September 1993

FOCUS

The Magazine of the North American Data General Users Group

Data General's new Aviions

AV 8500 & 9500 servers, AV 500 workstation join a growing open systems enterprise strategy

In Focus

New Aviion 'benchmark shock'
Unix Notebook: The letter

Plus

BJ's time tricks
More about sar
FSCOPY: a new backup tool
NADGUG 93: Visiting Atlanta
Preliminary conference schedule

Bulk Rate
U.S. Postage
Paid
permit No. 38
Fulton, MO

See us at NADGUG Booth #219

At last – INFOS® on UNIX®!

Transoft is proud to announce U/FOS™ – The UNIX implementation of INFOS you've been waiting for

- smooth, rapid migration of your COBOL, Fortran and PL/I applications
- full INFOS functionality
- automatic data conversion
- choice of major UNIXs
- improved functionality and better utilities
- API for third party software products

Huge savings on redevelopment and retraining costs.

With seven years experience, Transoft are experts in software portability and are a leading international supplier of Open Systems tools to the Data General community. Our UBB Universal Business Basic product – nearly 5,000 copies sold to date – has enabled DG users worldwide to migrate to UNIX. And our powerful U/SQL (Universal Structured Query Language) operates on a variety of COBOL, BASIC and RDBMS file types.

With U/FOS you can achieve not only a smooth, rapid migration of your INFOS applications to UNIX, but also powerful additional features including better data compression, better checkpointing and RDBMS-level data integrity and recovery. SQL reporting is also planned, using our proven U/SQL product.

Act now – get the financial and operational benefits of Open Systems – U/FOS improved functionality – RDBMS-level transaction security – and make massive financial savings on redevelopment and training.

To obtain further details and arrange a personal demonstration, please contact:
TRANSOFT INC, 1100 Circle 75 Parkway, Suite 800, Atlanta, GA 30339, USA.
Tel: (404) 933 1661 Fax: (404) 933 1662
TRANSOFT LTD, Nash House, Datchet Road, Slough, SL3 7LR, England.
Tel: 0753 692332 (Int + 44 753 692332)
Fax: 0753 694251 (Int + 44 753 694251)

TRANSOFT®
Portability and Productivity

Software Tools for Your Trade

INFOS is a registered trademark of Data General Corporation.
UNIX is a registered trademark of UNIX System Laboratories Inc. UBB and U/SQL are Transoft trademarks. All other trademarks are acknowledged.

Circle 48 on reader service card.

Kill ICOBOL Bugs DEAD!

With *RAID**, ICOBOL bugs won't bite you anymore! *RAID* is the only ICOBOL debugger using pop-up windows, pull-down menus, mouse support and simple, speedy command operation. These features combine to give you the most potent, easy-to-use tool for finding and exterminating ICOBOL bugs.

RAID simultaneously monitors break points, program variables and source code in separate windows, allowing you to immediately zoom in on the problem. The result is faster debugging—and increased productivity!

And like all other Wild Hare products, *RAID* is completely portable, to zap bugs no matter where they hide.

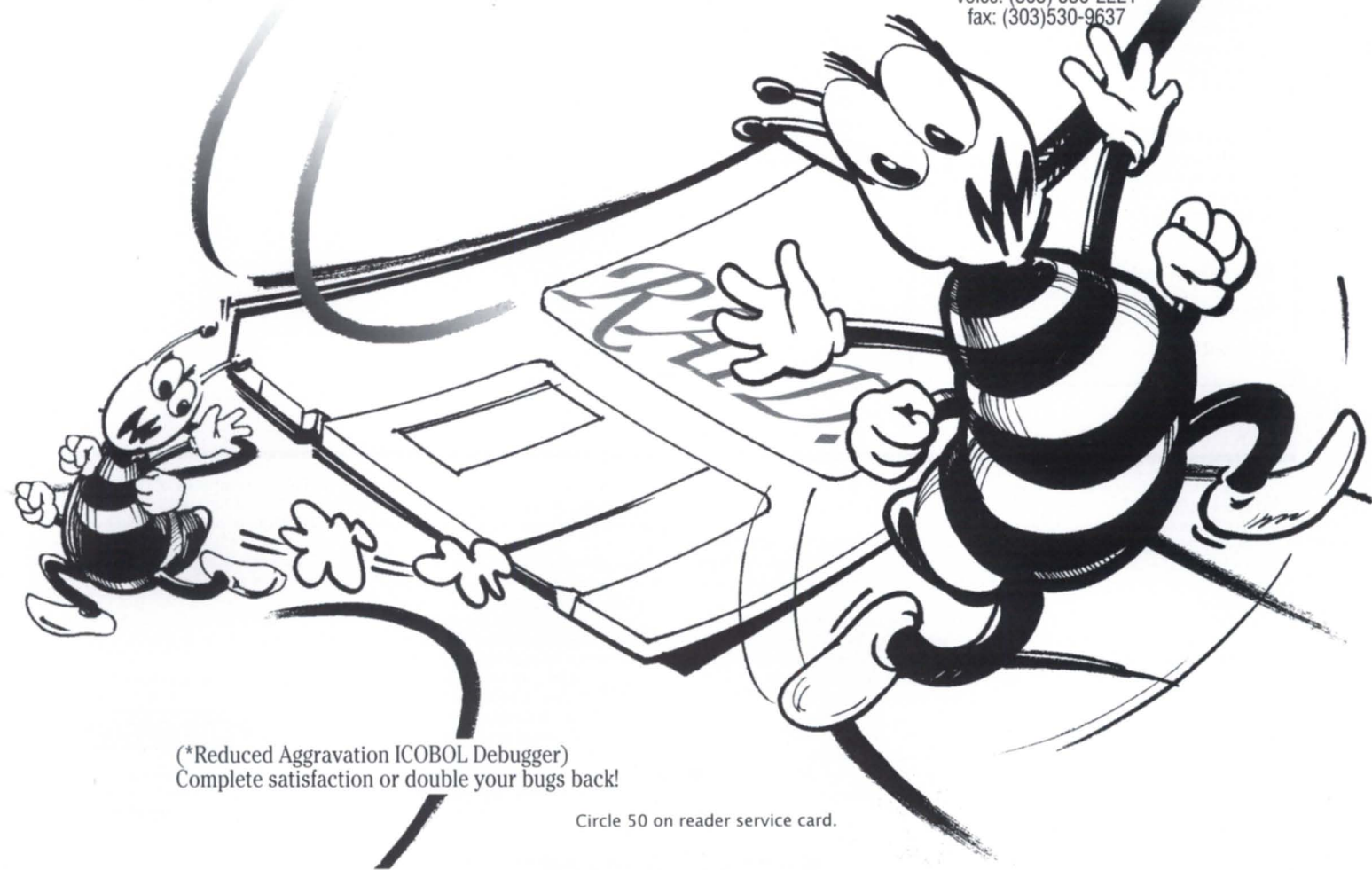
RAID is an integrated part of Wild Hare's *Choice!*™ ICOBOL runtime system and *Axis* ICOBOL compiler. We combined the most portable runtime, the fastest compiler and most powerful debugger to give you unparalleled programmer productivity!

Itching to try it? Order *Axis* with *RAID* by September 30, 1993, and we'll give you *Choice!* FREE! It's even covered by our 30 day sting-proof money back guarantee.

Get rid of ICOBOL bugs now. With *RAID*!

wild hare
COMPUTER SYSTEMS INC

6595 O'Dell Place, Suite M
Boulder, Colorado 80301
voice: (303) 530-2221
fax: (303)530-9637

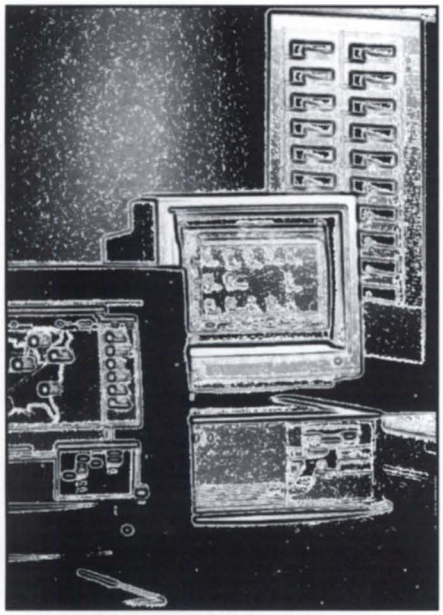


(*Reduced Aggravation ICOBOL Debugger)
Complete satisfaction or double your bugs back!

Circle 50 on reader service card.

FOCUS

The Magazine of the North American Data General Users Group



FOCUS ON: NEW AVIIONS

'Benchmark shock'
Data General's Aviion line expands again, offering eye-popping numbers and tantalizing possibilities
by Doug Johnson **8**

Philosophically speaking
Excerpts from an interview about the new Aviions with Data General's Stephen Gardner, Vice President Aviion Marketing **10**

New DG/UX features **13**

Netware-ready **16**

AV "onGO" **17**

EXECUTIVE MESSAGE

Members, members, members!
by Frank Perry **4**

IN GENERAL

News and notes from the greater Data General community **6**

NADGUG 93

Atlanta: the sweetest peach in the South
High tech meets Southern hospitality for those attending NADGUG 93
by Doug Johnson **18**

Training, networking, & technology
It's the largest gathering of Data General stuff in the world. NADGUG 93 features a full slate of events. Included here is a preliminary agenda to whet your appetite **20**

SYSTEM MANAGER'S LOG

More time tricks
BJ offers a pair of functions for getting current calendar time and converting a calendar time to local time
by Brian Johnson **24**

UNIX NOTEBOOK

The letter
With the release of its new Aviion 8500 and AV 9500 Unix file servers, DG seems to understand what it takes to be successful in the commercial marketplace
by David Novy **30**

AVIION PERFORMANCE TUNING

More about sar
The author continues a series of articles explaining the performance-monitoring utilities available for solving some of the most common bottlenecks affecting DG/UX in a multi-user server environment
by Thomas E. Soukup **32**

AOS/VS II

FSCOPY: a new backup tool
If you have a lot of data to back up, and you need a consistent, fast solution, FSCOPY will likely satisfy your needs
by Mark Wilding **40**

ON-LINE HELP

Who to call for information about NADGUG and Focus **42**

PRODUCTS AND SERVICES

The latest products for Data General systems **44**

BULLETIN BOARDS

DASH items from the Data General Customer Support Center **48**

Cover design by Ann Soto and Casey Hunter; original photo of Aviions provided by Data General

FOCUS, the Magazine of the North American Data General Users Group (ISSN 0883-8194) is the official publication of the North American Data General Users Group (NADGUG) in cooperation with Turnkey Publishing.

Editorial and business offices are at P.O. Box 200549, Austin, TX 78720, phone 512/335-2286. NADGUG headquarters are located at NADGUG, c/o Danieli & O'Keefe Associates, Inc., Chiswick Park, 490 Boston Post Rd., Sudbury, MA 01776, phone 508/443-3330.

FOCUS, the Magazine of the North American Data General Users Group is distributed to members of the North American Data General Users Group. Membership fees are $60 per person ($110 outside North America). A one-year (12 issues) subscription to *FOCUS, the Magazine of the North American Data General Users Group*, costs $48. For memberships and subscriptions outside the U.S., add $50 to defray the cost of mailing.

The cost of single copies is $4. Requests to replace missing issues free of charge are honored only up to six months after date of issue. Send request to *FOCUS, the Magazine of the North American Data General Users Group*, c/o Turnkey Publishing.

NADGUG is an independent association of computer users; it is not affiliated with Data General Corporation, nor does it represent the policies or opinions of Data General Corporation. The views expressed herein are the opinions of the authors, and do not necessarily represent the policies or opinions of NADGUG or of Turnkey Publishing, Inc.

Advertisements in *FOCUS, the Magazine of the North American Data General Users Group* do not constitute an endorsement of the advertised products by NADGUG or Turnkey Publishing, Inc.

Copyright © 1993 by the North American Data General Users Group. All rights reserved. Reproduction or transmission of contents in whole or in part is prohibited without written permission of the Publisher. The Publisher assumes no responsibility for the care and return of unsolicited materials. Return postage must accompany all material if it is to be returned. In no event shall receipt of unsolicited material subject this magazine to any claim for holding fees or similar charges.

Volume 9, Issue 9.

NORTH AMERICAN DATA GENERAL **USERS GROUP**

DATA GENERAL IS OPENING A LOT OF EYES WITH THE BEST OPEN SYSTEMS SERVER IN THE WORLD!

The AViiON 9500– for performance range, high availability, data integrity, storage management and price/performance. It's simply the best open systems server in the world!

AViiON®–The complete open enterprise solution:
Flexibility–Choose the size server you require today.
Scalability–As your needs expand, the AViiON 9500 grows to 1600 MIPS of power.
High Availability & Data Integrity & Storage Management–
The combination of AViiON servers, CLARiiON™ storage products and the DG/UX™ operating system is unmatched.
Price/Performance–AViiON is a recognized industry leader.

AViiON–Impeccable credentials:
A $1 Billion customer base in less than four years.
Voted #1 for Customer Satisfaction in Computerworld's "CW Guide to Servers."*

AViiON–The world's best server!
From a company that understands your enterprise computing needs. Call **1-800-DATA GEN**

Data General
Where the World is going!™

Circle 13 on reader service card.

AViiON is a registered trademark and CLARiiON and DG/UX are trademarks of Data General Corporation. © Data General Corporation 1993 *March 22, 1993

Frank Perry

Members, members, members!

by Frank Perry

My role as NADGUG membership chairman is one thing I would like to address in my turn at this column. Any organization is only as good as its membership, and my job (along with all the other members) is to increase that membership. To do that we have developed a series of programs and benefits.

I'm sure most of you have seen our literature touting NADGUG membership benefits, and I won't be repeating them all in this column. Instead, let me tell you why I belong to a user group, and specifically, why I belong to NADGUG.

I was in the data-processing field for some 30 years before my recent retirement. I always found that no one person had all the answers, nor could any one company afford to develop everything it needed. My participation in groups of users always seemed to provide me with more than it ever cost us.

At every meeting or conference I ever attended, I met a person or attended a presentation that gave me an answer to a problem I was facing right then, or would face in the future. I even found answers for problems I didn't know I had—how's that for networking? I also met some nice people who were going through expansions, systems tests, and other experiences. I could call them later for advice.

Another facet of user groups is that they are more effective in getting the attention of the company, in this case Data General. If you are a very large user you probably don't need this clout, but for more average-sized users it helps to collect our problems and concerns for presentation. History has shown that this approach worked for NADGUG, and today we are able to review RFEs (requests for enhancement) and prioritize them through our Special Interest Groups (SIGs). The SIGs have been quite active in this process, which was developed several years ago by Dennis Doyle when he was NADGUG vice president. Meetings at the annual conference and correspondence help SIGs gather input about what various products need.

Enough about benefits! I'm preaching to the choir, anyway. We are trying hard to grow the membership and to retain our present membership. One of our growth vehicles is the "Box-Of-Tide" program, where Data General gives six-month trial memberships to new customers on a selected basis. We have developed a procedure to establish and maintain contact with these prospects in an attempt to convince them of membership benefits and get them to join. We are also working to retain our present membership with a system of follow-up telephone calls by a select committee. Anyone wanting to help in this effort should call me at 401/397-3533.

One of the benefits of living in New England is that I am close enough to attend some of the larger Data General product announcements. I had the opportunity to be at the June 29 announcement in Boston of the new Aviion AV 8500 and AV 9500 server systems. I was most impressed by these products and their positioning in the overall product line. As an old MV user, as well as a user of centralized systems, it seems that the Aviion product line has now addressed the needs and concerns of users like me—allowing me to continue with a centralized environment, or to partially (or totally) decentralize.

The ability to network, always one of Data General's strong points, is enhanced even more by the new Aviions. I encourage all of you to look at these systems as you grow. I'm sure they'll be available in Atlanta during the October conference, so I'll see you there. Δ

Frank Perry is a past NADGUG president, and currently is chairman of the Membership Committee.

FOCUS
The Magazine of the North American Data General Users Group

NADGUG LEADERSHIP

President
Jan Grossman

Vice President
Tim Boyer

Treasurer
Steve Pounds

Recording Secretary
Thomas Bounds

Audit Committee/ Conference Committee
Calvin Durden

Membership Committee
Frank Perry

Planning Committee
Dennis Doyle

Publications Committee
Maggie Morris

RIG/SIG Committee
Al Devitt

By-Laws Committee
Brad Friedlander

FOCUS MAGAZINE

Publisher
Greg Farman, Ph.D.

Associate Publisher
Robin Perry

Editor
Doug Johnson

Contributing Editors
Tim Boyer, Brian Johnson, Doug Kaye, Kim Medlin, David Novy

Contributors
Frank Perry, Thomas E. Soukup, Mark Wilding

Advertising Manager
Susan de Blanc

Art Direction & Layout
John Houser, Casey Hunter, Ann Soto

Office Manager
Pam Sicking

Assistants
Tammy Agnew, Dana Marruffo

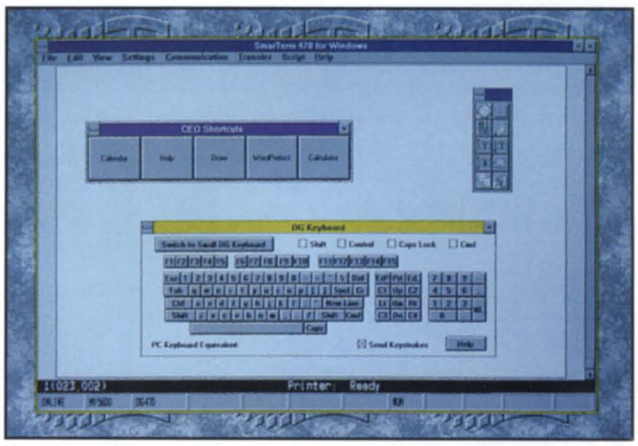
Discover the basic principle of connectivity ...

