE FOLLOWING FORM:
C          FORMAT ('#', ....
C          THIS WILL SUPPRESS THE NEXT FORMAT FROM
C          OUTPUTTING A CR
C
C CHARACTER N*(4)
C INTEGER  N1, N2, ITMP1, ITMP2, IBLK, I
C
C          N - ARRAY TO CONTAIN ASCII TERM. COMMANDS
C          N1 - ROW
C          N2 - COLUMN
C          ITMP1 - INTERIM CALCULATION FOR ROW
C          ITMP2 - INTERIM CALCULATION FOR COLUMN
C          IBLK - ERASE SCREEN FLAG (1=YES)
C          I - LOCAL INDEX
C
C          CHECK IF SCREEN IS TO BE BLANKED 1ST
C
C IF (IBLK.EQ.1) THEN
C   WRITE (*, 101)                !ERASE SCREEN 101
C   FORMAT (1X, '<036><106><105>')
C ENDIF
C
C          PERFORM INITIAL CALCULATIONS
C
C ITMP1=N1/16                      !MOD 16 ROW
C CITMP2=N2/16                      !MOD 16 COLUMN
C
C          CALCULATE COLUMN POSITION
C
C N(1)=CHAR(ITMP2+48)              !COLUMN 1ST
C N(2)=CHAR(N2-(ITMP2*16)+48)      ! IN TWO DIGITS
C
C          CALCULATE ROW POSITION
C
C N(3)=CHAR(ITMP1+48)              !ROW 2ND
C N(4)=CHAR(N1-(ITMP1*16)+48)      ! IN NEXT TWO DIGITS
C
C          OUTPUT THE POSITION
C
C WRITE (*,102) (N(I),I=1,4)       !OUTPUT THE FOUR CHAR
102 FORMAT (1X, '<036><106><120>', 4A1, $) !SUPRESS CR
C
C RETURN
C END

```

RUNTM.F77

```

C *****
C
C SUBROUTINE RUNTM (PID, ETIME, CPUTIM, IERR)
C
C          GETS PID NUMBER AND RETURNS ELAPSED TIME
C          IN SECONDS AND CPU TIME IN MILLISECONDS
C
C INTEGER*4 ISYS, IAC0, IAC1, IAC2
C INTEGER*4 PAC(4)
C INTEGER*4 PID, ETIME, CPUTIM, IERR
C
C          SET UP TO MAKE SYSTEM RUN TIME CALL
C
C IPID=24                          !RUNTIME CALL
C IAC0=PID                          !PID NO.
C IAC1=0                            !USING PID
C IAC2=WORDADDR(PAC)               !RETURN LIST
C
C          PERFORM RUNTIME CALL TO GET
C          ELAPSED TIME AND CPU TIME
C
C IERR=ISYS (IPID, IAC0, IAC1, IAC2)
C
C ETIME=PAC(1)                     !RETURN ELAPSED TIME
C CPUTIM=PAC(2)                    !RETURN CPU TIME
C
C RETURN
C END

```

PDAD.F77

```

C *****
C
C SUBROUTINE PDAD (PIDIN, PIDOUT)

```

```

C          THIS SUBROUTINE RETURNS THE HIGHEST PID
C          FATHER BELOW PID 3 IN PIDOUT
C
C INTEGER*4 ISYS, IAC0, IAC1, IAC2
C INTEGER*4 PIDIN, PIDOUT
C CHARACTER UNM*32
C
C          CHECK FOR A PID LOWER THAN 4
C
C IF (PID.GT.3) THEN
C   SET CALLIN PID NUMBER
C
C   IAC1=PIDIN
C
C   FIND THE FATHER
C
C   DO WHILE (IAC1.GT.3)
C
C     I=IAC1
C
C     SET UP TO MAKE FATHER PROCESS CALL
C
C     IPID=87                      !FATHER PROCESS CALL
C     IAC0=I                        !PID NO.
C     IAC1=0                        !RETURN FATHER PID
C     IAC2=0                        !RETURN LIST
C
C     THIS CALL WILL RETURN THE FATHER'S
C     PID IN IAC1
C
C     IERR=ISYS (IPID, IAC0, IAC1, IAC2)
C
C   END DO
C
C   IF (IAC1.LT.3) THEN
C     PIDOUT=IAC1
C   ELSE
C     CALL UNAME(I, UNM)
C     IF (UNM(1:3).EQ.'OP ') THEN
C       PIDOUT=2
C     ELSE
C       PIDOUT=I
C     ENDIF
C   END IF
C
C ELSE
C
C   PIDOUT=PIDIN
C   IF (PIDOUT.EQ.3) PIDOUT=2
C
C ENDIF
C
C RETURN
C END

```

PIDSON.F77

```

C *****
C
C SUBROUTINE PIDSON (PID, FLAG)
C
C          THIS ROUTINE DETERMINES IF THIS PID
C          HAS ANY SONS
C          IF YES THEN FLAG=1
C          ELSE FLAG=0
C
C INTEGER*4 ISYS, IAC0, IAC1, IAC2
C INTEGER*4 PID, FLAG
C INTEGER*2 STAT(200)
C
C          PERFORM PSTAT CALL TO DETERMINE
C          IF SELECTED PID HAS ANY SONS
C
C IPID=5
C IAC0=PID
C IAC1=0
C IAC2=WORDADDR(STAT)
C
C IERR=ISYS(IPID, IAC0, IAC1, IAC2)
C
C          CHECK BIT PATTERN FOR ANY SONS
C
C FLAG=0
C DO J=2,17
C   FLAG=FLAG+STAT(J)
C END DO
C
C          IF SONS EXIST THEN MAKE FLAG = 1
C
C IF (FLAG.NE.0) FLAG=1
C
C RETURN
C END

```




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MDELAY.F77

```

C *****
C SUBROUTINE MDELAY (MIN)
C
C     THIS ROUTINE WILL DELAY THE SELECTED
C     NUMBER OF MINUTES BEFORE RESUMING THE PROCESS
C
C     INTEGER*4 MIN
C
C     SET UP TO DELAY 1 MINUTE
C
C     IPID=179      !WDELAY CALL
C     IACO=1000*60*MIN !DELAY IN MILLISECONDS
C     IAC1=0        !RESERVED
C     IAC2=0        !RESERVED
C
C     PERFORM WDELAY CALL TO
C     DELAY MIN MINUTES
C
C     IERR=ISYS (IPID, IACO, IAC1, IAC2)
C
C RETURN
C END

```

PIDFORM.F77

```

C *****
C SUBROUTINE PIDFORM
C
C     THIS SUBROUTINE WILL LAYOUT A FORM
C     FOR THE PID ACTIVITY REPORT
C
C     CHARACTER MODE*6(4), LEGEND*22(4)
C
C     DG 400 SERIES CONTROL CODES
C     FOR:
C         NORMAL
C         BLINK ON
C         REVERSE VIDEO
C         DIM ON
C
C     DATA MODE/'<217><236><305><235><000><000>',
C     & '<217><236><305><235><216><000>',
C     & '<217><236><305><235><236><304>',
C     & '<217><236><305><235><234><000>'
C
C     EXPLANATION LEGEND
C
C     DATA LEGEND/'FATHER PROCESS OR OP ',
C     & 'ACTIVE PROCESS ',
C     & 'INACTIVE TERMINAL SON ',
C     & 'UNASSIGNED PID '/
C
C     OUTPUT TOP PID LEGEND
C
C     CALL CURPOS (0,5,1)
C     WRITE (*, 101)
C 101 FORMAT ('#', ' [0] [1] [2] [3] [4] [5] [6] [7]')
C
C     CALL CURPOS (0,43,0)
C     WRITE (*, 101)
C
C     OUTPUT SIDE PID LEGENDS
C
C     DO I=1, 256,16
C         J=I+8
C         WRITE (*, 201)I, J
C 201 FORMAT (1X, '[', I3, ']', 33X, '[', I3, ']' )
C     END DO
C
C     OUTPUT BOTTOM PID LEGEND
C
C     CALL CURPOS (17,5,0)
C     WRITE (*, 101)
C
C     CALL CURPOS (17,43,0)
C     WRITE (*, 101)
C
C     OUTPUT EXPLANATION LEGENDS
C
C     DO I=1,4
C         K=I+18
C         CALL CURPOS (K,10,0)
C         WRITE (*, 301) MODE(I), LEGEND(I)
C 301 FORMAT ('#', A6, A22)
C     END DO
C
C END

```

UNAME.F77

```

C *****
C SUBROUTINE UNAME (PID, UNM)
C
C     THIS SUBROUTINE WILL RETURN THE USERNAME OF
C     THE CURRENT PROCESS IN THE CHARACTER
C     STRING UNM, THE STRING WILL BE TERMINATED
C     WITH A <NULL>
C
C     CHARACTER UNM*32
C     INTEGER*4 ISYS, IACO, IAC1, IAC2, IFLG, PID
C
C     DETERMINE IF THIS IS TO BE THE
C     CALLING TASK'S PID
C
C     IF (PID.LT.0) THEN
C         IFLG=1
C     ELSE
C         IFLG=0
C     ENDIF
C
C     IPID=58      !?GUNM CALL
C     IACO=PID     !PID NO. OR -1
C     IAC1=IFLG    !USING PID OR -1
C     IAC2=BYTEADDR(UNM) !RETURN LIST
C
C     PERFORM SYSTEM CALL TO GET USERNAME
C
C     IERR=ISYS (IPID, IACO, IAC1, IAC2)
C
C     BLANK THE STRING AFTER THE USERNAME
C
C     IFLG=0
C     DO I=1,32
C         IF (UNM(I:I).EQ.<000>') IFLG=1
C         IF (IFLG.EQ.1) UNM(I:I)= ' '
C     END DO
C
C     RETURN
C     END

```

TIMDAT.F77

