

January 1990

FOCUS

The Magazine of the North American Data General Users Group



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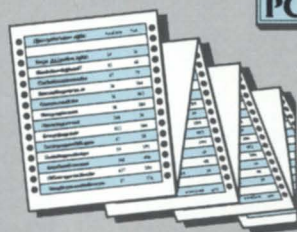
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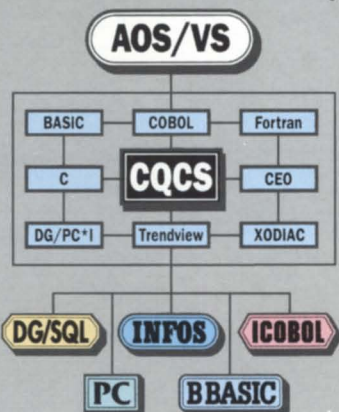


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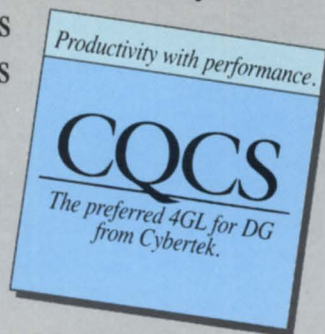
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On-line, any time

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The proliferation of electronic bulletin boards has created a new medium for communication—an underground network that falls somewhere between the telephone, ham radio, and campus bulletin board. Users of electronic bulletin boards have also developed their own brand of shorthand, but I'll get to that later.

One of the first ways that residents of the San Francisco area were able to communicate after the November 14 earthquake was through a local electronic bulletin board. Likewise, NADGUG members logged on to our bulletin board and were relieved as reports came in from Bay Area friends that they were all right.

NADGUG bulletin boards are not edited. They are truly wide-open and robust forms of communication, with all the rights of free speech as defined in the first amendment.

If you've read our monthly feature, "Bits and bytes from the bulletin board," you know how useful and informative the notices on the board can be. The excerpts only give you a hint of what can be found electronically. The topics under discussion are limitless. You may reply to a question, or think up your own topic. The bulletin board is public. Everyone can read every message and every reply.

I log on about once a week to check my messages and find out what other DG users are talking about. If I don't have any pertinent remarks, then I just "lurk." That is, I peruse the boards and read all the messages, without leaving any myself. In doing so, I usually learn something new about operating Data General computers. There are regular users who almost always have comments or answers for other people's dilemmas. We are fortunate that these NADGUG members have a forum for sharing their knowledge.

Be warned that bulletin boards are addicting. Some NADGUG members are admitted bulletin board junkies—the NADGUG bulletin board was closed over a weekend one time last summer when Rational Data Systems, (home of the NADGUG bulletin board) moved its offices, and some members suffered withdrawal pains. Rest assured, the NADGUG

BBS is open 24 hours a day, seven days a week.

When you log on, you may notice some funny punctuation on some of the messages. Since you can't show emphasis in a typed message, bulletin board mavens have created their own shorthand, called "emoticons." If you're the type that dots your "I"s with a happy face, you may be interested in these symbols, which must be read sideways:

:-) = Smile

;-) = Smile and a wink

8-(= Frown by someone wearing glasses

The number is 415/499-7628. There is no cost for NADGUG members, except for telephone charges. Now that I've shamelessly promoted the NADGUG bulletin board, please log on and let me know what you think of the bulletin board, *Focus*, or anything else. My address is "Focus editor."

In the November issue of *Focus* we published a roster of all the NADGUG interest groups and committee members, including photographs of the NADGUG Executive Committee. I have to admit that one of the most challenging things about this job (after learning to say "NADGUG" correctly) was figuring out the leadership structure of NADGUG. An attempt to make this structure clearer for other members inadvertently may have confused things. For the record, the NADGUG Executive Committee is made up of the current president, vice president, treasurer, recording secretary, and the planning committee chairperson. The planning committee chairperson is always the immediate past president of NADGUG.

Donald Clark, who so ably guided NADGUG during 1989, heads the planning committee. His photo should have been included in the November issue, along with the other Executive Committee members. C.A. Miller, who was pictured and who served for two years as head of the Executive Advisory Council, is not a member of the Executive Committee. My apologies to the mis-labeled.

△

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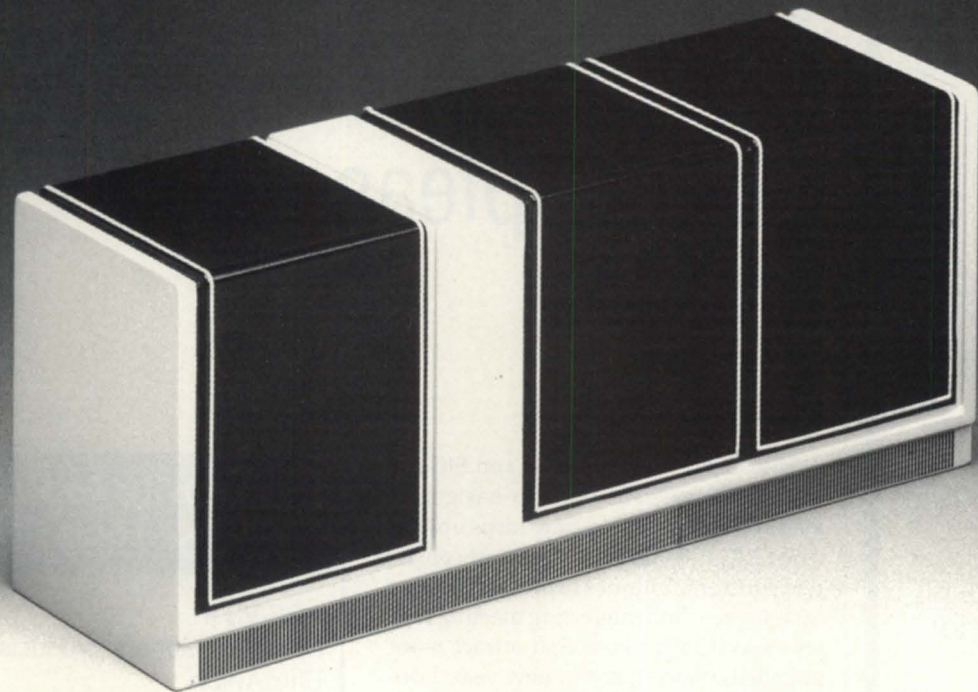
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	San Francisco	Jan 18/19 Feb 15cf
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	Santa Clara	Jan 11f Feb 13fp
	Woodland Hills	Feb 13f
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	Stamford	Jan 16f
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	Tampa	Jan 18f
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	Raleigh	Feb 1/#
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	Iselin	Jan 9f Jan 30f Feb 13c
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	Buffalo	Jan 17f
	Corning	Jan 16f
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	New York	Jan 10f Jan 24f Feb 7f Feb 21f
	Rochester	Feb 6p
	Syracuse	Jan 31f
OH	Cincinnati	Jan 11c
	Cleveland	Jan 18f
	Columbus	Feb 7f
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Victoria	Jan 18c
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How to please crowds

The Survival Kit for RIGs and SIGs in the November issue of *Focus* has generated conversation and new ideas among some RIG/SIG leaders. The most consistent concern continues to be how to come up with new and interesting meeting topics—specifically, those that attract more attendees. Since this is a new year, I decided to compile a list of the most popular meeting topics of 1989.

The list might help organizers determine which topics may have been beaten to death, as well as find new ones. The hands-down winner (and a possible candidate for the "beaten to death" category) shouldn't be a surprise to anyone—AOS/VS II was discussed on its own merits, as well as in comparison with its predecessor AOS/VS, by just about every group. Data General product announcements continued to be a very popular way to get interaction between RIG members and local Data General people, and although only a few groups discussed it in 1989, DG's Unix platform and the Aviiion series promises to be a crowd pleaser in 1990.

Please keep me informed of any interesting meeting topics that you hear of, and meetings that attract large numbers of attendees.

A new SIG dedicated to DG users in the **healthcare industry** is being organized by **Bill Stranges** with Cain Associates (718/448-8024) and **John Espesito** of Data General (516/454-8900). Contact ei-

(Continued on page 10)

Favorite topics of 1989

- AOS/VS II
- New Data General products
- Unix/Aviiion
- Communications issues
- NADGUG
- Bar coding
- PC integration
- Data General software support
- System performance issues
- Tours of Data General facilities
- Disaster recovery
- Software vendor night
- Hardware vendor night
- Tours of member sites
- Infos II
- Parties and social events
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






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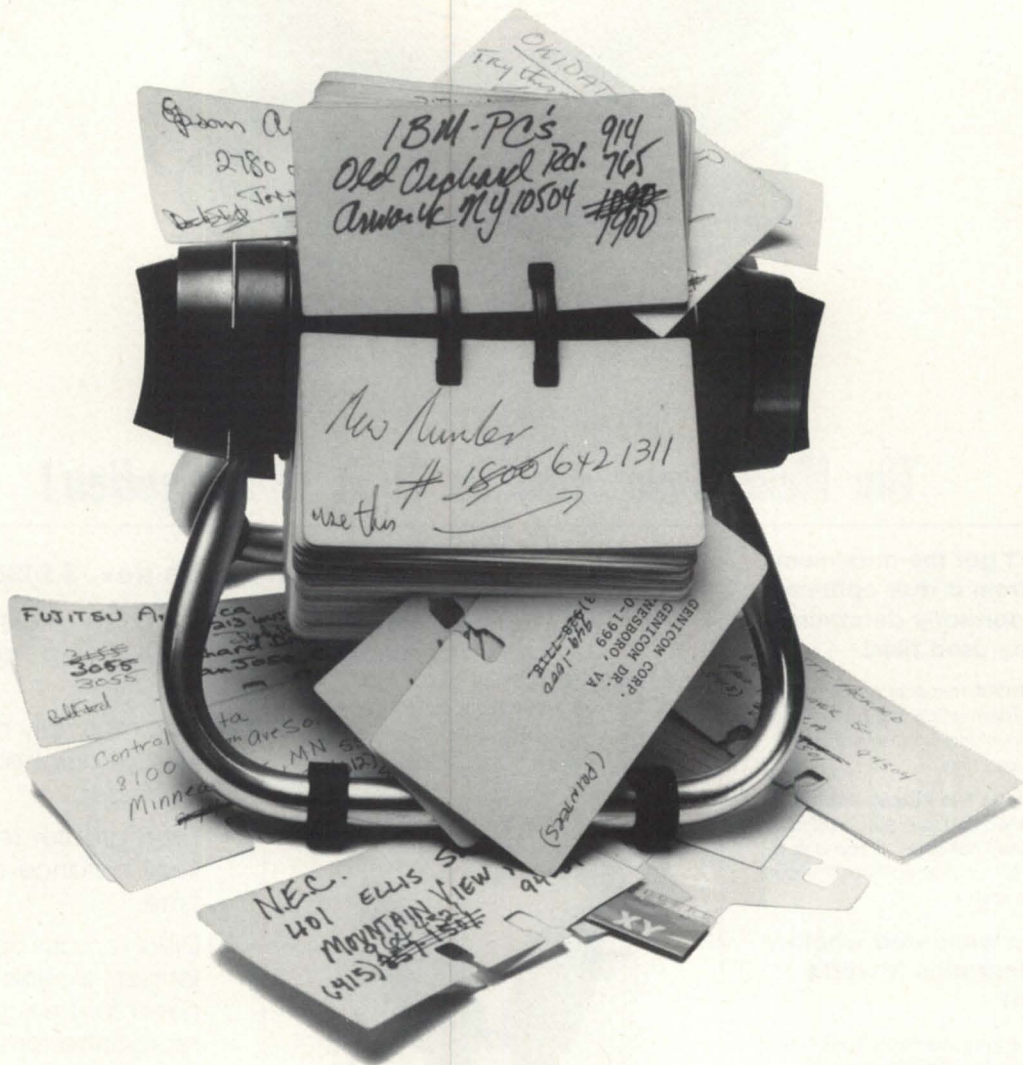
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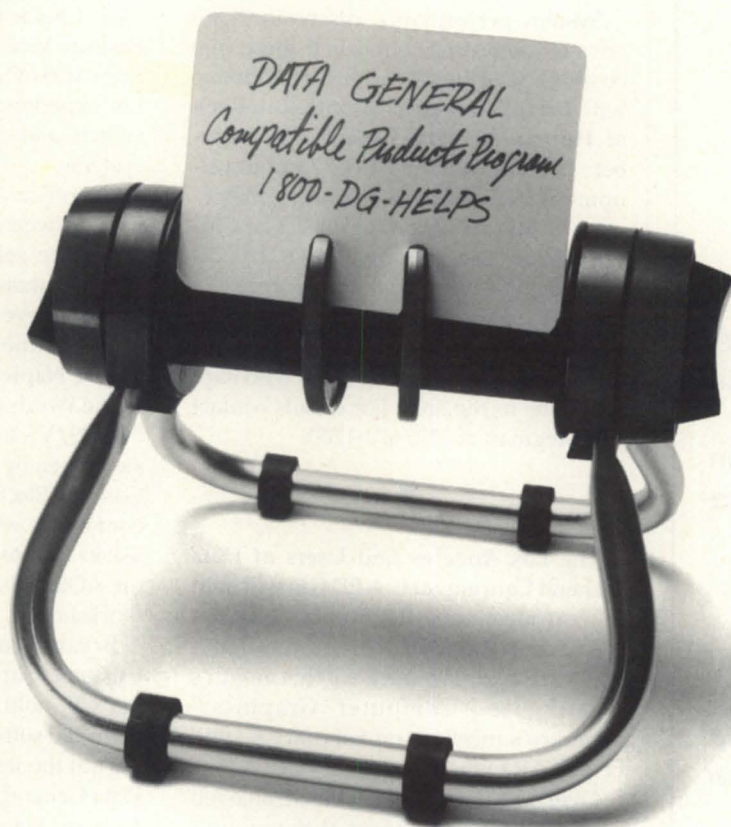
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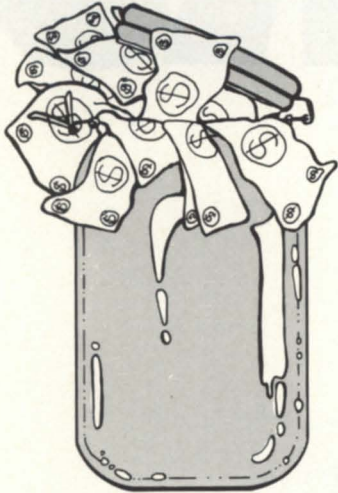
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ROUNDUP

(Continued from page 6)

ther Bill or John for membership information.



Southeast Virginia DG users are creating a new group in their part of the state. **Pam Musick** of Langley Credit Union (804/825-7131) has started the effort, and wants to hear from anyone interested in helping with the new group.



System performance discussions are always interesting, but when these discussions take the form of a roundtable with **Brian Johnson** of **BJ, Inc.**, **Ron Fitch** of **Human Insights Group**, and members of **Data General SEPAC** and **development teams** as panel members, they're events you can't afford to miss. The **Chicago Area User Group (CADGUG)** is bringing this event to you on February 21 starting with a dinner at 6 p.m. All CADGUG members are invited to attend along with any other DG users who happen to be in the area. For details contact **Jim Siegman** at 312/673-1700.



The **Los Angeles End Users of Data General Equipment (LA EDGE)** will hold its next meeting at the Brookside Country Club in Pasadena on Tuesday, January 9, at 7 p.m. The theme of this month's meeting is "Computer Graphics." February's meeting, on February 8, will be a "VAR night."

Over 60 members of LA EDGE enjoyed a delicious Turkey dinner at the group's November meeting. After dinner, **Jacques Roy** of Data General gave a presentation on Unix and Data General. In addition to tracing the history of the operating system, giving sample Unix commands and comparable commands in AOS/VS, Roy presented DG's current and future strategies for implementing Unix, and answered questions that arose during and after his presentation.

LA EDGE is the regional interest group for the greater Los Angeles area, and is now in its fourth year of operation. Anyone wanting more information or an LA EDGE information packet should contact **Mark Speer** at 818/897-7777 or **Carolyn Naber** at 818/793-2141.

The Clarion Castle Hotel and Resort in sunny Miami, Florida is the sight for the first annual **AOS/VS workshop** to be held January 11-12. Besides being a great place to spend a couple of days in January, this workshop is a must for AOS/VS users. Although the work doesn't start until Thursday morning, the fun starts Wednesday night with a welcome hospitality suite.

The AOS/VS SIG has lined up an impressive list of speakers to head up sessions with topics that should be of a particular interest to anyone running AOS/VS. **Chuck Goes**, NADGUG RIG/SIG Eastern Vice Chair, recently converted from AOS/VS to AOS/VS II. He will share his experiences while making the big switch, and compare the two operating systems.

An office automation debate will be held between users of Wordperfect and CEO. The session will be mediated by **Greg Farman**, *Focus* publisher, and will feature **Steve Kern** of Werner and Pfleiderer as the CEO representative and **Bernie Napier** of Southern Air Transport as the Wordperfect backer.

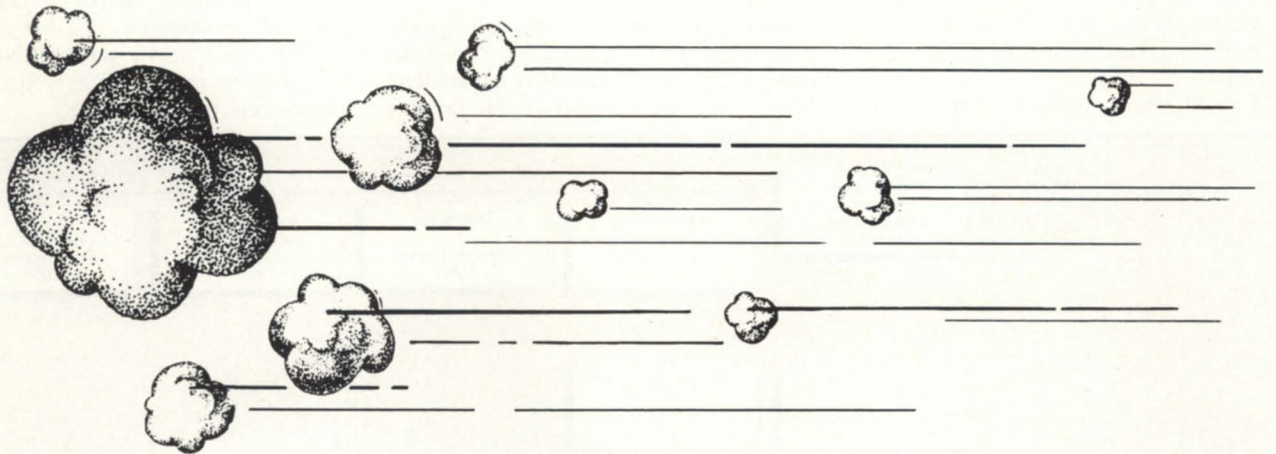
AOS/VS users who attended the session given by **Ken Rammey** of Rochester Gas and Electric at this year's NADGUG conference were so impressed that they asked him to give another presentation on AOS/VS performance issues at the workshop.

Bryan Scoggins of Data General's Customer Support Office in Atlanta, Georgia will hold a discussion on DG hardware and software support issues. Rounding out the sessions will be **Gary Davis** of Data General, who will speak on interoperability between MV and Avion computers.

Data General will sponsor a cocktail reception for all workshop attendees on Thursday evening. The fee for the workshop is \$300. For more information, contact the Meeting Department of Wilcox World Travel and Tours at 800/452-2803 or 704/254-0746. Δ

Cathlene Gentry is the RIG/SIG coordinator for NADGUG. She may be reached at Focus magazine, 4807 Spicewood Springs Rd., Suite 3150, Austin, TX. 78759; 1-800/877-4787, (1-800/USR-GRUP).

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DG Corporation

Senior executive changes

A year-end shuffle of Data General top executives found general operations placed in the hands of financial specialist Ronald L. Skates, and co-founder Edson de Castro taking on new roles as chairman of the board of directors and chief scientist.

Herb Richman, another company co-

founder, will serve as vice chairman of the board of directors, as well as continue to direct overall sales efforts.