Defy the gravity of your connectivity problems.

It's a basic principle worthy of Newton:
When the complexities of multiple platforms weigh you down, discover superior PC-to-host connectivity with new SmarTerm®470 for Windows.

Take emulation to new highs.
SmarTerm 470 for Windows provides PC users with the only full-featured, precise Dasher 470C terminal emulation software for Windows with connectivity to MV and AViiON hosts. Whether you need emulation for text or graphics, SmarTerm connects on the highest levels.

Break free under your own power.
Escape from high internal support costs with the ease of Windows and SmarTerm's pioneering corporate support tools and utilities, including simplified graphical keyboard remapping, a pop-up virtual DG keyboard, an on-screen toolbox, user-definable button palettes, powerful scripting, scrollback, and a customizable help system. You'll reduce calls to the help desk and standardize your site's connectivity.



New SmarTerm 470 for Windows corporate support tools.

Discover SmarTerm.

SmarTerm 470 for Windows is the only emulation software that includes SmarTerm TCP/IP FREE. Get Windows Sockets TCP/IP and more, at no extra cost! Plus get drag-and-drop FTP, XMODEM, YMODEM, ZMODEM, and Kermit file transfer protocols. Discover the basic principle of connectivity today. Call **1-800-EMULATE.**

Persoft U.S.A. 465 Science Dr. • Box 44953 Madison, WI 53744-4953 • Phone (608) 273-6000 • Fax (608) 273-8227

Persoft Europe World Trade Center • Beursplein 37 • Box 30237 • 3001 DE Rotterdam, The Netherlands
Phone +31 10 405.3560 • Fax +31 10 405.5073

persoft®
CONNECTIVITY SOLUTIONS
DOS • Windows • Ethernet • Token Ring

©1993 Persoft, Inc. All rights reserved. Persoft and SmarTerm are registered trademarks of Persoft, Inc. All other trademarks mentioned are properties of their respective owners.

Circle 34 on reader service card.

More (*wince*) red ink

Data General reported a net loss of $16.4 million (47 cents per share) for the third quarter of fiscal 1993, which ended June 26. The company had reported a net loss of $11.7 million (35 cents/share) during the same quarter in 1992. Revenues for the third quarter of 1993 were $252.4 million, down from $259.2 million for the same period a year ago.

Commenting on the quarter results, Data General President and Chief Executive Officer Ronald L. Skates said, "The weak worldwide economy, particularly in the European marketplace, and industrywide competitive pricing pressures continued to negatively impact both our revenues and overall results."

Aviion open systems, the company's leading revenue producer, again

Data General Corporation

Condensed Consolidated Statements of Operations

(in millions except per share amounts)

	Quarter Ended June 26, 1993	Quarter Ended June 27, 1992	Nine Months Ended June 26, 1993	Nine Months Ended June 27, 1992
Revenues:				
Product	$151.9	$151.4	$494.9	$501.3
Service	100.5	107.8	304.6	326.5
Total revenues	**252.4**	**259.2**	**799.5**	**827.8**
Costs and expenses:				
Cost of product revenues	96.7	92.9	302.6	289.8
Cost of service revenues	60.0	63.7	177.8	195.3
Research and development	24.1	27.4	76.0	83.6
Selling, general, and administrative	85.3	85.1	257.4	269.8
Restructuring charge	—	—	—	48.0
Total costs & expenses	**266.1**	**269.1**	**813.8**	**886.5**
Loss from operations	(13.7)	(9.9)	(14.3)	(58.7)
Interest income	2.1	2.7	6.4	8.7
Interest expense	3.6	3.6	10.9	10.9
Loss before income taxes	(15.2)	(10.8)	(18.8)	(60.9)
Income tax provision	1.2	0.9	4.4	2.1
Net loss	**$(16.4)**	**$(11.7)**	**$(23.2)**	**$(63.0)**
Primary and fully diluted net loss per share	$(0.47)	$(0.35)	$(0.67)	$(1.93)
Weighted average shares outstanding	34.8	33.1	34.8	32.6

Data General • Buy • Sell • Trade

Processors:

MV40000 HA2	SAVE $
MV40000 32MB	SAVE $
MV30000 Model 1, and MOD 2,3,4 Upgrades	Call
MV20000 16MB Models 1&2	SAVE $
MV20000 Model 1 to Model 2 upgrade	SAVE $
MV 15000-20 upgrade from any system	SAVE $
MV10000 4MB	$2,000
MV8000-II 8MB	900
MV9500 CPU w/32MB	25,000
MV9600 CPU w/32MB	36,000
AViiON All Models	**SAVE$**
MV8000 Model 9300	800
MV 7800/MV7800XP 4MB 16 Slot	1900/2900
MV4090 2MB	700
MV4000DC 2MB, 120MB, floppy	1,200
MV2000 Enhanced 4MB 160 MB disk	3,200
4380 ISC-2 (Synch)	300
AViiON 5225+	Call
AViiON 4100	Call
AViiON 4625	Call

4370 IAC-16 RS232, 20MA, W TCB	$600
4623 IAC-24 w/TCB-24	3,300
ANY TERMSERVER OR TRANCEIVER	
4367 IAC-8 RS232, 20MA Modem Cnt	400
4532-A ILC	2,350
4560 LAC-12	450
4586 ITC-128 terminal controller	4,950

Disk Storage Units:

6161 147MB Disk subsystem	$400
6236 354MB Disk subsystem	600
6239 592MB Disk subsystem	1,950
6329 120MB MV2000/MV1400	600
6363 160MB MV2000/MV1400	900
6491 322MB for MV2500 or CSS	1,300
6554 662MB for MV2500 or CSS	1,700
6581 500MB R.A.M.S. Disk	Call
6720 CSS2 1.0GB Disk subsystem	7,000
6685 1.0GB Disk Drive A/O	2,700
2351 Fujitsu w/BMX3	2,500
6061/6122 Zebra Disks or Parts	Offer
Zetaco ARZ, SKS and Laser Disk subsystems	Call

Terminals:

6165 D460 Monitor with keyboard	$150
6166-X D410 Monitor with keyboard	120
6169-X D211 Monitor with keyboard	125
6391-X D214 Monitor with keyboard	140
6392-X D215 Monitor with keyboard	150
6393-X D411 Monitor with keyboard	160
6394-X D461 Monitor with keyboard	250
6500 D216 Monitor with keyboard	210
6682 D217 Monitor with keyboard	275
6567 D412 + Monitor with keyboard	275
6683-X D413 Monitor with keyboard	350
6568 D462 + Monitor with keyboard	500
6693G-X D1400i Monitor with keyboard	375

Tapes:

6026 800/1600 BPI Brown, FCC compliant	550
6341-A 1600 BPI Streaming Tape (SCSI)	1,100
6299/6300 1600/6250 BPI	950
6586-A Galaxy Tape (SCSI)	3,200
6587-A 1600 BPI Tabletop (SCSI)	3,900
6590M 2GB Subsystem (SCSI)	2,500
6588/6589 6250BPI Tape (SCSI)	8,500/8,700

THOUSANDS of Parts For DG Machines

Processor Options:

4380 ISC-2 (Synch)	$300
8997 Expansion chassis MV15, 20	2,500
8819 Second IOC for MV10000	1,000
8762 Expansion chassis	1,900
4543-B MCP1 8 Async 2 Sync DCH Ptr	1,050

Specials
HiPerStor disk arrays used on MV, AViiON , SUN, HP, NOVELL, & More!

Printers
Genicom
Data prodcucts
Data South
Mannesman Tally

Memories
Data General and Third party memories available for all systems

International Computing Systems
P.O. Box 343 • Hopkins, MN 55343
1-800-522-ICSC (4272)
(612) 935-8112
FAX 612/935-2580

Call for our low prices!

Circle 24 on reader service card.

posted growth compared to the previous year's comparable quarter, but declines in proprietary Eclipse MV line revenues and in services business more than offset the gains.

The company added to its Aviion line in June with the introduction of the AV 9500 and AV 8500 family of servers, and the AV 500 workstation. Also announced was an enhanced version of its DG/UX Unix operating system (see article, beginning page 8).

For the first nine months of fisc 1993 DG reported a net loss of $23.2 million (67 cents/share). For the same period in 1992 the company reported a net loss of $63 million ($1.93/share). The 1992 loss included a restructuring charge of $48 million resulting from costs associated with a workforce reduction. Revenues for the three quarters totaled $799.5 million, compared with $827.8 million fior the same period last year.

"The continued success of the Avion line strongly reinforces our belief that our open systems strategy is correct for the needs of the marketplace," Skates said. "However, in light of current worldwide econonic conditions, we continue to be very cautious about the remainder of 1993."

Eagle names Heichel

"Still in stride and poised for the future," says the press release from Eagle Software announcing the appointment of David Heichel as president and CEO. Mr. Heichel has been with Eagle Software for seven years, acting as interim CEO since January. Prior to his appointment, he served as vice president of product development. He is the author of Eagle's DISK_PAK software.

David Heichel

In General is compiled by Robin Perry. Please send news items to Robin, c/o Focus magazine, P.O. Box 200549, Austin, TX 78720; 512/335-2286; Fax: 512/335-3083.

Fire sale

It wasn't the fire that damaged the MV/9300 at Ralph's Federal Credit Union in Los Angeles on June 9. It was the water used to douse the particularly stubborn blaze located on the roof directly above the computer room.

The next day, Ralph's transferred computer operations to its hot-site provider Data Assurance Corporation (DAC) of Englewood, Colorado. DAC built the system to specifications from system tapes that had been stored at DAC so that all that was left to do when the emergency was declared was ship communication equipment and applications data. By Thursday evening, June 11, Ralph's was running live via DAC's system. Δ

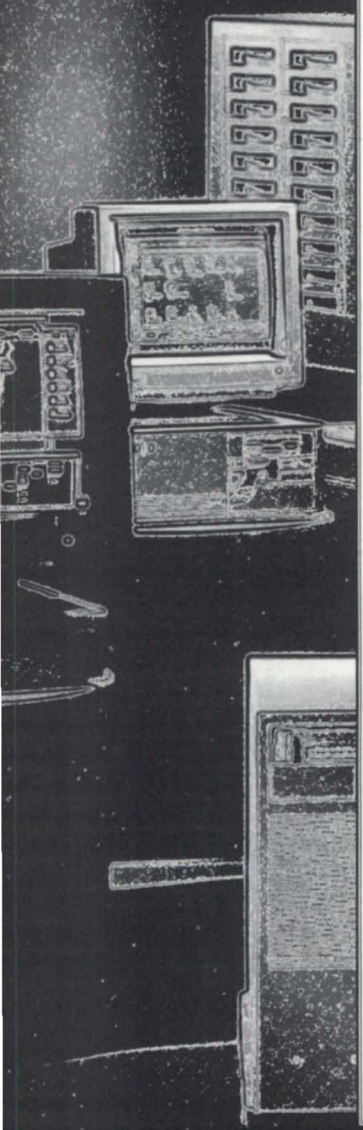
Circle 20 on reader service card.

Benchmark shock

SYNOPSIS

Data General's Aviion line expands again, offering eye-popping numbers and tantalizing possibilities.

by Doug Johnson
Focus staff



Incredible, astounding, inconceivable . . . At some point will we run out of superlatives to describe the transcendentally extraordinary systems that crowd the computer industry landscape these days? Well, it may have happened already.

Just a couple of years ago Data General did a clever pizza-box promotion in which it crowed, "We fit 117 MIPS (million instructions per second) of Mainframe Power in a Pizza Box!" That was the Aviion 7000 and 8000 series, top of the line at the time. They *were* quite impressive, stupendous, fantastic, and so on. And then the top-of-the-line number skipped upward to 235 MIPS the very next year.

Today you might stretch, yawn, and ask, "Only 117 MIPS? *Only* 235 MIPS?" and return to channel-surfing on cable TV. We humans possess an innate tendency to grow accustomed to things, even the amazing, the phenomenal, and so on.

But stifle that yawn a moment and imagine a couple of new high-end Aviion servers. Call them the AV 8500 and AV 9500, give them the new Motorola 88110 chips, and unveil them publicly in an important product-announcement event on June 29. As for performance stats on these newest, fastest machines, let's go all the way to the wall with it and toss out a really eye-popping number:

1,600 MIPS

Note the "benchmark shock" on individual faces in the audience.

Now sure, systems just a few years from now probably will blow these away, but allow yourself to be dazzled for the moment. According to Data General, its new 16-processor Aviion AV 9500 server offers *four times* the performance of its previous top-line Aviion system—up to 1,600 MIPS. That's 1.6 *billion* instructions per second and 1,000 TPS (transactions per second).

"Well it *is* staggering," said Stephen Gardner, DG's vice president of Aviion marketing. "It was only six or seven years ago when we were absolutely thrilled when we got around 10 to 15 transactions per second. The majority of the market at that time felt that was pretty good."

But users and customers today are doing things with technology that far surpass what was even possible just a few years ago. And getting more computing power tends to feed the need for still more.

"If we had brought a system to market four or five years ago with 1,600 MIPS and 1,000 transactions-per-second performance, nobody would have known what to do with it," said Gardner. "It would have been the greatest White Elephant of all time. Now, it's mainstream."

AV 9500

It may look like a funky refrigerator in the promo photos, but the AV 9500 is the new flagship

of the Aviion family. With from 2 to 16 processors, it's intended to satisfy the broad computing demands of a variety of organizations and departments (spec and price charts on page 12), whether it's 100 users or more than 1,000, in distributed or centralized arrangements.

It is in the 16-processor configuration that the AV 9500 server will be able to process up to 1,600 MIPS and handle 1,000 transactions per second. The AV 9500's 8-processor version will provide up to 800 MIPS and 600 transactions per second. AV 9500 models with 12 and 16 processors will be available in the spring of 1994.

AV 8500

The new AV 8500 is considered a mid-range server, available in both dual and quad configurations, and upgradeable from a 2-processor to a 4-processor system by adding CPUs. As an enterprise server the AV 8500 can deliver computing resources for 75 to 300 users, but could serve up to 600 in a larger setting. As enterprise servers, the AV 9500 and 8500 both support Unix, MS-DOS, Apple, and Nextstep operating systems.

AV 500

Offered as a low-end, desktop color graphics tool, the new AV 500 workstation provides a platform for GIS (geographic information systems), data base management systems (DBMS), software development, and other commercial client/server applications. The AV 500 provides faster integer and floating-point performance for CPU-intensive applications. Its expansion capability, from 16 MB of memory to 128 MB, and high storage capacity (up to 2 GB internal), allow the system to grow and evolve along with the work it has to do.

"The Aviion servers we introduced today [June 29] again demonstrate Data General's ability to design and deliver products that technologically are the finest in the industry," said Thomas West, the company's senior vice president of Advanced Development.

Pricing for the AV 9500 server will start at about $84,000 for the 2-processor version; $104,000 for the 4-way model; $125,000 for the six-processor model; $144,000 for the 8-processor model; $220,000 for the 12-way version; and $280,000 for the 16-way version. AV 8500 prices begin at $36,000 for the 2-processor model and $56,000 for the 4-way version. The AV 500 workstation will be priced at $15,000.

"These new products significantly strengthen our popular Aviion line," said Ronald L. Skates, DG president and chief executive officer. In its four years of existence the Aviion line has grown to a customer base of more than 20,000 installations.