```

C *****
C SUBROUTINE TIMDAT (TMDT)
C
C     THIS SUBROUTINE WILL RETURN THE CURRENT
C     SYSTEM TIME AND DATE IN CHARACTER FORMAT
C     IN STRING TMDT (OF LENGTH 18)
C
C     INTEGER IDATE(3), ITIME(3), IBLD(6)
C     CHARACTER TMDT*18
C
C     GET SYSTEM DATE AND TIME FOR HEADER
C
C     CALL DATE (IDATE)
C     CALL TIME (ITIME)
C
C     SET UP DATE TO BE IN MM/DD/YY FORM
C
C     ITMP=IDATE(1)-1900
C     IDATE(1)=IDATE(2)
C     IDATE(2)=IDATE(3)
C     IDATE(3)=ITMP
C
C     DO I=1,3
C         IBLD(I)=ITIME(I)
C         IBLD(I+3)=IDATE(I)
C     END DO
C
C     DO I=1,6
C         M=(I-1)*3+1
C         N=M+1
C         ITMP=IBLD(I)/10
C         IBLD(I)=IBLD(I)-(ITMP*10)
C         TMDT(M:M)=CHAR(ITMP+48)
C         TMDT(N:N)=CHAR(IBLD(I)+48)
C     END DO
C
C     TMDT(3:3)=':'
C     TMDT(6:6)=':'
C     TMDT(9:9)=' '
C     TMDT(12:12)='/'
C     TMDT(15:15)='/'
C     TMDT(18:18)=' '
C
C     RETURN
C     END

```

stamped. Also shown on the screen are number scales, which help locate a PID quickly. PIDACT updates the screen once a minute. Executing PIDACT requires no special privileges.

Process terminator. The task that terminates processes is called ERP. Approximately once every eight minutes ERP monitors the CPU activity of all the processes on the system. An inactive user is warned. If no significant activity is observed after two successive warnings, the process is terminated. To terminate the process, the monitor requires superprocess privileges. Upon warning a user or terminating a process, ERP records the action in a log.

ERP uses the following criteria to terminate a process: current CPU time < old CPU time + threshold; current CPU time > = old CPU time; user name not in VIP table; PID < 3; program name < > OP; father process resolves to EXEC.

ERP was designed specifically to terminate processes based upon inactive leaf nodes in the process tree. Since CEO leaves an inactive CEO_WP when completing word processing without exiting CEO_CP, the active CEO_CP will be terminated. This feature could be changed by modifying ERP or writing an additional task to monitor and terminate CEO_WP processes only. In addition, if a user initiates coprocesses such that they are both leaf nodes in the process tree and only one is active, the process tree is terminated. If users intend to have an inactive coprocess as a leaf node, then they should request that the system manager place their names in the VIP table.

Conclusion. The PIDACT and ERP tasks are part of the SMIS security system. Although security is the primary consideration, the termination of idle processes also frees limited system resources: terminals, memory, and process capacity. The average CPU time involved in running ERP is 0.2 percent. Each idle process uses, on the average, 0.1 percent CPU time. Therefore, for SMIS, the overhead for running ERP is well justified. Δ

For a complete PIDACT and ERP listing, please contact Sharon Lindley at Rockwell International, 4901 Corporate Drive, Huntsville, AL 35802; 205/453-2373. Robert McKosky, formerly with Rockwell, is now with General Electric. John Chapman is at NASA.

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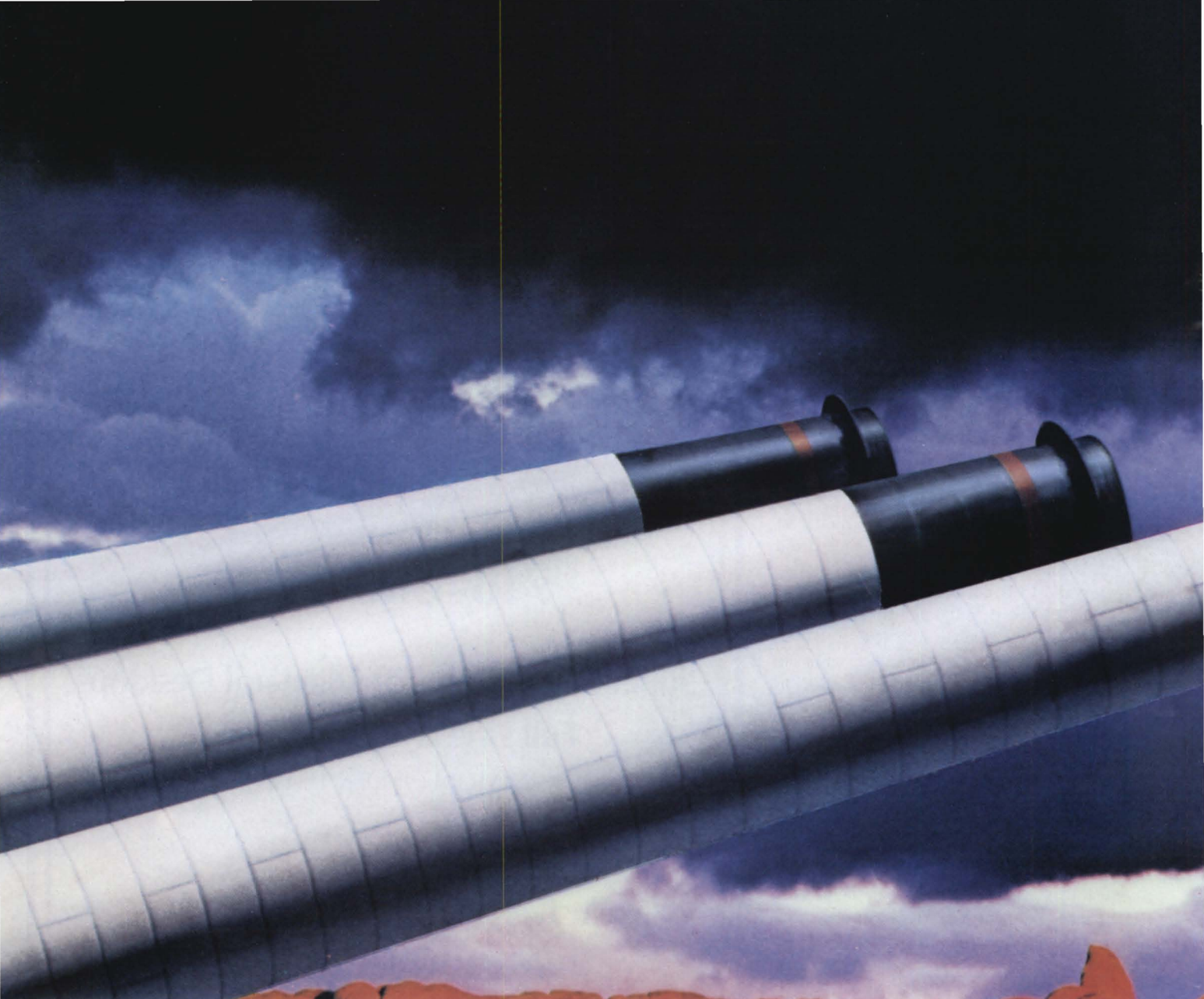
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“Raising the bar”

DG's new Customer Support Center opens with a campaign to improve customer satisfaction

by Greg Farman
Focus staff

“Service is DG’s secret weapon. We bring in prospective customers to help close the sale.” The speaker was William Bentley, DG’s vice president, North American Field Engineering. The occasion was a recent press tour of DG’s new Customer Support Center facility in Norcross, Georgia. The attitude reflected both a sense of pride in the steps Data General Service has taken to improve customer satisfaction, and a decision to raise the standard.

It was an attitude we encountered many times that day. Along with my counterparts from *Data Base Monthly* and *Data General Micro World*, I was visiting the new facility for the first time. We had spoken with a variety of DG officials, including Bentley, Frank Silkman (vice president, Worldwide Field Engineering), Jim Foxworthy (director of the Customer Support Center), Herb Haslam (hardware support manager), Cliff Izer (support operations manager), and Bryan Scoggins (software support manager). We also got a chance to talk with the people who answer the phones and field questions from customers. What we heard was remarkably consistent.

Bentley explained that the Customer Service Center is not treated as a profit center, but rather is charged with improving service. Its mission is to raise the level of customer satisfaction, which in turn helps to sell more DG equipment. Accountability is based on surveys of customer satisfaction; the goal for this year is to attain an average satisfaction rating of 8.5 (on a scale of 10).

That goal was one of the first things we heard when we arrived at the CSC. Steve Carter, marketing communications manager

for Field Engineering, told us that CSC personnel are in the middle of a campaign called “Raising the Bar.” The previous standard for customer satisfaction with hardware service was 8.0, he explained, and the industry average is now in that range. DG field engineering is seeking to raise that level by a tenth of a point per quarter, and is now ahead of that pace. Satisfaction with software support is expected to climb to 7.5 this year from its current level of 6.5.

Jim Foxworthy puts the goal in loftier terms: “To be an industry leader.” Sounding as though he takes seriously the management maxims from *In Search of Excellence*, Foxworthy says that he and his managers are “spending a lot of time asking customers what they want.” What customers want, apparently, is a single source for fast and reliable answers, regardless of the type of problem they are experiencing.

At least that is what the CSC is hoping to deliver. Within a few months, all service calls will be routed through a single toll-free telephone number, 1-800-DG-HELPS. (CSC staffers wouldn’t say whether DG had to pay extra for that particular number.)

So what can the approximately 20,000 service contract customers expect when they call? Of course they won’t see the facility itself, 55,000 square feet in a new brick building in the expanding Atlanta suburbs. They will never talk to more than a small fraction of the 200 hardware and software support staff and technicians the facility houses. They probably won’t care that the CSC bought a Northern Telecom SL/1 PBX system that can accommodate more than 300 phone calls at a time. Likewise for the seven MV/10000 sys-

tems that support the staff and operations. However, Cliff Izer, manager of support operations, hopes that customers *will* notice a quicker response when they have problems.

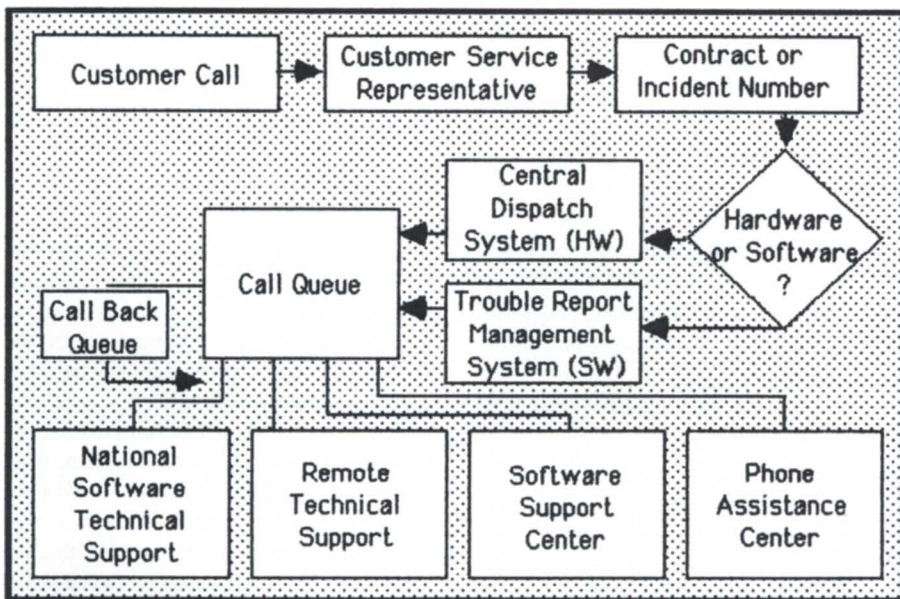
The new facilities are letting management gather elaborate statistics on call-handling. For example, Sherri Arterburn, who manages the staff of customer service representatives, says that each of her operators handles 80 to 100 calls per day, with calls averaging 30 to 45 seconds each. At the moment she checked, seven of the operators were talking to customers and no customers were on hold. After about two weeks of training, the operators are expected to quickly collect customer information, determine whether the problem is with hardware or software, and then route the call to the appropriate area.

Once a call is routed to either the Central Dispatch System (for hardware problems), or the Trouble Report Management System (for software problems), customers can expect a 9- to 16-minute wait before a technical representative calls them back.

Two separate groups form the first line of support for hardware problems. The Phone Assistance Center fields 400 to 450 new trouble calls each week for the Desktop and DG/One. If the customer is on a standard contract, PAC representatives will dispatch a field engineer if they have not been able to resolve the problem within one hour of phone consultation. If the customer is on the extended warranty program, the representative will send replacement boards for the customer to swap out. If the problem persists after two board swaps, the problem will be escalated to the next level.

The other hardware support group is the Remote Assistance Center, which handles

The new facilities are letting management gather elaborate statistics



Customer Service Call Processing Flow

trouble calls on larger systems. For systems equipped with the proper communications equipment, the RAC representatives can run remote diagnostics. In many cases this lets them isolate the problem so that a local field engineer can be dispatched to the customer's site with the proper spares to fix the problem. For contract customers, if the field engineer doesn't fix the problem within four hours on site, the problem escalates to the next level.

For both the PAC and the RAC, the next escalation level is Corporate Technical Support (CTS), or its West Coast mirror image, WCCTS. CTS, also known as the "fly squad," has eight hours of phone consultation to resolve the problem before going to the customer site. CTS representatives have the support of corporate research and develop-

ment, manufacturing, and product management specialists. They also work closely with their counterparts in National Software Technical Support (NSTS), the top level for software trouble, because many intractable problems may involve both hardware and software.

For software there is a similar pattern. The first line is Problem Identification, a group of 19 engineers divided into specialty areas. They are currently able to solve about half of their calls within 30 minutes by referring to their data base of known problems. According to Bryan Scoggins, software support manager, this success rate will improve significantly as the data base is enhanced. He says DG is also studying how to implement

an artificial intelligence "expert systems" approach to help the representatives recognize the symptoms of particular problems.

If the problem persists beyond 30 minutes, the next level is a specialist in "Group A" or "Group B." These specialists can dial up the customer's system to replicate the problem. If they can't resolve the problem within four hours of phone consultation over four days—by fixing it, by generating a Software Trouble Report, or by dispatching a local software support representative—they escalate it to an NSTS representative.