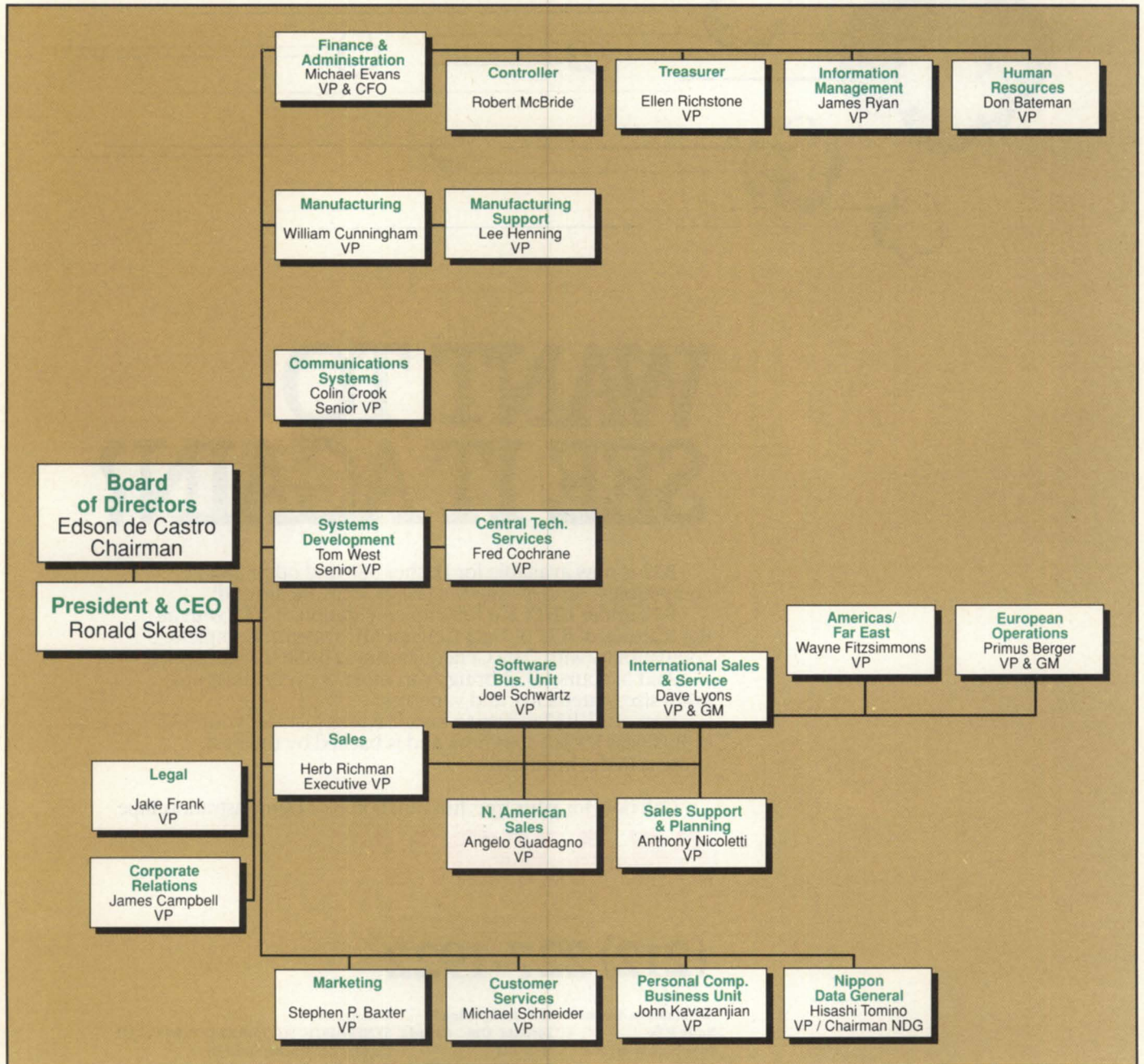
Until now, de Castro was the only president of Data General since the company's founding in 1968. In his role as chief scientist, a new position, he will guide the company's technological directions and future strategies.

Skates, now president and chief executive officer of Data General, joined the company in 1986 as senior vice president, finance and administration. He became

chief operating officer in August 1988. A new chief operating officer has not been named.

"This a natural progression, since Ron had already been focused on day-to-day activities while Ed focused on technologies. Also, for a company of Data General's size, it is typical to have a chairman of the board," said Corporate Spokesperson Jim Dunlap.

The chart below reflects the shift in corporate management, as well as changes in the reporting structure. △



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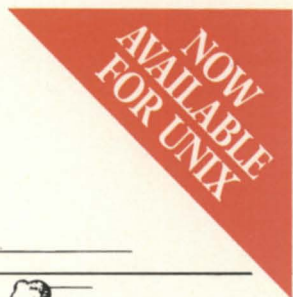
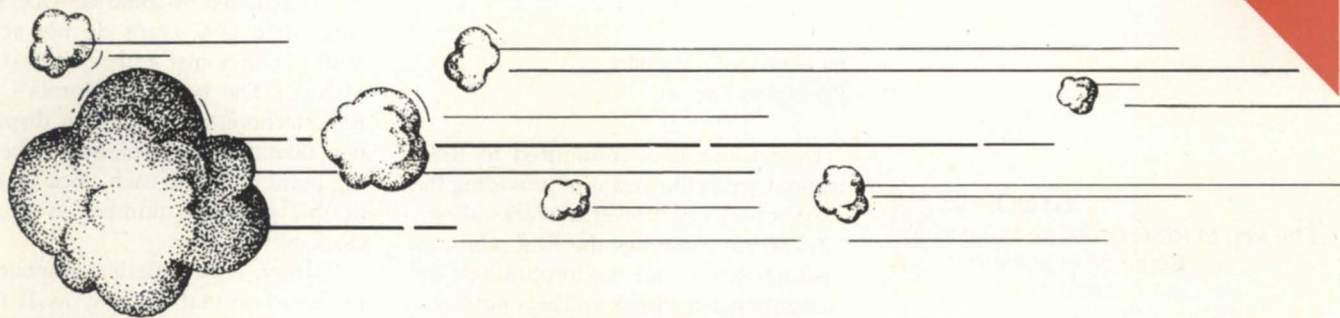
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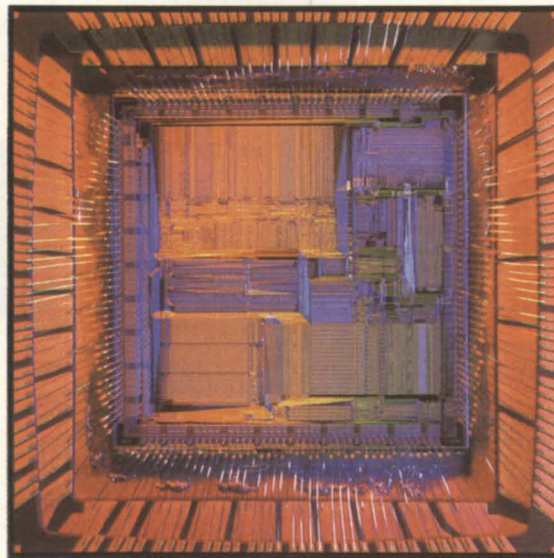
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Taking a calculated RISC



Motorola's MC88100 RISC microprocessor

by Michael E. Marotta
Special to Focus

SYNOPSIS
The key to RISC is the instruction set. Reduced is something of a misnomer.

Data General is committed to RISC technology as the means of providing the market with fast, powerful workstations. This article examines the RISC chip, its instruction set, and the implications for computing in the 1990s and beyond. There is no doubt, in my opinion, that RISC technology will eclipse all of the processors we accept today.

The Data General Aviiion workstations are controlled by the 88000 family of RISC processors from Motorola. There are other RISC chips. However, Motorola's 88000 offers unexcelled speed and power at a competitive price. Also, Motorola already sells about 50,000 different products. Therefore, Data General can count on a reliable supply of both chips and tech-

nologies. In fact, Motorola claims that by 1993 half of the 2 million RISC units in use will be theirs.

Hardware

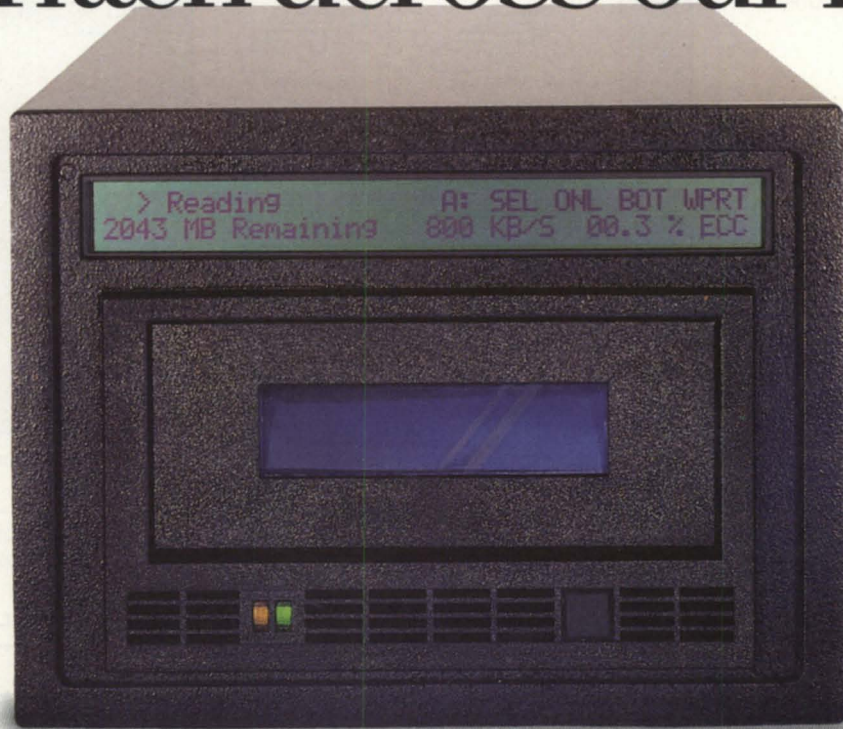
A basic 88000 system uses one 88100 CPU (central processor) and two 88200 cache/MMUs (memory management units). One MMU handles instructions, the other takes care of data. The CPU has five independent execution units on the chip: instruction unit, data unit, integer and bit field unit, floating point unit, and a special function unit. (See Figure 1, page 16.) Since the architecture assumes a 32-bit word, it doesn't take any longer to process 32 bits than to process 1 bit.

All floating point, integer multiply, and integer divide operations are "on chip." According to Charles Melear, technical marketer for Motorola, "This is an honest-to-goodness multiply because there is a hardwired floating point unit and an accumulator. You can multiply a 32-bit number by a 32-bit number and get a 32-bit number." This should dispel the rumors circulated by some MS-DOS magazines that RISC chips do not actually multiply, they just add really fast. Says Melear, "The key to Motorola's 88000 RISC technology is that you dispatch a new floating point operation to the floating point unit with each clock cycle or a double precision number every other clock cycle."

Further, each unit is independently pipelined so that as many as 11 operations can be carried out concurrently. In addition, there is a "file" of 32 general purpose 32-bit registers and a "scoreboard" for them. Although these registers are indeed general purpose, they also have a conventional usage and a naming scheme. In the words of one Motorola source, "We went to a bar one night and named the registers. It is a software convention."

Registers use "scoreboarding" because it allows all of the processor's instruction

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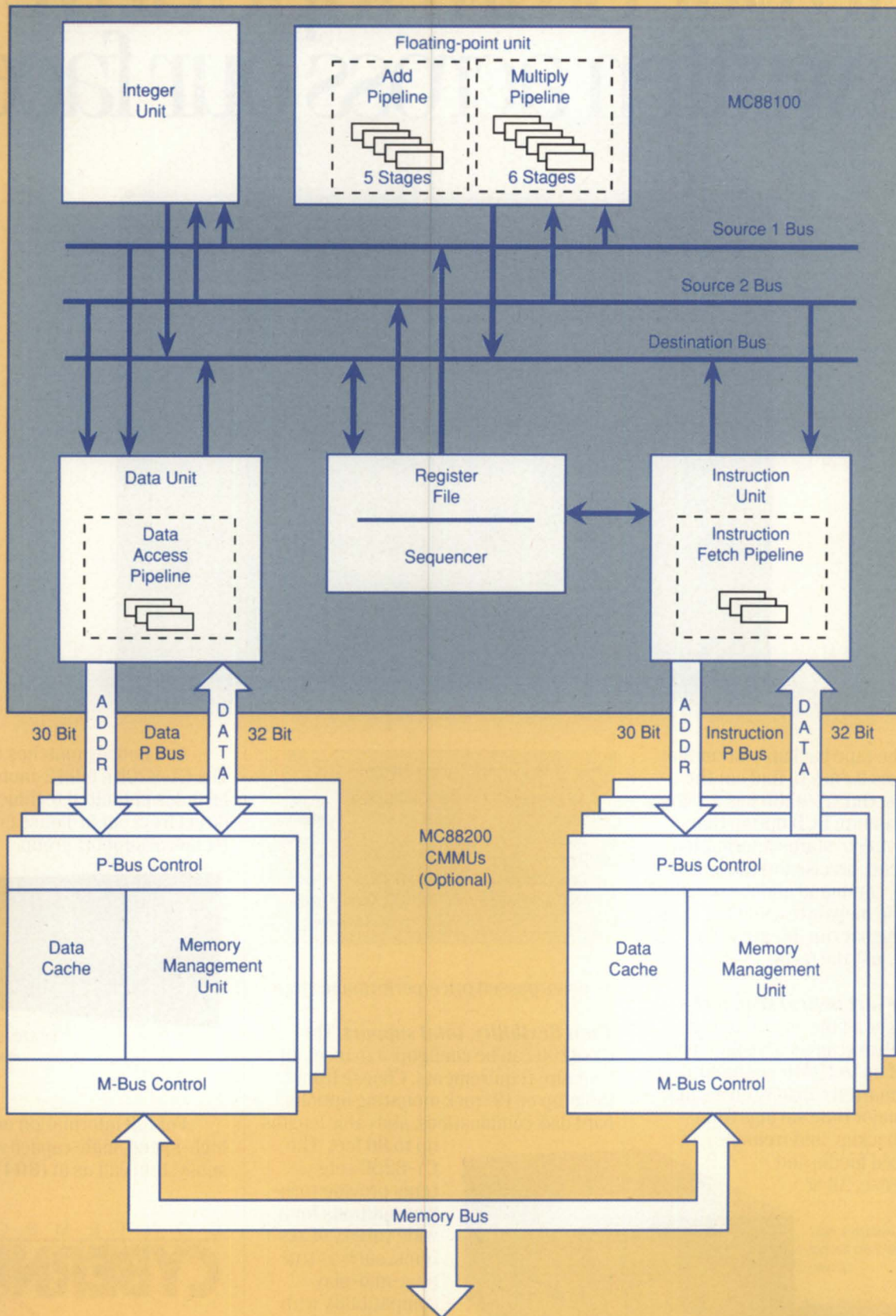
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Figure 1: Execution units



units to share the register file without destroying each other's register-based data. (Note that the *reduced* instruction set has no PUSH or POP command.) Each register has a scoreboard bit that serves as a flag. Before a functional unit uses a register, the scoreboard bit is checked. If the register is busy, the calling unit waits until it is available.

The Motorola 88000 RISC chip set was implemented according to the principles of "Harvard architecture." According to this design philosophy, the processor moves data and instructions independently and simultaneously both internally and externally. This allows the CPU to take maximum advantage of the MMUs and their caches.

RISC cache works just like the cache in the Data General MV series. Caches are high-speed intermediate memories that sit between the processor and the main memory. They are used to provide fast access to frequently-needed information, both data and instructions. Each cache holds 256 sets of 16 words (four lines by four words per line) of four bytes each, for a total of 16 KB per cache. These items are continuously loaded from main memory.

The 88200 relies on four-way set associativity that increases the cache hit rate. This boosts the likelihood that the information needed by the processor will be available directly from the fast cache. In essence, four parts of a program are stored in four small blocks, making it 90 to 95 percent likely that the code required by the processor is in the cache.

Again, the 88200 provides 16 KB of cache memory. By comparison, the MV/2000 has no cache; the MV/20000 has a 4 KB instruction cache and a 16 KB buffer; the MV/40000 also has 16 KB "on chip" as a foundation for the 64 KB "on board." Note, however, that since as many as eight 88200 MMUs can be linked to one 88100 processor, an Avion-class workstation can have a total of 128 KB of cache—double the amount available on an MV/40000.

In order for the CPU's function units to have access to the *right* data, the 88200 has a special "bus-watching" logic, sometimes called a snoopy. The snoopy ensures that the continuously-updated cache memories used by the processors are always consistent with the information in main memory. When multiple processors access the data in main memory, data

becomes outdated. The other processors need to have correct, not antiquated, data. The snoop routine asks the other processors "Who is keeping a copy of the data at this address?" When one of the processors does the electronic equivalent of raising its hand, it is instructed to erase its copy of the data as being no good any more. Thus, there is always one and only one good copy of the data.

Like other 32-bit processors, the 88000 can address as much as 4 GB of RAM. You would be challenged, however, to find another 32-bit processor that can pump out 80 MB per second. (By comparison, the MV/40000 has an I/O bandwidth of 60 MB/sec.)

Motorola's RISC processors were designed to allow multiprocessing and the creation of fault tolerant systems. While one 88100 CPU connected to two 88200 MMUs is the basic configuration, other geometries are possible. As many as 504 processors can be linked together in a single system.

The 88000 series has been produced and benchmarked at three processing speeds: 20 MHz, 25 MHz, and 33 MHz. Ideally, each instruction is executed in a single clock cycle. There are some real-world trade-offs, however. Even so, the 20 MHz RISC runs about 16 MIPS and the 25 MHz RISC yields 21 MIPS. These figures are far in excess of RISC chips from other companies.

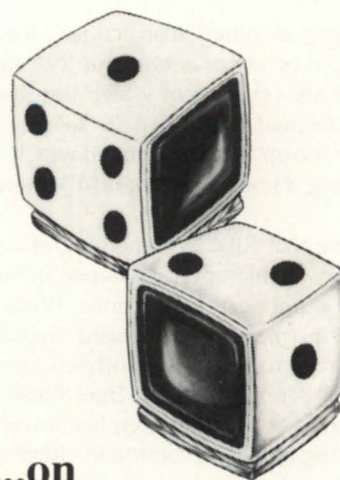
The Motorola RISC chips are also surprisingly affordable. In single quantities the 20 MHz CPU and MMU are \$494 and \$619 each; at 25 MHz, the price is \$697 for the 88100 CPU and \$875 for the MMU; the 33 MHz CPU sells for \$894; the associated MMU for \$1,171. Again, two MMUs are required for each system, one to manage instructions, the other for data.

The Motorola 88100 and 88200 are built on 1.2 micron double metal high performance complementary metal oxide semiconductors (HCMOS). However, Motorola is already looking to replace HCMOS with gallium arsenide emitter-coupled logic (ECL) gate arrays by 1991, boosting performance to 80 or even 100 MIPS.

Software

The key to RISC is the *reduced* instruction set. There are only 51 instructions. By comparison the Intel 80x86 chips (used in the DG/One and compatibles) support 130 commands. Note that this in-

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cludes redundant instructions like JBE (jump if below or equal) and JNA (jump if not above), both of which translate to hexadecimal instruction 76. Also, hex 90 is the "no op" NOP command which does nothing, a holdover from IBM 360 assembler.

Note that RISC is something of a misnomer. All microprocessors use about the same number of instructions. While the 88000 instruction set is, indeed, "reduced" to 51 commands, this is still very close to the 100 commands on an Intel 80x86. The Motorola 88000, however, has fewer addressing modes. A command either adds two registers or adds a register to an embedded field in an opcode. With RISC, the maximum number of commands is just over 100, while the Intel 80x86 can have about 1,000 possible commands when you take into account all of the addressing modes.

RISC chips have no stack pointer. In order for a program to do an indexed store, the programmer must make it possible for the code to acknowledge and

take an exception and dedicate one of the 32 general-purpose registers for a stack pointer and from that do an indirect load or store. The programmer (and the program) maintain the stack.

While there is no hardware stack, all registers have a "shadow register." This is a copy of the contents of the real-time registers. These shadows "freeze" when an exception condition occurs. When the program returns from the exception, the shadow registers are written to the real-time registers. In fact, you *always* read *only* the shadow registers because the real-time registers are always changing. If you tried to read the real-time instruction pointer, every time you issued a command to read it the contents would be different because of your command.

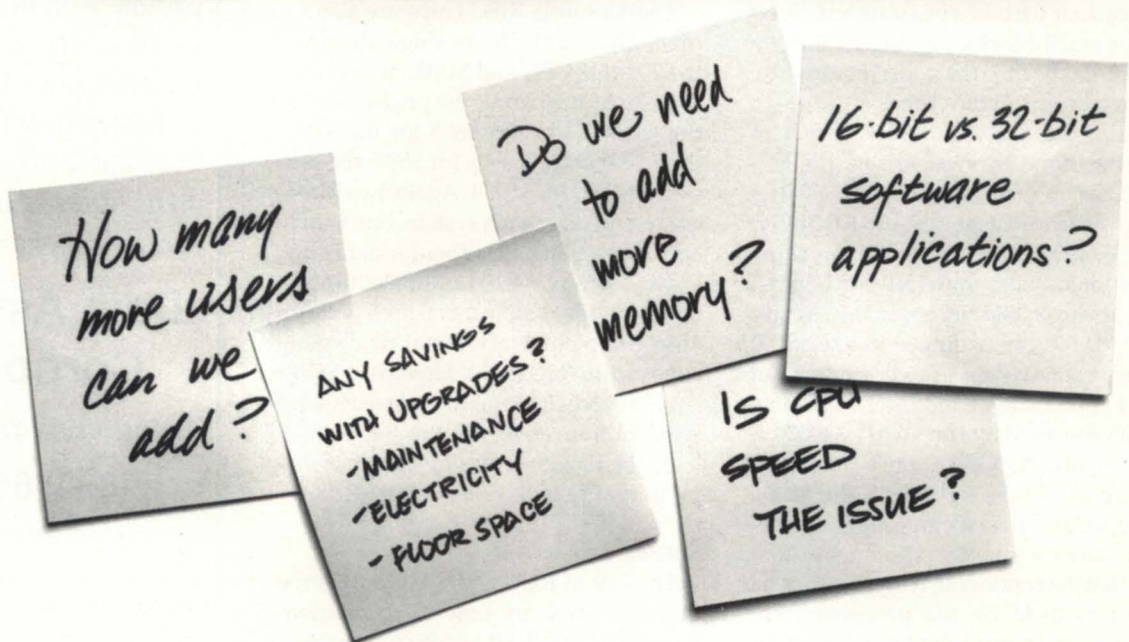
RISC chips benefit from fixed-length instructions. The processor always knows where each command starts and ends. By contrast, an Intel 80x86 instruction may be one, two, three, or more bytes long. For instance, 4Eh means "decrement the Source Index register," a handy one-byte

instruction. However, adding a word to the Source Index and then XORing the data stored at the sum of these against the DX register translates to a single four-byte command whose mnemonic is XOR DX,[WORD + SI]. RISC chips avoid this confusion. Being 32-bit devices, all commands are four bytes long and all arguments are four bytes long.

The 88100 instruction set contains the usual arithmetic commands, flow controls, and so on. It also includes several commands for manipulating bit fields. The 32-bit instructions and data fields carry a lot of information. With instructions that manipulate bit fields, you can subtly alter the information in a CPU register or a memory location. For instance, since bits 5 through 15 represent a subopcode, altering them gives you the ability to subtract, rotate, multiply, etc. the data in a given combination of source and destination registers. Also, manipulating bits gives you the power to control the color, saturation, and hue of a pixel.