Software partners

Joining Data General in its June 29 product announcement were several software industry leaders, including Oracle Corporation, Computer Associates, Information Builders, Inc., and

Continued on page 15

ASSET REMARKETING CORPORATION

1103 S. Cedar Ridge Drive
Duncanville, Texas 75137
(214) 296-9898 (800) ARC-9993
FAX (214) 296-9651

DATA GENERAL HARDWARE

IF IT'S IN STOCK, WE WON'T BE UNDERSOLD . . . GIVE US A TRY

MV5500DC W/16MB,662	$7,500	IAC 24 RS2S232 W/TBC	$2,600
MV18000-SX COMPLETE	4,500	IAC-16 4370	165
10432-DD 10KVA UPS	6,000	LAC 16/2 RS232 4713	2,000
AVIION 7420 VME8/P	400	6554 662MB DISK DRIVE	1,200
AVIION 3200 16MB, 662	2,750	6541-A 1 G/B SMD DISK	1,200
MV1000, 4MB, 179, 150MB	1,600	6239-A 592MB ARGUS 2	795
AVIION VDC 128 CTRL	1,000	6591 2 G/B TAPE SCSI	1,400
MV3500 W/8MB, 150MB	3,900	6539 179MB SCSI DISK	600
AVIION 2 G/B TAPE/PHU	1,800	MAXTOR 8760-E EDSI/DG	1,200
AVIION SMD DISK DRIVE	1,200	6631-A 600MB RAM DISK	2,500
MV15/20 DATARAM 16MB	850	6236-A 354MB DISK DRIVE	200
MV15/20 EXP CHASSIS	750	6299 OR 6300 TAPE S/S	1,000
MV15/20 16MB MEM PCB	1,500	2 G/B TAPE IN PHU	1,800
MV15/20 FPU 8991	600	1.3 G/B SCSI-2 DISK	1,500
MV15/20 MID PCB R61	1,600	SPARK TAPE CONTROLLER	800
MV7800 CPU W/4MB	300	6475 LASER 12PPM 3/BIN	600
D/461 W/KYBD	250	D/216+ W/BARCODE OPT	275
D/411 W/KYBD	165	D/215 W/BARCODE OPT	225
D/460 W/KYBD	125	D/462E WHITE SCREEN	250
D/410 OR D/211 W/KYBD	100	D/216 MODEL 2 W/KYBD	175
D/214 W/KYBD	100	DG HRMC-2 CONTROLLER	1,000
D/215 W/KYBD	125	MV10000 CPU BOARD SET	400
D/462 GREEN OR AMBER	250	MV4000 CPU BOARD SET	100
D/217-G W/KYBD	250	DATA PRODUCTS BP1515 STCKR	400
D/216+ AMBER W/KYBD	195	4518 OR 6321 PTR	150
D/578A W/KYBD	225	D/216+E PHROM	100
D/216 W/KYBD	160	S/140 256KB MEMORY	50
D/578-E/A W/KYBD	250	S/140 512KB MEMORY	150
D/470C COLOR CRT	300	S/140 CPU W/HFU 14501	600
LAC 16/2 4712 RS422	600	NOVA 4 MEMORY	CALL
6026 TAPE DRIVES/PARTS		MV4000 PARTS/BOARDS	
6125 TAPE DRIVES/PARTS		DATA PRODUCTS B1515 POWER STACKER	

BUY SELL LEASE TRADE

Circle 3 on reader service card.

Fires, Earthquakes, Floods!

1992 brought hurricanes, fires, floods, earthquakes and more, just about every possible disaster that could strike. Is your company prepared?

Data General Business Recovery Services offers you peace of mind

If disaster strikes, the same professionals who know your computers best will fully support your disaster recovery, providing a wide range of recovery solutions.

Data General Business Recovery Services Supports all of Your Needs, Including:

Hot-Site Service through established, dedicated hot-sites

On-Site recovery support

Computer Operation Relocation Service

Don't Wait till Disaster Strikes- Call 1-800-DATA GEN Today!

Data General
Where the World is going!

Copyright 1993 Data General Corporation.

Circle 10 on reader service card.

Philosophically speaking

(Excerpts from an interview with DG's Stephen Gardner)

"Enterprise" computing and a DG philosophy of thinking

"You used the words, "taming and managing complexity," in your question. That is *the* challenge, not only for people trying to move from a proprietary to an open systems environment, but it's the challenge that faces *anybody*...

"[Enterprise computing] is further and further integrating technology into the basic fabric of a business. It's not simple. And I think a vendor who strives to cut through the fog of acronyms and buzzwords and Bs and Cs, and can help provide people with a relatively simplistic view of complex technology, is a vendor that is adding value by its very approach. And that is one of the things that we're definitely trying to do.

"We stressed very heavily during the course of this new product announcement the whole concept of common sense and pragmatism around the creation of solutions. And it felt right to all of us because it was in many ways an embodiment of who we are—if you look at our sales force, or marketing team, our development people; they're very down-to-earth people. They're not people who are up in the clouds, dealing with advanced theory that won't be applied for the next 10 years, or off on missionary efforts trying to open up new markets. What we're trying to do is pragmatically bring good technology, or excellent technology, together to create outstanding, simple systems solutions. It sounds simple, but behind it is really the fact that we're managing a lot of complexity that we're hoping our customers never have to see.

A new Aviion culture

"The [Aviion] customer base is, to a very large extent, relatively new to Data General. In fact, about 70 percent of our base—or 70 percent of our sold systems—came from customers who weren't previously with Data General. So a lot of customers are dealing with us as a supplier for the first time. It also brings a lot of people who are making their initial move to open systems from the proprietary world.

Stephen P. Gardner
Division Vice President
Aviion Business Unit—
Marketing

Stephen Gardner is responsible for all aspects of marketing Aviion hardware and software products, including product marketing, marketing programs, and operations. He joined Data General in February 1993 after five years at Bull Worldwide Information Systems.

While at Bull he held a series of senior management positions, including president of Integris, vice president of North American marketing, and vice president of small systems product lines. Prior to Bull Worldwide Information Systems, Mr. Gardner was with Stratus Computer as district manager of federal system sales; Sequoia Systems as director of sales; Burroughs Corporation as director of product management and director of strategic planning; and with Bain and Company as a senior consultant.

Mr. Gardner holds an MBA degree from Harvard University and a BA degree from Princeton University.

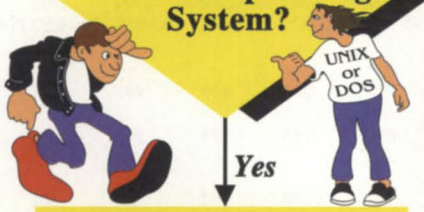
"So, if there's a common thread among our customers that has deeply influenced, *deeply* influenced, the nature of the products we build and the services that we decide to provide, it's a high degree of desire for us not only just to provide a product, but [also] take on a role of helping them match the product to their particular business, through services or software or both. It's a much more service-hungry, solution-hungry base than the old minicomputer customer base necessarily was, although certainly to generalize like that, immediately a dozen exceptions come to mind. But in general I would say that the Aviion base is a very, *very* solution-oriented base, whether it be our VAR solutions, which is about half of our business, or whether it be our directly provided customers, which is the other half." Δ

ATTENTION CEO USERS!

EAGLE Software Has Got You Covered!

Yes

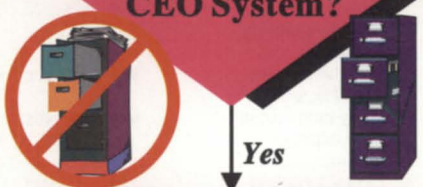
Moving to Another Operating System?



Yes

No

Need to Optimize Your CEO System?



Yes

No

Tight On Disk Space?

Yes

No

New!

CABINET_CONVERTER™

Migrate CEO Files to UNIX® or DOS®

- Allows mass conversion of CEO files to any word processor or spreadsheet supported by CEO_DOC_CONVERT or KEYpak.
- Moves information stored in the CEO document summary to the summary fields in WordPerfect.™
- Perform one mass migration or migrate in stages to meet users' needs.
- Flexibility allows customization to meet your specific migration needs.

MAID™ for CEO®

CEO Optimization Utilities

- Recovers wasted disk space by the tens of thousands of blocks.
- Provides full-time notification of new CEO mail and reminders even if you're not in CEO.
- Helps avoid document loss and keeps CEO_INDEX errors from corrupting your files.
- Allows operations on the CEO filing system not normally available through CEO.
- Supercharges the performance of the CEO mail system.

New!

DOCtAR™

DOCument ARchiver and Compressor for CEO

- Compresses and archives CEO documents up to 70% to any directory.
- Allows immediate restores by CEO users as a CEO user application or CLI program.
- Runs in conjunction with, or in place of, the CEO_ARCHIVER.
- Includes all the compression software you need at one low price.

Also from EAGLE...

FILE_MONITOR™
A superior file usage monitor and disk balancer.

DISK_PAK™ OnLine!™
Optimize your disks without shutting down your MV.

VS_TOOLBOX™
Powerful tools for MV management, optimizing INFOS®, and system security.

RUSH™
Now you can FAX documents directly from your MV terminals!

DISK_PAK™
The premier disk optimization product for MVs.

Call Today!

1-800-477-5432

EAGLE Software, Inc.
123 Indiana Avenue
Salina, KS 67401
Phone: 913-823-7257
FAX: 913-823-6185

Circle 21 on reader service card.

Developing

ORACLE®

applications?

We can help!

We have over 300 person years of experience in developing complex Oracle applications

We provide

- ❒ Data Modelling
- ❒ Database Design
- ❒ Application Development
- ❒ Technical Support
- ❒ User Training
- ❒ Performance Tuning

Why us?

Use our technical expertise in SQL*Forms, Pro*C, Oracle RDBMS and performance tuning.

Minimize your risks with our excellent project management skills.

Cut your software costs using our high-technology labs in India.

Get excellent support. We can provide 7 days, 24 hours technical support.

ORACLE is a registered trade-mark of Oracle Corp.

Intelligent Information Systems, Inc.

P. O. Box 68035
Raleigh, NC 27613
Ph: (919) 870-9356
Fax: (919) 870-5346

713, Anna Salai
Madras, 600 002
INDIA
Ph: 91-44-883-545
Fax: 91-44-825-3280

Circle 25 on reader service card.

Aviion high-end servers

	AV8500	AV8500	AV9500	AV9500	AV9500	AV9500	AV9500	AV9500
Processors	2	4	2	4	6	8	12	16
MIPS	180	360	180	360	540	720	1200	1600
Cache	0.5 MB	1 MB	0.5 MB	1 MB	6 MB	8MB	108 MB	144 MB
Memory								
Min.	64 MB	64 MB	128 MB	128 MB	128 MB	128 MB	128 MB	128 MB
Max.	2 GB	2 GB	2 GB	2 GB	2 GB	2 GB	2 GB	2 GB
VME Options:								
VME slots internal	5	5	5	5	5	5	5	5
VME slots external	N/A	N/A	8/16	8/16	8/16	8/16	8/16	8/16
Form factor	6U	6U	6U	6U	6U	6U	6U	6U
Packaging	Office	Office	Rack	Rack	Rack	Rack	Rack	Rack
Mass Storage:								
Max internal	10 GB	10 GB	10 GB	10 GB	10 GB	10 GB	10 GB	10 GB
Max external	1.2 TB	1.2 TB	1.9 TB	1.9 TB	1.9 TB	1.9 TB	1.9 TB	1.9 TB
Clariion disk array	yes	yes	yes	yes	yes	yes	yes	yes
Optical	yes	yes	yes	yes	yes	yes	yes	yes
Backup/Load Devices:								
CD-ROM	std	std	std	std	std	std	std	std
Cartridge	8 mm 525 QIC 4 mm	8 mm 525 QIC 4 mm	8 mm 525 QIC 4 mm	8 mm 525 QIC 4 mm	8 mm 525 QIC 4 mm	8 mm 525 QIC 4 mm	8 mm 525 QIC 4 mm	8 mm 525 QIC 4 mm
Clariion tape array	yes	yes	yes	yes	yes	yes	yes	yes
Reel-to-reel	yes	yes	yes	yes	yes	yes	yes	yes
Communications:								
LAN	1-4	1-4	1-8	1-8	1-8	1-8	1-8	1-8
Synchronous	12	12	36	36	36	36	36	36
Asynchronous	3-1020	3-1020	3-2040	3-2040	3-2040	3-2040	3-2040	3-2040
Parallel printer	LAN	LAN	LAN	LAN	LAN	LAN	LAN	LAN
Users	50-150	125-300	50-175	150-325	300-425	400-550	500-850	800-1000
High-availability Features:								
Fault-tolerant disk array	yes	yes	yes	yes	yes	yes	yes	yes
System failover capable	yes	yes	yes	yes	yes	yes	yes	yes
Power:								
N + 1 cooling	std	std	std	std	std	std	std	std
N + 1 power	N/A	N/A	std	std	std	std	std	std
Uninterruptible power supply	option	option	option	option	option	option	option	option
Recoverable from:								
CPU failure	yes	yes	yes	yes	yes	yes	yes	yes
Memory failure	yes	yes	yes	yes	yes	yes	yes	yes
I/O channel failure	yes	yes	yes	yes	yes	yes	yes	yes
VME channel failure	N/A	N/A	yes	yes	yes	yes	yes	yes

Data General Aviions: example configurations

Configuration	CPU	Memory	Disk Storage	CD-ROM Drive	Tape	Other	List Price
AV 8500	Dual	64 MB	520 MB	yes	- -		$36,000
AV 8500	Dual	128 MB	3.5 GB Clariion array	yes	4 mm DAT		$80,450
AV 8500	Quad	64 MB	520 MB	yes	- -		$56,000
AV 8500	Quad	256 MB	6.0 GB Clariion array	yes	4 mm DAT		$123,750
AV 9500	Dual	128 MB	520 MB	yes	- -		$84,000
AV 9500	Dual	256 MB	6.0 GB Clariion array	yes	4 mm DAT	5-slot VME chassis	$156,575
AV 9500	Quad	128 MB	520 MB	yes	- -		$104,000
AV 9500	Quad	512 MB	14 GB Clariion array	yes	Clariion array	16-slot VME chassis	$262,255
AV 9500	8-way	128 MB	520 MB	yes	- -		$144,000
AV 9500	8-way	1 GB	24 GB Clariion array	yes	Clariion array	16-slot VME chassis	$419,255
AV 9500	16-way	128 MB	520 MB	yes	- -	16-slot VME chassis	$280,000
AV 9500	16-way	2 GB	34 GB Clariion array	yes	Clariion array	16-slot VME chassis	$747,330

New DG/UX features

Data General announced increased high-availability functionality, enhanced storage management, and support for POSIX THREADS in a new release of DG/UX, the Aviion's implementation of the Unix V Release 4 operating system.

"Five years ago, we designed DG/UX to focus on the needs of customers with commercial requirements," said Tom West, DG senior vice president, advanced development. "We focused on symmetric multiprocessing, high availability, security, and systems management. Today, it's arguably one of the industry's best. Now, we're adding more functionality to DG/UX, focused directly at the needs of an enterprise server."

New high-availability features include a distributed lock manager, allowing Aviion systems to be configured in clusters to improve applications availability; online controller restart; applications-transparent use of backup LAN controllers; and dynamic bad-block disk remapping.

Storage management enhancements include virtual disk management (VDM), allowing customers to reconfigure disks online to enhance performance and availability, transparent to applications execution; and the bundling of Legato's Networker for unattended networkwide backup and recovery.

System performance enhancements include support for POSIX 1003.4a standard for THREADS, optimized for symmetric multiprocessing. This allows applications with multiple threads of control, such as data base systems, to take further advantage of the Aviion multiprocessor environment.

DG/UX 5.4, Release 3.0, is scheduled to ship in the fourth quarter of 1993. Pricing will be between $500 and $25,000 depending on the number of users. Δ

SYSGEN DATA Ltd. MARKETING

Data General COMPUTERS & PERIPHERALS WORLDWIDE

MV 15000 MOD 10, CPU Complete	$2,500	6299 S/S	$1,000
MV 15000 MOD 10, CPU Board	1,500	6300 S/S	1,000
MV 15000 MID Board	750	LAC 12	200
MV 2000 4MB, Flpy	1,300	DG 70MB Drive (2000 Format)	300
MV 20000 Model 2 Upgrade	2,000	DG 160 MB Disk	400
MV 20000 Loaded	CALL	MV 7800XP System Configured	1,500
MV 15000/20000 Floating Point	750	B600 LPM Printer	350
6239 S/S 592MB	850	Genicom 3320/3318 Printers	150
DG Shadow 500 MB Disk Drives	1,350	32 MB Memory (MV 20000 Style)	4,500
AViiON 4625 Fully Configured	17,000	MV 5600, LAC 32, 16MB, 1GIG, 150 Meg Tape	2,500
AViiON 5100 Fully Configured	8,500	6321 Printer	100
AViiON 3200 Fully Configured	2,850	MV 5 500, LAC32, 662, 322, 2GIG	9,000
LAN BOARD (2000 Style)	300	D411 175 D211	135
MV 4 & 10 Memory 2MB	100	D214 135 D215	150
STARLAN	1,000	D216 New 365 D412	325
IAC 16 (RS 232) w/TCB 16	150	D462+ 400 D463	425
IAC 16 (RS 422)	150	DG Desktop 10, 20, 30	CALL
IAC 8-2	100	Dataram 16MB (MV 15000)	650

Call For Unlisted Equipment

SYSGEN SPECIAL — DG 6321 Printer $125; DG 500 MB Shadow $1,350; AViiON 4300 System Complete $6,500; AViiON 5220 Call

DATARAM AUTHORIZED DISTRIBUTOR SCIP

BUY • SELL • TRADE • LEASE

PRICING SUBJECT TO CHANGE WITHOUT NOTICE

ALL EQUIPMENT SOLD IS WARRANTED FOR 30 DAYS

Authorized WordPerfect Motorola VAR

12 ELKLAND ROAD, MELVILLE, NY 11747 (516)491-1100 fax: (516)491-1559

Circle 43 on reader service card.

ARC®

COMPRESS and Library Files

Take the Disk Equivalent of . . .

And Reduce it to this.

Now Available for

UNIX*, AOS/VS, MS-DOS, OS/2

Libraries are Compatible on ALL Platforms!

Backup to Tape still available for AOS/VS.

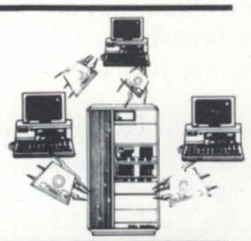
TurboTran™

Xmodem/Ymodem Protocol

provides ***ERROR-FREE*** file transfer to and from ***ANY*** PC, using almost any emulator, at speeds up to 38,000 baud.

The Smart Connection™

Complete PC integration with SmarTerm™ products and perfect integration with CEO.



CORPORATE LICENSES AVAILABLE

DBA Data Bank Associates, Inc.