Similar to their counterparts in CTS, the NSTS representatives are backed by corporate software development, corporate system support, and software support engineering. Only about two percent of the software problems reach this level, although the NSTS representatives act as an informal resource for groups A and B.

The CSC is being promoted as a support system that can address virtually any problem a customer might encounter. Company officials are confident enough to say that a similar facility will probably be established in the United Kingdom for the European market, with another possibly in Australia. But whether the CSC can achieve Jim Foxworthy's goal of making Data General Service an industry leader remains to be seen—the facility is still new, and some parts of the system are still being planned. Remember, however, that Foxworthy made a lot of promises at Conference '85 about what users could expect in the way of support; he invited us to take notes and hold him accountable. That sounds like a man who expects to deliver on his promises. It also sounds like an offer we shouldn't refuse. Δ

To my surprise, they actually want us to send them more STRs

From the nation's capital . . .

New releases, odd rumors, mirrored disks, early reports, and free advice

by George Henne
Contributing Editor

Once again, I'm back from attending a conference. This time it was the Data General Systems Supplier Conference held in Washington, DC. There are several items of note I want to pass along to Business BASIC users. In case that doesn't interest you, I'm also going to cover battery backups.

The Systems Supplier Conference was for the value-added resellers of Data General equipment. This group is responsible for the vast majority of Business BASIC licenses that have been sold. They find it a powerful language that allows fast development of business applications.

Since Research Triangle Park, North Carolina, is not too far from Washington, the BBASIC development group was well represented. In fact, just about everybody was there. Part of the reason they were there was to meet their customers, but it seemed to me that they were just as interested in soliciting suggestions for future enhancements. It's really true—they're not just resting on their laurels, but are looking for more ways to improve the language. They're in the process right now of evaluating exactly what they are going to do next. You can help them a lot by forwarding your suggestions to them as soon as possible. Send them to Russell Harms at DG in Westboro, and he'll see they get to the right people.

The next product to be released will probably be RDOS Business BASIC 8.01. There won't be anything new in it, but the known bugs from 8.0 will be corrected, including:

- ERROR 01 messages appearing in HELLO program on some systems with ALMs (most frequently on S/140s, but others too)

- Hangs resulting from using string variables longer than the key length in K*** statements. Note: this problem also exists in AOS/VS BBASIC.

- Initialization problems with foreign terminals

- The "19 job" problem: genning a system with 19 jobs doesn't work, while 18 or 20 jobs are just fine.

- On RDOS systems, other than the Desktop, hangs caused by not INITing \$SYS and \$LIB before bringing BBASIC up. Note that while the VACUUM utility INITs these to do a CLEAR, it subsequently RELEASEs and leaves them uninitialized.

- Fix of the STME problem under RDOS

All of these problems either have patches out or are easily worked around, so it really isn't necessary to delay going to RDOS BBASIC 8.0 just to wait for 8.01. I think the scale of the problems this revision fixes is another indication of just how solid the new version is.

Other than that, Nova RDOS BBASIC 7.1 is about to come out. This is a final cleanup of the product before it gets laid to rest in Category C. It definitely does *not* restore SAVE file compatibility with the other versions of Business BASIC.

The people who support Business BASIC brought out some impressive figures on their processing of STRs (Software Trouble Reports). They are currently down to a mere 15, with 197 having been closed in the last year. They have a new computer tracking system for STRs that really keeps them hopping!

To my surprise, they actually want us to send them more STRs. It's not that they're just lonely or bored. Now that they've got a good mechanism and the right people to fix the problems, they're pretty confident they can fix whatever you throw at them. Don't be shy. Dust off those old problems you thought there would be no use sending in, and keep them busy!

Personally, I've got two STRs in to them at the moment. One I haven't heard anything on yet, but the other I got a phone call within about a month of sending it in. The person who called was quite knowledgeable about BBASIC, and had good suggestions on solving the problem. It's not fixed yet, but may be in just a few days. The month delay before they called was mostly the time it took the STR to move through the system to get to the right place.

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One of the oddest rumors to circulate was that 32-bit RDOS is in the works

Several hints about new products were also given at the conference. "Mirrored Disks" are coming: two disks are hooked up to a single controller, and whatever gets written goes to both disks. The intent is more to improve performance and convenience, not to provide redundancy. The controller will optimize disk reads to go to the drive that is closest to the data. When a backup is done, one of the drives will be "frozen," while the other is used for continued processing. This feature will be able to be used on any of the Argus-style drives, including those already installed. The 354 and 592 MB drives are the current members of the family.

The Argus controller has another trick up its sleeve: it keeps a "block modified" bit for each sector. Using that, one could do a backup of only the parts of the disk that were changed since the last full backup. In the next year, we should see utilities that will take advantage of this, though perhaps in the AOS/VS world only.

Both the mirroring and incremental backup address a problem created by improved disk technology. I remember when 10 MB was a lot of disk to have on a system. Now most new systems seem to have at least 354. However, over the same years there hasn't been a corresponding improvement in backup media. Standard mag tape is still with us. New products like the Megatape exist, but the bugs are not yet completely out, and there is no standard emerging.

Data General's planning philosophy is to separate the functions of backup, data interchange, and software distribution where appropriate. Traditionally, the reel-to-reel tape has satisfied all these functions, except for the brief fling with floppies. At the low end, one device may have to do all three jobs. However, at the high end, expect to see some divergence. My impression is that cartridge tape, such as on the Desktop, will be improved so that it is effective for use across the line.

One of the oddest (and unconfirmed) rumors to circulate was that 32-bit RDOS is in the works. After having declared for years that this would never, never happen, DG may have realized there are customers who have special applications that will always run best

under RDOS. If DG wants to keep these customers and convert its entire product line to 32-bit machines, a 32-bit RDOS seems inevitable. There are people out there (not BBASIC users!) quite used to putting 50 or 60 terminals on RDOS-based machines. It's not that they don't like the speed and price of the MV/ series; it's just that AOS/VS uses a lot more resources.

While 32-bit RDOS might have seemed like a pretty good idea a few years ago to BBASIC users, I don't think it offers much anymore. A lot of work has been put into AOS/VS BBASIC so that it takes advantage of the power of the operating system. It would be horrible to give all that up. BBASIC actually runs faster under AOS than RDOS on the same machine, so a 32-bit RDOS BBASIC might not be any benefit at all.

Early users of the MV/4000 DC appear to be quite pleased with it. It has the performance it is supposed to have, and has no special difficulties. Benchmark results from the folks at Research Triangle Park show it to be a bit slower than an MV/4000 on their BBASIC tests but still faster than the S/140 it has pretty much replaced in the DG line.

Data General has announced a new package for the MV/4000 DC that includes the 1600 BPI streaming tape drive in a separate cabinet. If you're considering converting to a DC, I think that tape drive is essential. The additional cost is really only the price differential between the streamer and the cartridge.

Finally, a word about battery backup on MV/ systems. One of the big reasons for their speed is that frequently used records tend to stick in memory, instead of going out to the disk. The other side of this is that records do not get written out until the CPU needs the memory for something else or until the file is closed by all users. Since BBASIC is very good when it comes to using memory efficiently, this may not occur for quite some time.

Recently, we learned just how long that could be. A customer with only a 1 MB MV/4000 and 12 terminals had a brief power failure. His battery backup unit had not arrived, so the system went down. He brought it back up, ran FIXUP as required, and brought the system back up normally. Every-

thing seemed OK for a minute or two, until they started trying to call up work they had done that morning: some was there, and some wasn't. Orders from 3 hours earlier were missing, whereas the last order was OK. A complete restore had to be done, and clearly should be done in almost every case of complete power failure.

The battery backup option that DG supplies is expensive (\$4,800 on an MV/4000), and not fully effective. It preserves the contents of main memory for 3 to 6 minutes; if the power failure is longer, all your work is lost. What we recommend to our clients is a micro-UPS (Uninterruptable Power Supply) unit. We use the ones from Topaz, which list for about \$1,100. They provide line conditioning when the power is OK, and up to about 20 minutes in the event of power failure. A single 1 KVa unit is capable of powering an MV/4000 for about 20 minutes. When the power comes back on, the system automatically flushes the buffers out to the disk.