The claim that the 88000 will process

IN THE DARK v



one instruction per clock cycle is not quite correct. It takes three cycles to fetch, decode, and execute an instruction. If you could view this process at the micro level, from the outside of the processor box you would see one instruction going in and one instruction coming out each clock cycle, but they are not the same instruction.

Like other processors, the RISC chips "pipeline" instructions. This means that each instruction is advanced as far as possible with each "tick" of the clock. An instruction that requires more than one tick does not prevent others from completing. Two instructions can share a pipeline at the same time.

All of the integer arithmetic commands, boolean operators, and bitfield instructions always execute in a single clock cycle. The branching conditions slow down the processing because they require looking forward to the next instruction. In fact, a branch can leave a "hole" in the pipeline. However, there are programmatic ways around this.

Fortunately, machine code is not the only language available for Motorola's RISC machines. In addition to the assembler (and its linker), the Motorola developer's kit comes with a C compiler supported by a monitor and debugger. Fortran, Prolog, Lisp, Ada, Pascal, and Basic are also available from third-party vendors.

Shareware

Over 60 system manufacturers have adopted the 88000 RISC processor. 88open announced the BCS (Binary Compatibility Standard) in July of 1988.

BCS defines the standard interface between a vendor's application programs and operating systems that run on the 88000. This means that software written for one vendor's products will run on all other 88000-based systems, without modification. It also means that there is no need for a so-called industry standard computer. Every manufacturer is free to make the most of RISC in its own way and yet, all hardware conforming to BCS

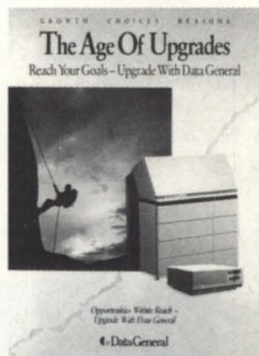
will run all BCS software.

Motorola and 88open decided on the names for the 32 general purpose registers to facilitate the BCS convention. Except for R0 and R1, these are not dedicated. However, if, for instance, you always use registers 26, 27, 28, and 29 for the linker and if you always use register 31 as the stack pointer, you will be in accordance with the BCS convention.

If you want to write code for all 88000 machines, you must know how the operating system handles data. The operating system of choice, of course, is Unix. It is not surprising, therefore, that AT&T announced its own ABI ("Application Binary Interface"). This is a Unix V Release 4.0 superset of BPI. AT&T has pledged that software written for the Motorola 88000 BCS will execute *without recompile* on future versions of Unix. Naturally, these computers can run DG/UX since it is compatible with AT&T Unix, Berkeley BSD, and POSIX.

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software developers have joined 88open. Data General's Aviion workstation will run software from SAS Institute, Inc., Franz, Informix, and Relational Technologies, to name just a few. Motorola is encouraging a philosophy that says, "Software should be interoperable on different products with no need for alteration." DG users will be among the prime beneficiaries of this shrink-wrapped software.

In time, many other products will become available. Consider the thousands of programs and utilities available to users of Apple Macintosh and IBM compatibles. Developers for these platforms can move their wares to the Aviion with the aid of emulation boards from Opus and Tektronix. Opus makes an emulation board for the DG/One-386; Tektronix produces an 88000 emulator for the MacII.

Warpware

New technology requires new language skills. Aviion enthusiasts will be speaking of MIPS, Whetstones, Dhrystones, and

FLOPS. MIPS are millions of instructions per second. A whetstone is a benchmark for integer arithmetic; the dhrystone was developed to measure computers whose processors included dedicated floating point hardware, such as the MV series or a DG-One with a math co-processor. One FLOP is one floating-point operation per second.

The Aviion runs at 17 MIPS or 20 MIPS, depending on the model. Four megabytes of RAM is standard and they can be upgraded to 28 MB. Up to three mass storage devices can be connected to an Aviion, including the 322 MB disk and the 150 MB tape. The workstations can run in standalone mode or be networked. The network server can be configured with one or two RISC processors. It pushes 40 MIPS and will support as many as 250 users.

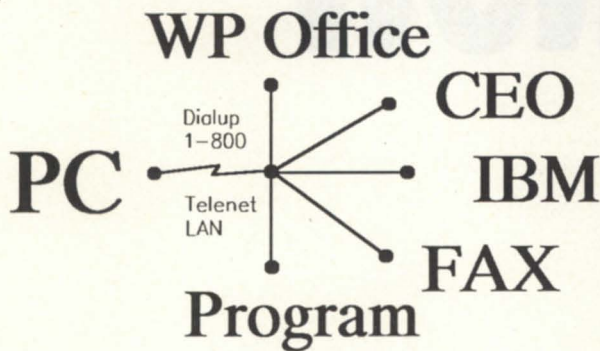
If you want to see where the Aviion line is headed, consider the specialty hardware developed on 88000 RISC chips by Bolt Beranek & Newman. BBN Advanced Computers is located in the small town of

Cambridge, about 40 miles outside Westboro. Their TC2000 computer uses multiple RISC chips and can push 9,576 MIPS. The TC2000 runs from eight to 504 processors. With eight processors, the system yields 152 MIPS (the same as 104 MegaWhetstones or 160 MegaFLOPS). With 504 processors, the system yields 9,576 MIPS (the same as 6,552 MegaWhetstones or 10,080 MegaFLOPS).

Ten thousand MegaFLOPS is 10 GigaFLOPs—10 billion floating point operations per second. Three 322 MB disks will hold a gigabyte; that is one billion bytes. The 17 MIPS Aviion requires 58 picoseconds to complete one instruction. That is 58 billionths of a second. This is a little faster than the speed at which an atom emits a photon, making the Aviion effectively faster than the speed of light! Δ

Michael E. Marotta is a technical writer with a decade of experience on Data General and other equipment. He works in manufacturing and business environments.

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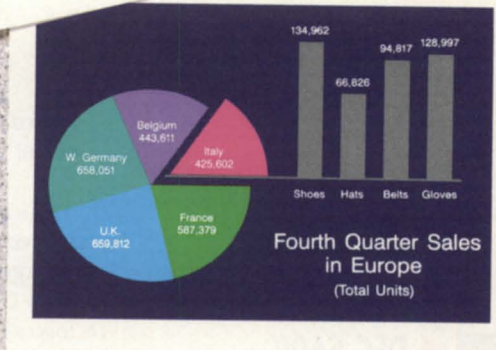
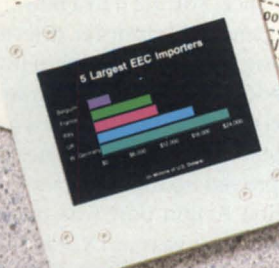
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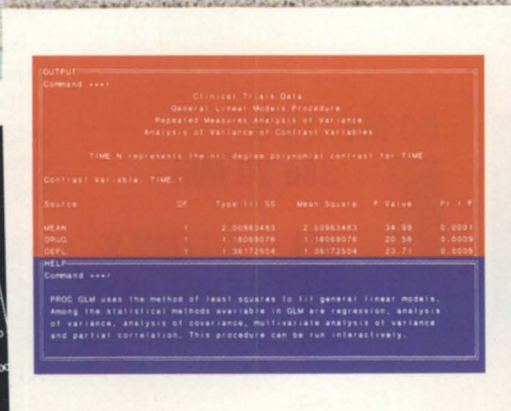
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7943.00	1882.00	758.00	1757.00
402.00	11177.00	6216.00	6661.00
1810.00	529.00	10129.00	863.00
5530.00	1155.00	430.00	1914
8217.00	1169	329.00	725
581.00		1009.00	5247.00
		10607.00	292.00
		4066.00	836.00
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FROM: Lab 041B
RE: Product #2298 Clin.
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Note that the initial...



A porting profile

SYNOPSIS

Transoft's UBB takes BBasic to the Aviiion and demonstrates its power.

by Mike Edwards
Special to Focus

DG's introduction of the Aviiion system has created a demand for the migration of a large volume of BBasic code. At Transoft, a UBB port to the Aviiion was for us a logical expansion of the options available to UBB users. We took a keen interest in seeing how our product, Universal Business Basic (UBB), would perform on a new generation of RISC machines.

C gives portability and performance
UBB is written almost entirely in C to

provide a combination of portability and performance. Porting it to a new machine involves source file transfer, directory set-up, coding for the specific chip involved, compilation, and quality assurance testing. This normally only takes us a day for a new standard Unix machine, and the Aviiion proved no different.

The first Aviiion port was undertaken in mid-July last year at DG Slough, England, by Owen Jones, our UBB project manager. Both an AVX/300 workstation and an AVX/5100 server system were made available to us. We chose to use the workstation for the initial port because of the advantages of its X Window facilities. This was a powerful development aid, enabling us to compile in one window while editing source in another.

Few problems

UBB source was transferred to the Aviiion from our 386 Xenix development system via cartridge tape (one of the benefits of open systems!) and no problems were encountered in the initial port. We used the Pass 13 pre-release version of DG/UX 4.10 and the gnu C compiler provided as part of the DG/UX development system.

A BBasic QA suite, a standard part of UBB ports, showed two problems in DG/UX that were not previously apparent. The first related to a side effect of the getcwd (get current working directory) system call. We found that if it was called over 20 times successively, the call did not tidy up, and file descriptors were left open. A small C test program confirmed this, so we got around the problem by restricting the call's use. Secondly, we found it was not possible to initialize semaphores, meaning we had to use the UBB shared file option (usually reserved for networked versions) for lock and job management, rather than the faster shared memory.

Having completed the port, UBB was transferred by cartridge tape to an AV/5100 system server for an independent order processing benchmark. This involved updating three different data bases and yielded 14 transactions per second.

70 percent increase with later DG/UX

As soon as Pass 14 (the customer release version) of DG/UX 4.10 was available at the end of August, we re-reported at DG Slough using the workstation for the

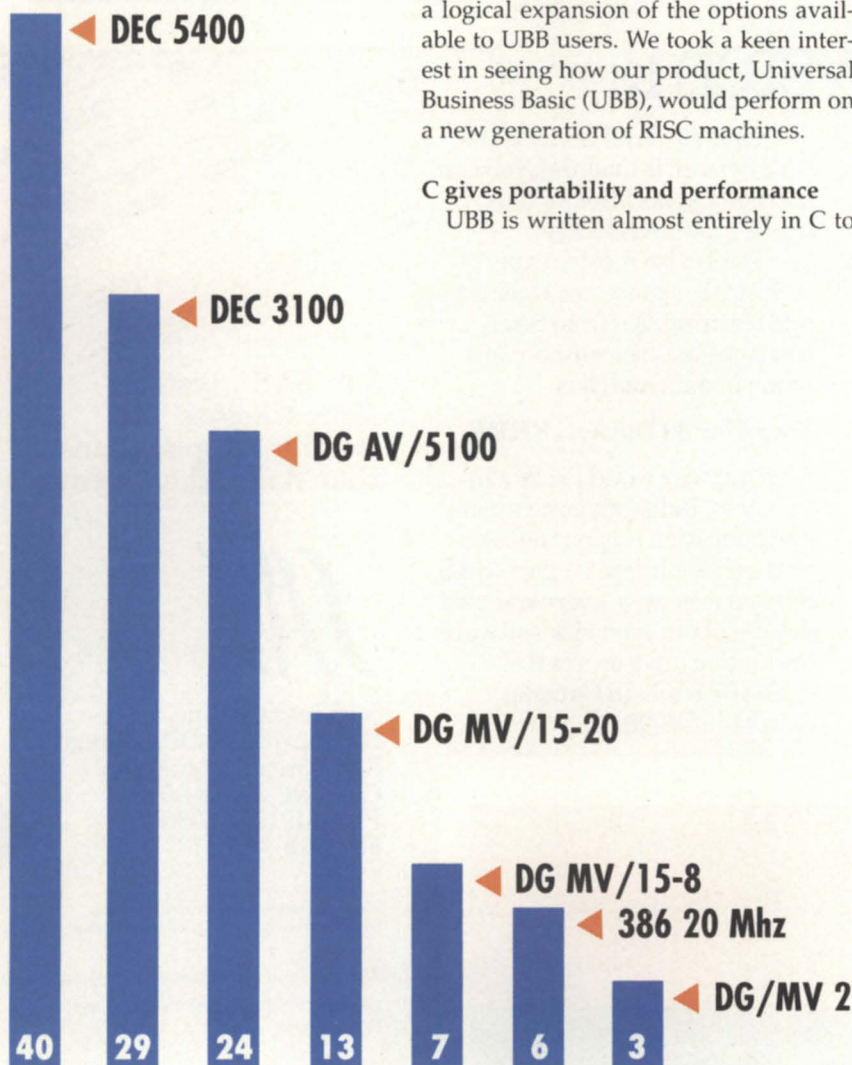


Figure 1: Transactions per second

port, as before, and the server for additional testing and benchmarking. This time, however, after the initial port had been undertaken using the gnu compiler, UBB was recompiled using the newly available and faster Greenhills C compiler.

We found that the new DG/UX had solved the semaphore problem, and we were now able to use the faster shared memory UBB lock and job manager. DG/UX itself was also significantly faster, one of the contributing factors being DG's removal of kernel debugging calls. The overall net result was a 70 percent higher AV/5100 benchmark figure—from 14 to 24 transactions per second.

Comparisons with other machines

These results were compared with figures for MVs using BBasic rev 5.01 under AOS/VS and others using UBB on the new DEC RISC machines and a 20 Mhz 386. (See Figure 1).

On this test, the Aviion with UBB gives nearly twice the performance of an MV 15-20 at less than half the price. The results also indicate that though the DEC machines are still faster, DG has dramatically closed the gap. Geoff Baker, our development director, said he suspects "the main reason for the remaining difference lies in disk I/O."

Overall

As with our previous port to the Dasher 386 and 386/ix, we found DG to be very helpful. In this connection, Andy Plasket, an SE with DG UK VAR division, deserves particular thanks.

Apart from the getcwd problem, we found that the release version of DG/UX was 100 percent compliant with Unix V, that the X Window system was very useful, and that Aviion performance was very good—a creditable achievement for a new product line vital to DG's future. Δ

Mike Edwards is the managing director of Transoft Ltd., Slough, England. Transoft was founded in 1986 by ex-DG BBasic VARs and specializes in BBasic portability and productivity tools. It has been porting BBasic software to industry standard systems since spring 1987, and by the end of 1989 had installed over 500 units worldwide across 25 platforms. He may be reached at +44 753 692 332 (tel.), or +44 753 694 251 (fax).

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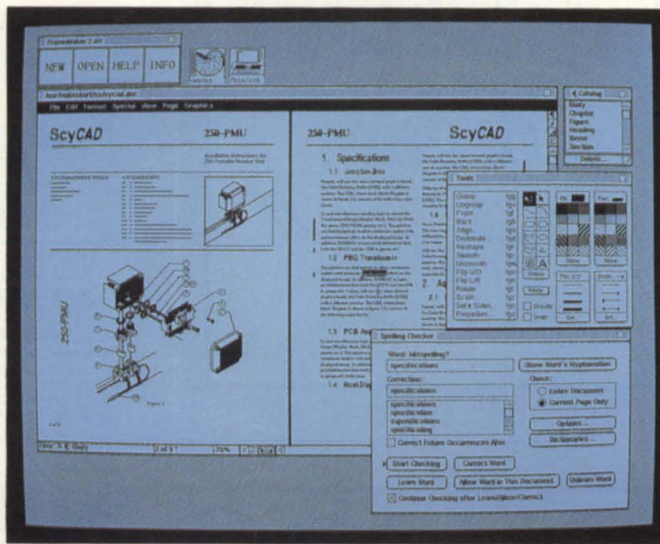


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Building a toolbox with Framemaker



Word processing, page layout, and graphic design all take place in the same mode in Framemaker software.

by Seemee Ali
Focus staff

At press time, there are over a hundred different software vendors developing products for the Aviiion series, with more expected to join the ranks. One product that stands out at the moment is Frame Technology's Framemaker publishing and graphics software, which DG may eventually bundle with the Aviiion.

Very modestly, Frame's Original Equipment Manufacturers (OEM) marketing manager Rick Collison described the product as one designed for the "casual user." Designed by Macintosh and PC software programmers to be easily learned, and accessible to both new and experienced operators, Framemaker's capabilities suggest a greater potential than Collison's words imply.

It is a comprehensive software in which "what you see is what you get" (WYSIWIG) word processing meets a full

graphics tool kit with extensive page layout capacities. Drawing and word-processing take place in the same mode. Framemaker does not have niche-oriented functions such as MCAD, CAE, and CASE, but integrates into these applications. It is compatible with Postscript and encapsulated Postscript laser printers and typesetters, so that existing output devices can produce presentation-quality documents.

Framemaker is an exclusively Unix-based software introduced in March, 1987. Data General adds its name to a list of OEM customers that includes Hewlett-Packard, Toshiba (which has developed a Japanese version of the product), Siemens, Tektronix, Sony, and others. Comparing the Aviiion to other Unix systems to which Framemaker has been ported, Collison said "We're happy with the performance of our product on it; we think it's a pretty fast machine It seemed to be a very typical port for us."

He added a vote of confidence in Motorola's RISC chip, explaining that Frame's strategy "is to port to all the major environments. We certainly see the 88000 environment as a major environment of significance in the future, and so we want to be a part of that as the market emerges and grows."

Collison was similarly favorable in his analysis of Data General as a business partner. Calling DG an "up and coming major player in the Unix workstation market place," he indicated surprise at Data General's ability to market the Aviiion so successfully. "I'm quite impressed with their ability to pull together a bunch of software applications and get it on their new hardware," he said. "Basically, they're a new player in the workstation market, and they're coming to that market with a broad suite of tools, Framemaker just being one of many that's available on that platform. That takes a lot of work to do, and they're doing it in a fairly quick manner." Δ

SYNOPSIS

Unix-based publishing and graphics software, designed by Macintosh and PC programmers, ports to the Aviiion.

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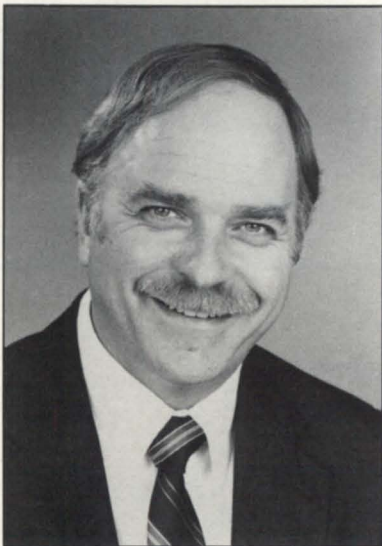
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Cheering for a fast chip

SYNOPSIS

The 88open Consortium, Ltd., is a nonprofit organization comprised of computer vendors (including Data General) and research institutions devoted to the success of Motorola's 88000 chip. In this interview, 88open's president, Bob Anundson, shares his views on RISC architecture.



Bob Anundson

by Seemee Ali • Focus staff

Cheerleaders may be the computer industry's most valuable players during its doldrums, sometimes surpassing even technological breakthroughs in their importance. For each singular innovation, there emerge several manifestations, with the RISC chip hardly being an exception. In the RISC hall of mirrors, Motorola's 88000 chip faces Sun Microsystems' SPARC chip, Intel's i860, and Mips' R2000 and R3000. Each chip has big backers—Data General, Tektronix, and Unisys behind Motorola; Olivetti, Stratus, and Prime behind Intel; DEC, Tandem, and Silicon Graphics behind Mips; AT&T, Toshiba, and Xerox behind Sun. The loyalties, however, are hardly entrenched—Unisys was pledged to Sun's SPARC before it switched to Motorola, and Stratus spurned Motorola for Intel.

Enter the cheerleaders. Enter Data General with the Motorola 88open entourage. Hear them shout "Give me a B! Give me a C! Give me an S! Whaddaya get?! Binary Compatibility Standard! Go RISC! Go Motorola! Fire up!"

Bob Anundson is the president of the 88open Consortium, Ltd., an organization comprised of corporations like Data General with a vested interest in promoting Motorola's RISC chip, implementing compatibility standards, and influencing the development of 88K technology. The organization has been successful in creating a binary compatibility standard and "shrink-wrapped" software that's workable on any system using the Motorola 88000 chip.

In the following interview, Anundson gives his perspective on topics ranging from the ideal computing environment to the difficulty of assembly language programming under RISC architecture.

Focus: In creating standards, does your group work with other groups like the Open Software Foundation (OSF) or do you work alone?

Anundson: Let me start off by saying this: In the ideal world, users would be able to buy a computer from any vendor knowing that all the software runs on it, connect to any other computing environ-

ment, receive mail, and exchange data without a new learning experience. [They could] run any computer without learning a new user interface, and buy desk-top computers which are compatible with other computers on site. Standards aside, that's the objective.

Standards are really the mechanism you do that with . . . Organizations like OSF create standards on a source level, [but] that doesn't get you to the environment I was talking about. You need to take the standards that are created at the source level down to a binary level . . . because that's what software vendors distribute their software on. What we have done is taken the prevailing industry standards and converted them to an 88-specific binary set of standards which will create what we call shrink-wrapped software.

The second thing that we are doing is providing a set of tests and certification procedures so that consumers of computers know that the various systems and software conform to these standards.

Focus: Could you describe these tests? Do they vary with the equipment?

Anundson: They're a standard set of tests. We have two kinds of tests—one for systems, and one for application software. The ones on systems are fairly straightforward. We use much of the work that was originally done by AT&T called SVVS [System V Verification Suite]. We have built additional tests on top of that, and they go through and exercise the system. [They] make sure all the calls are there, and [that] the calls respond in the proper way.

And for software, we have some breakthrough technology in a package called ACT/88. It's a series of tests that scan application software at the source level, at the binary level, in static form, and also coexist in a dynamic form (that is, while it's executing), to watch the application code and make sure it doesn't do things that are in variance to the standards.