20010 Century Blvd., Suite 104
Germantown, Maryland 20874
Telephone (301) 540-5562
or FAX (301) 540-8105

MasterCard VISA

*Programmed Specifically for 88K and the DG AViiON.

ARC is a registered trademark of System Enhancement Associates, SmarTerm is a registered trademark of Persoft Corp., CEO is a registered trademark of Data General Corp.

Circle 11 on reader service card.

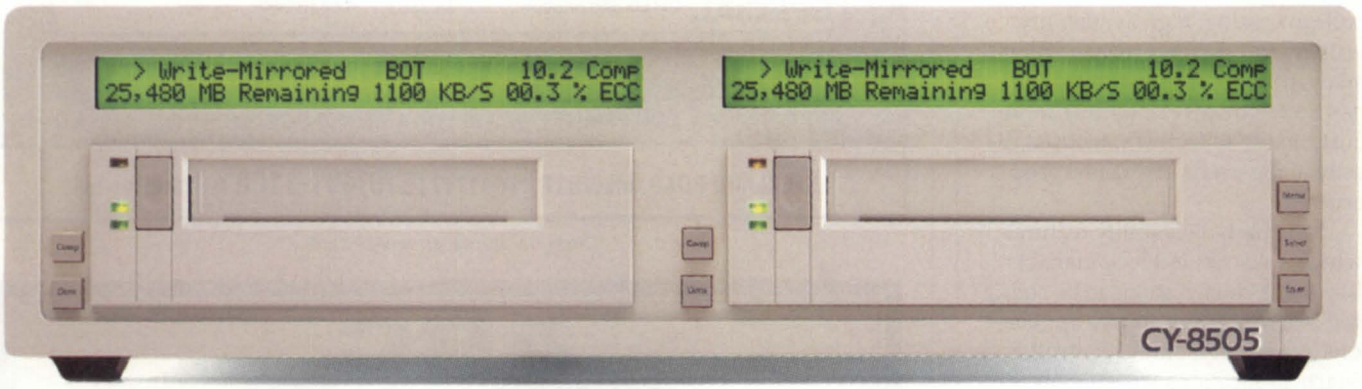
To Backup 50 GB, Two Recording Heads Are Better Than One.

Single:
Drives can operate independently.

Cascade:
Data automatically writes to the second tape when the first tape is full.

Mirroring:
Writes the same data to both tapes simultaneously.

Striping:
Writes data to two tapes at once, in alternate blocks, doubling capacity and speed.



Introducing the dual drive CY-8505 with the Advanced SCSI Processor.

Working independently, each drive can store up to 25 GB, at speeds of up to 90 MB per minute. So it's perfect for unattended backup.

But performance *really* hits the ceiling when the drives *work together*.

Four selectable recording modes, plus ***offline copy and verify***, give you the flexibility to write 50 GB of data any way you need to.

Consider it a data storage management tool, a solution that will solve the problems you encounter every day. The need for higher capacity and speed; the need to make duplicate tapes for off-site storage and data exchange; the need for real-time status information–and the need to save resources and boost productivity *on every level*.

Each tape drive offers the most advanced in data recording technology. Our *hardware data compression* option is the fastest available. And it's switch-selectable, so you can read and write uncompressed data for compatibility with other sites. Add *accelerated file access* to locate a single file in an average of 85 seconds. And we even offer a *data encryption* option that lets you control access to sensitive data.

All this, and the *proven* reliability and price performance of 8mm helical scan tape storage.

We back this turnkey solution with a *two year warranty* that includes responsive service and technical support from our in-house engineering group.

If you need a data storage solution that *means business*, call today for more information at:

(804) 873-9000

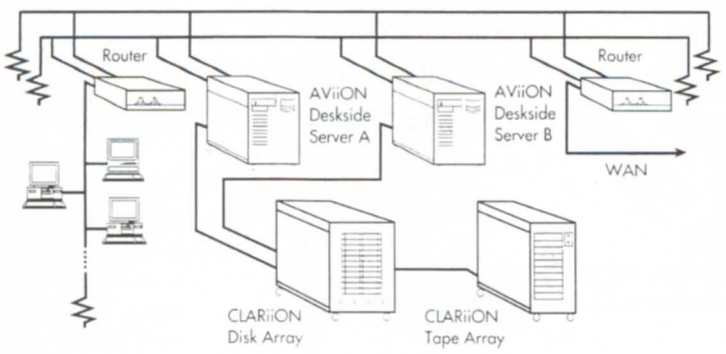
TRUE COMPATIBILITY WITH

Alliant	Convergent	DEC Unibus	IBM S/38	NeXT	Pertec	STC
Alpha Micro	DataGeneral	Gould/Encore	ICL	Novell	PICK	Stratus
Altos	DEC SCSI	HP	Intergraph	OS/2	Plexus	Sun
Apollo	DEC BI-Bus	IBM AS/400	Macintosh	PS/2	Prime	Texas
Arix	DEC DSSI	IBM Mainframe	McDonnell	Parallel Port	Pyramid	Instruments
AT&T	DEC HSC	IBM RISC/	Douglas	PC 386/ix	Sequent	Unisys
Basic-4	DEC Q-Bus	6000	Motorola	PC MS-DOS	Silicon	Ultimate
Concurrent	DEC TU/TA81	IBM RT	NCR	PC Xenix/Unix	Graphics	Wang—*and more*

CONTEMPORARY CYBERNETICS

Rock Landing Corporate Center • 11846 Rock Landing • Newport News, VA 23606 • Fax: (804) 873-8836

Circle 44 on reader service card.



An enterprise server LAN (diagram courtesy of Data General)

Continued from page 9

Dun & Bradstreet Software. Because of a myriad of partnerships between Data General and software developers, more than 3,000 applications are available on Aviion systems.

"The technology of this new [Aviion] product line is very impressive," said Dr. Jerry Baker, senior vice president of Oracle. "The expansion from 8-way to 16-way processing pushes Data General into the high end of the marketplace. The Oracle parallel server technology and DG's clustered systems together provide the performance and high availability that is important to be successful in the enterprise marketplace."

Taming and managing complexity

Businesses downsize away from mainframes, but in turn transfer their resources and faith to increasingly complex distributed networks. A word cropping up often these days is *enterprise*. DG considers its new high-end Aviions to be "enterprise servers," and by that the company intends for them to be more than just a big, electronically muscular brute that blazes away at the rate of, say, 1,600 MIPS.

An enterprise server "is defined by the services it provides," says a recent DG promotional brochure. In the open systems world, an enterprise server manages the distribution of corporate data. It provides filing, printing, and communications support to client PCs, workstations, and point-of-sale terminals. Ultimately, the distributed enterprise server is transparent to the individual user.

"The broad scalability, high availability, data management, and storage capacity that the Aviion, Clariion, and DG/UX combination deliver is unequaled in the industry," said Joel Schwartz, vice president, Aviion Business Unit. "These products, coupled with a broad range of mainframe-class applications and system administration tools make Aviion an excellent choice for an open enterprise computing platform."

Data General seeks to position its various open systems products at all the important spots in building fault-tolerant, distributed computing environments. DG's ideally described LAN (local area network), a double LAN possible with DG/UX (see diagram, above), includes a pair of Aviion servers, a Clariion disk array, and Clariion tape array. Further enhancements to the configuration would include the Oracle parallel server and the Tuxedo transaction processing (TP) monitor. These represent a new class of software that help "glue" client/server computing together. The Oracle parallel server allows a pair of Aviion servers to share a same data base. Two small systems can in effect deliver the performance of a single larger one, and one server failing does not require taking over disks or restarting applications. The TP monitor directs client requests automatically to the available server.

"Our intention is to be a leader in the enterprise server marketplace," said Skates. "With the combination of our new high-end Aviion systems, Clariion open storage devices, the high availability features of our DG/UX operating system, our service capability, and software partnerships, Data General today can provide the industry's most complete open enterprise computing solution."

And stupendous, and amazing, remarkable, exceptional, and so on. From here on out, you'll have to come up with your own superlatives. Δ

STORE YOUR DATA FOR AS LOW AS $300 ON CD-ROM

Advantages of CD-ROM

CD-ROM technology has the best combination of storage and retrieval capabilities to satisfy your large data needs.

- 650 MB
- Long-term media life
- Random access to data
- Easy distribution of data

Services Available

Digital Dynamics Inc. can serve your complete CD-ROM and CD-Interactive needs.

- Produce Macintosh, UNIX, Windows, and MS-DOS compatible discs
- Data conversion from many sources and formats
- Hypertext indexing for multiplatform architectures
- CD-I development with full motion video

For More Information

Call: (313) 995-2400
Fax: (313) 995-3232

DIGITAL DYNAMICS INC.
3055 Plymouth Rd., Ann Arbor, MI 48105

Circle 19 on reader service card.

Do you have any idea how fast you're going?

❑ System Calls ❑ ❑ Character I/O ❑
❑ Networking ❑ ❑ Scheduling ❑
❑ Processes ❑ ❑ CPU Usage ❑
❑ Memory ❑ ❑ Overview ❑
❑ History ❑ ❑ Disk I/O ❑

UX/RPM

DG/UX Real-time Performance Monitor

❑ Highlights key performance statistics on a single DG/UX system
❑ Helps to quickly identify performance bottlenecks
❑ Displays data over short or long periods of time
❑ Shows maximum and minimum values with the times they occurred
❑ Displays process information - sorted by CPU, Memory, Priority...
❑ Saves screen images to disk for later evaluation

Now with Logging and Playback!

This is the DG/UX performance tool you've waited for!

Data General Systems Evaluation and Performance Analysis Center (SEPAC)
4170 Ashford-Dunwoody Road, Suite 300
Atlanta, GA 30319
(404) 705-2520
FAX (404) 705-2660

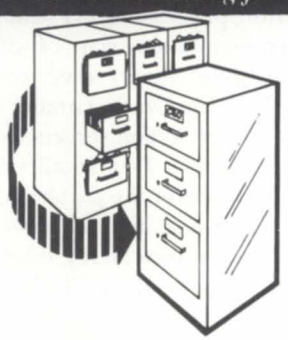
Data General
Where the World is going!

Circle 14 on reader service card.

The product CEO system managers and users have been waiting for.

Now With Automatic ARChiving

ARChive Interface Module (AIM)™



Compress CEO Documents With Immediate, On-Line Restoration

As a CEO public application:

- Relieves the system manager of the responsiblity to restore user's documents.
- Saves disk space by compressing the files into an ARC® library.
- Keeps CEO users happy by allowing them to restore their own documents.
- Works either with, or independently of the CEO archiver, and will restore documents previously archived to tape.

Call, Write or FAX for AIM on a 30 Day Approval!

CORPORATE LICENSES AVAILABLE*

DBA
Data Bank Associates, Inc.

20010 Century Blvd., Suite 104
Germantown, Maryland 20874
Telephone (301) 540-5562
or FAX (301) 540-8105

MasterCard VISA

ARC is a registered trademark of System Enhancement Associates, CEO is a registered trademark of Data General Corp.
*Must also purchase a license for ARC.

Circle 12 on reader service card.

Netware-ready

Customers who order the new AV 8500 or AV 9500 enterprise servers can receive a 5-user Netware for Unix license included with the purchase at no additional charge.

Data General and Novell have maintained a working partnership dating back three years. "What we're trying to do is make it easier for our customers to implement enterprise networks that include both Unix and Netware," said Stephen Gardner, vice president of Aviion marketing. "TCP/IP is the Unix networking standard, but to many customers, the commercial networking standard is Netware. Enterprise customers want Unix servers for the scalability and data base performance, but they also need them to plug and play in their commercial environment."

Rapid expansion of Unix in commercial markets has led to increasing demands for Netware services, said Jan Newman, executive vice president and general manager of the Netware Systems Group with Novell, Inc., "Data General has been at the forefront, providing Netware in the Unix environment since their introduction of Netware for Unix on Aviion in 1990." Data General is the only Unix vendor shipping the Netware MHS messaging system on Unix, with an optional MHS-SMTP-X.400 Gateway, providing a single-server solution for PC file, print, and mail services.

"One does not have to look at market share numbers for very long before one realizes that Novell with Netware has about 70 percent of the commercial, departmental computing local area networks," said Stephen Gardner. "And if we as an organization are determined to help those departmental networks integrate into the entire enterprise—and of course we would like our servers to be the enterprise servers in the integrated point—for us to provide Netware, a basic Netware license free of charge to show people how that commitment is there, to us it's just good sense." Δ

AV "onGO"

Data General last July announced a suite of enterprisewide office information software for its Aviion family of open systems servers. The first two members of the collection to be introduced were AV "onGO" Office and AV "onGO" Write/Paint/Draw.

AV "onGO" is a scalable, standards-based office information system with a distributed, client/server architecture. It consists of electronic mail, a network calendar, and directory services. AV "onGO" Write/Paint/Draw is a word processor and document publisher for creating documents that include text, tables, graphics, and images. Developed and marketed as "onGO" Office and "onGO" Write/Paint/Draw by Uniplex Limited, Data General is marketing the products under the AV "onGO" Office and AV "onGO" Write/Paint/Draw names, without modification.

The system supports multiple client desktops, including MS Windows PCs, Motif workstations, X terminals, and ASCII terminals; multiple networks including Novell Netware and TCP/IP; and scales across multiple, distributed servers. Users can integrate existing MS Windows or Motif applications. In addition, DG can offer the system with Unix desktop applications such as Wordperfect, Lotus 1-2-3, or Wingz. Data General and Uniplex have worked together under a marketing and development relationship since 1989. The two companies collaborated in developing the "onGO" PC client software, and Aviion is the primary platform used by Uniplex to develop the "onGO" product.

AV "onGO" and AV "onGO" Write/Paint/Draw will be available worldwide through DG's direct sales force and the company's value-added reseller (VAR) channel for Motif workstation and X terminal clients. Pricing will be $262 per seat for 100 users. Write/Paint/Draw is priced at $298 per seat for 100 users. Δ

DOWNSIZING!
SMARTSIZING!
RIGHT SIZING?

MAC DATA

Can provide consulting and conversion services when you change from AOS/VS or RDOS to UNIX or PC networks.

SINCE 1981
BUY-SELL-REPAIR
NEW AND QUALITY USED
DATA GENERAL

CURRENT HARDWARE SPECIALS:

6640 LASER $800
D214 W/KYB $99
IAC-16 W/TCB $350
NEW TERMINALS $CALL
D216 W/KYB $200
LAC-32 W/TCB $2100

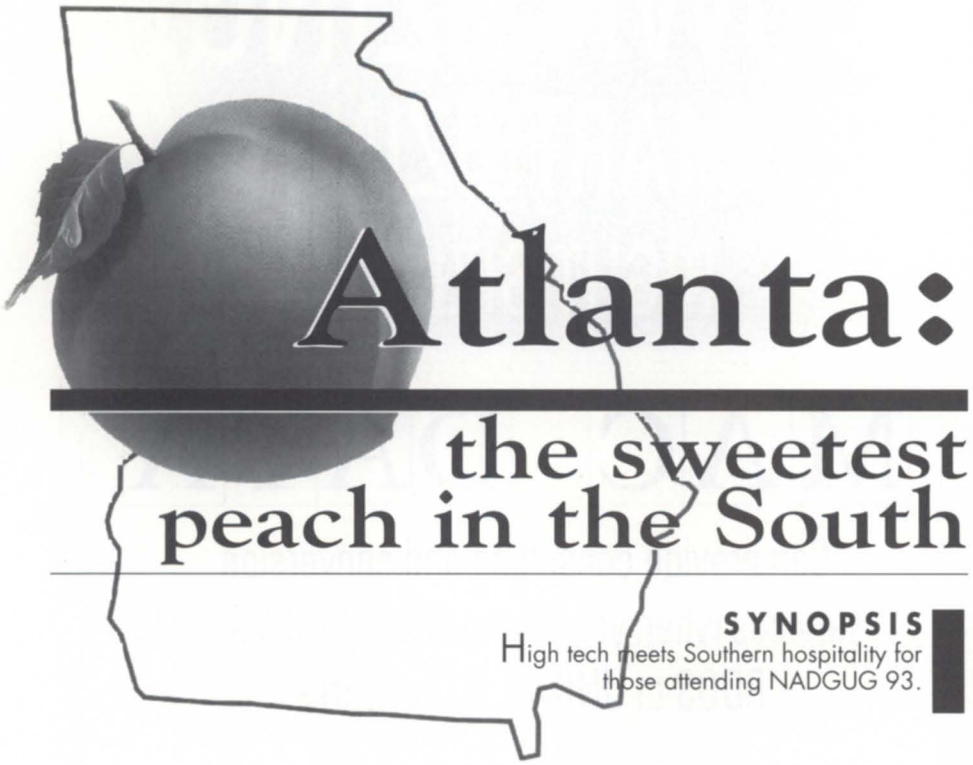
AVIION DISK UPGRADES $CALL

EXTENSIVE INVENTORY!!

Call Today 1-800-878-8783
FAX: 203-274-7593

MAC DATA, INC.
429 MAIN ST.
WATERTOWN, CT 06795

Circle 26 on reader service card.



Atlanta: the sweetest peach in the South

SYNOPSIS

High tech meets Southern hospitality for those attending NADGUG 93.

by Doug Johnson
Focus staff

As James M. McPherson pointed out in his landmark Civil War narrative, *Battle Cry of Freedom*, the South had invested tremendous effort into defending Atlanta. As a result, the strategic railroad hub became a "symbol of resistance and nationality second only to Richmond."