But, you ask, 20 minutes of protection means your next failure is sure to be 21 minutes long. How can you be really safe? Well, we ask our clients to get a second unit, for the disk. Another 1 KVa unit will handle a 354 MB drive. Plug the console into one of them, and your whole system is protected (and will continue running) for up to 20 minutes, enough time for you to terminate the jobs that are running and do a normal shutdown.

If you want to get really fancy, there are UPS units with an interface to the system that notifies it when there is a power failure through a normal terminal port. A process could be running that monitors that port, and commences a system shutdown automatically after backup power has been on for 10 minutes. Δ

George Henne is vice president of MICOM Computer Systems; he 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; 416/445-4823.

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Circle 8 on reader service card

What are you doing in a DUMP like this?

by Tim Maness
Contributing Editor

It's December and the last column of the year, which gives me a fine excuse to clean off my desk and talk about a miscellany of disparate topics.

The first of which is a common task all 32-bit installations must deal with: backing up and restoring disk files. On the basis of the fact that almost half of the AOS & AOS/VS System Managers Panel at the August NADGUG meeting was spent discussing problems with dumping and loading files, I'm assuming there is a lot of interest in this topic. I know I'm interested; I still have all the disk files I had when I worked on a big machine, and now I spend a lot of time moving files on and off my two little 38 MB disks—with a cartridge tape drive no less.

There are basically three reasons to put files on a tape: routine backups in the event there is a disk failure, archiving files that are no longer needed on the disk (or that there is no room for), and exporting information. I'm going to address the backup and archiving types of operations.

It is probably pretty obvious that you need to have adequate backups for your disk files. If it isn't, I hope you will learn from others' horror stories, rather than wait for your own. Although disks are becoming very reliable, they do fail, and unfortunately they usually don't give adequate warning to let you dump your files off before they go.

The usual pattern is to do a full backup of the entire system at regular intervals (like monthly) and then to do incremental backups, either daily, every other day, or even twice a day. If you have several cycles of backups, you are probably in pretty good shape if a catastrophic disk problem develops.

The technique you use to back up depends on your time constraints and what type of nerves you have. There are basically two choices for backup programs: the device-oriented approach, which consists of PCOPY and the new MSCOPY program, and the file-oriented approach, represented by

DUMP/LOAD and DUMP__II/LOAD__II. I happen to think that backing up with a device-oriented program depends too heavily on the device, not only on the specific type of device, but on the format of the particular one used. For example, if new bad blocks develop in the disk remap area, all PCOPY backups become essentially useless. (See STR #028355, last entry on page 58, of the September AOS/VS Newsletter if you don't know someone who's had this happen.)

PCOPY is fast, as much as twice as fast as DUMP__II in some cases, but has very little flexibility. It can only be used to back up a complete LDU, and to restore anything requires that the entire disk be restored. This all-or-nothing approach makes it impossible to help users who put an extra space after the + in the template when cleaning up their directory. (This is a much more common occurrence than a disk failure!)

The new MSCOPY is also a device-oriented utility but is limited to non-master LDUs of a specific type (6236 and 6239). It makes use of their fancier hardware to just back up sectors that have been modified since the last backup. I have the same reservations about this utility that I do about PCOPY. I'm very leery of anything that tells you to "hope for the best" as part of the action to take for a particular error message (bitmap not aligned).

I may think that using PCOPY is worse than it is because my only interaction with it is dealing with frantic people who have only used PCOPY for their backups, they've had disk hardware problems (which are now fixed), and they can't get their PCOPY tapes to reload!

The file-oriented (i.e., DUMP__II) approach may not be perfect, but it does have a lot of flexibility. The dump format contains not only the data associated with each file but also all the information necessary to rebuild all of the files' characteristics (e.g., the acl, element size, etc.). This additional information allows LOAD__II to restore any file exactly as it was.

The main complaints I heard expressed at the System Managers Panel about backing up were:

- labeled tapes are confusing and difficult to use
- there is no way to continue dumping if a hard error occurs, and, more importantly, there is no way to continue loading files if a hard tape error occurs
- because DUMP__II doesn't know more than one tape is being used (labeled tapes are managed by EXEC), the output listing doesn't contain any hint about where it was when the next tape was mounted
- confusion over what the LOAD/SPECIFIC switch is supposed to do. It does *not* allow you to begin loading in the middle of a dump file (which is what everyone wanted it to do), but rather to quickly position to a second (or third, etc.), separate dump file on a multivolume tape set.

At this point, it would be wonderful to say "using the following macro will solve all of the above problems," but unfortunately the solution to the preceding problems won't be found in any macro. Overcoming these deficiencies became very important to me, especially the inability to continue loading files when there is a hard tape error. Need I say more? *Everyone* gets burned once in a while! We initially wrote a utility that has been expanded into a replacement for DUMP__II/LOAD__II and overcomes the problems that cause most of the headaches in the backup process.

This product is called the Disk Backup and Recovery System (DBR) and has been available from my company for the last year or so. DBR is fully compatible with AOS(/VS) dump format, it can tolerate hard tape errors that occur when dumping or loading files, and it does not use EXEC's labeled tape handling mechanism, so there is no confusion about labeled tapes. When DUMP comes to the end of a tape, it just asks for the next volume to be mounted. DBR DUMP knows when it's changing tapes, so listings indicate which files are on what tapes.

The technique you use to back up depends on your time constraints and what type of nerves you have

DBR DUMP has an option to create an index for the files dumped, and DBR LOAD can search this index in seconds and tell you exactly where on which tape a specific file is located. DBR LOAD has no need for a /SPECIFIC switch, since it's possible to mount any volume of a multivolume dump and begin loading files or use /N to see what is on the tape. I hope this isn't too much of a plug for one of our products, but it is the only solution I'm aware of for those problems.

On to other things. Have you ever encountered the situation in which you have added some code to a program, a new feature perhaps, and the previously existing functions, which you didn't change at all, now run slower? As much as 30 percent slower? If you are running on an MV/4000 (including SCs and DCs), the problem could be due to LINK assigning addresses to your code such that bits 16-21 of the address collide with bits 16-21 of the addresses your data occupies. I appreci-

ate George McDonald of Haverly Systems calling me to discuss this interesting problem.

The MV/4000 accesses memory by constructing an intermediate address in the ALU and loading it into the logical address register (LAR). The CPU accelerates the translation process by maintaining an ATU cache in its scratchpad. This cache has 64 entries. Each entry contains the result of translating a logical page address into a physical page address. Bits 16 to 21 of the logical address in the LAR point to one of the ATU cache's 64 entries. The CPU compares the upper 15 bits of the logical address with the cache entry's tag. If they match, the CPU takes the address of the physical page stored there and forms the desired physical address. If they don't match, the CPU must then access the segment base register (SBR) and proceed with the translation.

The SBR provides the page address of the first-level page table. The CPU constructs a

physical address and accesses the page table stored in main memory. Memory returns the address of a physical page that contains the desired data. What this means is if the address of the page you are referencing is one of the last 64 pages you've accessed, the CPU can go directly to that page. Otherwise it takes two or three additional memory references to get to the page you wanted.

Consider what happens if LINK assigns addresses such that critical areas of your program overlap bits 16-21 of their logical addresses. Say, for example, that 32 pages of data referenced by 32 pages of code have logical addresses that collide. Effectively this has cut the size of the ATU cache to half of what it should be. It is easy to see how in a CPU-intensive environment this could account for 20 to 30 percent of the time.

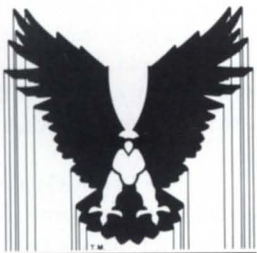
I'm impressed George was able to figure this out! Especially since the only place these bits are documented is page 3-10 of the "Eclipse MV/4000 Product Summary." He did it by looking at addresses LINK assigned to the code modules and the areas of memory containing data. What's the solution for this problem? Reorder the list of modules you're LINKing together so critical areas don't overlap.

Even if you haven't noticed your programs slowing down, analyzing them to see if this is occurring might let you squeeze another 20 percent or so improvement out of the CPU.

And last, but not least, I'm compiling a list of "gotcha's," those undocumented little things that, if you'd only known about them beforehand, could have saved you lots of agony. If you have some things that fall into this category and would like to share them to possibly spare someone else some pain, send them to me and they will form the basis of a column to appear in the near future. For the really embarrassing ones, I'll accept unsigned entries in envelopes with no return address.Δ