Focus: 88open test centers for software and hardware were to be available in late summer of 1989? Have they opened?


Anundson: Yes. We have a technical center in San Jose, California. It's got a staff of between 15 and 20 people. They have delivered test systems for both

applications and systems. The sponsors, the people who paid for all that [including Data General], have access to those test suites on their own sites, and to do self-certification. Shortly, we'll be offering certification for non-sponsors of what we call the Software Initiative. That will be available for people who didn't necessarily pay for this facility.

Focus: How do you enforce software compliance?

Anundson: Actually, that's through certification. We certify it with a gold seal, a Good Housekeeping equivalent to a seal of approval on software systems. If we discover that someone is not compliant, we yank that.

Focus: How does one become a member




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FOCUS ON: RISC COMPUTING

of 88open? Are there fees?

Anundson: Yes, 88open has two parts to it. It has a general membership where the standards are created, and it has a subsidiary that does the certification stuff. [The subsidiary] has a subset of the sponsors, of which Data General is an important part . . . It's a membership organization with a fee structure that is graduated from as little as \$1,000 up to \$100,000 if you happen to be Motorola.

Focus: What are 88open's priorities? I understand there are three committees—technical, business, and world strategies.

Anundson: I don't know how you prioritize it, because you have to treat it as a business. There are really two main activities that we are driving on. One is the creation of the standards, and the follow-up work with the tests—that's really a technical area for the most part.

It doesn't really do any good if you do all of that, unless the world really knows and believes in what you're doing. So we have quite a bit of promotional effort. We go to shows. We just came back from Unix Expo with a very large booth showing shrink-wrapped software and how this whole world came together.

Focus: What about the world market? What kind of international involvement are you getting into?

Anundson: We have members from Japan and from Europe, and so from a membership organization view, we're a world organization, as opposed to an American operation. We have produced, for example, a binary compatibility standard for our Japanese extension. That would be an example of one of our world activities.

Focus: During a two-month period, Data General reported adding software solutions for the Aviion at a rate of one per day, and they attributed much of this momentum to 88open. Could you describe the extent of Data General's involvement with your group?

Anundson: Data General has been one of the driving forces within the 88open. They were one of the founding members. Through Don Lewine [DG's director of

engineering], they chaired the BCS committee. He did a sterling job doing that. They have driven the testing certification involvement. As one of the member corporations they're one of the leaders. Data General has been extraordinarily supportive, and extraordinarily good at providing leadership.

Focus: How would you assess the Aviion system?

Anundson: Dynamite. And the reception of it in the marketplace looks like dynamite too . . . They're going to do very well with that product if the interest I saw [at Unix Expo] correlates with the business. It's the right kind of product. It broke the myth that RISC computers have to be expensive. Its pricing is at the higher end of the PC marketplace, as opposed to being up in the stratosphere where these products had traditionally been before. But it's an extraordinarily good value. Talking to the people who developed software out there [at Unix Expo], they're excited because it's such a high performance, high value system. Rumors are that various people, when they're porting software [to the Aviion], actually turn around and buy these for their in-house work as well.

Focus: What do you think are 88open's biggest accomplishments to date?

Anundson: Building a shrink-wrapped environment that works.

Focus: Cooperative organizations like 88open seem to be quite trendy at the moment. Some people have attributed this to the downturn faced by the computer industry. Do you think organizations like yours are a permanent fixture, or are they just marriages-of-convenience to help the industry through a rough spot?

Anundson: First of all, I wouldn't attribute any downturn to why the organization got started. I believe that [cooperative organizations] were formed because the market will not tolerate proprietary environments for new products. People like Data General will continue to service the market that they created during the seventies and eighties, but the market for the nineties for new installations . . . will simply not accept the systems where soft-

ware is running only on that system.

[Consumers] will want an open environment, one that they can choose from amongst competing systems vendors. [88open] was born out of necessity to make that happen. That's what you see in Unix, and Unix's most redeeming value is that its technology is available for all system manufacturers to rally around, as opposed to having their own proprietary operating system.

Now, having said that, these various organizations were put together in order to coordinate or direct the things that have to be mutual among companies. It's hard for me to conceive that that's going to be less important in the future. This cooperation and coordination needs to take place; it doesn't happen on a voluntary basis. You need people who are dedicated and vendor-neutral, and so you have these organizations that are vendor-neutral staffed in order to coordinate and force the common-ness that the marketplace will need.

I think we may go through a metamorphosis. The same question could be said about the user group for Data General. Has it diminished; has it gained? It seems to me that the 88open is not unlike what has happened with user groups for single vendors at this point. We're unlikely to disappear. But if it accomplished its mission, the organization isn't very important; it's the results that are.

Focus: The president of AT&T's Unix Software Operation, Larry Dooling, was quoted recently as saying "Those of us who send people to meetings often would prefer that we didn't have to send people to so many." Does the 88open feel the need to distinguish itself in this respect?

Anundson: Well, we use what he builds, but he doesn't do what we do. What he builds is a set of standards at the source level, and that's not sufficient. Everybody's bothered by going to meetings, and coordinating them, but no one has responded with an alternative . . . It doesn't look like it's been an extraordinary burden on our members. We have created our set of standards very quickly, very expediently, and it's worked out quite well.

Focus: Some programmers are seeing RISC as a step backwards due to the lower

number of instructions, making programming more difficult.

Anundson: The answer to that is if somebody's still doing assembly language code, they're probably a knuckle-dragger at this point in time. They really have to get on with it, and get into a higher level language, and out of assembly language. Only the compiler writers, really, want

access to it [assembly language]. They want their compiler code to scream. That's why they created the differential for their product. So the answer is that the past architectures . . . were really not oriented to do more work within the computer, they were oriented to make it convenient to write assembly language code. That is no longer done, so that is no longer an appropriate way to design a computer. Δ

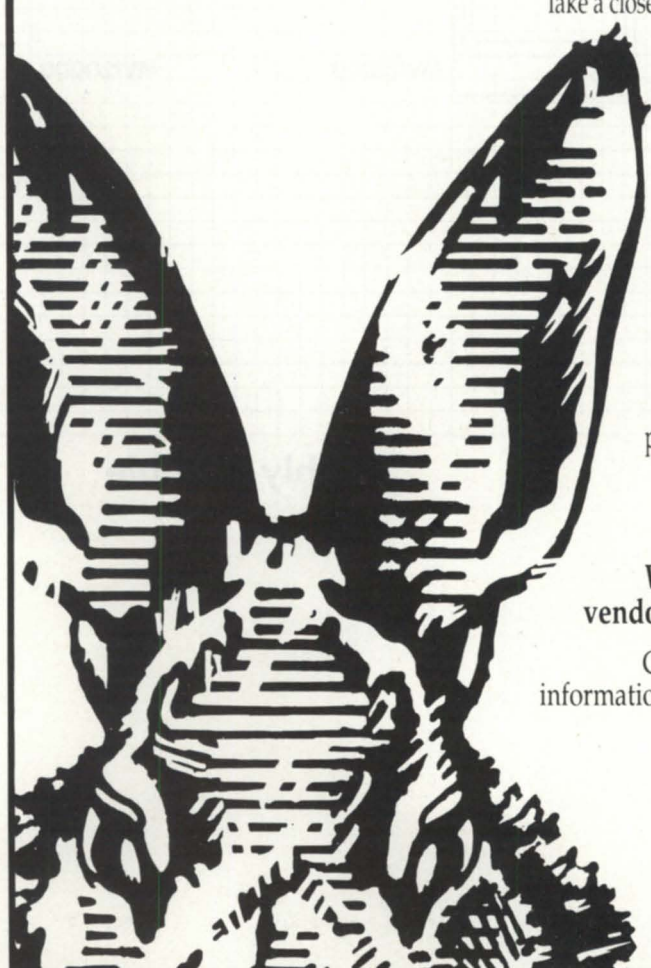
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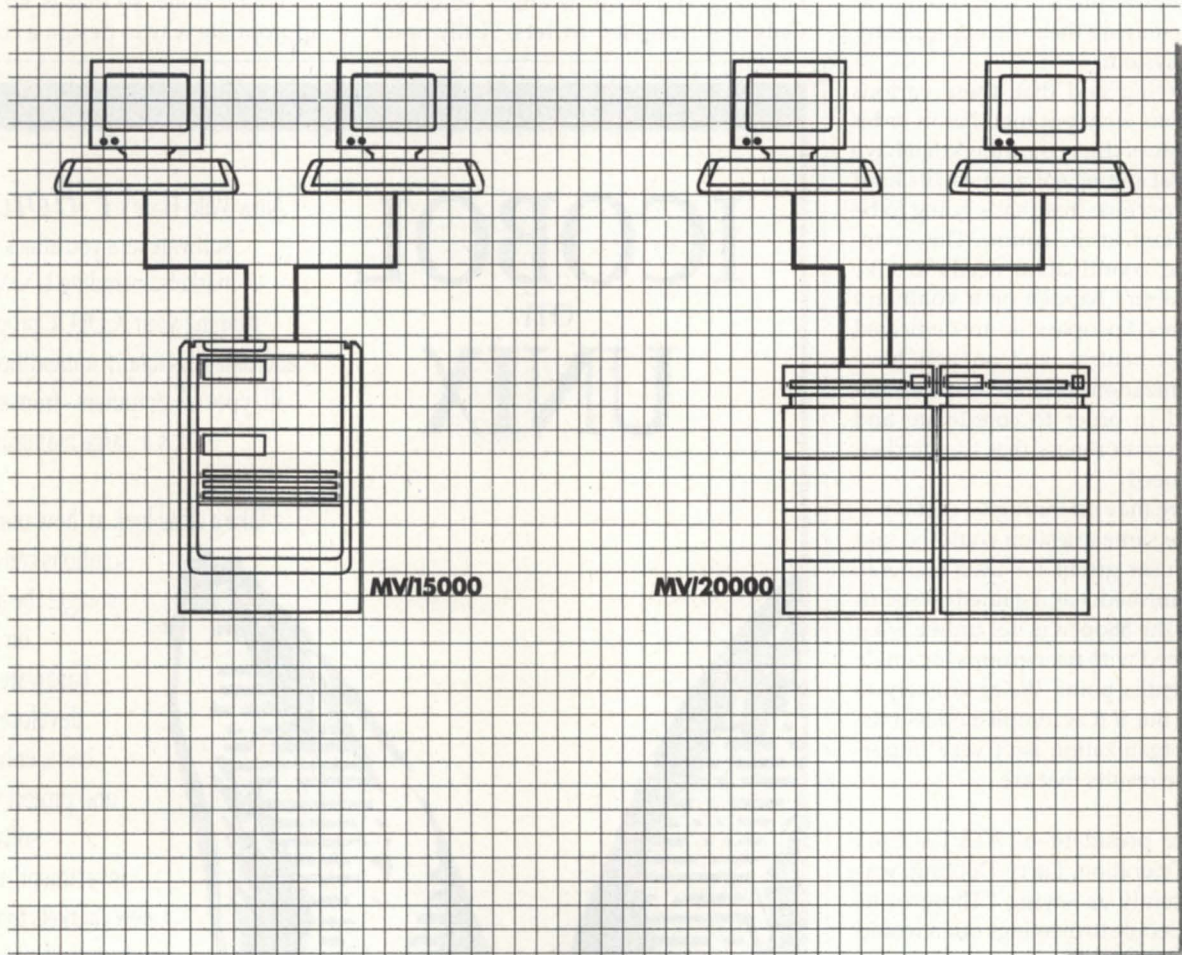
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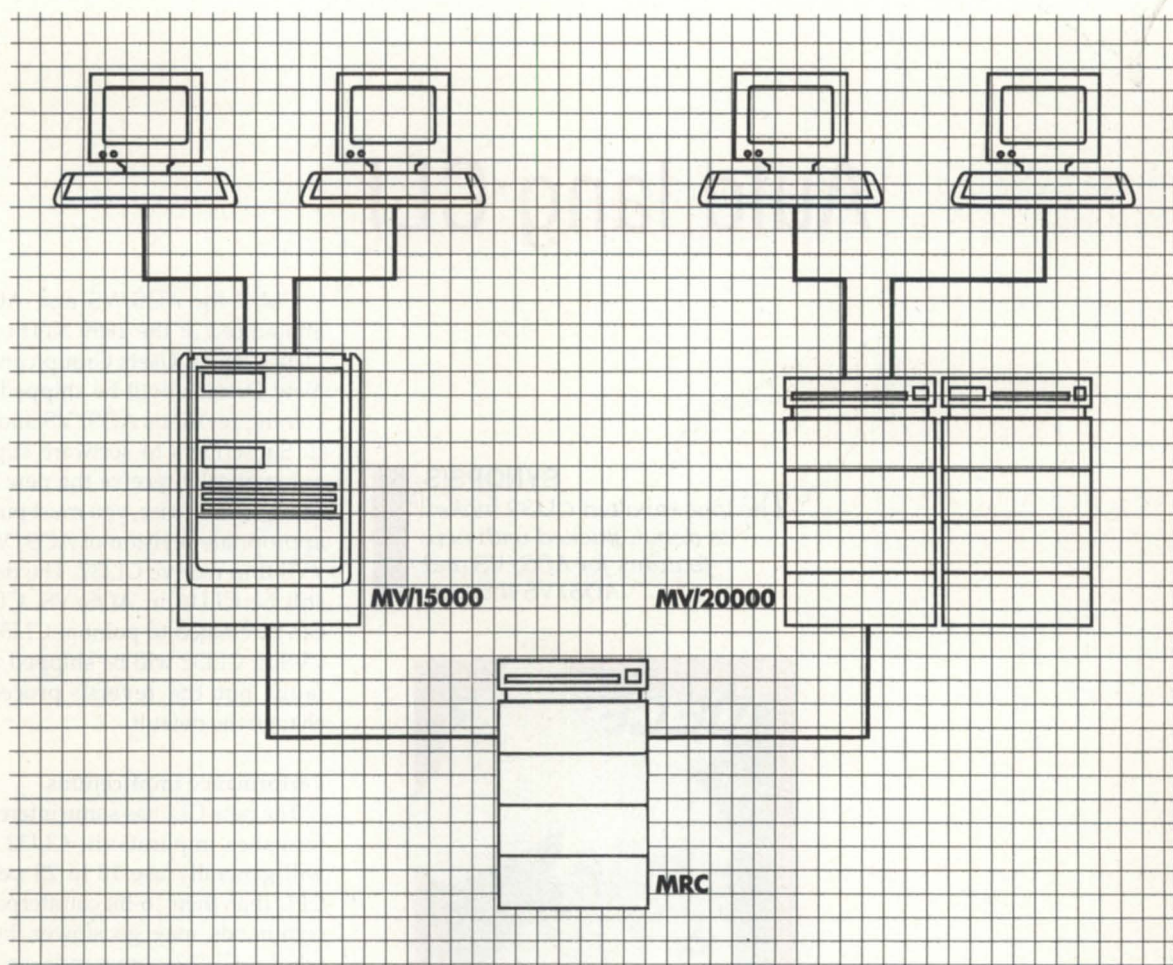


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Auld lang CLI

SYNOPSIS

The long-awaited CLI32 makes its debut, packed with new features for AOS/VS and AOS/VS II users.



by Joe Cannata
Special to Focus

Data General has unveiled the long-awaited 32 bit CLI. A dream of many users—a collection of “nice to have” features—is now reality. Data General users will soon be able to tap into the power of this program, expand their macro capabilities, and take advantage of new features.

CLI32 for AOS/VS and AOS/VS II, announced at the 1989 North American Data General Users Group conference in New Orleans, will be shipped with upcoming revisions AOS/VS and AOS/VS II. Subscribers to software support will automatically receive the new CLI at no charge. Otherwise, you must purchase the appropriate revision of AOS/VS or AOS/VS II to receive CLI32. The default will still be CLI16 in AOS/VS. CLI.PR link can be created to point at CLI32. In AOS/VS II, CLI32 will be shipped as the default, but the reverse procedure can change the default.

Performance implications

The new CLI has some interesting performance implications. CLI32 functions will generally use 10 to 25 percent less CPU than their 16-bit counterparts. Some commands may go slower, but on the whole, CLI32 commands are quicker. There may be some variance between VS and VS II.

Each CLI32 will cost 30 pages of memory, compared to 24 in CLI16. This should not be a surprise—the number is equal to the unshared pages for the same macros that ran under CLI16.

The new CLI has command compatibility with CLI16, meaning that macros should work in the same way as they always did. The only exception to this will be in cases where the macro writer used abbreviations on commands, switches, or pseudomacros. Not all abbreviations will be a problem.

Switches in the new CLI will generally be required to be spelled out a bit more, and many of the one-letter switches have

been expanded to full words. Global switches like /Q or /L= will remain as they were. Special "bridge" switches have been created to map old abbreviations to their expanded counterparts. Switches can still be abbreviated, but be careful about minimum uniqueness.

As an example in CLI16, COPY/B becomes COPY/BINARY in CLI32. The minimum unique abbreviation for COPY/B will be /BI. Incidents like this may play games with your macros, so prepare by scanning what you have now.

In CLI16, template expansion is handled directly by different commands. Filter tables are used to selectively eliminate various returns of filenames. Conversely, every CLI32 command will use the expansion and filter table routines. Four global template option switches have been created, /SORT, /COUNT, /TCR=, and /TRAVERSE. File filter switches remain /AFTER, /BEFORE, and /TYPE= as before. An advantage of this change is constructs like [!FILE/SORT]. Because of these new global expansion and filter switches, situations like COPY/BI will create the need for greater than one letter abbreviations on your switches, since the /B in BINARY conflicted with the /B in BEFORE. You need to be wary of this possibility.

Environments will function differently in CLI32. In CLI16, only the current environment and the one previous to it can be altered. In CLI32, all previous environments can be viewed or altered. Any command in CLI16 that accepted a /P will now allow a /LEVEL=. This gives the user unlimited access to all environments, and opens the door for some clever usage. A negative level number will be treated as a relative reference.

That was no comment

The COMMENT command in CLI16 may be used for documentation of macros. While the text following COMMENT was ignored, "<", "[", and "()" were not. This made for some interesting results. CLI32 introduces lexical comments. Using two backslashes as the syntax, "\\ ", all text between the double backslash and the delimiter is ignored. No more "interesting results" should arise. An "&<NL>" combination, will be ignored as well. A rare CLI16 macro may have a "\\ " in it, and in this case, it would behave differently.

CLI32 presents an additional way to get output from a directed command. A new global switch has been added, /STR=name. Output from a command can be stored in a string named <name>, making the command output easily accessible to macros. It will eliminate the need for SPEED scripts, and strings named TIME.OUT. Doing a STR/NAME=TIME.OUT will produce the time that

was captured with the TIME command.

Command history

What promises to be one of the more memorable enhancements to CLI32 is command history. Patterned after other industry equivalents and Unix, CLI32 enables users to access previously typed command lines. Like having unlimited control-A capabilities, users can scroll for-

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ward and backward through their recorded history, using the up and down arrow keys.

The default number of events saved is 25. This can be changed by entering HISTORY/SAVE=n. The maximum is 32,767 events. Doing a HISTORY by itself will display the whole buffer. Entering HISTORY 7 displays event 7 on the screen. This is not meant to imply random access. When the maximum you set has been reached, events will overwrite, starting with the lowest number. Null lines will not be saved. Any text that is typed on a line before a down/up arrow is pushed will be erased. It is possible to renumber the history lines, using the /RENUMBER switch. Using the /KILL switch, you can clear the history buffer altogether, and reset the starting line to 1. Display of the current command number can be set as part of the prefix.

Other new features

There are other new commands and pseudomacros in CLI32, including the

[!ARGUMENT] pseudomacro. The format, [!ARGUMENT, arg list], results in the expansion to the arguments requested. You could try, for instance, [!ARG/COUNT %-%], and get back a count of the arguments. You can even use [!ARG/ITEM=1-6:3,d,e,f,g,h,i,j], which would return "d,g,j."

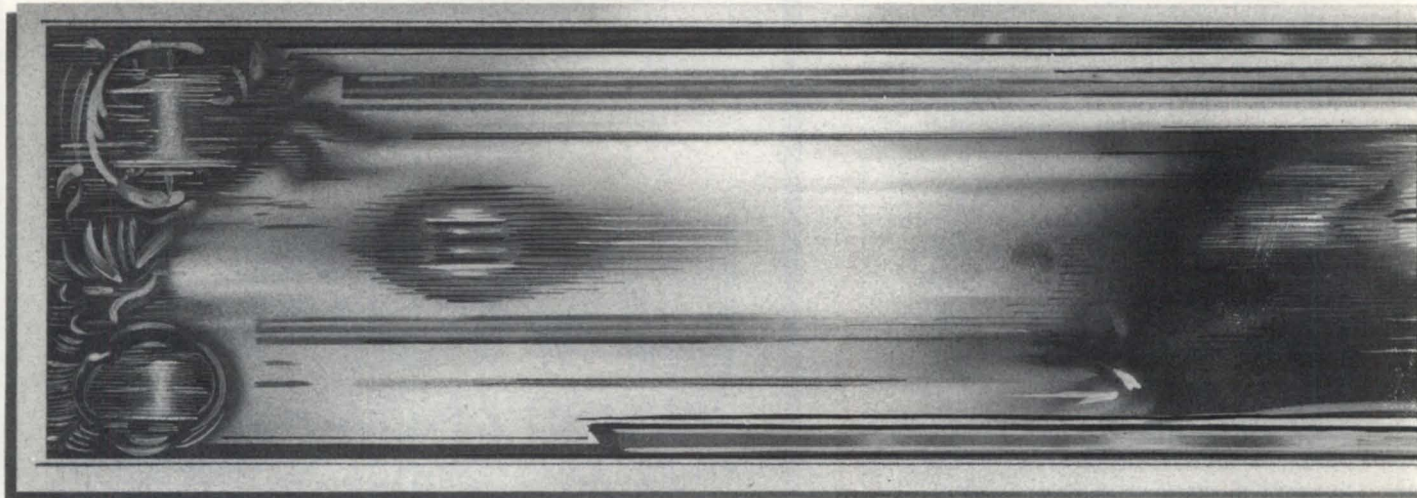
The syntax for the /ITEM= is the same as the syntax used for range dummy arguments, only ":" replaces the comma. Another useful pseudomacro is the [!IMPLODE], which performs the exact opposite of [!EXPLODE]. This helps shorten macro code that attempts concatenation. Two more pseudomacros, [!UMAXIMUM <arg list>] and [!UMINIMUM <arg list>], will expand to the largest and the smallest of the arg list, respectively.