And so it must have been all the more painful for the sinking Confederacy to see this proud city of 20,000 captured, wrecked, and burned by the forces of Union General William T. Sherman. The fall of Atlanta was unmitigated tragedy for the South, but for American President Abraham Lincoln it probably provided the political boost he needed in the North to win re-election during that autumn of 1864.

That November as Atlanta lay in smoking ruins, Sherman's army set out across the rest of Georgia on its notorious "March To The Sea," smashing anything deemed of military value, and demolishing just about everything else for good measure. Sherman pursued this total-war policy to demoralize the South and crush any further resistance. He vowed to "make Georgia howl!"

It would have been impossible at the time to survey the vastness of the war damage, the sheer scale of the disaster for the South, and envision a shining modern city built upon the sad debris. So, because we can and because this article isn't a history lesson, let's leap forward in time and take a look at Atlanta today. What's there to see? Well, let's begin by observing that it's astounding the difference 129 years can make.

Past and future

For those spirited NADGUG conference attendees invading Atlanta and the Inforum convention center during the fall of 1993, there are plenty of historic sites that recall the Civil War. Among others, you can visit Kennesaw Mountain National Battlefield or grandly sculpted Stone Mountain. The Atlanta Cyclorama in Grant Park features a huge, in-the-round painting of the historic Battle of Atlanta. And then there's even *Gone With The Wind* novelist Margaret Mitchell's home (not open for tours, but you can look from outside).

But remember that there's much more to late-20th-century Atlanta than just Civil War history. It's the sweetest peach in the South, the 12th-largest metropolitan center in the United States, with a population now of more than 2.8 million. It's fast becoming the nation's leading media communications and entertainment center, with Ted Turner's Cable News Network, superstation WTBS, and Turner Network Television. The baseball Braves, basketball Hawks, and football Falcons give the city a full complement of professional sports teams. And the whole world will watch when Atlanta hosts the 1996 Summer Olympic Games.

Atlanta is an international city these days, offering all the incredible variety you could want. It's not so much a matter of coming up with something to do during an Atlanta visit. Instead, it's a matter of choosing what you can reasonably fit into your schedule from a huge list of possibilities.

The Atlanta area is an important home for Data General as well. High tech meets Southern hospitality at the Customer Support Center headquarters (which NADGUG 93 attendees will visit during an organized tour; see Thursday morning in the preliminary schedule that begins on page 20), and the Systems Evaluation and Performance Analysis Center (SEPAC).

In case you *do* find some time away from the Inforum convention center and NADGUG 93's many exhibits and seminars for sightseeing (come early, stay late, make it a vacation trip!), following is just a whet-your-curiosity list of some of the attractions:

Georgia State Capitol. The dome is coated with native Georgia gold, and this 1889 traditional statehouse features natural science displays, a Hall of Flags, and a Hall of Fame honoring outstanding Georgians. It's right downtown; one block south of the Georgia State station.

Jimmy Carter Library and Museum. The nation's 39th president is honored in exhibits recounting his life and administration; 1 Copenhill.

Martin Luther King, Jr. Center for Nonviolent Social Change. Visit the King Center site, Dr. King's grave, and the

home where the civil rights leader was born in 1929, also Ebenezer Baptist Church where he preached.

Atlanta History Center downtown. Exhibits, tours, lectures, and videos detail Atlanta's rich history.

Fernbank Museum of Natural History. This is new, completed within the past year. It's the largest natural science museum south of the Smithsonian Institution in Washington, DC, and the largest built anywhere in the USA since the 1930s. Georgia's history is the museum's centerpiece.

Underground Atlanta. In the heart of downtown, six city blocks have been transformed into an urban marketplace with restaurants, specialty shops, and entertainment sites.

Zoo Atlanta. In Grant Park, this attraction features primates, big cats, giraffes, elephants, birds, and lots more in natural settings.

Stone Mountain Park. It's not just the world's largest exposed mass of granite with a huge sculpture carved in the side, but also 3,200 acres of parkland featuring swimming, fishing, tennis, golf, a skylift, and other fun stuff.

World of Coca-Cola. This is a bona fide American institution: a collection of more than 1,000 pieces of memorabilia remembering the history of the soft drink with the logo recognized around the world. Give *everybody* on your shopping list Coca-Cola T-shirts for Christmas. Located adjacent to Underground Atlanta.

Six Flags Over Georgia. The Southeast's foremost family theme park. Offers more than 100 rides, shows and other attractions.

Still stumped? Well, you could explore the campus of Georgia Tech University, or take a 200-foot bungee jump at World Bungee Gorgia, or check out an 1855 steam locomotive at the Big Shanty Museum, or get some culture at the Callanwolde Fine Arts Center, or . . . you get the picture. Enjoy. Δ

Seeing Atlanta . . .
The Atlanta Convention & Visitors Bureau is located at 233 Peachtree Street, Suite 2000, Atlanta, GA 30303. Call 404/521-6600.

DG, SUN
& MOTOROLA
BUY & SELL • NEW & USED

CPU's
SUN ELC, SLC, IPC, IPX
SUN S/10-GX SYSTEMS
SUN 4/75-GX SYSTEMS
Motorola 3, 4, 8000 SYS
AViiON SYSTEMS
MV/15000, 20000
MV/10000, 18000
MV/8000, 7800, 78XP
MV/4000, 4000DC
MV/2000, 2500

MEMORY
MV, ECLIPSE, AViiON
NOVA & MICRO NOVA

PRINTERS
6215, 6216
GENICOM
Data Prod B300,B600
Printronics P-300
HP LASER JET I. II. III. IV

DESKTOP
DG/10, 20, 30 PKG
15, 38, 71 MB DISK
USAM-4, USAM -1
CARTRIDGE TAPE
MEMORY

COMMUNICATIONS
IAC-8, 16, 24
VME ASYNC/SYNC
COM BASIC I/O
ATI-16, AMI-8
ALM-8, ALM-16
LAC-12,16,32

DISK / TAPE
ALL SUN DRIVES
322, 332, 662MB
500MB, 1.2GB 1.4GB
354, 592 MB
10, 12.5, 25, 50MB
6231 CART N/E
6026, 6123, 6125
6299, 6300, 6021

CRT'S
WYSE (All Models)
D-210, 211, 410, 460
D-214, 215, 411, 461
D-216, 412, 462, 470
D-217, 413, 463

SUN MONITORS
365 - 1100 GS
365 - 1112 HR Color
365 - 1160 HR Color

WANTED ★★★★ | AViiON, SUN WYSE - 60's

AMES SCIENCES, INC.
1787 Chancellor Point Rd., Trappe, MD 21673
410-476-3200 • Fax 410-476-3396

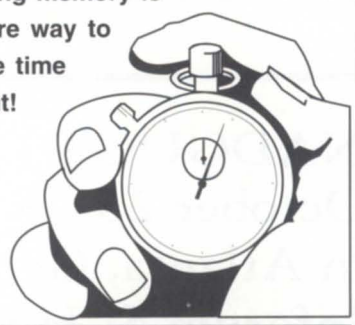
Circle 1 on reader service card

Memory Solutions for AViiONs

The best bang for your buck!

AV100 to AV4625
Memory upgrades increase performance and capabilities.

Adding memory is a sure way to make time count!



DDS DIGITAL DATA SYSTEMS, Inc.
1-800-762-7811
AViiON is a trademark of Data General.

1551 NW 65 Ave.
Ft. Laud., FL 33313
FAX: (305) 581-1325
TEL: (305)-792-3290

Circle 18 on reader service card.

Finally, the right **TCP/IP** solution for connecting DOS users to DG/UX and AOS/VS.

TERMview/*PC*™

*Multi-Window **TCP/IP** Connectivity Software for DOS.*

Compatible with Data General's **CEO** and **DG/UX** Software.

D460, **VT320**, **ANSI**, and **3270** terminal emulation and TCP/IP included at one low price.

Graphical User Interface allows multi-session viewing under DOS.

Includes:

TELNET, FTP, RLOGIN, TN3270, PING, DOMAIN NAME, NETSTAT

TCP/IP Protocol Stack with NDIS, ODI, and PACKET Driver Support. Coexists with Netware and LAN Manager.

D460, VT320, ANSI, and 3270 Terminal Emulation with full color support.

GUI/Windowing Environment for viewing *multiple concurrent sessions* under DOS.

Copy-and-Paste text between sessions.

Macro's for automating repetitive tasks.

COM support for async/modem sessions.

Call For Free DEMO DISK!

ASYNC SYSTEMS, Inc. 203 Middlesex Turnpike Burlington, MA 01803 (617) 270-3530

Circle 4 on reader service card.

Training, networking, & technology

NADGUG 93 Conference October 25-28 in Atlanta, Georgia Inforum & Hyatt Regency

The Data General Customer Support Center in Norcross

It's the largest gathering of anything and everything about Data General you can find in the world. NADGUG 93 features a full slate of events, seminars, and activities. Following is a preliminary agenda. Major categories for seminars include "Introduction to Open Systems," "Downsizing & Your Enterprise," "DG/UX Filing System Tuning," networking, management, migration, and applications development.

For registration information call 800/253-3902, ext. 1234 (U.S. & Canada only) or 508/443-3330, ext. 1234.

Monday, October 25

9:00am - 1:45pm Office Automation Workshop / Roundtable
9:45am - 1:45pm Roundtables & Special Interest Group Meetings
2:00pm - 3:30pm Special Combo Super Session
3:30pm Exhibits Open
Welcome Reception

Tuesday, October 26

8:15am - 9:00am NADGUG General Session

9:00am - 5:00pm
Open Systems Training: Introduction to Open Systems

9:30am - 2:00pm Exhibits

9:00am - Noon
Special 1/2-Day Training Seminars: Network Strategies for the 90s *(General, Conceptual, Future Trends)*
Special 1/2-Day Training Seminars: Introduction to DG/UX *(Unix, Technical)*

9:00am - 10:00am
Networking: Wireless LANs—Networks for the 90s *(General, Conceptual, Future Trends)*
Management: Developing & Implementing a Corporate Security Policy *(Unix, Technical)*
Migration: Open Systems Office Automation: Getting There from Here *(General, Conceptual)*
Performance: SCSI Peripherals & the MRC *(MV, Technical)*

11:00 - Noon
Networking: LAN Servers, The Next Generation—NetWare 4 & Windows NT Advanced Server *(General, Technical, Future Trends)*
Management: Mass Storage from Novadisk to the 21st Century *(MV, Conceptual, Future Trends)*
Performance: Performance Characteristics of Clariion Subsystems *(General, Technical)*
Cooperative Processing: Using Middleware to Build Distributed Applications *(Unix, Technical)*

1:15pm - 2:15pm
Networking: When Fault Finding is Essential *(Unix, Technical)*
Management: Data General's Different Handheld Computer *(General, Conceptual, Future Trends)*
Migration: Downsizing to Data General Aviion Platforms *(Unix, Conceptual)*
Performance: Disk Optimization—You've Come a Long Way Baby! *(General, Technical)*

2:30pm - 5:00pm
Special 1/2-Day Training Seminar: A Technical Overview of Net-

ware 3.11 for Aviion Systems *(Unix, Technical, Future Trends)*
Special 1/2-Day Training Seminar: A Technical Introduction to Simple Network Management Protocol *(Unix, Technical)*

2:30pm - 3:30pm
Networking: Aviion Systems in the Enterprise: Applications & Architectures *(Unix, Conceptual)*
Management: Using Your Information System as a Competitive Weapon—Client/Server Next General ERP *(General, Conceptual)*
Migration: Infos to Open Systems—Your/Direct/Path to Unix *(MV, Conceptual)*
Performance: ToolTime! How to Evaluate & Use Performance Analysis Tools *(Unix, Technical)*

3:30pm - 4:30pm Exhibits

4:30pm - 5:30pm
Networking: FDDI to ATM—Choosing the Right Path to Your Network's Future *(General, Technical, Future Trends)*
Management: PICK Data Bases & Technology Update *(General, Conceptual)*
Migration: Re-Engineering to Open Systems *(Unix, Conceptual)*
Applications Development: Integration Toolsets for the 90s *(Unix, Conceptual)*

Wednesday, October 27

8:00am - 9:00am
Networking: Cost-Effective Voice/Fax/Data Networks for the 90s *(General, Conceptual)*
Management: Client/Server Computing: Yes? No? Maybe?/Why? When? Where? *(MV, Conceptual)*
Management: Future Trends in Storage Devices *(MV, Conceptual)*
Applications Development: Taking Advantage of CLI32 *(MV, Technical)*

9:00am - 5:00pm
Open Systems Training: Downsizing & Your Enterprise

9:00am - 1:00pm
Special 1/2-Day Training Seminar: NetWare vs. TCP/IP for PC Connectivity *(Unix, Conceptual)*
Special 1/2-Day Training Seminar: Information Technology Acquisition Support Methodology *(General, Technical)*

9:10am - 10:10am
Networking: Low-Cost Integration of Voice & Data Communications *(General, Conceptual)*
Management: Highly Available MV Storage Solutions *(MV, Conceptual, Future Trends)*
Applications Development: Programming With the AOS/VS II TCP/IP Socket Library *(MV, Technical)*
Cooperative Processing: Cooperative Computing for Infos II Users *(MV, Conceptual)*

10:00am - 4:30pm Exhibits

11:10am - 12:10pm
Management: AV Image—Building Blocks for Open Imaging Solutions *(Unix, Conceptual, Future Trends)*
Management: The Application of Optical Disks for Computer Output Data Storage & Retrieval *(Conceptual, General)*
Applications Development: Rapid Application Development—No Smoke, No Mirrors *(Unix, Technical)*
Cooperative Processing: Remote Printing—Configuring Your MV, Aviion & PC *(General, Technical)*

1:30pm - 2:30pm
Management: Good Locks Make Good Neighbors—Better Password Management Under DG/UX *(Unix, Technical)*

Peach of a Deal
Worldwide — Everyday
on Data General Hardware

CPU
AV 4625 "demo" with 64MB memory, 2.0 GB disk.....$21,500
AV100 "new" 16MB memory, 332MB disk.....$2,900
MV15 mod 20 "complete system".....$2,900
MV9600 CPU Upgrade from MV9500.....$12,900

MEMORY
Aviion 192MB memory.....$23,900
Aviion 64MB memory.....$7,900
Aviion 32MB memory.....$2,900
MV95/9600 32MB memory.....$5,900
MV15/20 32MB memory.....$2,900
MV3500 16MB memory.....$950

DISK AND TAPES
6841 2.0GB disk drive.....$2,900
6685 1.0 GB disk drive.....$1,800
6796 520MB disk drive.....$990
6554 662MB disk drive.....$1,150
6662 332MB disk drive.....$850
6621 1.2 GB RAMS Disk.....$5,500
6026 800/1600 BPI tape S/S.....$490

CRTs
6683 D413 with keyboard "new".....$375
6501 D412 with keyboard.....$225
6308 D470C color with keyboard.....$195
6500 D216 with keyboard.....$149
6256 D460 with keyboard.....$99

COMMUNICATIONS
7419 VDC-16.....$1,350
4626 LAC 32 with TCB.....$2,200
4532 LAN controller.....$1,690
7408 VDA-128.....$1,200

PRINTERS
4597 LB1515 band.....$8,900
4596 LB615 600LPM.....$3,400
DP B600 serial.....$950
Genicom 1020 240CPS serial.....$290

OTHER
CSS II with host adaptor (HRMC).....$3,500
CDC 9720-1230 1.2GB SMD.....$1,490
10404 3KVA UPS for AViiON.....$2,900

1-800-229-2897

CW COMPUTER WHOLESALERS INC.
3246 Marjan Drive 404-455-4542
Doraville, Georgia 30340 FAX 404-457-5841

Circle 9 on reader service card.

BUSINESS BASIC UNDER MS-DOS!

With

MOUSE SUPPORT...

Pop-Up WINDOWS...

KPREV Index Support...

(and of course)

a ROYALTY-FREE RIGHT to reproduce and distribute executable files!

PCBB is an easy to use product which allows you to convert your existing double and triple precision D.G. Business BASIC applications and data over into a single or multi-user MS-DOS environment. Binary compatibility allows data and index files to be moved and utilized without modification.

PCBB features include on-line help, debugger, an editor which offers the look and feel of an interpretive environment and Compiler Driver which expedites the process of compiling source code without the creation of batch files. Special features such as support for extended or expanded memory, 128 user channels, pop-up window support, KPREV index support, an allowance for labels to be utilized instead of line numbers, and a Block Common area that can range in size from 512 bytes to 10K in size are standard. Utilities to maintain Data General compatible screen files, param, logical database and index file structures are also included.

Purchase of **PCBB** includes a royalty-free right to reproduce and distribute executable files.

Write, call or fax now for more information

MAS®

MarcAlan Software, Inc.

22096 North Pet Lane
Lincolnshire, Illinois 60069-4113
Voice: 1-800-728-7387
Fax : 1-708-634-9460

PCBB is a registered trademark of MarcAlan Software, Inc. All other product names and logos are trademarks or registered trademarks of their respective owners.
© MarcAlan Software, Inc. 1990

Circle 27 on reader service card.