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

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More baud for your buck

by Paul Kiley
Special to Focus

As an application specialist at Data General's Special Systems Group, I have participated in countless discussions on the subject of enhancing computer system performance. This issue involves numerous considerations, all further complicated by the fact that every application is unique. Yet, as you know from your own experience, a better performing system can save time and money.

This article describes user application needs and the hardware products developed to meet these needs. All of the solutions described here are based on application requirements that Data General users have presented to the Special Systems Group. Since the intent is to show how these needs have generated particular enhancement products, I have attempted to minimize technical details.

The solutions proposed here focus on ways to enhance system performance by increasing I/O throughput and system execution. Although it would help to understand Data General's Burst Multiplexor Channel (BMC), the application requirements and their solutions may be of interest to the user community at large.

High-speed communications. A Data General OEM required several high-speed SDLC (synchronous data link control) communication ports on his Eclipse MV/10000 computer system. His requirements were quite specific: 16 communication ports, each capable of supporting 1 megabaud full-duplex.

To satisfy these requirements, Data General's Special Systems Group developed a high-speed communications controller. This multiboard set consists of one to four intelligent communications multiplexors and a BMC interface. The multiplexor incorporates an Intel 8088 microprocessor design that controls data transfer between its local memory and the 16 communication ports. The BMC interface simply moves data between local memory and host memory at BMC rates.

Why should you consider a high-speed communications controller on the BMC channel? The systems advantage is twofold. First, with all 16 communications lines running at maximum transfer rates, only a small fraction

of an Eclipse MV/10000 BMC capability is required. Second, the data channel is free to process devices that operate at lower speeds, such as terminals.

Where can you use this type of product? Generally, we anticipate its implementation as a high-speed communications controller for large message blocks, such as in a polled, multidropped network. In this particular application, the customer developed his own software.

Increasing I/O performance. While we are discussing freeing up I/O channels, let's consider a product for Eclipse MV/4000 users: the Eclipse MV/4000 I/O Controller.

With this product (Model 5575IOC), we designed a special I/O controller for use on the Eclipse MV/4000. This product is a cache memory system that buffers I/O data transfers from the CPU memory accesses so that both operate concurrently. By enabling I/O channels to transfer data independently of the CPU, we can increase I/O bandwidth by 75 percent.

The Eclipse MV/4000 I/O Controller can certainly enhance system performance, provided the application is appropriate. In addition to the increased bandwidth, this product enables the Eclipse MV/4000 system to support as many as eight BMC devices.

Is the above product suitable for your application? If your Eclipse MV/4000 configuration supports a large number of I/O devices and you think the CPU is spending considerable instruction time servicing between these I/O devices, it may be worthwhile to learn more about the I/O Controller.

High-speed data capture. Using a data channel, how fast can you actually transfer data from an external device? Consider this.

A Data General OEM wanted to move data from his "black box" to the system memory at rates exceeding 2 MB/sec. We built a high-speed BMC interface to meet these requirements. We later reevaluated the design, made a few modifications to ease user implementation, and wrote a common language software driver. The result? The General-Purpose

BMC Interface (Model 5400GP).

This interface provides a user-friendly, 16-bit parallel, bidirectional interface to the CPU's BMC channel. A simple asynchronous handshake controls all data transfers. The Model 5400GP also provides six interrupt control lines (three in/three out), six handshake control lines, and five general-purpose data lines. All signals are RS-422 differential, and come together in two 50-pin "D" connectors on the CPU bulkhead.

In addition to performing data channel and programmed I/O transfers, the Model 5400GP can produce excellent performance results. For example, using FORTRAN-callable subroutines, we conducted a dedicated test on an Eclipse MV/10000. With the General-Purpose BMC Interface, we were able to transfer 512 KB blocks at 7 MB/sec.

The Model 5400GP is suitable for a variety of applications. For example, as described in the product's user manual, two Eclipse MV/10000 computer systems can be coupled back to back. Other appropriate applications include high-speed data acquisition and telemetry systems.

But the main advantage of the Model 5400GP is this: As a general-purpose BMC interface, it provides the flexibility required to configure I/O equipment on the BMC.

Enhancing CPU execution. The disk constitutes an integral part of the system architecture. Systems performance is, of course, often directly related to disk performance under the operating system. Every time you access the disk, rotational and seek-time latencies can cost your system thousands of instructional cycles.

Naturally, when the Special Systems Group was asked to determine ways to enhance a system's performance with continuous file swaps, we chose to examine disk performance first. The result? We developed the RAM-DISK, a semiconductor memory board that functions like a disk under our common language software driver system. RAM-DISK provides 4 MB of memory on a single board and occupies one slot in the CPU chassis. As semiconductor memory, the seek

With the General-Purpose BMC Interface, we were able to transfer 512 KB blocks at 7 MB/sec

and rotational times are reduced to a built-in latency time of 0 msec; data transfers to host memory approach maximum BMC rates. In addition, we managed to take advantage of the CPU's battery backup system for data retention during power failures.

Since the RAM-DISK can operate as much as 20 times faster than a disk, we expect it will be used in systems performing continuous file searching and updating.

Further evaluation of RAM-DISK applications and performance figures led to the development of the RAM-BOX (multiaccessed peripheral memory). Contained in a 10.5-inch chassis, RAM-BOX appears to Data General's Winchester disk controller as another disk drive. RAM-BOX features 0-msec seek and 1.5-msec rotational latency times, and can be modularly expanded up to 100 MB. Software access is via embedded

software drivers, and the disk controller provides hardware access. The RAM-BOX requires no additional CPU chassis slots. Suitable applications could include modeling, simulation, and multi-CPU communications.

Software enhancements. In addition to these hardware performance options, the Special Systems Group can also increase system throughput with software microcode. By microcoding heavily used, CPU-intensive software routines, we can greatly reduce execution time of these functions. For example, customized microcode residing in the Writable Control Store (WCS) of the Eclipse MV/family computer can improve performance significantly. For a discussion of microcode in the Eclipse C/380, see the November issue of *Focus* ("Bridging the Performance Gap," page 20).

Increasing I/O throughput and system execution. Until now, I have described two methods of enhancing performance: by increasing either I/O throughput or system execution. What about a product that can implement both?

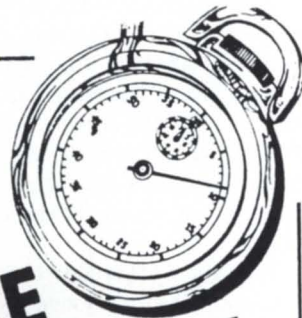
Consider the ArrayPlus 2000 (Model 5520), Data General's intelligent peripheral coprocessing system. Designed to execute large algorithms independently of the CPU, the ArrayPlus 2000 plugs directly into Eclipse MV/family computers for accelerated signal, vector, and array processing functions. The ArrayPlus 2000 communicates with the host computer via the BMC (maximum 3 to 4.5 MB transfer). The system can also communicate directly with external devices through dedicated direct-access I/O ports.

Here is a practical example of an ArrayPlus 2000 application. A Data General OEM needed to use an Eclipse MV/4000 computer in a video inspection system. The system requirements were: acquire video information at 5 MB/sec, reconstruct the image in memory, and compare the image with specifications. Additionally, the system had to maintain identification files, update displays, and monitor process status.

In the above application, the Special Systems Group assisted a Data General OEM in interfacing his video camera directly to the ArrayPlus 2000's I/O port. The OEM wrote application code for the ArrayPlus 2000's processor. The Eclipse MV/4000 could now spend more time processing results.

These peripheral storage, communication, and processor products represent but a few ways to increase system performance. Although not a panacea for all system performance issues, they can be used effectively in appropriate application areas. Δ

Paul Kiley is senior application specialist at Data General's Special Systems Group. He has worked extensively with Data General users on a variety of interface specifications and designs. For additional information on these performance enhancements or for application assistance, contact the Special Systems Group at 617/480-7150.



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Surprising and speedy

ICOBOL rev 1.30 is packed with new features—not all of them documented

by Tim Boyer
Contributing Editor

Last month I admitted that I'm the foolhardy type who loads a new revision tape as soon as it arrives. Also, since I'm running in a true production environment, I tend to find new features and discover any bugs very quickly. Last month I covered the first round of discoveries in ICOBOL rev 1.30, and this month the story continues.

I found a few more "undocumented features" since the last issue. When I set up the 88-level statement