In the area of string manipulation, three new entries debut. The [!INDEX] pseudomacro enables you to find the position number of a character in a string. For instance, [!INDEX .CLI UP.CLI] would expand to 3. The ".CLI" is the search-

string, and the "UP.CLI" is the character string searched. The [!SUBSTRING] pseudomacro helps you strip out certain character sequences from a string. In this example, [!SUB/ITEM=4-6 SED.PR.PH], ".PR" would be returned. The range is characters 4-6, and the string is "SED.PR.PH". Other switches allow you to concatenate, pad, and reverse results. The last of the new string pseudomacros is [!LENGTH]. Used with an argument, it will return the length of any argument. You can try this, for example: VAR0 [!LENGTH [!READ type in a username:]]. If VAR0 was greater than 15, you could generate an error.

With CLI32, it is no longer necessary to use LOCK_CLI. In addition to the ability to lock the same list of commands as in LOCK_CLI, you can also selectively lock commands. This is achieved through the commands LOCK and PASSWORD. The PASSWORD command enables you to choose and confirm a password of 1-32 characters, which can be read from, or written to a file. When)LOCK is entered,

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you will be prompted for the password; when in a file, the password will be encrypted to avoid detection.

A user named Su!

A visible change will be in the area of the three special privileges: SUPERUSER, SUPERPROCESS, and SYSTEM MANAGER. Gone will be the "*" on your screen, or having to type a JPINIT x, wait for an error, and kludge the system manager privilege. A new command, PRIVILEGE, selects one of the "big three" privileges. You will be able to invoke super-user like this:

```
)PRIVILEGE SUPERUSER ON.
```

The result, "Su!", will take some adjustment.

What will really look different will be what appears if all three privileges are turned on: SpSuSm!). System manager status (ON/OFF) will appear now in the output from the CURRENT command. For the die-hards, the SUPERUSER and

SUPERPROCESS commands will still exist, and a macro can be written to change the "Su!") back to "*"."

Some file manipulation commands have also been provided in CLI32. With the OPEN command, users can open a file for input or output, and use the READ command to do data-sensitive reads from a file. Opening a file will provide a channel number, and READ <fileid> will let you read from a file a line at a time. You can set an /EOF=string value to be displayed when you reach the end of the data in the file. The CLOSE command closes the appropriate files.

In the area of strings and variables, prior restrictions have been lifted. You will be able to name your strings and variables, giving you virtually as many as the stack can hold. The original STRING, as well as VAR0-VAR9, and their associated pseudo-macros will remain, so CLI16 macros need not be changed. The STRING/NAME= construct will allow you to generate a named string of 1-32 valid filename characters. The same syntax will work for

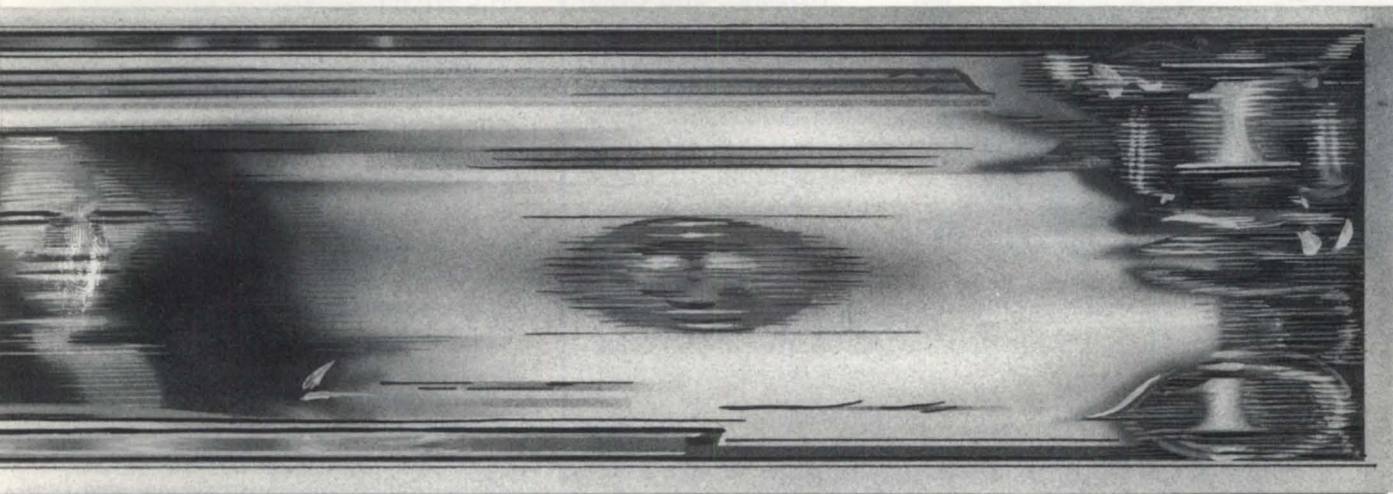
variables, VAR/NAME=. To display the values at all environment levels, the /INFO/NAME= syntax is used. The /ALL switch on a STRING or VAR command will display values at all levels. Also of note is that STRING and VAR names are separate, and that VAR /NAME=8 is different from VAR8.

Dump the LOAD, and the DUMP

Besides the added features of CLI32, some changes have been made to existing CLI16 functionality, including the removal of some CLI commands. The first to go are DUMP/LOAD. DUMP_II /LOAD_II are beginning to grow apart from DUMP and LOAD, and retiring the commands eliminates compatibility issues. Watch for this in your current macro sets. Another command for the shelf is PERFORMANCE. It showed how many system calls CLI has made since it was PROCed, and how many since the last PERF command.

There are some other welcome alterations to CLI16. In the CLI16 environment,

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fields like STRING, DIRECTORY, and PROMPT have 127-character fields. In CLI32, they have much more room; the maximum amount determined by the CLI stack size. Larger capacities give CLI the ability to handle the output redirection discussed earlier.

CLI32 now uses multiple input buffers. This means that ^A will really return the last command line. After a CRE/I session

is over, for instance, a ^A will return CRE /I, not the “)” as it did before. In addition, a user request for implied program execution has been granted. You will be able to type in a program name, without the X command to get it to run, as long as there is no command, macro, or directory with the same name. The invalid command error message has been changed to “Error: Not a command, macro, or

program.”

Slick changes have been made to some other popular CLI16 commands. The ability to alter searchlists will be cleaner. You will be able to remove, insert, or determine the location of a directory on the list using the new SEARCHLIST command syntax. The WRITE/NONEWLINE command will let you generate output minus a <NL>. PREFIX has been expanded from 24 to 80 characters, and will now be a part of the environment.

New switches on FILESTATUS will provide some interesting information. F/OPENCOUNT/COUNT will give you the open and total number of files in a directory. Another switch, /CPF= helps avoid the display problem when a filename is greater than 16 characters. The SPACE command now can be used on VS II DIRs to return current space only. You can also do a SPACE on any file in VS II to get its current size. A new switch on the ACL command, /TOPDOWN, lets you process files in a directory-first manner. You can now use this variation on [!DATE], [!DATE/NUMERIC ascii_string]. This will expand to the number of days since 12/31/67 to the current date, enabling you to calculate the date tomorrow. You are even covered into the 21st century. The [!TIME] pseudomacro has changed as [!DATE] did. [!TIME/NUMERIC] will expand to the number of biseconds since midnight. Issuing a [!TIME n] with “n” being in the range of 0-43199, would return an ASCII time of day.

Some other expanded capabilities are in the area of tracing. Two additional switches will allow users to trace files and conditionals. You also will be able to trace replacements. One other change to CLI16 is that the arithmetic pseudomacros like [!UADD] will now take more than two arguments.

I was glad to see one thing that did not change in CLI32. You will still be able to use the XYZZY command as before. (It's nice to see some things are stable.)

The functionality of CLI32 will fit cleanly in your current environment. This is only the first revision of the product. As it is used more, further enhancements will be made. △

Joe Cannata is a training specialist for Data General Educational Services in McLean, Virginia. He may be reached at 703/827-9690.

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Pipe realities

SYNOPSIS

Pipe files transfer information between processes by taking the output of previous operations and passing it to the next command or program. AOS/VS offers a limited, but still useful, level of pipe-file functionality.

Figure 1: Pipe pending options and behavior

	One Ended	Two Ended
?PALW	PEND	PEND
?PNVR	ERROR	ERROR
?PTWO	ERROR	PEND

PEND waits until the condition no longer exists.
 ERROR returns either ERPFL or EREOF (depending upon process writing or reading).

Figure 2: ERIFT illegal file type operations

?ALLOCATE	Allocate disk blocks
?ESFF	Flush shared pages to disk
?GCLOSE	Close a file for block I/O
?GOPEN	Open a file for block I/O
?GPOS	Get file position
?GTRUNCATE	Truncate a file for block I/O
?PRDB/?PWRB	Perform physical I/O
?RDB/?WRB	Perform block I/O
?RECREATE	Recreate a file
?RPAGE	Release a shared page
?SATR	Set or remove the permanence attribute

I have a button on my wall that says "Calm down, it's only ones and zeros." Well, friends, it gets even simpler than that.

As we all know, the zeros in a bit stream have no value, and therefore don't mean anything. They can be ignored and removed. Having done so, you are left with a whole pile of ones. They are redundant, and can be compressed down to a single one. A single one bit is also useless, for two reasons: all of the bit streams reduce to it, and therefore it does not convey any meaningful information; and, a single one, by itself, has no point of reference or contrast, and therefore doesn't even exist.

For that reason, I will *not* reveal the value of the eXtended Modify Address Somewhere (XMAS) that I mentioned in the December article, as it would not serve any real purpose.

In last month's article I presented a short history lesson and cursory summary of instruction sets. I could, of course, go through the entire instruction dictionary of the MV family computers . . . but instead, I will leave it as an exercise to be worked out by the reader.



Now that you have digested the details of XLEFB, PBX, WGBITBLT, JMP, NOP and all of the other CISC instructions that the MV family executes, it is time to look at something else.

In previous articles, I discussed how to transfer information between tasks by using the ?XMT and ?REC system calls; processes on the same host by using the ?IREC and ?ISEND calls; and processes on different hosts by using NACALL, NCALL, NREAD, and NWRITE. Another method of transferring information between processes is by using pipes.

If you have used Unix on any machine, or DOS on personal computers, you are probably familiar with the concept of piping

information from one program to another. Under DOS, a common example is

TYPE filename | MORE

When COMMAND.COM in DOS sees the "|" symbol, it takes the output of the previous operation, and "pipes" or passes it to the next command or program. Although AOS/VS does not support pipes

to this level of functionality, they are still available, and do have their uses.

Pipes are, you know, totally tubular!

Like many other computer related widgets, pipes owe their name to an analogy in the physical world. Think of a pipe as a conduit that is not level, is of a specified length, and is connected between two (or more) processes. When

something is placed in the higher end of the pipe, it will (probably) come out of the other end. If more than one thing is placed in the pipe, they will come out of the pipe in the same order in which they were placed into the pipe.

Creating a pipe

When viewed in the operating system context, a pipe is simply a special type of file that acts as a FIFO (first in first out) queue for bytes of information. A pipe file can be created by using the ?CREATE system call, or by using the ?OPEN system call with a special extension for pipe files. The length of the pipe file is fixed at 4,096 bytes (two pages) when the ?CREATE call is used. The use of the pipe extension of the ?OPEN call allows the pipe file to be created with any integral page size from one to sixteen pages (2,048 to 32,768 bytes).

Opening a pipe

When a pipe file is created explicitly by using ?CREATE, one can consider the pipe to exist, but both ends of the pipe are sealed. A process can open one end of the pipe by using the ?OPEN system call, and the end of the pipe that is opened depends upon the "direction" of the ?OPEN call. If the pipe is ?OPENed with the input bit (?OFIN) set in the packet, then that process will be at the lower end of the pipe, and will receive the bytes that are placed into the pipe by using the ?READ system call.

Conversely, a process can ?OPEN the pipe file with the output bit (?OFOT) set in the packet, and put bytes into the top of the pipe by using the ?WRITE system call. (Since the pipe is not level, a process cannot open both ends of the pipe by using the ?OFIO option, which specifies both reading and writing. It is also illegal to try to open the file for shared I/O with the ?SHOP bit.)

If the pipe is opened at only one end, it is still fairly useless, as AOS/VS will not allow processes to read from or write to the pipe until both ends are open. (Disallowed I/O on a single-ended pipe is indicated by AOS/VS returning an error message that indicates either that the pipe is full or at end-of-file with the ERPFL or EREOF error messages.)

Filling a pipe

Once a pipe has been opened at both

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the top and the bottom, I/O may occur on the pipe file. If a process tries to read from an empty pipe, then the process will pend while waiting for bytes to come out of the pipe. When a process writes to the pipe file, the bytes will enter the file and wait to be read by a process at the lower end of the pipe. More than one WRITE operation may have been executed against the pipe file before any process reads the information from the pipe, and in this case, the queuing action of the pipe occurs.

A process may WRITE to the pipe file until it gets full, at which time AOS/VS returns the ERPFLL error message. In this case, you realize that you might want to create a slightly longer pipe so that it can hold more data, or check on the correct operation of the process that should be reading the data that you have put into the pipe.

Other than the length of the pipe, the programmer has only one set of options regarding the behavior of the pipe file. In the ?PIPD offset of the pipe extension subpacket, one of three options may be chosen to modify how AOS/VS responds when certain conditions occur. The three options are ?PALW, ?PNVR, and ?PTWO (the default). They specify whether AOS /VS causes the process to pend or return an error when either 1) the pipe is full and the process is trying to write to the pipe, or 2) the pipe is empty and the process is trying to read from the pipe. The action also depends upon whether the pipe is one- or two-ended. The table in Figure 1 (page 37) helps to summarize the behavior taken.

Cleaning a pipe

When a process is finished with its end of the pipe, all it has to do is ?CLOSE the pipe file, and it may even ?DELETE the pipe. (No peculiar pipe extensions or subpackets are required for either of these two calls, unlike ?OPEN or ?CREATE.) When one end of the pipe is closed by all processes that opened that particular end, the pipe becomes one-ended.

Michael Dupras is senior consultant for the Software Products and Services Division of DG Canada. He may be reached at Data General, 1827 Woodward Dr., Ottawa, Ontario, Canada K2C 0P9.

Smoking a pipe

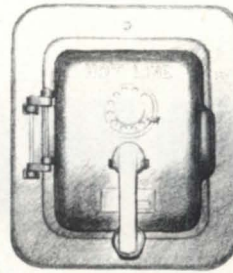
Because pipes are disk files, they do have ACLs that may be set or changed. The file can also be renamed. But, because they are byte-oriented files and transient in nature, a number of file-oriented system calls are not permitted against pipes. Figure 2 (page 37), taken from the AOS/VS *System Concepts* manual, lists the invalid operations on pipe

files. These restrictions do not imply that pipes are useless, just that these operations are useless on pipe files.

In addition to the operations that are listed in Figure 2, issuing a ?READ or ?WRITE system call with the ?RTVB record type (variable block, variable record) will also generate an error code ERRFM indicating illegal record format.

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EARTHQUAKE LAMPING

SYNOPSIS

San Francisco shaker fails to rattle our intrepid reporter. Post quake tour reveals that DG machines can withstand a jolt; but what about the psychics?

HAPPY_NEW_YEAR

Just think, 10 years from now we're all going to be scrambling around trying to fix those thousands of programs that are sure to blow up when confronted with a date in the form of 01/01/00.

DISASTER_RECOVERY?

I used to say that I was going to commit suicide by jumping head first into a paper shredder the next time that I had to read yet another article on disaster recovery and hot site services. Well, in spite of our recent little earthquake, that's still a true statement.

I hadn't even planned to bore you to death with an earthquake story, until one of the editors at *Focus* expressed disap-

pointment when I told her that I thought the event had already been covered to death (no pun intended). Plus, by the time that you read this the Loma Prieta earthquake is old news, unless we got the dreaded San Francisco follow up earthquake in the meantime (this was written on November 4).

Anyway, rather than lecture you on boring things like off site backup (we do it), backup site agreements (we have an informal one with a company in Lost Angeles), and 400-page detailed disaster plans (we don't have one), I thought I'd just relate my personal perspective on the disaster.

I had just walked out of a warehouse style office supply place in the South Of Market Area (SOMA) after checking out their prices on LaserJet toner cartridges. I got on my motorcycle, backed it out of the parking space against the side of the building, and started the engine. While I was pulling my gloves on, I saw the cashier start waving frantically. Then she leaped over the counter and headed for the front door. I figured she saw me walk

out without paying for anything and assumed that I copped a box of staples or something. Then I noticed that a Mercedes parked in the space adjacent to the one that I had just backed out of was doing a violent rock and roll number without benefit of a driver at the wheel.

About that time, I got knocked off the motorcycle by Newton (he discovered that Force = Mass x Acceleration). Both the bike and I were experiencing the same acceleration, but the bike won the mass contest, so down we went. As I tried to get up, I looked out from the parking lot onto Harrison Street and noticed that the surf was up. Except that in this case, the waves were traveling through asphalt instead of water. Also, there was a crack in the asphalt about 10 feet in front of me that was doing this little recursive open /close routine as each wave went by, just like in the movies. Each time it opened, little jets of dust would shoot up vertically, also just like in the movies.

SOMA is an area of old warehouses and factories just south of the downtown financial district. Most of the buildings in

the area are two or three floors and were built before the fifties. I was about two blocks from where a brick wall fell on some parked cars, squashing them to a height of about a foot and killing five people. Two of those killed were employees of *MacUser* magazine who had just left a meeting at the Ziff Davis offices in the building that lost the wall. Who says the computer business isn't fraught with danger? So much for the sad part. The funny part is that the previous tenants of the building had just recently broken their lease and moved out claiming that the building was unsafe in the event of an earthquake. One would think that the court battle would be a pretty cut and dried event now, but not according to the lawyers for the building owners (what a surprise).

Most of the SOMA is built not on landfill, but on something nearly as bad; old marsh land. As a result, the SOMA was the second worst hit area after the Marina district where the spectacular fire occurred. At last count, 450 buildings in the city are unusable and will need either major repairs or demolishing. Over half the buildings involved are in the SOMA. None of the buildings are high rise office or apartment buildings.

Anyway, after kissing the pavement at the parking lot I got back on the bike and made my way back to where I live, which is about a mile and a half south of downtown. All the traffic lights were out, and when I got to the entrance ramp of the elevated freeway that I usually take to get home there were a couple of cars climbing onto the ramp gingerly, staying very close to the edge on the assumption that it might be stronger there. I opted to go the rest of the way home using surface streets, and it's probably a good thing that I did. That little freeway is now very closed and might not open until spring. It seems that one of the support pillars a half mile past my exit exploded, exposing the steel reinforcing bars inside. The blown support is right at the point where the freeway changes from three lanes in each direction side by side to a double decker freeway similar to the one in Oakland that pancaked.

At home the earthquake was almost a non-event. Nothing fell. Nothing broke. No cracks. I take credit for most of that because when I moved back to the city from the South Bay in 1982, I constrained

my search for a place to live to two hills that had one thing in common; they were both composed entirely of bedrock. There's a third bedrock hill, but it's entirely occupied by the San Francisco Mint. The hill I ended up on was the one hill that suffered zero structural damage during the '06 quake. I also checked the building to make sure that the frame was bolted to the concrete foundation. It was, and

still is.

My Significant Other's first comment when I got home was "Wow, that was the best one yet!" With an attitude like that, I figure we deserve each other. She and the upstairs neighbor had broken out the battery powered TV and were on the balcony with binoculars checking out the noticeable gap in the Bay Bridge. As darkness fell, it was really spooky looking out

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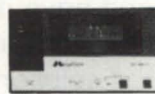
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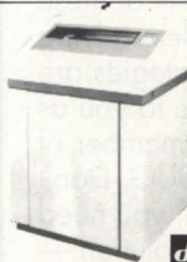
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over a mostly dark downtown and across the bay. The only lights were from the Naval Bases at Alameda and Treasure Island, both of which have massive emergency power rigs. My place faces the other way from the Marina, so I couldn't see the orange sky from the Marina fire. News helicopters were buzzing overhead and the Goodyear blimp was gliding around, having been released from service at

Candlestick Park by the postponement of World Series Game Three.

My first reaction watching the little battery powered TV for the next few hours was that, except for dead phones and no power, there was no damage evident in my immediate neighborhood, and the downtown area seemed to look OK from the balcony. The situation just didn't match the death and destruction scenario

being touted on the tube.

It's been several weeks now, and in retrospect, the media really blew the whole thing out of proportion. The loss of life was on a par with couple of typical midwest tornados, or a severe hurricane. Sure, there was a lot of property damage, but the only difference is that we take our property damage hits once or twice a century in big doses, whereas the tornado belt and Gulf Coast take theirs in smaller doses every 10 years or so. It's true that lives were lost, but it's also true that 99.999 percent of the area residents were alive and uninjured.

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The most critical job on the computers was a large client payroll job that had to be run in time for the paychecks to be distributed on Thursday morning

The only major shortage that arose as a result of the quake involved a dearth of white stretch limos for the network news types who descended on the city to cover the aftermath. At one point, there were reportedly a half dozen of them parked outside a local TV station's offices while the Today Show staff huddled inside.