Management: Symmetry & Scalability in Commercial Multiprocessing *(MV, Technical)*
Applications Development: Advanced Systems Environment Toolset (A*SET) *(Unix, Technical)*
Cooperative Processing: Aviion Remote Printing Without Headaches *(Unix, Technical)*

2:30pm - 5:00pm
Special 12/-Day Training Seminar: A Technical Introduction to Domain Name System (DNS) *(Unix, Technical)*
Special 1/2-Day Training Seminar: How to Select the Right Aviion Data Base Management System *(Unix, Conceptual, Future Trends)*

2:40pm - 3:40pm
Management: Automating Management of Distributed Resources *(Unix, Conceptual)*
Management: Recent Developments in AOS/VS II *(MV, Technical)*
Applications Development: Object-Oriented Client/Server Application Design with NEXTSTEP *(Unix, Technical)*
Cooperative Processing: Putting Some Electronic Mail Muscle into Your Network *(General, Conceptual)*

4:30pm - 5:30pm
Management: Implementing Open High-Availability Systems *(Unix, Conceptual)*
Management: New Features in Infos II—Improve Performance & Recovery *(MV, Technical)*
Applications Development: An Introduction to the User SCSI Interface *(Unix, Technical)*
Cooperative Processing: An Overview of Electronic Mail in DG/UX *(Unix, Technical)*

7:00pm Cocktail Reception & Banquet

Thursday, October 28

8:15am - 9:15am
Management: Data General Tape Array for High Capacity & High Reliability *(General, Conceptual, Future Trends)*
Management: Configuring High-Performance DG/UX Disk & File Systems *(Unix, Technical)*
Applications Development: Effective Design Methodology *(General, Conceptual)*
Cooperative Processing: ORACLE Parallel Server for Aviion *(Unix, Technical)*

8:30am - Noon
Management: Understanding Data General Support & How to Effectively Use Support Services—Special Tour of Data General's Customer Support Center *(General, Conceptual)*

9:30am - 12:30pm
Special 1/2-Day Training Seminar: DG/UX Filing System Tuning *(Unix, Technical)*

10:15am - 11:15am
Management: Remote Support Services & Security Features *(Unix, Technical)*
Management: Lightning Fast Backups *(MV, Technical)*
Migration: Migration to Client/Server Computing: A Four-Step Approach *(Unix, Technical)*
Applications Development: ICobol 2—the Next Generation *(General, Technical)*

11:30am - 12:30pm
Management: Overview of X-Windows *(Unix, Conceptual)*
Management: Evaluation of Performance & Correctness of Data Base Products *(General, Conceptual)*
Applications Development: Totally RADical ICobol—A Simian Systems Session *(General, Technical)* Δ

ENJOY

The Benefits of Belonging.

As a NADGUG member, an entire world of benefits becomes available to you.

FOCUS MAGAZINE NADGUG's monthly publication is devoted exclusively to users of Data General equipment. FOCUS is full of technical articles, product reviews, user profiles, and announcements of the latest products — no matter what kinds of systems you're running, FOCUS has the information you need!

ANNUAL CONFERENCE AND EXPOSITION NADGUG's Conference and Exposition is part of the largest annual Data General gathering in the world. In conjunction with DG's Sales and Systems Engineers meeting and SOURCE, the annual VAR conference, NADGUG provides Data General users the ultimate forum to confer with everyone who is anyone in the Data General community. Join us in Atlanta, October 25–28, 1993, for NADGUG's 20th Anniversary celebration!

ELECTRONIC BULLETIN BOARDS NADGUG's member bulletin board system is run by Rational Data Systems, with US Robotics modems for service from 1200 to 9600 baud. Dial 415-499-7628 to communicate with other users and to download/upload programs and utilities!

NADGUG members can also access Data General's DASH, or Direct Access for Support Help, Bulletin Board. Dial 800-327-4272 for on-line sign up today!

SOFTWARE LIBRARY NADGUG now has two software collections available for members. Both the AOS/VS and UNIX library tapes are full of programs, utilities, and macros — for any Data General system!

NADGUG MEMBER DIRECTORY The annual directory provides members with a personal guide to users with similar hardware, software, and system needs. This year's directory will present for the first time a Product/Service section.

REQUEST FOR ENHANCEMENT PROCESS Through NADGUG's Special Interest Groups, members have the opportunity to review and prioritize specific product Requests for Enhancements (RFEs). In addition, at NADGUG's annual conference, SIG forums review product enhancements and present them to the development teams with their recommendation for inclusion in the standard product or for follow-up.

REGIONAL AND SPECIAL INTEREST GROUPS RIGs and SIGs are two of the most effective ways that NADGUG promotes the free-flowing interchange of valuable information. RIGs are organized by people who are interested in getting together on special occasions or on a regular basis. SIGs are put together by people who want to share information about common products, technologies, or applications. Join one today!

NORTH AMERICAN
DATA GENERAL
USERS GROUP

Join the Group. Call 1-800-253-3902 (ext. 1234), and ask for more information about NADGUG membership benefits.

Circle 30 on reader service card.

Brian Johnson

More time tricks

SYNOPSIS

BJ offers a pair of functions for getting current calendar time and converting a calendar time to local time.

:RECAP

Last month I proposed using Universal Coordinated Time (commonly known as UTC) in applications where there is need for timestamping information in such a way that the timestamp values are guaranteed to always increase, and the actual elapsed time between two events can be computed simply as the arithmetic difference between the two timestamp values.

Because AOS/VS is blissfully ignorant of Daylight Savings Time (DST), I also supplied a program to be run during the UP macro that will adjust the AOS/VS UTC offset during DST so that the ?GTIME system call will report the correct values for both local and UTC time.

This month I'm going to provide you with two functions: one to get the current calendar time, and the other to convert a calendar time to local time.

For those of you without access to last month's column, a couple of terms need defining. Local time is the time in your current time zone, typically expressed in conventional terms (e.g., 21-JUL-93 12:13:14 PST). Calendar time is based on UTC, which we will express as the number of seconds since Jan 1st, 1970, using an unsigned 32-bit number. My choice of Jan 1st, 1970, is no coincidence; it's the same base used by most Unix systems, and it's also the base used by DG C's ANSI-compliant time library routines. Another popular base is Jan 1st, 1900; it's the one chosen by P.J. Plauger in his recent book, *The Standard C Library*.

UTC is available from a variety of sources: in the U.S. it can be heard on several frequencies on the short wave radio band (e.g., WWV on the 10-meter band), or as ASCII text from the Telephone Time Service (TTS) of the National Institute of Standards in Colorado. Local time can always be computed from UTC unambiguously if the rules for local DST are known.

:CALENDAR_TIME

This function is relatively simple once we have DSTMON running to correct the AOS/VS UTC offset during DST. It simply asks the system, via the ?GTIME system call, what the current UTC is, and then converts it to the scalar notation that I've chosen to use.

The time() function to accomplish this is part of Figure 1. It's compatible with the ANSI C time() function, and can be used in place of the DG C library function. And it should be. It turns out that whoever coded the DG C function blew it and used a pair of system calls, ?GDAY and ?GTOD, instead of a single ?GTIME call. This opens a potential window since the pair of calls might fall on either side of midnight.

:LOCAL_TIME

Once you adopt calendar time as your standard for the purpose of timestamping events, then you're stuck with the problem of displaying a calendar time value as local time for the benefit of the humans using the software. Luckily for us, I made a simplifying assumption in last month's column that will help us a lot; we will be dealing only with times since 1987 when the rules for Daylight Savings Time (DST) in most of North America were standardized.

According to the current rules, DST begins at 02:00 local time on the last Sunday in March, and ends at 02:00 local time on the last Sunday in October. The actual time change sequence here in California (the Pacific Time Zone) during March and October is:

UTC	March	October
09:59:58	01:59:58 PST	01:59:58 PDT
09:59:59	01:59:59 PST	01:59:59 PDT
10:00:00	03:00:00 PDT	01:00:00 PST
10:00:01	03:00:01 PDT	01:00:01 PST

The localtime() function to convert a calendar time to local time is part of Figure 1. For those of you who are porting to some other language, a description of the ANSI C time structure members is in order, since the folks at ANSI chose to use a combination of zero-based and one-based numbering. The structure members are:

To convert an arbitrary calendar time to local time we first have to figure out the true offset from UTC of the time zone where the system that we're run-

ning on is located. Unfortunately, the program I showed you last month compensates for the failure of the current design of AOS/VS to handle DST by fudging the UTC offset while DST is in effect, so we can't just simply ask the operating system.

One alternative would be to locate the currently running system .PR file, find the configuration file associated with a particular system .PR file, and because I'd like to be able to run on lots of AOS/VS revs and VSGEN has changed significantly over the years.

A simpler alternative is simply to create a file somewhere that is visible to everyone and to store the UTC offset in the file. This is easy enough, but it's one more little thing to remember when installing a system, so I came up with a better idea. I added a bit of logic to last month's DSTMON program to create a link in the root named UTC_OFFSET whose resolution string is the UTC offset for the current system in the same notation as that used by VSGEN (i.e., -8:00 for the Pacific Time Zone). Now our conversion program can simply look up the link resolution to get the true UTC offset.

:NIST:TTS

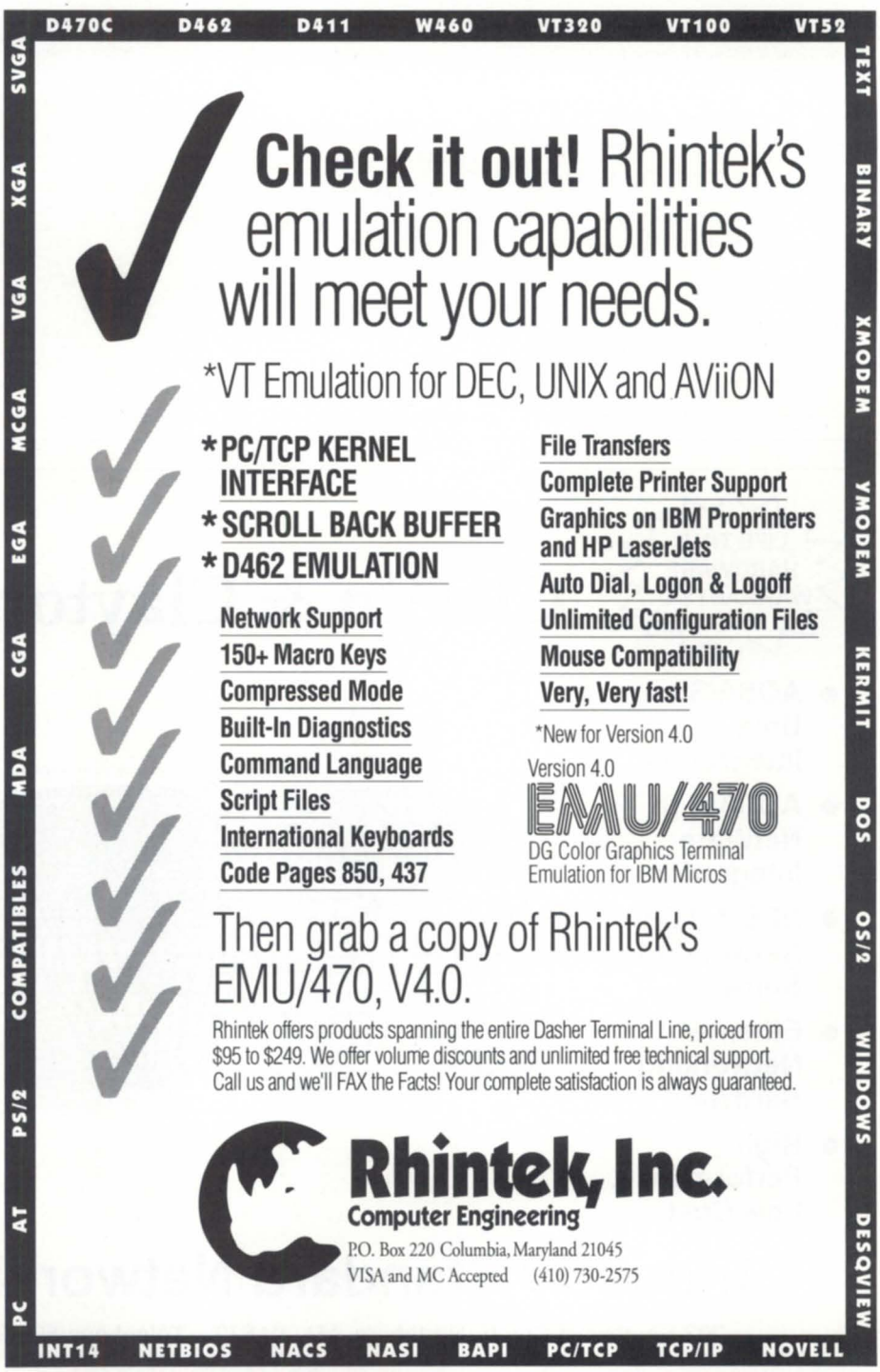
I promised last month to show you the program that I use to dial the National Institute of Standards & Technology Telephone Time Service each night to adjust the system clocks on our MVs. Unfortunately, this column is running a bit long and the program is relatively straightforward, so I'll just give you the phone number of the NIST service and describe what you'll see when you call it. The phone number if 303/494-4774. Use TTY emulation with eight data bits, no parity, and one stop bit. Only 300 and 1200 baud are supported due to the scrambler delays inherent in the modulation schemes used in faster modems. Call the first time with a terminal emulator that can capture the dialog and type "?" to get a tutorial on the service.

The output of a typical call is shown in Figure 2 (page 29).

tm_year	0..199; 1900..2199
tm_mon	0..11; Jan..Dec
tm_mday	day of month, 1..31
tm_wday	day of week, 0..6; Sun..Sat
tm_yday	day of year, 0..365
tm_hour	0..23
tm_min	0..59
tm_sec	0..59
tm_isdst	-1 (unknown), 0 (ST), +1 (DST)

The On-Time Marker (OTM) asterisk at the end of the line is synchronized so that it is sent precisely at the time indicated earlier in the line, but we don't need to be that accurate, so simply reading the line, then decoding it, and setting the system clock is good enough to get accuracy within a second. Be sure to use ?NTIME to set the system clock in order to avoid the two call (?SDAY/ZSTOD) window problem mentioned earlier.

:EPILOGUE



Circle 37 on reader service card.

Figure 1: DSTLIB.C

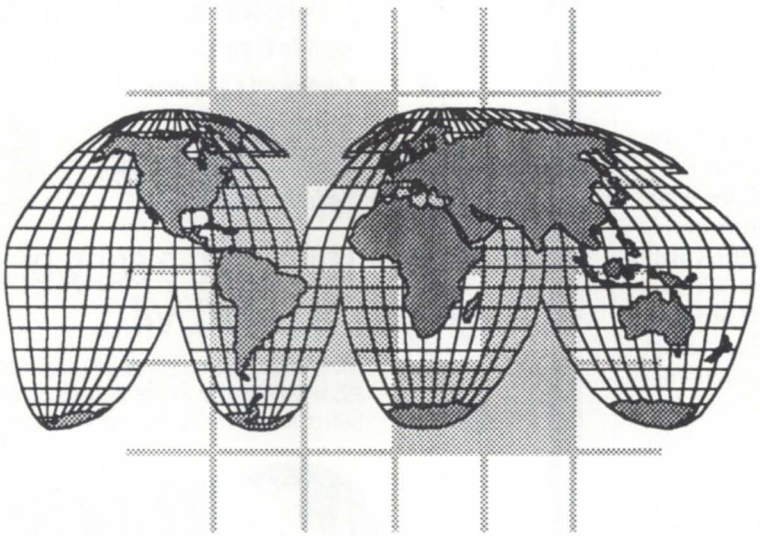
```
#include <stdio.h>    /* printf()... */
#include <stdlib.h> /* strtoul()... */
#include <string.h> /* memset()... */
#include <time.h>/* time_t... */

#include "sys_glink.h"
#include "sys_time.h"

#define LOCAL static
#define GLOBAL extern

#define BASE_YEAR70
#define BASE_LEAP((1900 + BASE_YEAR) % 4)
#define BASE_WDAY4    /* 1/1/70 was a Thu */

/* A macro that returns the no. of days to the */
/* start of a given month for a given year. */
#define DTM(year,month) \
        ((year - BASE_YEAR + BASE_LEAP) % 4 == 0 && \
            year != 200 ? \
                leap_tbl[month] : std_tbl[month])

LOCAL const short leap_tbl[12] = {0,31,60,91,121,
                        152,182,213,244,274,305,335};
LOCAL const short std_tbl[12] = {0,31,59,90,120,
                        151,181,212,243,273,304,334};
LOCAL const char *dow[7] = {"Sun", "Mon", "Tue","Wed",
                            "Thu", "Fri", "Sat"};
LOCAL const char *numsuff[10] = {"th","st","nd","rd",
                        "th","th","th","th","th","th"};

/* Return the true UTC offset in minutes.  The AOS/VS */
/* offset is true if DST is not currently in effect */
/* and one hour less if DST is in effect. */
LOCAL int true_utc_offset(void) {
    int      ier;
    char *cp;

    char lrstr[$MXPL];    /* Link resolution string */
    static char uopn[] = "@TRUE_UTC_OFFSET";
    static int utc_offset=-1;

    /* Already done the hard work? */
    if (utc_offset != -1) return utc_offset;

    /* Get the link resolution. */
    if (ier = sys_glink(uopn,lrstr)) {
        fprintf(stderr,"From true_utc_offset(): ");
        fprintf(stderr,"%s, file %s\n",
                                strerror(ier),uopn);
        exit(ier);
    }

    /* Convert the link resolution string */
    /* from [+|-][H]H:MM format to minutes. */
    cp = lrstr;
    utc_offset = strtol(cp,&cp,10);
    cp++;    /* Bump past the ':' */
    utc_offset = utc_offset * 60 + strtol(cp,NULL,10);

    return utc_offset;
}

/* Return the no. of days to the start of a given */
/* year and month taking leap year into account. */
/* year is assumed to be 70..206 (corresponding to */
/* 1970..2106) and month is assumed to be 0..11. */
LOCAL long daysto(int year, int month) {
    long days;
    int      leap_days;

    leap_days = (year - BASE_YEAR + BASE_LEAP - 1) / 4;
    if (year > 200) leap_days--;
    days = 365 * (year - BASE_YEAR) +
        leap_days + DTM(year,month);
```

LIFE TIME HARDWARE WARRANTY !!