```
01 CHECK-IF-NRM-OR-ASM PIC 9(3).
   88 NRM-MACHINE VALUES ARE 1 2
   5 8 11 23 35.
```

it wouldn't work! No matter what value I passed in, it was never an NRM-MACHINE. So, just for the heck of it, I tried

```
88 NRM-MACHINE VALUES ARE 001
002 005 008 011 023 035.
```

This worked fine! I guess that the moral of the story is stick to alphanumeric in an 88-level field.

A potentially disastrous CLI bug has just made an appearance. A DELETE command using wildcards (e.g., "DELETE XX-") will *not* delete files in other directories, even with a valid link entry and the directory initialized. For example:

```
DIR DP0F
CREATE XX.XX
DIR DP0
LINK XX.XX DP0F:XX.XX
DELETE XX.
```

gives back NO FILES MATCH SPECIFIER:XX-.. However, typing DELETE/V XX.XX works just fine!

This could actually be a feature, however. Has anyone out there accidentally deleted

valuable files while in a subdirectory because they were LINKed in? I'm calling it a bug, but only because I didn't know about it beforehand. Is this documented anywhere?

Some of you may be asking why this could be a problem. It has to do with the way REORG handles an already existing file, something I found out the hard way, of course. I REORGed my SALESMAN file (66 bytes long, 3-byte key) to DP0F:CLEANFILE, and then moved it back. I then DELETED DP0F:CLEANFILE.-, and REORGed my SHIPTOFILE (130 bytes long, 6-byte key) to DP0F:CLEANFILE. Since this was all done in a macro, running at night, I never saw the NO FILES MATCH message.

The next day, all of the order entry and billing programs blew with a FILE ACCESS 9F from SHIPTOFILE. Looking at this file, I found out that it was—you guessed it—66 bytes long with a 3-byte key! It took me two days to figure out what had happened. So if you do your REORGs to a dummy file, be very, very sure that the file does not already exist.

One more before we get to the fun stuff. You all know RDOS commands that won't work with wildcard characters, such as PRINT. How about one that will work *only* with wildcards? For some obscure reason, I was building a file to recompile some of the programs I had recently changed. I typed BUILD AFILE OE-.CO LOGN.CO. As I hit CR, I noticed that I had spelled LOGON as LOGN. Well, before I deleted the file and tried again, I typed AFILE. It looked like this:

```
OEITEMMNT.CO,OEMENU.CO,
LOGN.CO,^
```

The first two programs existed—the third is a typo that got built into the BUILD file anyway! So, I tried all nonsense names.

```
BUILD BFILE <A,B,C,D>.<E,F,G,H>
Sure enough, the file contained
A.E,A.F,A.G, etc.
```

Normally, I try to use explicit file names in commands in order to cut down search time. On a 137 MB disk, it is much faster to LIST LOGON.<CO DD PD> than it is to LIST LOGON.-. In this case, I have to train myself to do the opposite, or else the BUILD won't do what I want it to do.

Enough of that. Back to the RDOS Roundtable in Boston.

How about a rousing cheer for Research Triangle Park? RDOS is alive and well! I can't believe things have turned around so. Three years ago I was running an obsolete language on top of an obsolete operating system, and now I'm running the speed demon of the DG world.

It looks like RDOS and DG/RDOS are on their way to becoming a single product, with DG/RDOS absorbing RDOS. With 7.50, the first change goes into effect—Control-A and Control-C are gone, to be replaced with the double-keystroke standard from AOS and DG/RDOS (on the master console only; the MUX lines will retain their one-stroke interrupts). From a practical point of view, I agree totally with this move. It must be hard enough getting money from DG to support an OS that they don't *really* like without having to support two such operating systems. I don't care which version ends up the winner—as long as it is small, easy to learn, and runs like the wind.

If WordStar is the program most often pirated, CRTEDIT must be in the top ten

Backups. This very important issue came up repeatedly at Boston. A little background on this—it could save your installation. Data General supplies four types of backups for RDOS. Three don't work as they should, and the one that works best isn't supported.

BURST is the least user-friendly piece of software I've ever seen. It throws strangely garbled error messages at you, will abort the backup for the oddest of reasons, and the VERIFY function—well, if you use verify, try this. While the tape is rewinding, change disks. The verify will work just fine—it just makes sure that the tape is readable. On the whole, DTOS is friendlier.

DUMP, on the other hand, is extremely reliable and very versatile, since you can pick and choose which files you would like to DUMP. The major drawback is that it takes me two days to do a DUMPed backup. It is slow, and DUMP can't handle multireel dumps, which makes it not very practical for our use.

FDUMP is somewhere in between. It is fairly fast and can handle multivolumes. With a little messing around, it is even possible to FDUMP selected files. For years, however, there has been a nasty rumor floating around that FDUMP loses files. Although I have never had that happen, I've heard it from some pretty reliable sources.

COPY works fine. COPY doubles as my diagnostics program—if it gives me trouble, I call the field engineer. COPY is fast. COPY has a true verify. COPY is user friendly and gives me valuable statistics.

COPY isn't supported.

The reasons for this are valid. COPY has its own device drivers, and there is simply no more room for the new disks. But I'll bet my back issues of *BYTE* that it would be easier to rewrite COPY to make it smaller (or use RDOS device drivers) than to write a whole new backup.

That's what they've done, though. The new utility is called IMOVE and is currently running under DG/RDOS. Since I don't have a Desktop, I'll have to wait until it's ported to RDOS to tell you about it. Unless some kind soul wants to give me a report on the IRDOS bulletin board. The number is 415/924-3652. This is a hint.

I know nothing about non-DG backups for RDOS, but I'd sure like to. Is there a salesperson in the audience?

A question was brought up about editors. If WordStar is the program most often pirated, CRTEDIT must be in the top ten. Now that other RDOS users have the DO facility (about time!), why not give them CRTEDIT? Or sell it to them? I suppose it's personal prejudice, but I think it's still one of the best editors around. I'd give my right arm to have a version that runs under MS-DOS (WordStar's OK, but every time I go back to the Eclipse I hit Control-C to scroll down a page and . . .). Instead, another editor is being planned. I'll reserve my judgment, but my disk is quickly being filled up with nonsupported software—and *no way* am I going to the "new, improved" editions.

Whoops, WordStar just told me I'm on page five. Time to get to ICOBOL. Continuing with the new stuff . . .

Detached terminals. No, this is not what happens when you pull a 6053 towards you and the plug falls out. The detached terminal feature allows you to run any program that does not require screen input from the master console—without tying up the console. It's sort of like PASS for programs. For instance, we have this one cleanup program for inventory control that took about an hour to run, and just spooled out items with negative quantities in stock. Now, instead of tying up a terminal or figuring out some weird hardware solution, I just RUN PROGRAM "#O NEG-STOCK NEGSTOCK.LG". The screen returns to LOGON, and the program is out there running on terminal 65. Any output to the terminal is written into the file NEG-STOCK.LG. In fact, I've just written a menu to do this with all the programs that spool automatically. Just pick a number—the program is running, and you return to the menu.

I wrote a PASS-type queue using this feature. Its advantage is a VERIFY? feature on the delete function (all those who have deleted a print job you just spent two hours running, raise your hand). The people maintaining ICOBOL are going to attempt to put this feature into a future rev.

The one feature that would be nice with this (and the one feature that my PASS does

not have) is an ABORT function under program control (e.g., #A65 or #OA NEG-STOCK). As things stand now (as far as I know), any abort must be done from LOGON's #A screen.

Rename files. ICOBOL now allows a system call to rename any file. For example, "#N AFILE BFILE" will rename AFILE to BFILE. I haven't found any good use for this one yet. If you think of one, call me.

SET verb. Another feature I have found no use for. You are now able to use multiple values in a SET statement, e.g.,