Well, this is a computer magazine, so I guess I'd better get topical here.

About 8:30 p.m., we decided to get on one of the motorcycles and take a little tour of downtown and see if the computers were still in one piece. If you're wondering how I could be so blasé about the computers, bear in mind that sitting in my garage at home were two full sets of archive backup tapes made the day before the quake. I figured the worst that

could happen is that I might have to write somebody in LA a check for a few thousand bucks for a used MV/4000 to install in my garage for a couple of weeks.

The computers are in an old building on the edge of Chinatown and the financial district. The building was partially reinforced about a year ago and is scheduled for a second round of reinforcing next year. Last year's work apparently did the trick, because the only damage was a lot of plaster dust on the carpet and some paint cracks where adjacent dry-wall panels meet. Two of the second shift operators were standing guard reluctantly, and the place was very dark. They said the building shook violently and they were jittery about being there during the aftershocks.

I checked to make sure that all the cabinet circuit breakers were off and then we left to continue the tour. The French restaurant next door was using candlelight and serving dinner to people stranded in town by the Bay Bridge closing. The cops came around later and asked them to close so that people wouldn't be encouraged to wander about in the downtown area all night. Looting and muggings were obviously on their minds, but apparently they never occurred. What actually occurred was more of a citywide party. The bars filled up and the liquor stores were sold out early. I like the attitude in this town.

In the dark it was difficult to see much damage other than a lot of broken glass and some broken masonry fragments on the sidewalks. We toured Nob and Russian Hills on the bike and didn't see much except for a spectacular view of the Marina District fire from the top of Russian Hill. Lots of people were out on the dark streets milling around, mostly because Nob and Russian Hills have lots of tall hotels and apartment buildings. The top floor residents must have experienced a bit of sea sickness when the quake hit.

By the time we got home at about 9:30 p.m., the power and phones were both back on. San Francisco is the tip of a peninsula and apparently all the power feeds enter the city from the peninsula. Because we live south of downtown toward the one edge of town that isn't water, and because there was so little damage in our neighborhood, we were one of the first to get power restored. Downtown was a different story; they wouldn't power up any building until it had been inspected

for structural problems and/or gas leaks.

By the next morning, the situation had changed dramatically. Lots of older buildings downtown were cordoned off with that yellow tape that the police use at crime scenes. The damage to buildings was a lot more obvious in the daylight.

We had a meeting the next morning (Wednesday) at the office and decided that the most critical job on the comput-

ers was a large client payroll job that had to be run in time for the paychecks to be distributed on Thursday morning. We decided on 6 p.m., Wednesday, as the point at which we'd put someone on a plane to LA to use the backup site to run the job, and then we notified the LA site of our decision using the fax phone (the regular office PBX system was very dead; it needs power to work). That might seem

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Reason #2

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scary, except that we had just done a successful dry run at the LA site only about a month before.

Also, we only needed one CPU to run the job, and we figured that even if our equipment had been damaged electrically when the power went off, the chances of getting at least two of the four MV/4000s back up once power was restored were excellent.

Being risk averse, I decided to run one dummy FIXUP pass (May I fix it? N<NL>) on each drive before running FIXUP for real. All drives passed with flying colors and by 6:15 p.m. we were back on the air with all four MVs

At 4:30 p.m., the power came back on at the office and they called me at home. I hopped on the bike and came down to supervise the restart. All four MV/4000s powered up uneventfully. Seven of the eight 6026 tape drives came up. The eighth had a blown fuse that took only a few minutes to find and fix. All 20 disk drives powered up uneventfully. Being risk averse, I decided to run one dummy FIXUP pass (May I fix it? N<NL>) on each drive before running FIXUP for real. All drives passed with flying colors and by 6:15 p.m. we were back on the air with all four MVs. The air was filled with the residue of numerous sighs of relief.

Unfortunately, we couldn't start running the critical payroll job because we didn't have any operators. They were having trouble getting into the city from where they live. After about an hour they arrived and the job was completed a little after midnight.



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A check later in the week with most of the other DG users in the Bay Area found that all of them had their systems up promptly once power was restored. One large user had all his MVs up on emergency power within hours, but several of his firm's IBM mainframes and his showcase Tandem system were still down two days later due to hardware problems. Tandem may be nonstop, but apparently it's not nonbreak.

A lot of funny stuff has happened since the earthquake. I've gotten phone calls from people I haven't heard from in years just checking to see if I was OK. And lots of our customers called just to check if we had survived. We've had a bunch of sporadic outages since the earthquake because the various utility companies have spent the last three weeks digging up every street downtown to patch minor leaks in the water and gas lines. In the process, they've cut the phone cable under the street in front of the office with a back hoe at least once so far. It put a bunch of our dial-in lines out of commission for two days (including the BBS).

The best anecdote by far has to do with the letter to the editors of *San Francisco Chronicle* from some Born Again Christian type saying that the earthquake was a message from God that the city famous for its tolerance of sexual promiscuity and gay lifestyles had better mend its licentious ways. The next day there was a letter from a gay guy pointing out that the worst hit areas of the city were the ones inhabited by rich heterosexual yuppie attorneys and stockbrokers, and that the mostly gay areas suffered little or no damage. Amen.

By far the most embarrassing part of the earthquake was to have everybody outside California see the reports on national TV that the Marina District shelters were serving Nouvelle Cuisine to the

BJ is the President of B.J. Inc., a San Francisco based consultancy specializing in system auditing, system management, and performance analysis. :SYSMGR is a division of B.J. Inc. BJ can be reached at 109 Minna St., Suite 215, San Francisco, CA 94105, 415/550-1444. The :SYSMGR bulletin board number is 415/391-6531 (300/1200/2400 with optional MNP class 4, CHAR/605X/CHARLEN=8/PARITY=NONE/AUTOBAUD) or 415/550-1454 (voice).

homeless, and that shelter residents were getting daily massages compliments of some holistic health group from Berkeley. Only in California . . .

P.S.: The latest score is Earthquake: 1, Psychics: 0. Neither Nancy Reagan's astrologer Joan Quigley, nor Sylvia Brown, the most famous local psychic, predicted the earthquake or any of its significant ef-

fects. I also rummaged around in the magazine rack in my john and found a copy of last January's *National Enquirer*; none of their psychics predicted it either. I can't wait to get my next quarterly issue of the *CSICOP Journal* (Committee for the Scientific Investigation of Claims of the Paranormal); they're sure to take the psychics to task for completely missing such a big event. Δ

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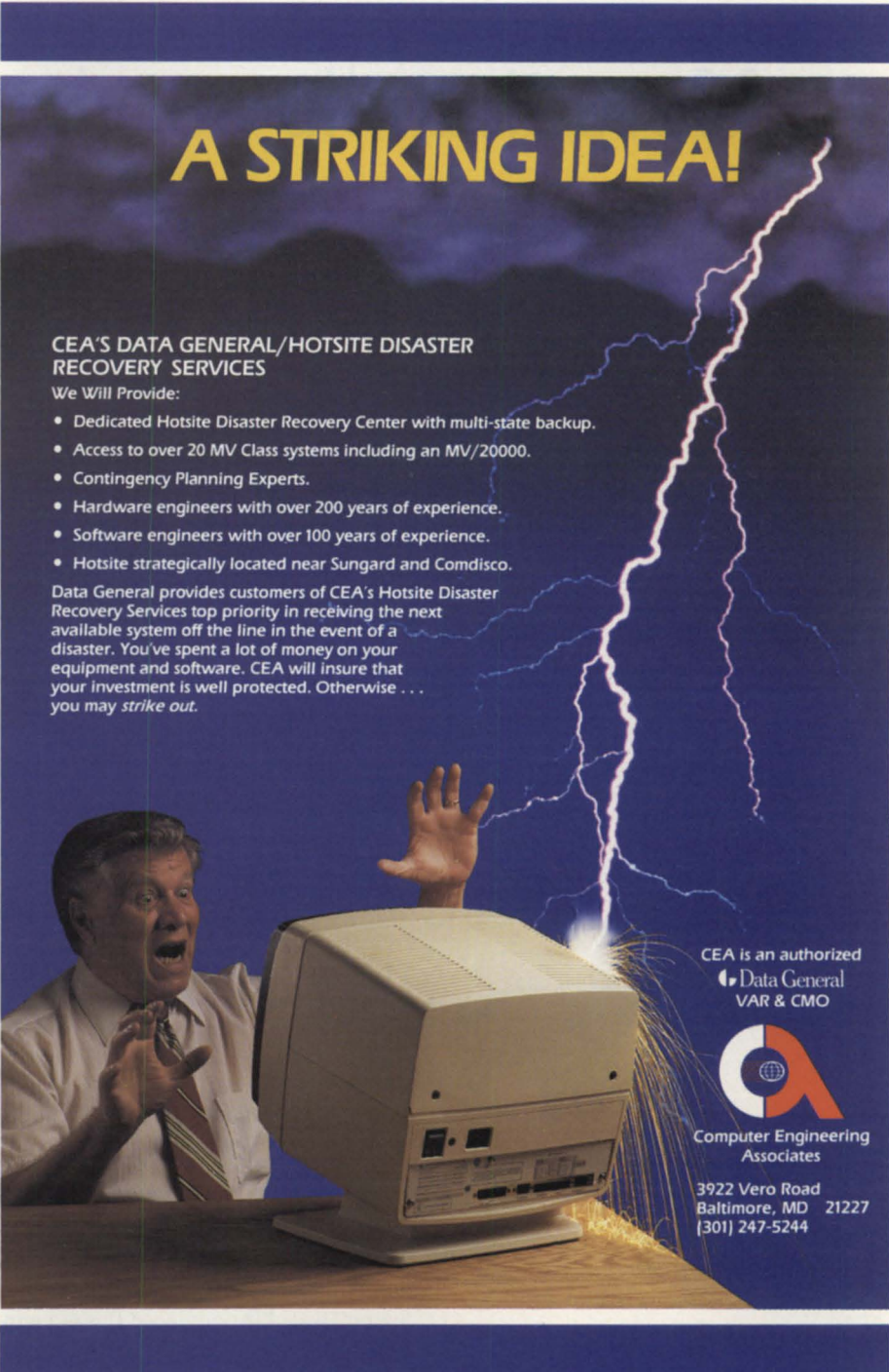
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More than lip service

SYNOPSIS

The BBasic platform of the future is on the Aviion. DG's diligence in supporting standards should win new customers.

Unix has been described in the past as a religion masquerading as an operating system. Unix gurus set the standards for hocus-pocus in the computer industry, mumbling obscure acronyms for obscure utilities. They seemed to relish the fact that their operating system was ignored and unspoiled by the attention of major vendors, who could only corrupt the sanctity of their creation.

Now major vendors, including Data General, are all jumping on the Unix bandwagon. The Unix gurus will turn in their graves while each vendor pays lip service to standards and then does everything possible to tie us into their systems exclusively. Right?

Not according to DG. It is serious about following the standards, even when it doesn't seem to be quite in its short-term interest. Infos, for example, will not be brought over to the Aviion. Infos customers will have to convert their applications to a standard file system that is already available under Unix.

Wherever Data General can choose between doing something its own way, or using the standard, it is choosing the standard—even when there might be a “better” way. I'm convinced this is a winning strategy, and that the gurus are appreciative, too. Furthermore, as the com-

puter field gets increasingly chaotic in the next year or so, customers will be won over. This was quite apparent at the 1989 Data General Reseller Conference in Colorado Springs, where DG's direction with respect to both Unix and Business Basic seemed very clear.

BBasic's new Unix version will become Data General's mainstream version of Business Basic. In the future, new features will appear first in Unix, and will be brought over later to AOS/VS Business Basic, if it proves feasible.

BBSIG report

The Business Basic Special Interest Group (BBSIG) met during the NADGUG conference in New Orleans. While the BBSIG was originally founded for users of Data General Business Basic, it has since expanded to include all users of languages derived from BBasic, including TAC, Bluebird, B32, Transoft, and Basix. The mission of the BBSIG is to provide a common voice for all users of BBasic and provide a forum for the interchange of ideas and techniques between vendors and users.

Paul Norman of Data General reported at the conference that DG intends to release a version of BBasic for the Dasher 386 (probably under a version of Unix called 386/ix), and for the Aviion in the early part of the new year. It will feature several enhancements including line numbers to 99999, variable names to 32 characters, maximum program size to 512 K, DO . . . WHILE, and quad precision arithmetic. Programs must be LISTED and ENTERED to be brought over.

RDOS BBasic will be going to category C, meaning no further revisions or support. DG/RDOS BBasic will continue to be supported—in fact, it will be expanded in rev 8.3 to include support for the 7800XP and the MV/15000. Saved files will be compatible between AOS/VS BBasic 5.1 and DG/RDOS BBasic 8.3. But

don't expect the goodies in Data General's Unix BBasic to come to DG/RDOS Business Basic. The source code for the Unix version will be totally different than the RDOS and AOS/VS versions, meaning any enhancements would have to be coded twice. Not a likely prospect.

Transoft was represented by Mike Edwards. Transoft's UBB is now available on over 20 platforms, including 386 /ix, Xenix, Aviiion, Ultrix, and DOS. About half of its installed sites are currently on DOS. Sales have been particularly strong in Europe, though no version exists for AOS/VS.

Murray Haszard of B32 confirmed the availability of B32 for AOS/VS, Xenix, Bell Technologies' Unix, and announced that Aviiion would be ready around the end of 1989. He assured the group that the strong performance characteristics of B32 carry over to Unix platforms. Furthermore, as a result of a rewrite of the AOS/VS version several months ago, B32 uses virtually the same source code on all of its operating system platforms. This ensures that the same features will appear no matter where the code goes. Data General, are you paying attention?

A discussion was held about desired enhancements to the language. Popular requests were for support for more than 132 characters on INPUT and PRINT, and the ability to open files over a network. The vendors present said they would listen carefully to suggestions from the BBSIG. This raised the question of how best to collect ideas for enhancements.

It was decided that all the ideas would be sent to me at Maxon. I'll publish them in *CoPILOT*, and forward all the responses to the vendors. Get me your suggestions soon! Incidentally, if you aren't getting copies of the *CoPILOT*, send me your name and address to add to the mailing list.

The last item on the agenda was the election of a new president. Due, no doubt, to lack of opposition, I was reelected president of BBSIG for another year. Δ

George Henne, a contributing editor to Focus, has worked with Business Basic users for more than a decade. He is the vice president of Maxon Computer Systems, 575 Madison Ave., Suite 1006, New York, NY 10022; 416/445-4823.

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Micro Cobols

SYNOPSIS

Our reviewer treads new ground with the help of RM/Cobol 85 rev 4.0, Micro Focus' Cobol/2 rev 1.1.17, and SBTEST

A couple of months ago, I stumbled upon an article in *PC Week*. It seems that Ryan McFarland had just come out with a new revision of RM/Cobol that was intended, among other things, to make the product more compatible with Data General's ICobol.

I had never heard of anyone revising anything to make it more compatible with a Data General product, so my curiosity was piqued. I've heard for years that "ICobol is just like so and so's Cobol," and wondered how compatible ICobol is with the other products out in the micro world.

I picked two Cobols that I felt an ICobol user might want to convert to or use on a micro: Ryan McFarland's RM/Cobol 85 rev. 4.0, because as far as I can tell they've got a version for every machine you can think of, and Micro Focus' Cobol/2 rev. 1.1.17, because of their heavy commitment to OS/2 and Unix. I decided to convert SBTEST, a general purpose ICobol benchmarking program developed some years ago by Creative Synergy. Not only does it do a lot of screen and file I/O (which I suspected would be a problem), but when I got it working I could run benchmarks.

First, let's just say that there's no such thing as a painless conversion. Despite what I told someone at the '89 conference, you have to get into the code and make changes. Change #1 doesn't apply to anyone using card format, so both of those readers can skip the next paragraph.

Remember Area A, Area B, the continuation area, and all of that good, "real," Cobol stuff? I didn't. It's been 10 years since I left the Burroughs punched card environment to take up CRTEDIT (thankfully), and all of my programs are

in CLI format. They won't compile. Micro Focus is the most care-free about formatting—as long as it isn't in columns 1 through 7 or 73 through 80. Ryan McFarland, on the other hand, is strictly by the book.

I suppose it's a bit hypocritical for anyone still running Cobol to complain about something being archaic, but I will anyway. Line numbering was a lifesaver when the rubber bands holding my card deck together broke. In a micro environment, however, it's rather silly. I'd like to see both of these compilers at least allow a compile switch that would make it unnecessary.

Vendor information

RM/Cobol-85 rev 4.0 markets for \$1,250 for a single user on DOS; an extra \$250 accommodates five more users. A new version, RM/Cobol-85 4.10, includes an editing tool called RM/Costar. Ryan McFarland sells the product for \$995.

Both Ryan McFarland Corporation and Micro Focus have new Cobol products for Data General machines. Ryan McFarland released RM/Cobol-85 version 4.01 for the Aviiion, available on DG/UX, with development systems starting at \$1,800. Please see page 63 for details about this product, or contact Ryan McFarland Corp. at 8911 Capital of Texas Highway North, Austin, TX 78759, 512/343-1010.

The Micro Focus product is the same as Cobol/2 rev 1.1.17 that is reviewed here, but is marketed by Data General as Cobol/2 rev 1, at costs ranging from \$900 for a single user on DOS to \$15,000 for 256 Aviiion DG/UX users. Contact Data General's Mike DiTullio at 508/870-7824 for more information, or write Data General Corp., 3400 Computer Drive, Westboro, Massachusetts 01580. Δ

Micro Focus is compatible

Once you get the reformatting out of the way, Micro Focus is incredibly compatible with ICobol. The only two errors that I ran into on the first compile were my own. First, I had added a test of the WRITE IMMEDIATE verb to the SBTEST program. As of this writing, Micro Focus is compatible through rev 1.30 of ICobol only. The other error was a screen item specified as PIC 9(10)JUSTIFIED. It seems that the Micro Focus compiler won't allow the use of JUSTIFIED with a numeric item. Aha! Something that ICobol will do that the others won't. Well, not really. The ICobol Programmer's Reference *also* states that JUSTIFIED "cannot be specified for a numeric item." The ICobol compiler just isn't catching it. An STR has been submitted.

Micro Focus' compiler command line doesn't have the half dozen or so switches that ICobol has. It has over 100 different options that can be set at compile time. To compile SBTEST, I used the following:

```
COBOL SBTEST,./DG/NOMF/NOOSVS/ANIM
```

which means to use ICobol 1.30 syntax, ignore Micro Focus and AOS/VB reserved

words, and prepare the code for Micro Focus' Animator debugger. I got a reserved word error from the data item CONTINUE, which I removed by using the /NOANS85 switch (although I could just as easily have used /REMOVE"CONTINUE). I then LINKed the program (yes, this is really a compiler, and not a pseudo interpreter—the result is an .EXE file) and ran it by typing SBTEST.

The first difference I noticed was that my numeric ACCEPTs were acting like I used USING instead of TO—they were already filled with zeros, so that entering 5 resulted in the field looking like 50. Back to the manuals.

In addition to the 14 high density disks that come with this Cobol, it's equipped with about 14 inches of the most comprehensive manuals I've ever read. I pulled out the Screen Handling Reference Guide and discovered that this, like many other screen functions, can be specified by the programmer. To make my ACCEPTs like ICobol's, I specified treating numeric fields as alphanumeric fields, and the zeros went away. You can choose whether you want the cursor to be at the end of an ACCEPT under the last character, or in the next position. The handling of a COLUMN + 1 can be specified immediately after the last field, or with a one-space gap. There are too many options in the configurator to list here, but suffice it to say that you can make your screens look any way you want.

After that change, the program looked identical to the one running on my MV/8000. When Micro Focus says that it's compatible with ICobol, it means it. The only manual conversion necessary is to get code out of the reserved areas, and I'm sure it would be (relatively) trivial to write a Cobol program to do just that.

If you do have a problem with code, Micro Focus includes the Animator, the best debugger I've seen this side of Borland. This is a full screen debugger that allows you to execute your program statement-by-statement while viewing the code. Of course, you can also skip to cursor position, run to a certain line, or set breakpoints if you like. Breakpoints can be certain statements, or they can be conditional—you can set it to stop when CUSTOMER NUMBER = "10410" AND ITEM NUMBER = "MUD 43". The data can be set and examined in ASCII or Hex, and up to 10 windows can display at one time. The Advanced Animator will even display your program in a structure diagram with instant flowcharting, including page references.

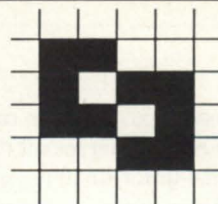
This is the debugger that I've been waiting for. The next time I have a problem in a program, I'm gonna dump the thing to the micro and compile it using Micro Focus, just so I can use the Animator.

Like an ICobol

RM/Cobol was a bit more difficult to convert. Unlike Micro Focus, however, RM/Cobol never claimed to be DG compatible—just that it had a few DG-like features. RM/Cobol has become such an industry standard that I gave it a shot anyway.

I used the source code that ran through Micro Focus without a hitch. RM/Cobol gave me a few hundred "Verb in area A" errors, which I corrected. I removed the DATA SIZE IS and INDEX SIZE IS clauses from the selects, and the RECORDING MODE IS FIXED from the FDs. I changed the reserved word CONTINUE to something else.

A couple of the errors took a little longer to find, though I



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suppose I'd have been quicker if I had been accustomed to card format. The error was "Period space required," and it meant that I was missing a period after a statement—unfortunately, on a line that very obviously had a period after it. After staring at it for a few hours, it suddenly dawned on me that Wordstar was in column 76 while I was looking at the offending period. Taking everything back four columns solved the problem, but surely there must be a better error message for this like: "Get your data out of my column, buddy!"

To execute the program, you must invoke a runtime module. In this case, the command would be RUN Cobol SBTEST. Lo and behold, it worked perfectly the first time. The accepts and displays executed with no change in code. If Ryan McFarland was trying to make the screen as ICobol-like as possible, they've succeeded admirably.