Claflin & Clayton, Inc.

24 HOUR TECHNICAL HOTLINE !!

- AOS/VS to Unix Integration
- AOS/VS to NetWare Integration
- NFS & TCP Networking Software
- Ethernet Networking Hardware
- High Performance, Low Cost



- File Sharing
- Remote Login
- Command Execution
- Electronic Mail
- Printing
- Backup
- AOS/VS I & II
- RDOS, AOS
- MV, NOVA, ECLIPSE, DESKTOP

Industry Standard Networking Solutions

203 Southwest Cutoff, Northboro, MA 01532 Telephone 508-393-7979 FAX 508-393-8788

Circle 7 on reader service card.

Figure 1: continued

```
    return days;
}

/* Return 0 or 1 depending on whether DST is in */
/* effect.   The time supplied in tmp is assumed */
/* to be Standard Time. */
LOCAL int isdst(struct tm *tmp) {
    int     dst,last_sun;

    if (tmp->tm_mon < 2 || tmp->tm_mon > 9) {
        dst = 0; /* Jan, Feb, Nov, Dec */
    }
    else if (tmp->tm_mon > 2 && tmp->tm_mon < 9) {
        dst = 1; /* Apr, May, Jun, Jul, Aug, Sep */
    }
    else if (tmp->tm_mon == 2) {  /* March? */
        if (tmp->tm_wday == 0) {
            dst = (tmp->tm_hour < 2) ? (0) : (1);
        }
        else {
            last_sun = tmp->tm_mday + 7 - tmp->tm_wday;
            while (last_sun > 31) last_sun -= 7;
            dst = (tmp->tm_mday < last_sun) ? (0) : (1);
        }
    }
    else {   /* It must be October */
        if (tmp->tm_wday == 0) {
            dst = (tmp->tm_hour < 1) ? (1) : (0);
        }
        else {
            last_sun = tmp->tm_mday + 7 - tmp->tm_wday;
            while (last_sun > 31) last_sun -= 7;
            dst = (tmp->tm_mday < last_sun) ? (1) : (0);
        }
    }

    return dst;
}
```

```
/* Return the current calendar time. */
/* An ANSI-compliant function. */
GLOBAL time_t time(time_t *ctp) {
    P_GTIME gtime_pkt;
    int     ier,mday,mon,year,hour,min,sec;
    time_t  ct;
    /* Ask AOS/VS what the current UTC is. */
    memset((void*)&gtime_pkt,0,sizeof(gtime_pkt));
    gtime_pkt.time_pkt_pkt_id = $TIME_PKT_PKTID;
    gtime_pkt.time_pkt_func   = $TIME_PKT_UTC;
    if (ier = sys_gtime(&gtime_pkt)) exit(ier);

    /* Convert to struct tm base values. */
    year = gtime_pkt.time_pkt_year - 1900;
    mon  = gtime_pkt.time_pkt_month - 1;
    mday = gtime_pkt.time_pkt_day;
    hour = gtime_pkt.time_pkt_hour;
    min  = gtime_pkt.time_pkt_minute;
    sec  = gtime_pkt.time_pkt_second;

    /* Do all the days up to this month. */
    ct = daysto(year,mon) * 86400;

    /* Add in the days for this month. */
    ct += (mday - 1) * 86400;

    /* Add in the time of day. */
    ct += sec + 60 * (min + 60 * hour);

    if (ctp) *ctp = ct;
    return ct;
}

/* Build a local time structure from a calendar time. */
/* DG's library routine doesn't cut it, so we have to */
/* do our own ANSI-compatible version of localtime(). */
/* Plus, readers might port this to (gasp!) COBOL. */
/* An ANSI-compliant function. */
```


nsts

National Software Technical Services, Inc. is a Data General system growth management company with emphasis on long-term, holistic solutions to every issue surrounding MV Class systems.

SYSTEM PERFORMANCE
GROWTH MANAGEMENT
SYSTEM MIGRATION
SYSTEM INTEGRATION
EDUCATIONAL SERVICES
TROUBLESHOOTING
DUMP ANALYSIS
DATA RECOVERY
PLANNING
PREDICTIVE SOFTWARE

4485 Lawrenceville Highway • Suite 108 • Lilburn, Georgia 30247-3615 • 404-923-1383 Fax: 404-923-3998

Circle 32 on reader service card.

RDOS under WINDOWS as a 21st century OS option?

Yes! on a PC network, too!

This great real-time OS runs faster than ever on a Hawk/PC using Nova/Eclipse backplane signals. NO reprogramming!!

16-bit AOS also runs better on a Hawk/PC

HAWK CO-PROCESSOR

STROBE DATA INC.
(206) 641-4940

Circle 42 on reader service card.

Figure 1: continued

```
GLOBAL struct tm *localtime(const time_t *ctp) {
    long days;    /* 0..49744 */
    long i;       /* Days to start of this year */
    unsigned long secs;
    int      year;    /* 70..206 */
    static struct tm ltm;

    /* Convert calar calendar time to */
    /* scalar local standard time. */
    secs = *ctp + (60 * true_utc_offset());

    /* DST state is initially unknown. */
    ltm.tm_isdst = -1;

    /* This will only loop a second time if it */
    /* turns out that DST is in effect locally. */
    for (;;) {

    /* Scalar local time -> local time structure. */
    days = secs / 86400;
    ltm.tm_wday = (days + BASE_WDAY) % 7;
    year = BASE_YEAR + days / 365;
    while (days < (i = daysto(year,0))) year--;
    days -= i;
    ltm.tm_year = year;
    ltm.tm_mon  = 11;
    while (days < DTM(year,ltm.tm_mon)) {
        ltm.tm_mon--;
    }
    ltm.tm_yday = days;
    ltm.tm_mday = days - DTM(year,ltm.tm_mon) + 1;

    /* Do the time-of-day. */
    secs %= 86400;
    ltm.tm_hour = secs / 3600;
    secs %= 3600;
    ltm.tm_min  = secs / 60;
    ltm.tm_sec  = secs % 60;

    /* If pass two then we're done. */
    if (ltm.tm_isdst != -1) break;

    /* Pass 1: if not DST then we're done. */
    if ( (ltm.tm_isdst = isdst(&ltm)) == 0) break;

    /* DST is in effect; add an hour and recompute. */
    secs = *ctp + (60 * true_utc_offset()) + 3600;
    }
    return &ltm;
}

/* Compile with VALIDATE/DEFINE and then link */
/* in order to make this an executable program. */
#ifdef VALIDATE

main(int argc, char *argv[]) {
    int     c,i;
    struct tm *ltp; /* Local time structure ptr */
    time_t  ct;     /* Calendar time */

    if (argc < 2) {
        fprintf(stderr,"\nUsage: DSTLIB ct...\n");
        exit(EXIT_FAILURE);
    }

    /* Convert each argument. */
    printf("\n   Calendar\tLocal\n");
    printf("   Time\tTime\n");
    ct = time(NULL);
    for (i = 0; i < argc; i++) {
        if (i == 0) {
            ct = time(NULL);
        }
        else {
            ct = strtoul(argv[i],NULL,10);
        }
```


DATA INVESTORS CORPORATION

247 Huyler Street
So. Hackensack, NJ 07606
(201) 343-8875
FAX# (201) 489-5633

COMMUNICATIONS

4623 IAC-24 W/TCB	$2,900
4370 IAC-16 RS-232 W/TCB-16	350
4368 IAC-8 RS-232 W/TCB-8	250
4370-A IAC-16 RS-422 W/TCB-16	250
4368-A IAC-8 RS-422 W/TCB-8	250
4380 ISC-2	150
4560 LAC-12	450
4561 LSC MV/2000	250
4543-B MCP-1	950
4463ZT USAM-4 DESKTOP	150
4532 ILC W/ACCESSORIES	1,700

SYSTEMS & PROCESSORS

MV/20000 MOD1 8MB	$6,900
8952 MV/15000 MOD-8 8MB	1,900
MOD-20 CPU BOARD UPGRADE REV.79	3,900
8994 IOC-2/3 MV20000	600
MV10000 CPU-O-MEM	900
8888 MV/7800XP 4MB	5,200
MV/7800XP 4MB CPU BOARD	4,800
MV/7800 4MB CPU BOARD	900
91547 MV/2000 4MB 160 DISK TAPE NEW STYLE	2,400
8760 MV/4000 2MB	1,400
8770 S/280 2MB W/BMC	800
8678N S/140 256KB	900
DESKTOP SYSTEMS & PERIPHERALS	CALL
005-15633 S/140 BMC MOD	1,400
Exide 3 K VA UPS	1,800

DISK DRIVES & MAG. TAPE

6239 592MB ARGUS S/S	$1,700
6236 354MB ARGUS S/S	900
6581 500MB RAMS DISK S/S	3,900
6581-A 500MB RAMS DISK ADD ON	2,900
6461 CSS 130MB TAPE 322 & 234 DISKS	4,200
6161 147MB WINCHESTER S/S	1,100
6554 662MB FOR CSS	2,500
6491 322MB FOR CSS	1,000
6446 234 MB FOR CSS	600
6329 120MB MV/2000	450
6363 160MB MV/2000	750
6100 25MB WINCHESTER W1/28	900
6300/6299 1600/6250 MAG TAPE S/S	1,900
6026 DUAL MAG TAPE S/S BROWN	850
6123 MICRO STREAMER BROWN	400
6270 DESKTOP CARTRIDGE TAPE	450
6125 STREAMER MAG TAPE S/S	400
BMX-3 CONTROLLER	1,100
BMX 2 CONTROLLER	950
005-2169/6299/6300 CONTROLLER	300

MEMORIES

80108 32MB MV/9500/9600	$9,500
8990-D 16MB MV/20000/15000	1,200
8990-C 8MB MV/20000/15000	400
8939 MV/7800XP 4MB	500
8871 8MB MV/4000/10000	800
8927 4MB MV/2000 NEW STYLE	1,150
8870 4MB MV/4000/10000	450
8765 2MB MV/4000/10000	200
8940 10MB MV/7800XP	2,700
8708 2MB MV/8000	200
8754 512KB S/140	300
8687 256KB S/140	200
8387 256KB NOVA/4	200
8656 256KB ECLIPSE	200
DESKTOP MEMORY	CALL

TERMINALS & PRINTERS

D-216, D-412, D-462, D-470C	Start at $165
D-214, D-215, D-411, D-461, D-220C	Start at 135
D-210, D-211, D-410, D-460	Start at 100
B1000 PRINTER	2,800
4364 600 LPM BAND S/S	1,600
4327 300 LPM BAND S/S	900
6215 180 CPS PRINTER	500
4433 150 CPS PRINTER	400
4434 160 CPS PRINTER	500
GENICOM MOD #3180	325
6475 12 PPM GRAPHICS LASER	1,400
4374 1200 LPM S/S	1,900

Data Investors is a worldwide specialist is Data General Equipment. We have been buying and selling pre-owned Data General Equipment for 16 years. All equipment is shipped from our facilities, thoroughly tested and guaranteed eligible for Data General Maintenance.

Circle 15 on reader service card.

Figure 1: continued

```
        ltp = localtime(&ct);
        c = (ltp->tm_isdst) ? ('D') : ('S');
        printf("%10lu\t",ct);
        printf("%s, %02d/%02d/%02d %02d:%02d:%02d P%cT",
            dow[ltp->tm_wday],
            ltp->tm_mon+1,
            ltp->tm_mday,
            ltp->tm_year,
            ltp->tm_hour,
            ltp->tm_min,
            ltp->tm_sec,
            c);
        printf(", %d%s day of year\n",
            ltp->tm_yday+1,
            numsuff[(ltp->tm_yday+1)%10]);
    }
}

#endif
```

Figure 2:
Sample NIST TTS output

```
National Institute of Standards and Technology
Telephone Time Service, Generator 1A
Enter question mark "?" for HEL?
                          D  L D
 MJD  YR MO DA HH MM SS ST S UTl msADV        <OTM>
49191 93-07-23 06:17:44 50 0 +.6 045.0 UTC(NIST) *
49191 93-07-23 06:17:45 50 0 +.6 045.0 UTC(NIST) *
49191 93-07-23 06:17:46 50 0 +.6 045.0 UTC(NIST) *
(repeats for 30 seconds before hanging up)
```

If you start DSTMON when you boot your system and you use the functions included in DSTLIB, then your AOS/VS system will automatically switch on and off DST and you'll be able to get consistent UTC values for use as timestamps.

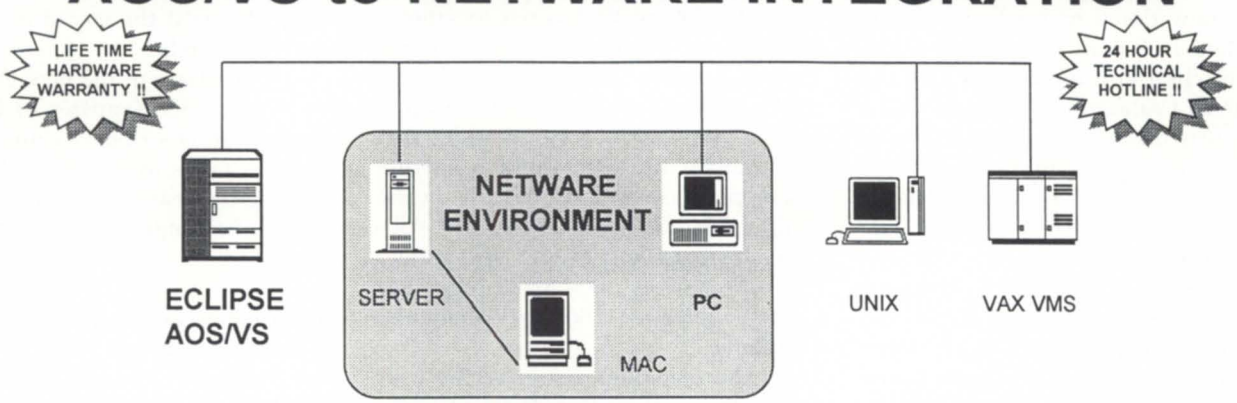
The source code shown, including the NIST calling program not shown here, is all available on the :SYSMGR BBS as item SML9309X in the SMLOGS subdirectory. And thanks to KayBee for helping me to test my stuff against DG/UX.

:HIATUS_OF_SORTS

After 8.083 years of writing these System Manager's columns, I've decided to take it easy for a while. This column will be the last of my regular monthly columns, although I will be submitting some articles in the future on an infrequent basis. Δ

Copyright © 1993 B.J. Inc. All rights reserved. BJ is 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 (voice) or 415/550-1072 (fax). The :SYSMGR Bulletin Board Service number is 415/391-6531 (300/1200/2400 with optional MNP class 5; 605X, 8/N/1), or 415/550-1454 (voice).

AOS/VS to NETWARE INTEGRATION



NOVELL Brings NetWare into Open Systems networking with support for industry standard NFS (Network File System) and TCP/IP networking protocols. Your NetWare servers already have the foundation for an enterprise-wide Open Systems integration strategy.

C&C brings AOS/VS into Open Systems networking by providing NFS and TCP/IP networking solutions for AOS/VS systems. You get network terminal access, file transfer, file sharing, backup, printing, electronic mail, and much more. This high performance, cost-effective software will allow you to utilize industry standard protocols.

This Open Systems networking architecture also provides integration from AOS/VS to other systems such as DEC, UNIX, HP, IBM, and many others.

Claflin & Clayton, Inc.

INDUSTRY STANDARD NETWORKING SOLUTIONS

203 SOUTHWEST CUTOFF
NORTHBORO, MA 01532

PHONE: (508) 393-7979
FAX: (508) 393-8788

Circle 6 on reader service card.

David Novy

The letter

SYNOPSIS

With the release of its new Aviion 8500 and AV 9500 Unix file servers, DG seems to understand what it takes to be successful in the commercial marketplace.

Yesterday I was having trouble getting started on my day's routine. I returned from vacation two days before and knew that I had a *Focus* article deadline. Isn't it amazing how you can move when you have a deadline to meet? So I called the editor and asked what was the theme of the next issue (we schedule these things about two months in advance). I was told that the September theme was the new Data General Aviion machines.

I thought to myself at the time that the issue theme was of little help to me. The most recent Data General Aviion announcement I knew about was a couple of new file servers that offered superb fault tolerance but did not have a lot of firepower. Nothing in the DG sales arsenal would have a lot of firepower until the new Motorola 88110 chip arrived. So, after my editorial conversation I switched my mind into ponder mode to see if I could find a different topic for my September column.