```
SET A,B,C,D TO ZERO
```

There must be some justification for the existence of a SET verb, but I can't find it. As far as I can tell, the code generated is exactly the same as for MOVE. Once again, if you know an instance where SET works just fine for you, and MOVE won't, please call.

Abort terminals. Not a new feature, just making the old one work the way it should. The #A call no longer waits for screen input to finish before it aborts. Previous to this fix, if you typed #A to abort a terminal, you then had to go around and type CR on the terminal you just aborted. If you had to do this anyway, I reasoned, why not walk around and hit END on the terminal a couple of times and not use the #A at all? Obviously, some other quick-witted person had also pointed this out to DG.

Again, a program-driven #A (perhaps coupled with a program-driven #M) would be handy. This would enable you to write a neat little program to do something such as display "YOU'VE GOT TEN SECONDS TO LOG OFF BEFORE I TRASH ALL OF YOUR DATA" to all the terminals, and then abort them all. Only from the master console, of course—we wouldn't want something like that happening to us! Δ

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

New controller and workstation give voice to CEO

New York—Data General has integrated voice mail with its CEO business automation software, allowing CEO users to send and receive voice messages.

The centerpieces of DG's announcements were the VMC/2 Voice Mail Controller, a \$10,000 communications board that provides the telephone-to-processor interface, and the \$1,595 Dasher D555 Integrated Voice/Data Workstation. DG also announced additions to its CEO software to provide full integration of the voice mail functions with CEO Electronic Mail (no additional charge).

The VMC/2 controller provides speech store-and-forward capability through two telephone ports, which authorized users can access from any tone-dialing telephone. The board digitizes and processes voice messages, with the telephone keypad providing input to the voice mail system.

Integrated with CEO electronic mail facilities, the VMC/2 board allows voice messages to be received, filed, forwarded, and deleted. It also supports distribution of messages to mailing lists, and enables senders to designate whether the message is urgent, confidential, or certified. The board allows users to attach voice comments to files, messages, and documents being mailed or forwarded.

The 15-inch board fits into an I/O slot in Eclipse MV/ family computers running AOS/VS. There is no need for a separate processor or storage unit for voice applications. Processors can be configured with up to three VMC/2 boards for local voice mail support, or a single processor can contain up to eight VMC/2 boards and be used as a voice mail server for a network of Eclipse MV/ family systems.

CEO users on systems using the VMC/2 voice mail controller can manipulate voice mail from their CEO inboxes by using menus that follow the standard CEO format. Alternatively, users can call the system from any standard tone-dialing phone to replay their voice mail and use the telephone keypad to enter commands.

The company's new Dasher D555 Integrated Voice/Data Workstation is of particular interest to executives and professionals using integrated voice mail capabilities. Occupying only 14 inches by 14 inches of desk space, the Dasher D555 enables users to perform all their business automation and telephone tasks from a single, desktop unit. Voice capabilities can also be used with DG's Dasher/One workstation and other Dasher family workstations connected to regular tone-dialing telephones.

The Dasher D555 combines all telephone and workstation functions in one compact package. The ANSI-standard text and graphics terminal supports DG voice and data products, including the VMC/2 voice controller board and CEO software. The attached telephone is a Bell 2500-compatible tone-dialing unit that functions whether or not the host processor is operating.

DG's newest Dasher workstation is a full-function, text and graphics terminal. It features a nine-inch monochrome screen of 24 lines by 81 columns and supports both vertical and horizontal scrolling. A tuck-away U.S. ASCII keyboard includes full-sized keys with tactile feedback.

Options for data entry are the keyboard, mouse, data tablet and stylus, or data tablet and puck. The telephone keypad may serve as an entry device for numbers.

The workstation includes eight user-programmable soft function keys for use of CEO functions without the keyboard. These keys also operate the telephone, support functions available from a PBX (call forwarding, call waiting, conference calling, and quick calling), or work with the D555 internal phone list (which can include up to 40 entries).

The D555 supports local or pass-through printing, and the full line of DG's integrated business automation software.

A two-wire Bell 2500 analog telephone set is integrated with the workstation. It features a tone-dialing keypad with speaker and bell volume control, speed dial, last number redial, mute, and hold keys. The unit includes a speakerphone and microphone, and supports both touch and rotary dialing.

Both the VMC/2 and the Dasher D555 are available 120 days ARO. Δ

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5091 family of modems expands DG's offerings

Westboro—Data General has introduced a complete family of modems to support 300-, 1200-, 2400-, 4800-, and 9600-baud transmission rates. Model 5091 family modems operate in full- and half-duplex, synchronous and asynchronous modes.

The modems are compact units that can be used standalone or as rack-mounted card modules. Offering a choice of operating modes, all are registered under FCC Part 68 for direct connection to the U.S. telephone dial network. Depending on model, they afford full Bell 212/103 and CCITT compatibility. The 2400-baud model, which supports CCITT V.22, meets international requirements.

This family of modems incorporates manual-dial, auto-dial, and auto-answer capabilities. In auto-answer mode, incoming calls connect automatically. Users can use the auto-dial mode to store and automatically dial up to 20 phone numbers maintained in a directory.

The modems represent the most recent of several products that support the DGConnect communication connection system. Δ

DG adds two laser printers

Westboro—Data General has added two new desktop laser printers to its line of business automation peripherals. The two printers are designed to offer high quality and speed with low noise levels to users who need letter-quality text and graphics.

Models 4557 and 4558 are high-speed, 300 by 300 dot per inch letter-quality printers. They provide shared or dedicated printing for business automation applications such as DG's CEO software and CEOwrite word processor.

They produce up to eight pages per minute and provide page setup and spacing options including superscript and subscript characters. They are supported by the entire line of DG computers. Capable of printing on transparencies, the printers contain four ISO-standard character sets. Additional fonts are available as options.

Priced at \$5,995, the Model 4558 produces full-page graphics that support the full line of CEO business graphics, including Trendview graphics display software, CEO Drawing Board free-form graphics software, and CEO Wordview word chart software.

The Model 4557 is priced at \$3,500. Both models are available 120 days ARO. Δ

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ILAR announces financial planning/decision shortcut

Newport Beach, CA—ILAR Systems has introduced Bottomline-V, a financial planning and decision support system for the DG/One and other MS-DOS systems with major spreadsheet packages. The system was designed to eliminate the need to develop personal worksheets for financial budgeting, planning, analysis, modeling, and forecasting. The system supplies the logic, equations, and formats, while the user supplies the data and assumptions, such as sales forecasts and percentages for operating expenses and cost of goods.

The user begins developing a planning system by completing a 12-month budget. This is followed by entering sales forecasts, costs of goods sold, operating expenses, average collection period, days of inventory carried, debt and equity funding, capital expenditures and R&D development budgets. These assumptions are entered into either the five-year annual, or the two-year quarterly forecasting programs.

The system then solves the financial model by using simultaneous financial equations through an iterative technique that can perform 9,000 calculations in a time of 1 to 3 minutes. The result is an income statement, balance sheet, statement of changes in financial position (sources and uses of working capital), and a complete financial ratio analysis statement. Reports may be printed and/or stored for future use.

Users may perform a historical analysis of

a company by entering income statement and balance sheet figures from past years. A statement of changes in financial position and a financial ratio analysis are created.

The 180-page user's manual contains documentation, step-by-step procedures, case studies, and computer output. Suggested retail price for Bottomline-V is \$395. Δ

ILAR Systems, Inc., 1300 Dove Street, suite 105, Newport Beach, CA 92660; 714/476-2842.

Ledger interface for Lawpak System

Lincolnwood, IL—DataGroup Ltd. has announced a general ledger and accounts payable model that interfaces with DLG*Lawpak

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law office management software. The product is a multiuser legal time and billing system compatible with Data General RDOS and AOS and with MS-DOS operating systems. It is menu driven, and all data entered are validated with operator help messages.

User-defined charts of accounts and financial statements allow the use of existing account numbers. Reports include general ledger, balance sheet, income statement, budget, and comparative statements. Reporting can be by profit center or the entire firm. Billing and accounts receivable information is automatically posted to the ledger. Out-of-pocket expenses can automatically be posted to the proper account for immediate client billing.

The system is designed to handle an unlimited number of timekeepers, clients, matters, and user-defined service codes. A