The Ryan McFarland debugger is very similar to ICobol's, with one important exception: you can run through the program step by step. Now that ICobol is keeping a separate .SY file instead of the information in memory, can we have that too, please?

The RM program both compiles and runs, with few changes. Unfortunately for those doing the conversion, however, there are a few subtle differences between the languages that may not show up at once—but could bite you later. For instance, the READ command always contains an implicit LOCK, unless you specify WITH NO LOCK. DG COMPUTATIONAL is very close to RM's COMP 3—but RM has a sign byte, which could affect redefines. The statement CALLPROGRAM "SBTESTA" compiles perfectly, and then does absolutely nothing when executed. The RM syntax is CALL "SBTESTA", but you'd think that at least a compiler error would be generated by the other form. Anyway, the end result is that while a conversion is certainly possible (and for some programmers even trivial, assuming that you have the know-how to write a program that will put sequential numbers in front of your statements), some programs will cause a problem. In that case, I did what any good programmer would do. I cheated.

Despite what you might infer from its frequent mention in this column, I don't own stock in Threshold, Inc. It just seems that whenever I run into a situation in which I need a little help, there is a Threshold product sitting on a shelf that works just fine. In this case, it was an ICobol to RM/Cobol conversion package for both Data General and PC environments. Just type

```
TX infile outfile
```

and your CRT format program is in card format, with the various ICobol features that we all take for granted (such as zeroing out variables automatically before doing an INSPECT) taken care of. Now *that's* the easy way to do a conversion.

Benchmarks

In Figure 1, you'll notice that ICobol more than holds its own on the I/O stuff. I'd like to see the results with, say, 30 terminals running on each package. Where the others tend to pull away is in the arithmetic. This just goes to show that ICobol is *not* a language in which to number crunch, something we already knew. ICobol is at its best doing the things that most Cobol programs do—moving alphanumerics and manipulating indexed files (although, from the results, it also seems to be heavily

Figure 1: Benchmarks

	Ryan McFarland	Micro Focus	MV/8000
Write Random (10K)	112	67	83
Read Random (10K)	53	49	45
Read/Rewrite Random (10K)	89	118	64
Write Sequential (10K)	37	12	51
Read Sequential (10K)	37	8	29
Read/Rewrite Sequential (10K)	104	45	71
Open/Read/Close (100)	26	12	19
Div S9(10) COMP by S9(5) giving S9(5) COMP (100K)COMP	105	120	218
Mult S9(5) COMP by S9(5) COMP giving S9(10) COMP (100K)	66	57	145
Add S9(5) to S9(10) (100K)	38	16	95
Move S9(5) to S9(5) COMP (100K)	29	15	44
Move X(50) to X(50) (100K)	17	17	9
Null Paragraph (300K)	41	46	9
Display at Line 24 (500)	26	6	13

Note: All times in seconds.
MV/8000 DISPLAY with Screen Demon on PARTIAL—51 seconds
without Screen Demon!

optimized for null paragraphs). One factor in Ryan McFarland's favor is that it automatically does repeating character compression on its files. Thus, a 10 MB SBTEST file took up only 2.2 MB. The I/O times for RM reflect compression/decompression on the fly.

Like a Rolling Stone

There's one important feature that both of these compilers share. They recognize that Cobol did not die in the late sixties.

ICobol has made great strides in execution speed, reliability, and elimination of size constraints in both file and program size. But in the 11 years that I've been running ICobol, I don't remember seeing a new verb. I was amazed to see the elements that a modern compiler contains, since I hadn't looked at one for a decade or so. I don't have the room in this article to go into any detail, but I hereby promise to write an article giving an overview soon. To give you a quick idea, although ICobol contains approximately 320 reserved words, most are for ANSI compatibility and have no functionality in ICobol. Micro Focus has about 450, and they all work.

Ryan McFarland and Micro Focus both have excellent compilers, and seeing the richness of a modern Cobol gives me hope for ICobol. ICobol will soon be moving from the protection of a proprietary operating system out into the real world. If Data General expects to compete with languages like these, they're going to have to bring ICobol into the nineties—and that will benefit all of us. Δ

Tim Boyer is EDP Manager at Denman Tire Corporation. He may be reached at P.O. Box 951, Warren, OH 44482; 216/898-2711 or on the NADGUG bulletin board at 415/924-3652.

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A complete listing of the NADGUG software library

ACK • Terminal emulator/file transfer program for both AOS/VS and AOS machines. 432 blocks.

Big Brother • Automatic log-off program written in Fortran 77. Donated by the U.S. Forest Service. 181 blocks.

B.J.'s BBS contributions • This addition to the library consists of about 20 items, including various programs, documentation, and macros. Some of the more interesting items include the :SYSMGR benchmark suite, a continuous incremental backup, a clean-up file maintenance program, a program to find strings in files, and a type-backward program. 5,749 blocks.

Black Jack • Kim Medlin of Data General presented this at the Las Vegas conference. 15,079 blocks.

CRTEEDIT • This is the old RDOS screen editor ported over to VS. 51 blocks.

DBCHECK • Checks the open status of an Infos file and examines the checkpointing status of a file. 230 blocks.

DUMpload • DUMpload is a Macintosh program to dump and load AOS/VS-compatible dumps on a Macintosh. 140 blocks.

ERP • A process-termination program developed by NASA and modified by Manville. In Fortran 77. 338 blocks.

FCOPY2 • Submitted by Jim Siegman, this utility makes two copies of a file at once.

FILEMNGR • With this new version, you can move, copy, delete, view, and perform several other options faster. This is distributed as shareware. If you try it and

continue to use it, you are requested to pay a registration fee. From Kim Geiger. 459 blocks.

FTNCVT • This is a Fortran 5 to Fortran 77 translator. 287 blocks.

Games • A collection from various places. Enjoy. 19,516 blocks.

Glossary • A program from John Grant that builds a list of words used in a document and shows where they are used. 416 blocks.

IMSLUTIL • A collection of CLI macros, Cobol routines, and assembly routines callable from Cobol. By IMSL of Houston. 6,154 blocks.

JAG_UTIL • JAG_UTIL consists of several programs: Filecount, Userspace, Scan, and Laminate. 1,501 blocks.

Kermit • A file-transfer protocol developed at Columbia University. Uses 9,328 blocks.

Logout • Another auto log-out system. 246 blocks.

Look • Used to view text files, Look allows you to move forward and backward in a file. Donated by Data General. 438 blocks.

Macros • A collection of macros from various sources. 452 blocks.

MENUDIR • This is an initial user menu that can chain to other applications and features a password-control system. From the Fed SIG. 492 blocks.

Misc Kerm • An expanded version of AOS Kerm, this now includes other versions of Kermit including DG/One Kermit. 6,298 blocks.

Notify and Prior • Two contributions from Concept Automation. Notify tells you when a process has terminated. Prior lists the priorities of processes. 273 blocks.

QHelp • A tree-structured help facility. 2,277 blocks.

RDOS Kermit • Now available. You must request the Kermit tape (rather than the library tape) to get RDOS Kermit.

SKLSCRN • The Cobol standard entry screen featured in George Burns' *Focus* article of April, 1988. 385 blocks.

Softrans • A file-transfer protocol written in Fortran 77 used to communicate with proprietary PC communications packages. 496 blocks.

Spell • Checks the spelling of a word or spell-checks documents. Submitted by Richard Kouzes. 5,163 blocks.

SWITCHES • The GET.SWITCHES routine from John Grant's column in *Focus*. 1,297 blocks.

TEX • Version 2.26a is now available. TEX (Terminal Emulator with Xmodem) is a terminal-emulation program written by David Down. He has revised the TEX software to include a command language. TEX is being distributed as shareware. At the end of 30 days, either remove it from your system or send the author a \$45 fee. 495 blocks.

VT100KER • VT100 emulator from John Grant. 1,135 blocks.

Xfer • A tape-conversion utility. 653 blocks. Δ

All NADGUG members interested in receiving the NADGUG software collection should send a 1,200-foot tape to:

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MV/2000 and MV/1400 users should send one formatted, error-free tape cartridge. Software contributions should be sent to the same address. Be sure to include your membership number. Allow 4-6 weeks for delivery.

People with AOS/VS rev 6 should send a 2,400-foot tape and specifically request DUMP_II instead of the usual compressed version. The de-compression program is rev 7 specific.

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Forecast for the nineties

SYNOPSIS

With the removal of technical barriers, communication across various networks will become easy.



M

y teenage son insists that the nineties don't really begin until 1991 and that 2001, not 2000, is the first year of the 21st century. For the rest of us mere mortals, however, this is the beginning of a new decade, and if a new year is a good time for reflection, then a new decade begs for a forecast as well. It's time to drag out the crystal ball once again.

I have an area of personal interest that I want to share, and I think it's going to make a big difference in how we use our computers within the next five to seven years. To reduce it to one sentence, the 1990s will be the decade when all of our computers, large and small, gain the ability to communicate easily with one another.

Imagine the scenario five years from now when PCs, minis, and mainframes can communicate with one another worldwide as easily as you and I pick up the telephone and call each other today. No modems, no manual logins or passwords, just a transparent worldwide packet-switched network for large and small computers.

Technical barriers

Unless an organization's computers can communicate easily and inexpensively with all other computers, including those of the organization's vendors and customers, data communications will continue to be implemented on a special case basis. There are three technical barriers to the realization of a worldwide data network:

- International message addressability
- Packet switching interfaces for small systems
- Data and transaction format standards

To meet these needs there are three emerging technologies that you've probably heard about, but when all three come together at the same time and in the same place, watch out

for a major revolution in computing. The three technologies I'm talking about are X.400/X.500 message interchange, integrated systems digital networks (ISDN), and electronic data interchange (EDI).

X.400

X.400 is an evolving CCITT standard for international message handling. When X.400 is widely adopted in the next few years, there will be a globally accepted method for addressing messages from one user, computer, or application to another. Getting a message from my PC in California to a customer's mainframe in Geneva will be as simple as it is now to send a fax.

The first and most obvious application to benefit from X.400 will be electronic mail. Those of us who use CEO know how e-mail transformed the way we work, but imagine the revolution when we can communicate with *everyone* from our PC or workstation.

If you and I exchange a large amount of mail (if we're in two branches of the same company, for example), it makes sense to connect our offices via leased lines. If we are DG users, we might run Xodiac and CEO over those lines and have a responsive electronic mail system.

Suppose, on the other hand, that we only communicate occasionally, say once a day on the average. We certainly wouldn't lease a line between our offices, but what other choices do we have? You could log into my MV, run CEO, and send me messages; but how would I get messages to you? You'd have to call into my system many times a day, just to check. If I had an urgent message, this wouldn't work, as you might not see it for hours. We could both subscribe to Telenet or another PDN, but once again, our volume of traffic doesn't justify the cost. Alternatives such as MCI-Mail, Compuserve, bulletin boards, etc., all suffer from the same requirement that the recipient must poll for messages—very kludgy.

ISDN

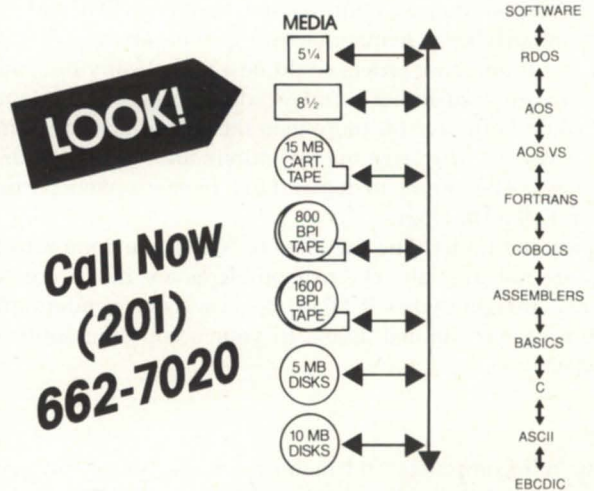
Right now, we have only two choices for electronic transfer of data: leased lines or dial-up. If you're a high volume user of a particular network (possibly your own), a leased line makes sense, but it still does not provide you access to a global network like the telephone (DDD) network system.

ISDN will be the solution. ISDN provides moderate data rates (64 KB/second) on a digital line. The telephone companies will offer an ISDN connection and the value added network services to back it up. This means you will have a single point of connection which, via X.400 services, will allow you to connect computer devices to any other devices on the planet using packet-switched virtual circuits.

Here's where the synergy of these new technologies comes into play. X.400 allows the interconnection and routing from your computer to almost any other, while ISDN allows you to do this over a single connection. Even more important, you will only pay for the data actually transmitted. Just like the basic telephone service that allows your telephone to stand idle awaiting an incoming call, the basic ISDN fees will allow your applications to monitor for incoming messages and connection requests 24 hours per day.

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Electronic mail is only the beginning. The X.400 specification is not just for mail. It includes a general message handling service (MHS) for application-to-application communications.

EDI

If electronic mail is the most obvious example of user-to-user communications, then EDI is the most obvious example of application-to-application communications. EDI and the X12 standards began in manufacturing where analysts discovered that if purchase orders could be automatically transmitted between a customer's and vendor's computer systems, they could both save far more than the cost of implementing such a system. The large manufacturers are so keen on this, that they are beginning to demand that their suppliers participate in EDI technology.

Given the underlying facilities of X.400, the communications are not difficult. The real problems are in the area of security. Imagine what it takes to allow your vendors and customers even limited access to your accounting software and data base.

OS/2

Our minicomputers and mainframes are reasonably well equipped to handle these new technologies. ISDN requires just another circuit board, and X.400 and EDI are simply addi-

tional software packages. But, if my prediction is to come true, our PCs will have to join the global network not just as occasional participants, but as full-fledged communications nodes. Here, I think, is the long-awaited *raison d'être* for OS/2. I'm not impressed by watching a spreadsheet recalculate in one window while I'm using a word processor in another. What I am impressed by, and need very much, is the ability to do my regular work while my machine remains available to receive incoming messages and perform other true background tasks. When that becomes available, then I'll buy OS/2.

I'm looking forward to the 1990s. All of the "enabling technologies" are in place to make dreams come true for many of us. There are no longer any major gaps or stumbling blocks, and the profits to be made by PDN vendors, telephone companies, and software firms will ensure the success of these ventures.

I'll check back at the end of 1990 to see if things are on schedule. Have a happy new year. △

Doug Kaye is the chairman of Rational Data Systems. He can be reached at 1050 Northgate Drive, San Rafael, CA 94903; 415/499-3354. This article is excerpted from the "1990 Rational Data Systems Report on PC Integration" to be published later this year. For a free copy of the 1989 edition, contact RDS at 150 South Los Robles Avenue, Pasadena, CA 91101; 818/568-9991. Copyright 1990, Rational Data Systems, Inc.

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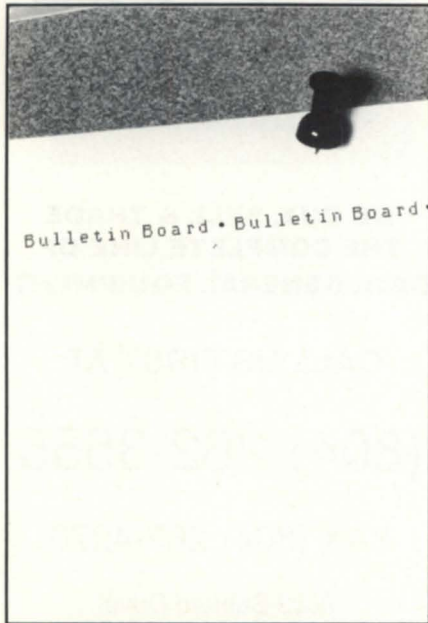
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Bits and bytes from the bulletin board



4.44 Present imperfect

From: Dave Stress

We found a bug in Present 4.44 having to do with multiple record definitions within a single .DF file. The problem occurs when the specified key field is multiply defined in more than one record.

For example, field CSTCTR is defined in records one, two, and three, but is only a key in record three. When Present tries to rebuild a new .MD file, you get an error message indicating KEY must have a type defined. The line being flagged in my particular .DF file is this:

```
INDEX CENTER_INDEX, KEY CSTCTR, RECORD CCENTER.
```

The record CCENTER is defined with field CSTCTR binary (4). The problem is not that the type is missing, but the field name was found in record 1 first. Present gets confused and creates a *fatal* error.

The way around this is to avoid confusion by calling the key by a unique name. This error was not present in pre-4.0 versions to my knowledge.

Infos info on Aviion

From: Richard Hankins

Does anyone plan on converting AOS /VS Infos applications to the Aviion? If so, are you planning on porting to the SQL? Is Infos that bad compared to SQL or is DG trying to protect their MV class

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machines by not porting Infos to the Aviion?

From: Jim Dingman

Yes. (You figure out which question.)

From: Phil Horvitz

DG will have a version of Infos that runs on an Aviion connected to an MV server—not quite the best scenario for the ultimate performance system. I think the idea is to offer limited compatibility but with such poor performance that you'll just forget about your MV and do the whole thing on the Aviion.

From: Doug Rady

Nor will there be DG/SQL on the Aviion.

Shining Cs

From: Tom Scheiderich

I need some input on C for AOS/VS and DG/UX. I am trying to find out about compatibility with other Cs such as Turbo-C. How up-to-date and solid are the compilers? For example, do they support function parameter declarations inside parentheses "function (int x)" instead of the older way: function (x) int x? Any opinions would be appreciated.

From: Doug Rady

The C compiler is probably the most stable of the AOS/VS compilers. It is not fully ANSI compliant because ANSI hasn't actually passed the C standard yet. It does support prototypes, void, void *, const, and a good chunk of the things that are or will be a part of the ANSI standard. It does not have ANSI standard header files yet. As far as Turbo-C and others of that kind, they usually include very non-portable non-C routines as part of their libraries. Note that AOS/VS C and MV-DG/UX C are the same compiler, but the compiler on the Aviion is different (though still very good). Some things like ioctl() can be a bear to work with, since ioctl() is implemented in a vast variety of ways. DG has promised an ANSI compliant compiler as soon as they can after the ANSI standard is fully passed.

The optimizer does have some quirks, but they don't create any problems for the end result code.

AOS die-hards

From: Rick Marnell

Are there any AOS users here? Does

anyone know of the current happenings with AOS—specifically the current revision (7.02)? Have there been any patches or enhancements in the last year or so? It looks like AOS is really dead. I guess me and my Desktop/30 will have to keep it alive ourselves.

From: Walter Mosscrop

Rick, we haven't seen anything new

for 7.02 in some time. We have five Desktop/20s, but we're trying to replace them with multiplexors/leased lines. It seems that I've seen far more activity from DG on RDOS than AOS.

From: Rick Marnell

Have you seen a recent copy of the monthly newsletter? Is anything ever mentioned about AOS software? I haven't



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seen a newsletter in years and thought I might be missing out on some of the latest patches and/or enhancements. Too bad AOS is on "hold." Other than the 64 K program size limitation, it's pretty decent.

From: Walter Mosscrop

I can't even find the last AOS newsletter we got. According to OIS, the last soft-

ware shipment was AOS 7.02 on 10/28/85. I agree that AOS is a good OS, but I think that DG sealed its fate with the Desktops (especially the *slow* disk interface). But, if it's doing the job, why switch?

?BOMBed in neutral territory

From: Martin Sweden

Has anyone heard of a system call/error routine called "?BOMB"? It man-

aged to take out our EXEC, but DG in Sweden hasn't got a clue as to why it happened. The system console shows the following information: Process termination, PID: 4 (that's EXEC!), Invalid address passed as a system call argument, FATAL RUNTIME ERROR: TERMINATION THRU ?BOMB.

No, it was not Friday the 13th (but almost). The only "strange" process running was system performance monitor (5.00). We run an MV/10000 with VS 7.65.

From: Andries Holtzhausen

I have had the same problem with EXEC rev 7.62. The agents (we have no DG in South Africa) told me to go back to rev 7.60. That worked. We now run 7.64 without problems.

Hmmmm, interesting . . .

From: Bill Benedetto

Has anyone out there run into this problem: We are running TCP/IP on our MV/8000 and MV/20000. We have some Sun SPARCstations (and 4/110s) hooked up via ethernet. The Suns are using Telnet to talk with the DGs (pretty simple so far). Anyway, the Telnet(d) on the MV/20000 has a habit of crashing. The rest of TCP/IP and company are OK (ftpd & netop), but Telnet(d) crashes. The most popular error that we get when this happens is: USER INNER RING MEMORY REFERENCE TRAP.

We are running TCP/IP rev 2.50, and the MV/20000 is running 7.60. Does anyone have any suggestions? These errors are frequent (at least twice a day) and the users all get logged off (now *there's* a surprise, huh?)

From: Jim Dingman

Hmmm, interesting. We have the same rev of TCP/IP on our MV/10000 and MV/20000. We haven't had the problem of Telnet(d) crashing, except when someone gets cute and runs SED or some other "full screen" application. However, we are running AOS/VS 7.64. I don't know if that really makes any difference. I haven't heard of any "improvements" in 7.64 that would make that problem go away. Δ

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The latest products for DG systems



The portable Walkabout terminal

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Las Vegas—Data General's compact Walkabout terminal, (12 inches wide x 10.6 inches deep, x 1.9 high) made its debut at Comdex.

The Walkabout allows users to exchange information with home or office computers. Its battery-powered terminal weighs five pounds, fits into a briefcase, and comes with a 25-line tiltable liquid crystal display (LCD) screen and full-size keyboard.