variety of billing and management reports is available. Statements can be designed by the firm with varying degrees of detail for fees and disbursements, and include an optional client billing summary. Draft and final statements can be printed or reprinted as often as desired. Billing and payment history is retained for complete accounts receivable reporting, including 30/60/90 aging on past-due accounts. All reports can be grouped by attorney responsible.

Additional integrated modules are available for docket control, trust accounting, mailing lists, and word processing. All software is supported by the company, which provides installation, training, and continuing support.Δ

DataGroup, 7250 N. Cicero, Lincolnwood, IL 60646; 312/675-1620.

32-bit version of disk backup and recovery

Salt Lake City—DMS Systems, Inc., has announced a 32-bit version of their Disk Backup and Recovery System utility program. The DBR System is designed to overcome limitations found in the CLI DUMP/LOAD and DUMP__II/LOAD__II utilities on Data General AOS and AOS/VS computer systems.

The new AOS/VS DBR System runs as much as 40 percent faster than DUMP__II. It handles hard tape errors and multivolume backups. The system is designed to speed up reloading of specific files from multivolume backups by creating an index and allowing



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loading to start with any volume of the set. Sequencing through preceding volumes is eliminated and labeled tapes become optional.

If a hard tape error is encountered when reloading files from a tape, the user may continue to load with the next block or the next file on the tape. CLI load utilities currently do not allow this capability.

The system has full AOS and AOS/VS compatibility and is interchangeable with CLI load and dump commands. Δ

DMS Systems, Inc., 740 East 3900 South, Salt Lake City, UT 84107; 801/268-6671.

Lions Gate Software signs on as DG ISV

Vancouver, B.C.—Lions Gate Software

has signed an ISV agreement with Data General to market their Series III accounting packages on the MV/ family of minicomputers.

According to the company, Series III is a flexible, fully integrated group of accounting packages, originally based on MCBA (MiniComputer Business Applications) accounting software. These packages, available in any version of DG COBOL, feature batch control of interactive data entry, comprehensive audit controls, user training courses, complete system documentation, and software support service, including toll-free telephone support. Δ

Lions Gate Software, Inc., 2555 Gilmore Avenue, Burnaby, British Columbia, Canada V5C 4T6; 800/663-8354 (within the U.S.) or 604/437-0001 (outside the U.S.).

DG sets third-party standards for CEO integration

New York—The CEO Integration Toolkit, software documentation that is a blueprint for customers to integrate third-party applications with CEO systems, was announced by Data General's Information Systems Division.

The CEO Toolkit consists of detailed instructions and examples that help applications developers and programmers integrate non-DG applications with CEO.

With the documentation, applications developers can choose to integrate the following CEO conventions from within their programs: interrupt, status line, user commands, CEO filing system, CEO calcu-

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lator, CEO electronic manual, inbox, calendar, user directory, document conversion, printing, and access to CEO post office agent.

The integration techniques explained by the toolkit include procedure calls (library routines), communications protocols, and the Agent User Interface (AUI).

Packaged on magnetic tape, the CEO Integration Toolkit is designed for use with the programming language PL/I, but the library routines it describes may be called from other higher level languages. The documentation is intended for use with DG's latest release of CEO software, which supports the integrated applications.

Priced at \$500, the CEO Integration Toolkit is available 120 days ARO. Δ

DG offers high-speed BMC interface

Westboro—Data General's new Model 5400GP is a general-purpose burst multiplexor channel (BMC) interface for high-speed data transfer between external devices and DG Eclipse and Eclipse MV/ family computers. The company developed the new interface for data acquisition applications and point-to-point interprocessor communications.

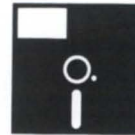
Depending on application software and hardware configuration, the interface can achieve data rates above 7 MB/sec.

Model 5400GP also offers flexible configuration options for moving data between the host computer and external devices. Options

include Data Channel (DCH) or Burst Multiplexor Channel (BMC).

Supported on DG's AOS/VS operating system, the interface includes a 32-bit AOS/VS software driver. This enables users to write application programs in Data General's common languages, including C, Fortran 77, and Pascal.

The package is priced at \$7,500, which includes the interface and AOS/VS software driver. Δ



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Software Testing: A Practitioner's Viewpoint, Patricia W. Daggett, Data General Corp.	11DG5	
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Patches for AOS SED needed to allow SED to work with DEC VT100s and other ANSI terminals. Similar to those provided by Tim Maness' article "Visible Means of Support," *Focus*, October 1985, for AOS/VS. Contact D.M. DeHaven, Williamson and Schmid, 17782 Sky Park Blvd., Irvine, CA 92714; 714/261-2222.

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After keeping a low profile for several months, former NADGUG President Mort Kahl has reemerged. He and two associates have joined forces to market a suite of COBOL accounting programs for DG systems. Mort writes: "Of course, I'm sure you realize that I've given you all this information in the hope that you might pass it on. Possibly as news of that immensely popular and fantastically able past president of NADGUG whom we all love so well. Far be it from me to demand a free plug, but what the hell, it can't hurt to ask." Very shrewd, Mort, but it won't work.

Forbes magazine reported in its October 21 issue on Digital Equipment Corporation's very peculiar policy concerning third-party equipment repairs. A DEC spokesman said emphatically that DEC was not interested in getting into third-party maintenance, but another spokesman told *The New York Times* that DEC would fix other vendors' hardware if it was part of a DEC system. Meanwhile, competitors reported that DEC was underpricing General Electric in some cases, and even going so far as to offer free software.

Apparently the lure of the computer repair business—a market worth an estimated \$13 billion a year—is too much for many large companies to resist. But for strategic reasons, many will resist admitting they would repair other companies' equipment. William Bentley, Data General's vice president for North American Field Engineering, was asked recently whether DG would consider revising its policy of not servicing third-party equipment. "We service what we sell," he answered. When pressed on how DG would respond to competition from others, he only added, "We do not plan to lose market share."

Speaking of service, users of the NADGUG on-line bulletin board (dial 415/924-3652; sponsored by Rational Data Systems) are doing just that. Mike Johnson, author of "Business BASIC Blues" in *Data Base Monthly*, suggested a poll of users' attitudes about the software support DG provides

through its Atlanta Customer Support Center. Doug Kaye responded with a very simple survey; it asks only how satisfied users are with each of the software products for which they receive support. The sample is probably not representative of users in general, but the system keeps users from voting more than once, so the results should be valid for users of the bulletin board.



A couple of koalas helped Cognos, Inc., celebrate the opening of its new Australian subsidiary, Cognos PTY, Ltd.

If you're not sure how to use the NADGUG BBS, refer to the November issue of *Focus*. This is a good opportunity to provide Data General with more of the objective information that DG President Edson D. de Castro says the company is looking for.

It's been a busy bulletin board, by the way. A quick scan of recent topics on the NADGUG BBS includes SPSA statistics, STR policies, mirrored disks, transaction processing, CEOwrite, WordPerfect, ICOBOL vs. AOS COBOL, and battery backup. There are also several new special interest groups forming.

Calvin Durden is stuck with two jobs until he can close out the books for NADGUG's fiscal year 1985, and turn them over to Don Clark, the new treasurer. In the

meantime, Calvin is both vice president and treasurer.

He recently sent treasurer's reports for August and September, but unfortunately there wasn't room in *Focus* to print them in their entirety. So here is a synopsis. Income for the two months was \$138,517.68, most of it from conference fees for Conference '85. Expenses were \$74,483.71, with the single biggest item being the Publications Committee (\$52,302.58). At the end of September, NADGUG had \$152,146.53 in its checking account and \$75,066.41 in savings. Calvin cautions against concluding that NADGUG is rich, however. Most of the expenses for Conference '85 hadn't been paid at the time of the report.

Communications Research Group sends news that it has enhanced the version of its BLAST communications software for DEC VAX computers. VAX BLAST now has virtual terminal emulation and pass-through capability to dial out and control asynchronous communications on any other computer running BLAST. BLAST was born and bred on DG equipment, but now runs under 25 different operating systems on more than 100 different computers.

Congratulations to Charles M. Boesenberg, who recently got his name in *The Wall Street Journal* as the new vice president and general manager for Data General Corporation's European operations. He replaces Raymond Fortune, who in April was named vice president for international sales and marketing.

It's always fun to compare rumors from various sources. As this is being written (November 1), most sources seem to agree that DG's micro MV machine will be announced on November 18. Some say its code name is Bulldog. One says a modestly configured system will be priced in the mid-to-high-twenties. What do you say?

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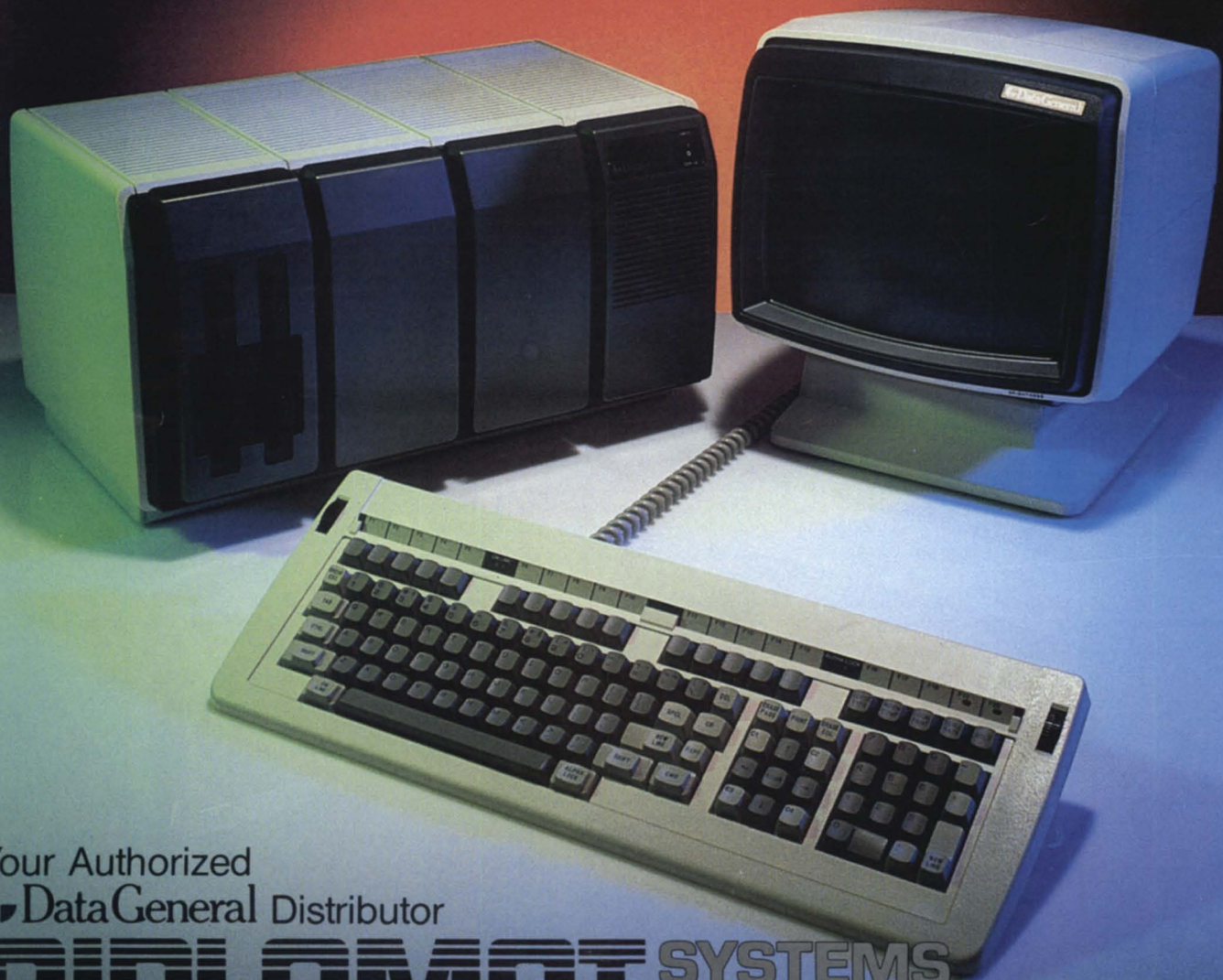
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