Walkabout features three built-in terminal emulators: Data General's D216, DEC's VT220 terminal, and ADM-3A

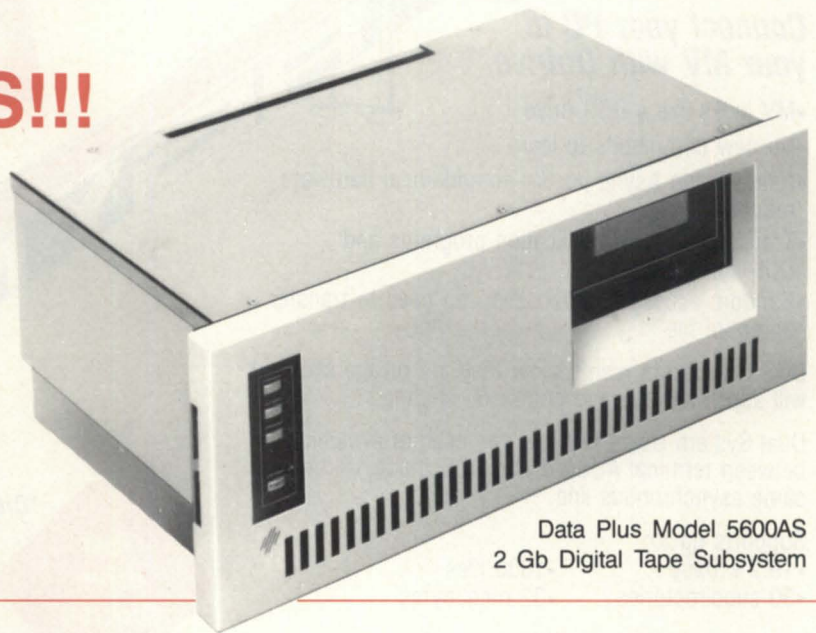
ASCII terminals. Keeping with DG's "wide open" theme, the three emulators let users communicate with other computer systems (not necessarily Data Generals') through terminal lines or over phone lines using a built-in 1200- or 2400-baud modem. Users can get electronic mail through services such as MCI Mail, or obtain information from public data bases (e.g., CompuServe, Dialog), or send and receive messages from office automation packages such as DG's CEO or DEC's All-In-One.

Software capabilities on the Walkabout include Notepad (a text editor), clock /alarm, dialer (a storing feature for frequently used modem numbers), and local print. The text editor creates up to 16 KB of text files and memos, and has the capacity to transfer files to and from the host system. An optional Diconix portable inkjet printer can be powered by an external AC source or by the internal rechargeable batteries. The print function within the Walkabout allows a file to be sent to the printer directly from Notepad.

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In addition, the printer can be configured to act as a slave to the display or set up so communications are printed directly by the printer without appearing on the screen.

Walkabout costs \$799 with a 1200 BPS modem; \$899 with a 2400 BPS modem. Volume discounts are available with shipments beginning in the first calendar quarter of 1990.

Data General Corporation, 3400 Computer Dr., Westboro, MA 01580; 508/898-4072. Δ

Circle 65 on reader service card.

New DG software allows conversation between networks

Westboro—Data General's new standards-based Communications Server allows communications between disparate, multivendor systems.

Communications Server (CS) software enables a variety of computers, tele-

phones, faxes, and telexes to "talk" to each other in a comprehensible fashion. Digital voice, graphics, image, or text formats can be shared among disparate networks or individual workstations using the new software.

Information is accessed in the user's familiar format, regardless of the original form of the data. For example, spreadsheets or graphics from different sources can be incorporated seamlessly into a word processing program.

The new software uses an X.400 backbone and peer-to-peer gateways to bypass proprietary protocols. Electronic mail is consolidated, and document conversion functions support more than 40 document types from DEC/dx to IBM Displaywrite to Wang OIS/VS and Wordperfect. An accounting function provides an audit trail of every aspect of the message flow through the CS platform. Hooks for encryption provide for network security.

CS/Client application services support PC users attached to a host over wide-area networks or local-area networks

(LANs). Asynchronous dial-up links or Ethernet Token Ring LANs provide messaging and office automation functions for otherwise isolated PCs. Gateway access, document conversion, and archival filing are also available to PC users.

Target markets for the new product are large corporations with many different vendors' computer systems, and network service providers who can offer Communications Server to individual subscribers.

DG is currently testing a further application of Communications Server in a pilot program with Singapore Telecom, in which the phone company serves as a liaison between computer users. Subscribing businesses can send messages, (invoices, purchase orders, etc.) and authorize electronic debit and credit of funds to each other through the phone company.

Communications Server is an implementation of Data General's Distributed Applications Architecture strategy. According to Stephen Baxter, DG's vice president of corporate marketing, it's "infi-

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nately modifiable," and will accommodate any new proprietary communications software that becomes a popular standard. Data General anticipates a version for the Aviion Unix system to be available in early 1991. The software is currently priced between \$99,000 and \$641,000, depending on configuration. Based on DG's Eclipse MV family, it is available within 120 days of receipt of order.

Data General Corporation, 3400 Computer Drive, Westboro, MA 01580; 508/898-4083. Δ

Circle 66 on reader service card.

RM/Cobol-85 Version 4.01 available for Aviion

Austin, TX—Ryan McFarland Corporation announced the release of RM/Cobol-85 Version 4.01 for DG/UX on Data General's Aviion system.

The high-level ANSI X3.23 system has

extensions to facilitate the development of X/Open and IBM SAA compliant applications, and includes the following Cobol features: INITIALIZE verb, scope terminators (e.g., END-IF, END-ADD), in-line processing version of PERFORM, >= and <= relational operators, nested source program capability, WITH TEST AFTER option of PERFORM, EVALUATE statement, EXTERNAL phrase for files and data items, CALL statement BY CONTENT option, and symbolic debugging. The compiler offers IBM VS mainframe and DG Cobol extensions including DELETE FILE, CALL PROGRAM, OPEN EXCLUSIVE, ACCEPT . . . FROM STATUS KEY, and EXCEPTION STATUS phrases.

The software is certified under both ANSI 74 and 85 standards. It offers 20 compiler options and 10 runtime options. The new version may be configured to allow users to "dereserve" words that were user-defined in the 74 standard, but reserved in the 85 standard. List pricing for the development system begins at \$1800; run-time only systems start at \$400.

Ryan McFarland Corporation, 8911 Capital of Texas Highway North, Austin, TX 78759; 512/343-1010 or 1/800-RM-COBOL. Δ

Circle 70 on reader service card.

DG/RDOS Rev 2.40 expands user base

Westboro—A new revision of DG/RDOS runs on MV/7800XP, MV/15000 Models 8, 10, and 20, and the MV/18000 Model 1 and SX systems, extending the range of processing power for Data General's RDOS and DG/RDOS customer base. DG says its RDOS rev 2.40 can boost computational performance by as much as 250 percent over 16-bit systems.

In addition, DG's Continuing Products Division now offers 16-bit CPU upgrades from older processors such as the S/140 to the MV/7800XP. Previously, any 16-bit upgrades to the MV/7800XP required RDOS customers to convert their applications to AOS/VS, AOS/RT32, or DG/UX.

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DG/RDOS rev 2.40 is available for desktop systems in Model 30568 and for MV family systems in Model 31285. The new revision also supports a 1600 BPI, reel-to-reel tape drive for the DG/500 (Model 5589), and a 662 MB disk subsystem (Model 6554) for MV family computers available from Data General Special Systems.

Data General Corporation, 3400 Computer Dr., Westboro, MA 01580; 508/898-4074. Δ

Circle 67 on reader service card.

Mainstreet ports Exclusive 2.0 to Aviion

New York—Exclusive 2.0, a real estate listings package, will be available on the Aviion system under the DG/UX operating system. The software is an integrated listings data base that includes office automation tools such as word processing and spreadsheet applications. It is meant to be used by a workgroup, such as a team of real estate agents, and offers a simplified template interface to access a user's own file of real estate listings.

Mainstreet Software, Inc., 381 Park Ave. S., Suite 801, New York, NY 10016; 212/779-8398. Δ

Circle 69 on reader service card.

SCIP announces add-in memory for MVs

Beverly Hills—MV1520, a new add-in main memory board for MV 15000 and 20000 machines, is now available from System Controllers and Interface Products (SCIP). The new board incorporates "FHCT" logic and 1 MB DRAMS to increase memory access time by 20 percent, according to the company.

The SCIP MV1520 comes in either a 16 MB or 32 MB memory size, with maintenance features including a board edge deselect switch that removes the memory from the system, and an LED indicator for configured memory and active memory. A life time exchange warranty is also included in the cost of the board, which is \$10,500 for the MV1520-16MB, and \$15,000 for the MV1520-32MB.

SCIP, 449 South Beverly Dr., Suite 201, Beverly Hills, CA. 90212; 213/282-8700. Δ

Circle 71 on reader service card.

Rev 3 DISK_PAK: Guess-less and self-reliant

Salina, KS—Eagle Software's rev 3 DISK_PAK disk reorganization and optimization software improves upon previous DISK_PAK revisions by performing its own analysis of frequently used files.

Collecting data from within the system, the new version automatically clusters these files together to reduce seek time. The new method also creates a disk structure that retains its organization longer, thus reducing, and occasionally eliminating the need for frequent reorganizations. Rev 3 is available at no additional charge to current DISK_PAK users.

Eagle Software, Inc., P.O. Box 16, Salina, KS 67402-0016; 913/823-7257, fax 913/823-6185. Δ

Circle 68 on reader service card.

SUCCESS sells

Asheville, NC—Computer Training Associates, Inc. will be marketing ASC Computer Systems' Success software, an integrated property management system that runs under AOS/VS, Unix/AIX, Unix, and DOS. Success is written in DG ICobol, and available for residential, commercial, and HUD property management applications. The package is sold in modules including G/L, A/P, payroll, and job costing. Computer Training Associates has also been certified to train users for Success (no pun intended).

Computer Training Associates, Inc., 1005 BB&T Building, Asheville, NC 28801; 704/251-9551. Δ

Circle 64 on reader service card.

Correction

In the November issue of *Focus*, the Borrowware software package from Bac-Tech Systems was incorrectly identified in a headline as a product for lenders. Borrowware is a loan management and documentation system for loan closing attorneys for banks. Δ

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SYSTEM PERFORMANCE ROUNDTABLE

Sponsored by
The Chicago Area Data General User Group (CADGUG).

Panelists include: Brian Johnson, president of B.J. Inc.
Ron Fitch, founder of Human Insights Group
Members of Data General's SEPAC and development teams.

ALL DATA GENERAL USERS ARE INVITED!

February 21, 1990
Beginning with dinner at 6:00pm.

Call Jim Siegman at 312/673-1700 for more details!



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ON-LINE HELP *Who to call for answers about NADGUG and FOCUS*

NADGUG

Electronic bulletin boards

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OIS (to get an OIS ID and password, contact a DG

field engineering telemarketing representative) 800/325-3065

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In Canada 416/823-7830

Membership, address changes

Jennifer Foye 800/877-4787

(Outside the U.S.) 512/345-5316

Information on RIGs or SIGs

Cathlene Gentry 800/877-4787

(Outside the U.S.) 512/345-5316

NADGUG staff and Focus Magazine address:

c/o Turnkey Publishing Inc.
 Stillhouse Canyon Office Park
 4807 Spicewood Springs Road
 Suite 3150
 Austin, TX 78759

FOCUS Magazine

512/345-5316

Editorial comments, article suggestions.....Robin Perry
 (please send product announcements to the address listed above)

Information about advertising.....Michelle Sentenne

FOCUS back issuesTurnkey Publishing staff

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- AOS/VS
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- CQCS
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- OASIS
(Office Automation)
- :PERFSIG
(performance and capacity planning)
- SIG/UX (Unix)
- SMBASIC

Let the North American Data General Users Group (NADGUG) connect you with other Data General users who have a similar special interest and who want to share information, ideas, problems, and solutions. No matter what the special interest is behind the group — equipment, systems or application software, major language, operating system, industry type — the reason is the same: to work together to exchange ideas on how to get the best performance out of your DG system.

Listed above are NADGUG's current special interest groups. If you are interested in making the connection with one of these groups, or if you have an interest that needs a group, please contact NADGUG's RIG/SIG coordinator, Cathlene Gentry, at 1-800-USR-GRUP (512/345-5316 outside U.S.) for further information.

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512/345-5316 (outside U.S.)

NADGUG Software Library tapes now available for the cost of the tape!

NADGUG's software library gives you access to dozens of useful programs and macros! If you have wanted a copy of NADGUG's software library and just haven't gotten around to sending in your tape, here's a deal for you! NADGUG is now offering to its members software library tapes for a \$30 charge (plus shipping), which covers the cost of the tape. VISA, MasterCard, American Express accepted. We will also bill your company. Call today or fax your order!

1-800-USR-GRUP 512/345-5316 (Outside U.S.) FAX: 512/343-7633

The Aviion's first legal customer is the firm of **Cassels & McCall** of Okeechobee, Florida. The law firm bought an Aviion 5100 server from Data General value-added reseller **Common Language Systems**, whose legal management software, Legal One, will be used for calendar /docket control, client profiles, accounting, trusts, client conflict search, and other aspects of law practice management.

Adding to Data General's range of legal solutions is a new independent software agreement with **Justlaw, Inc.**, of New York and Australia. Running on the MV family line and to be ported to Aviion systems, Justlaw's Evidence is a litigation support package. It includes a feature that allows a legal professional to download portions of a data base to a portable personal computer for use in the courtroom or outside the office.

Fiscal year 1989 for Data General ended with a bang or a thud, depending on your perspective. A companywide consolidation cost Data General a restructuring charge of \$80 million, plus the loss of some 700 employees. Employee lay-offs could double in the new year. Net loss for the year was \$119.7 million, or \$4.10 per share. Net loss for the fourth quarter was \$4.1 million, excluding the restructuring charge.

Data General losses were greater in fiscal 1989 than in the previous year. The 1988 fourth quarter loss was \$49.8 million, and net loss for 1989 was \$15.5 million, or .55 per share, including restructuring charges.

Operating loss for the 1989 fiscal year was \$47.4 million, compared to operating income of \$42.8 million, excluding the restructuring charge. Revenues for the year were \$1.31 billion, compared to \$1.36 billion for 1988.

Company officials play up the bright side of the balance sheet: fourth quarter revenues of \$357.1 million, the highest quarterly revenues reported in DG's 21 years of operation.

"We remain cautious, however, about prospects for 1990," said **Ronald L. Skates**, president and chief executive officer. "Our expectation is that overall demand will continue to be sluggish and erratic, particularly during the first half of the year. Longer term, we are confident that we have taken the right steps to generate revenue growth and become profitable."

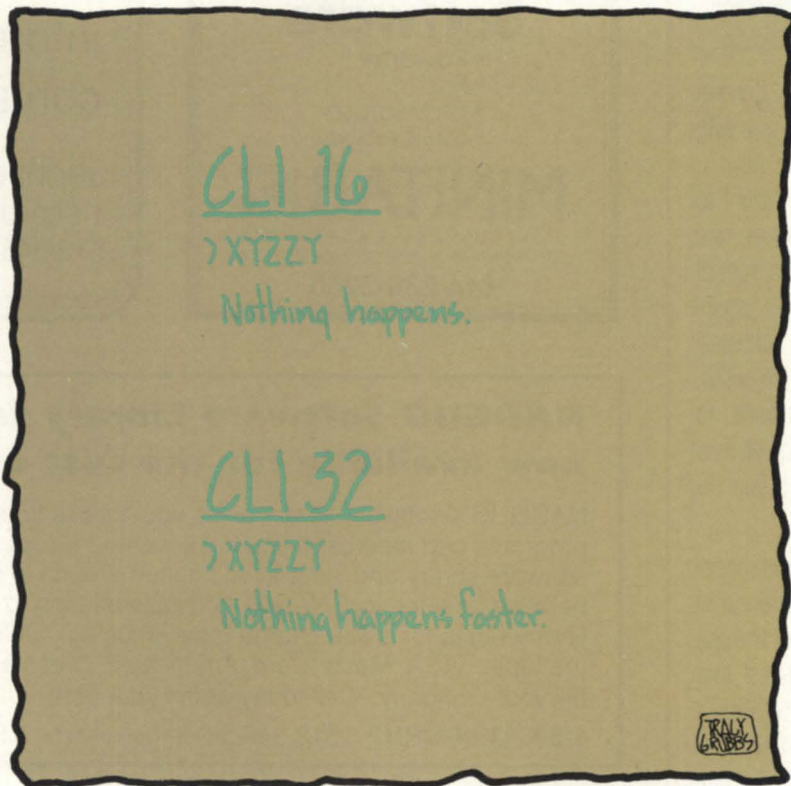
Wordperfect Corporation closed its third quarter with record sales of \$68

million and year-to-date sales of \$227 million. Sales figures are based on the company's two popular software packages, Wordperfect and Planperfect. A new business presentation graphics package, Drawperfect, is in beta testing.

Employees of **Data General Puerto Rico** were commended for their actions in the aftermath of Hurricane Hugo. The government's island-wide office automation system, built around CEO and 13 MV computers, was back in operation within 24 hours after the hurricane's impact. Relief efforts were coordinated through the system. **Mick Barry**, general manager for DG Puerto Rico, reported that "most employees were without running water and electricity for 10 days, but still managed to turn up for work every day and get critical accounts working again."

Data General personal computers and peripherals have been added to the product line of **The Future Now Corporation** of Cincinnati. The Dasher/286-12c and the Dasher/386 are among the solutions now offered by the **Wang** reseller, which markets PC products and computer training through 30 agents across the country.

Vykor Technology of Santa Barbara, California, has signed a value added reseller agreement with DG to market scanning, imaging, and communications solutions on Aviion systems. The applications will interoperate with **DEC**, **IBM**, and Wang products. Δ

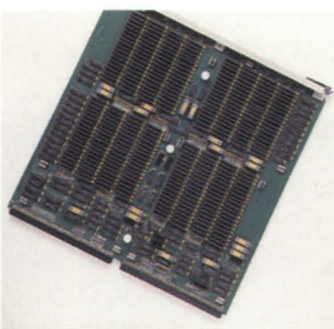


Memory Boards for MV/15000, MV/20000 Computers

Dataram DR-1520 memory comes in 8, 16 or 32MB board capacities. The add-in memory uses 1Mb RAM technology to upgrade processor performance, and does not affect DG service arrangements. Boards are user installable, have Enable/Disable switch and LED indicators.

Dataram Corp. Phone 1-800-822-0071 (NJ 609-799-0071).

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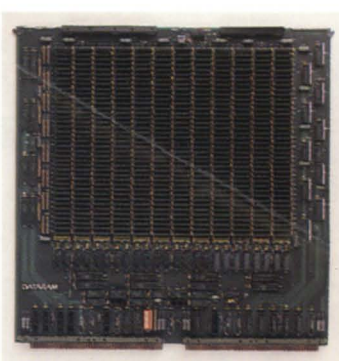


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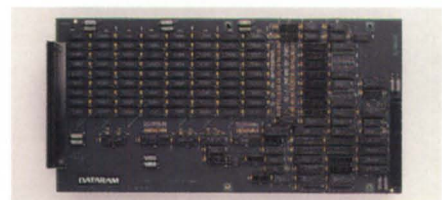
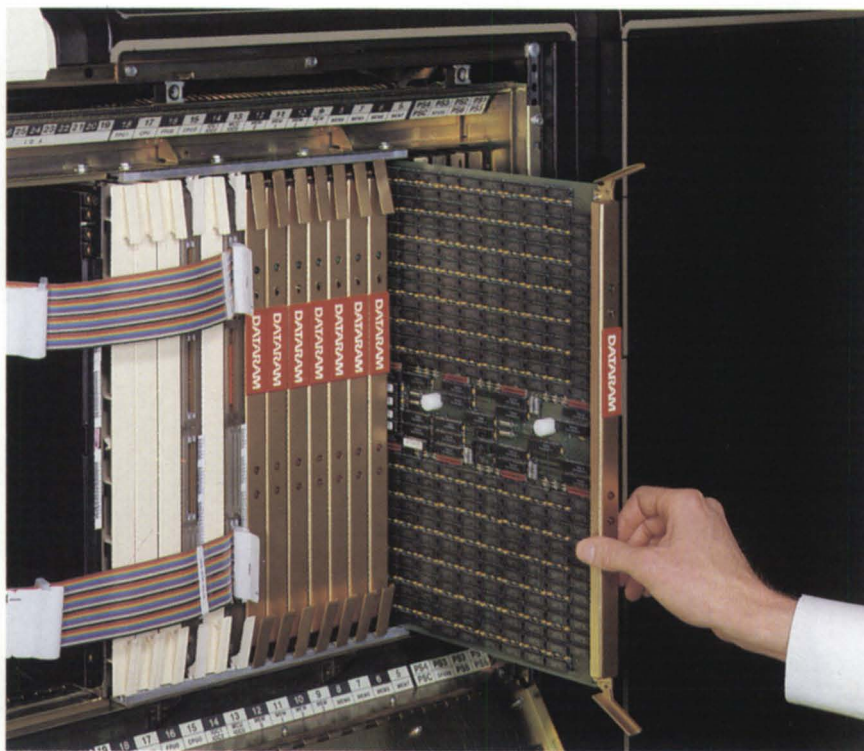
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Main Memory Upgrade for MV/4000 and MV/10000

DR-280 series memory offers a choice of 2, 4 or 8 MB of main memory per board. The DR-280 operates with highest reliability DRAM technology and can be installed in minutes — without hardware or software changes. **Dataram Corp. Phone 1-800-822-0071 (NJ 609-799-0071).**

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Lifetime Warranty on Memory for MV/1400, MV/2000, DS/7500

High-reliability 1Mb DRAM technology on 4MB and 8MB boards brings low-cost boost to processor performance. Dataram DR-1420 memories plug directly into all three processors, do not affect DG service arrangements. **Dataram Corp. Phone 1-800-822-0071 (NJ 609-799-0071).**

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Up to 16MB Extra Main Memory for MV/2500 Series

Dataram's DR-2500 memory boards, available in 8MB and 16MB capacities to improve processor speed and power, are fully compatible with hardware and software for DG's MV/2500. The plug-in memory needs no maintenance, has a lifetime warranty, and is available on a 30-day trial basis. **Dataram Corp. Phone 1-800-822-0071 (NJ 609-799-0071).**

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