Then I picked up the afternoon mail, and I noticed a rather thick letter from none other than good old Data General. I realized when I opened it that it wasn't just a letter; it was **THE LETTER.**

This was Data General's sales brochure announcing a new family of machines based on the anticipated Motorola 88110 chip. After reading through the material, all I could think was that DG really has put together a marvelous product line with nearly unimaginable price/performance. Scheduled for availability by August was a four-way-processor machine that can deliver 400 MIPS (million instructions per second) and 210 tpsA. In the fall, an eight-way, 800 MIPS and 450-plus tpsA machine is due. Next spring, a 16-processor, 1,600 MIPS processor with an expected 1,000 tpsA should be available.

The machines also give the user more than just raw power at an excellent price. The new Aviion systems come with Novell Netware for Unix and a five-user license for the network operating system. This is the first time that Novell has entered into a tight integration with Netware on a factory-shipped system coming from a Unix vendor. I have a personal bias toward Sun's PC-NFS for PC networking, but Netware is a fine product and Novell now owns the Unix System Laboratory that is responsible for Unix development. So if you were to do your PC networking using Netware instead of PC-NFS, I doubt that it is a decision you will learn to regret. In fact, by next year you might be asking *me* what took so long.

Another feature of the new Aviion machines that's easy to overlook when you see their amazing performance and price numbers is their fault tolerance. These machines possess tremendous self-healing capability. The systems come with redundant CPUs, memory channels, and I/O channels. If a machine CPU, memory channel, or I/O channel goes bad the machine reboots itself gracefully, ignoring the defective part and putting in an automatic call to DG for help. Previously, the only way to obtain this type of fault tolerance was to use two separate machines and a manual switch-over. Now if these machines are combined with a RAID box and a redundant tape array, it might be possible for DG system managers to work and have a social life. I don't know if the world is ready for such a possibility.

The release of the new DG Aviion 8500 and 9500 families of Unix file servers shows that DG understands what it takes to be successful in the commercial marketplace. The company should be congratulated on a job well done.

Information management: The saga continues

Recently I attended a presentation by the head of the graduate school of business from a large university. He stated that the Industrial Revolution began around 1650 and that Adam Smith wrote the *Wealth of Nations* in 1776. The Industrial Revolution and Smith's landmark book formed the foundations of our modern industrial society. However, a new type of society is beginning more recently—the information society. Rapid developments in computer technology, high-speed computer networks, global competition, and "flat" organizational structures are leading to changes that will be even more far-reaching than those brought about by the industrial age, he said.

DG TERMINAL SWAPOUT/REPAIR

SERVICING ALL DATA GENERAL TERMINALS

From **$59**

LESS TURNAROUND TIME...WE'LL SHIP YOUR ADVANCE TERMINAL TODAY!

Call for all of your self-maintenance requirements.

DIGITAL COMPUTER CONSULTING, INC.

Boston
Tel: (617) 837-7255
Fax: (617) 837-9641

Baltimore
Tel: (410) 750-7200
Fax: (410) 750-7202

Circle 17 on reader service card.

DATA GENERAL
COMPUTERS & PERIPHERALS

MONTHLY SPECIALS

MV7800XP COMPLETE	$2,600
MV 15000 MOD 10	1,800
4595 BAND PRINTER	1,600
6621 SUBSYSTEM	6,700
6239 SUBSYSTEM	1,150
D217 W/KEYBOARD	249
D216 W/KEYBOARD	159

Phone 404-416-0103
Fax 404-416-0155

6990 Peachtree Industrial Blvd,
Suite E, Atlanta GA 30071

R & D COMPUTERS INC.

Circle 35 on reader service card.

The truth of his words is becoming quite apparent. Information now comes from anywhere and goes anywhere on earth within moments, so long as you have a modem connection. And the point was reached about 1985 when more information was stored in electronic form than that stored in all the books in the world. It is amazing to consider that commercial computers first came on-line in the 1940s, and within just 45 years, 50 percent of the world's information inventory resides in them.

Later I talked with the chairman of the management information systems (MIS) department of the same university. I asked him where his department was heading regarding the teaching of the principles of product data management. He said he was not aware of the topic, and could I please send him some information. I was not surprised that he didn't know about product data management—it arose from corporate engineering and manufacturing centers, not from the business information systems community. So you can see, the revolution is *really* beginning when someone charged with knowing about information systems that will affect corporations in a major way is not aware even of the existence of product data management systems.

Corporate MIS departments are no longer needed to develop major cooperative information systems, because the computing power *and* the information needed for such systems has become distributed. This is not necessarily a positive development, but you can expect to see it happen more often, especially if corporate MIS departments are not responsive to the needs of the corporation's product development organizations. Computer hardware corporations that fail to recognize this will suffer similar problems. If they cannot provide the applications required to meet customer needs, the customers will buy hardware from a company that can supply the required applications. Δ

David Novy is a technical computer specialist with 3M in St. Paul, Minnesota. He is past chairman of the AOS/VS special interest group, and current chairman of NADGUG's SIG/UX.

NOW AVAILABLE--ICHOST MS-DOS NETWORK VERSION
NO EXTRA CHARGE--CALL FOR DETAILS

IC HOST™
TOTAL ICOBOL SOLUTION

Recognize these names? You should!
They represent the state of the art in computing today. Combine **ICHOST™** with one of these big names and get the best ICOBOL runtime and development system money can buy!

If you are developing and running ICOBOL applications with anything but **ICHOST™**, or you want to know more about the advantages of running ICOBOL with **ICHOST™** give us a call. Dealer discounts available.

Make **ICHOST™** your total ICOBOL solution

Gerry Manning & Associates
3311 Candelaria Road
Albuquerque, NM 87107
Phone: (505) 888-5011
Fax: (505) 883-7708

Our U.K./Europe Distributor:
Broadnet Ltd., Falcon House
North Feltham Trading Estate
Feltham, Middlesex, TW14 OUQ
Phone: 081 893 1515
FAX: 081 893 2183
Contact: Roland Eckert

DGCOBOL Compiler
AS LOW AS $595.00!
Compile ICOBOL in
DOS & UNIX environments
Enhanced error documentation
& compile times

Circle 22 on reader service card.

More about sar

SYNOPSIS

The author continues a series of articles explaining the performance-monitoring utilities available for solving some of the most common bottlenecks affecting DG/UX in a multi-user server environment.

by Thomas E. Soukup
Special to Focus

Performance monitoring and tuning the DG/UX system used to be considered difficult tasks. That doesn't have to be the case today, but to monitor and make changes that increase overall system performance, you must become familiar with the utilities available with the DG/UX multi-user system. You must not only be able to collect system activity and performance data, but also analyze the data and implement corrective actions.

The following sections will describe significant data items displayed by *sar*. For each *sar* option, the following columns and descriptions are included: the significant data item that *sar* reports; the significant data item that the real-time performance monitor (UX/RPM) displays on its screen; the significant data item that the AV SysScope performance monitor displays on its screen; a brief explanation of each data item; some general performance guidelines; and additional features included in UX/RPM and AV SysScope not reported by *sar* or other Unix utilities.

System calls by category (*sar -c*)

The *-c* option reports system calls by categories.

Figure 1: The sar -c option

SAR item	UX/RPM item	SysScope item
scall/s	system calls/sec	system calls/sec

The average number of system calls that have been executed per second.

SAR item	UX/RPM item	SysScope item
sread/s	read calls/sec	read system calls/sec

The average number of read system calls that have been executed per second.

SAR item	UX/RPM item	SysScope item
swrit/s	write calls/sec	write system calls/sec

The average number of write system calls that have been executed per second.

SAR item	UX/RPM item	SysScope item
fork/s	fork calls/sec	fork system calls/sec

The average number of fork and vfork system calls that have been executed per second.

SAR item	UX/RPM item	SysScope item
exec/s	exec calls/sec	exec system calls/sec

The average number of exec system calls that have been executed per second.

SAR item	UX/RPM item	SysScope item
rchar/s	phys read requests	chars transferred by read/sec

The average number of characters transferred from system buffers per second to read system calls.

SAR item	UX/RPM item	SysScope item
wchar/s	phys write requests	chars transferred by write/sec

The average number of characters transferred to system buffers per second due to write system calls.

Guideline for *scall/s*. This value is very application dependent. Values can range from a few hundred to a few thousand. If the system is spending a high amount of time in system mode (*sar -u*) and the number of system calls per second value is in the thousands, a kernel profile may need to be run to determine if the system is wasting time in the kernel. A kernel profile may assist to determine if applications are making excessive system calls.

Guidelines for *sread/s* and *swrite/s*. A small number of bytes per read may indicate a performance bottleneck because system call overhead contributes most to the cost of read. When possible, permit an application to read many bytes at once to increase overall read throughput efficiency. A small number of bytes per write may indicate a performance bottleneck because system call overhead contributes most to the cost of write. When possible, permit an application of write many bytes at once to increase overall write throughput efficiency.

Guidelines for *rchar/s* and *wchar/s*. These values are very application dependent. Values for *rchar/s* can range from zero to a few million. Values for *wchar/s* can range from zero to a few million, but are usually less than the *rchar/s* value under normal system loads. These values can assist you in determining the percentage of reads versus writes of an application.

You may issue 10 read calls and 5 write calls in your application program and assume the read-versus-write ratio to be 2 reads for every 1 write. However, the application read call may be serviced by physically reading from disk twice, thus the true ratio to be 4 reads for every 1 write. As changes are made to applications and file system pa-

rameters, *rchar/s* and *wchar/s* can be monitored to see the physical effects of the changes.

Disk Activity (*sar -d*)

The *-d* option reports the activity of block devices.

Figure 2: The *sar -d* option

SAR item **UX/RPM item** **SysScope item**
device disk name disk name
The DG/UX physical name for the block device.

SAR item **UX/RPM item** **SysScope item**
%busy % busy percent busy
The percentage of time the disk unit has been busy processing requests.

SAR item **UX/RPM item** **SysScope item**
avque aver que average queue
The average number of requests already queued to the device at the time new requests arrive.

SAR item **UX/RPM item** **SysScope item**
r+w/s # of requests reqs/sec
The average number of read and write requests to the device.

SAR item **UX/RPM item** **SysScope item**
blks/s blocks written blocks/sec
The average number of 512-byte disk blocks read and written per second.

SAR item **UX/RPM item** **SysScope item**
avwait aver resp average wait
The average time (in milliseconds) disk requests to this device have spent waiting in queues to be serviced.

SAR item **UX/RPM item** **SysScope item**
avserv aver serve average service
The average time (in milliseconds) it took to service disk requests to this device, including seek and transfer times.

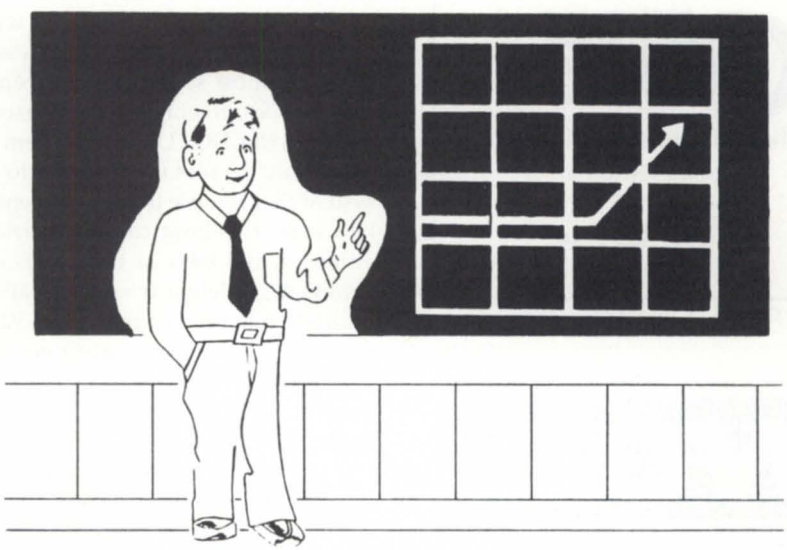
Guideline for *%busy*. The guideline for *%busy* is never to allow a disk to become greater than 30-percent busy. However, the *%busy* value by itself is not a very good indicator of the overall disk subsystem's performance. Instead, you should gauge the performance of the disk subsystem on *avque*, *avwait*, and *avserv* lengths.

Guideline for *avque*. A high value indicates that several requests are always queued up waiting for the disk to become available. For good system response, it is important for the disk subsystem to be able to keep this value in the low single digits. To reduce this value, more disk spindles, controllers, disk striping, and adjustment of the file system parameters such as DAR size, anniversary sizes, and data element sizes may be necessary. Later articles in this series will address disk issues.

Guideline for *r+w/s*. With a multi-disk configuration of similar disks, the number of requests should be balanced across the disk units. Overall system performance could be bottlenecked if one or a few disk units in a multi-disk configuration handle most of the I/O load. To balance the load, check which file systems are mounted on the most heavily used disks and attempt to better distribute those file systems. Disk striping may be needed to better distribute the load across disks.

Guideline for *avwait*. A high value indicates time spent waiting for the disk to accept an I/O request. As the *avque* increases, the avwait time will

Look Sharp with DataGen!



DataGen gives you the edge with split-second programming of file maintenance code in Cobol.

Cut The Backlog!

- **Conversions to Open Systems**
- **New Applications**
- **Relational File Design**
- **Maintenance (Enhancements)**

Productivity Systems Development Corporation
P.O. Box 1931, Summerville, SC 29484
803-851-6577

Circle 38 on reader service card.

At CDS, we don't just talk UNIX, We KNOW UNIX!

We're one of Data General's leading UNIX Distributors of both AViiON and CLARiiON. Here's Why:

- 10 Year History with UNIX products & education
- Authorized USL, Univel & Novell Education Center
- UNIX Consulting & Serivces

Education Centers:
Boston, MA; Westboro, MA
& Stamford, CT

CDS®
The Solutions Distributor
(f/k/a VITRONIX)
800-366-1145 Ext. 443
(508) 366-1144

Circle 5 on reader service card.

NCD CORPORATION®
YOUR DATA GENERAL MARKETPLACE!
BUY • SELL • LEASE • TRADE
AViiON New/Used
MV / Eclipse
Upgrades/Add-Ons
Large Inventory
DG Compatible Equip.
Depot Maintenance
CALL TODAY
(216) 953-4488
Fax Equipment Lists
(216) 953-9361
CDLA MEMBER
NATIONAL COMPUTER DYNAMICS
7650 Tyler Boulevard
Mentor, Ohio 44060-5286

Circle 31 on reader service card.

also increase. For good system response, this value should be less than 15-20 milliseconds and never more than 100 milliseconds.

Guideline for *avserv*. A high value indicates time spent seeking and transferring data. For good system response, this value should be close to the speed of the disk, i.e., 20-25 milliseconds. High values may indicate on-disk cache misses or if you're using a striped file system, that the file system's disk allocation regions are misaligned, causing high seek rates.

It may be possible to improve performance by making some of the changes to the file system that will be discussed in the next part of this series. One common solution is to remove unused files, freeing up disk space. By default, the DG/UX file system will allow only the root user to write to a file system that is more than 90-percent full. However, this limit can be overridden either on the *mkfs* or the *tunefs* command. A guideline is never to allow a file system to become more than 92-percent full. The extra time needed to search bitmaps for free blocks may have detrimental effects on disk and system buffer performance.

Over time, a disk allocation region (DAR) can become fragmented, especially if numerous files are created, deleted, or updated. The *dumpfs* command can be used to display information about the disk allocation regions. It can be run by the root user with the file system still mounted. When the "free data blocks' histogram" shows that a DAR doesn't contain any large blocks (block sizes of 16 or larger), then fragmentation may be an issue. In addition, mixing files of different element sizes hurts overall disk subsystem performance. Eliminate fragmentation by archiving and restoring the files in the affected file system.

Features of UX/RPM and AV SysScope for disk activity. Reports average response that is the average time in milliseconds a disk request spends being processed. List read blocks/sec that is the number to 512-byte block reads from the disk. Reports read reqs/sec that is the number of separate read requests from the disk. Reports write blocks/sec that is the number of 512-byte blocks written to disk. Reports write reqs/sec that is the number of separate write requests to the disk.

Buffer Activity of Metadata (*sar -b*). The *-b* option reports the buffer activity of the metadata. Metadata in DG/UX revisions 5.4 and later can be defined as data that the file system uses to describe and locate files, i.e., data about data. The buffer activity values indicate how metadata is being managed. By default, "PERCENTSYSBUF" is set to 5 percent of memory. This portion of memory is reserved for the management of metadata.

Figure 3: The *sar -b* option

SAR item	UX/RPM item	SysScope item
bread/s	phys block reads	MD physical reads blocks/sec

The number of blocks of metadata transferred by physical reads. These are blocks that are read from disk.

SAR item	UX/RPM item	SysScope item
lread/s	log block reads	MD logical reads blocks/sec

The number of blocks of metadata transferred by local reads. This includes blocks that are cached and blocks that require physical reads from the disk.

SAR item	UX/RPM item	SysScope item
%rcache	none	none

The average percentage of read requests satisfied from system buffers rather than disk requests.

SAR item	UX/RPM item	SysScope item
bwrit/s	phys block writes	MD physical writes blocks/sec

The number of blocks of metadata transferred by physical writes to the disk.

SAR item	UX/RPM item	SysScope item
lwrit/s	log block writes	MD logical writes blocks/sec

The number of blocks of metadata transferred by logical writes. This includes blocks that are cached or physically written to disk.

SAR item	UX/RPM item	SysScope item
%wcache	none	none

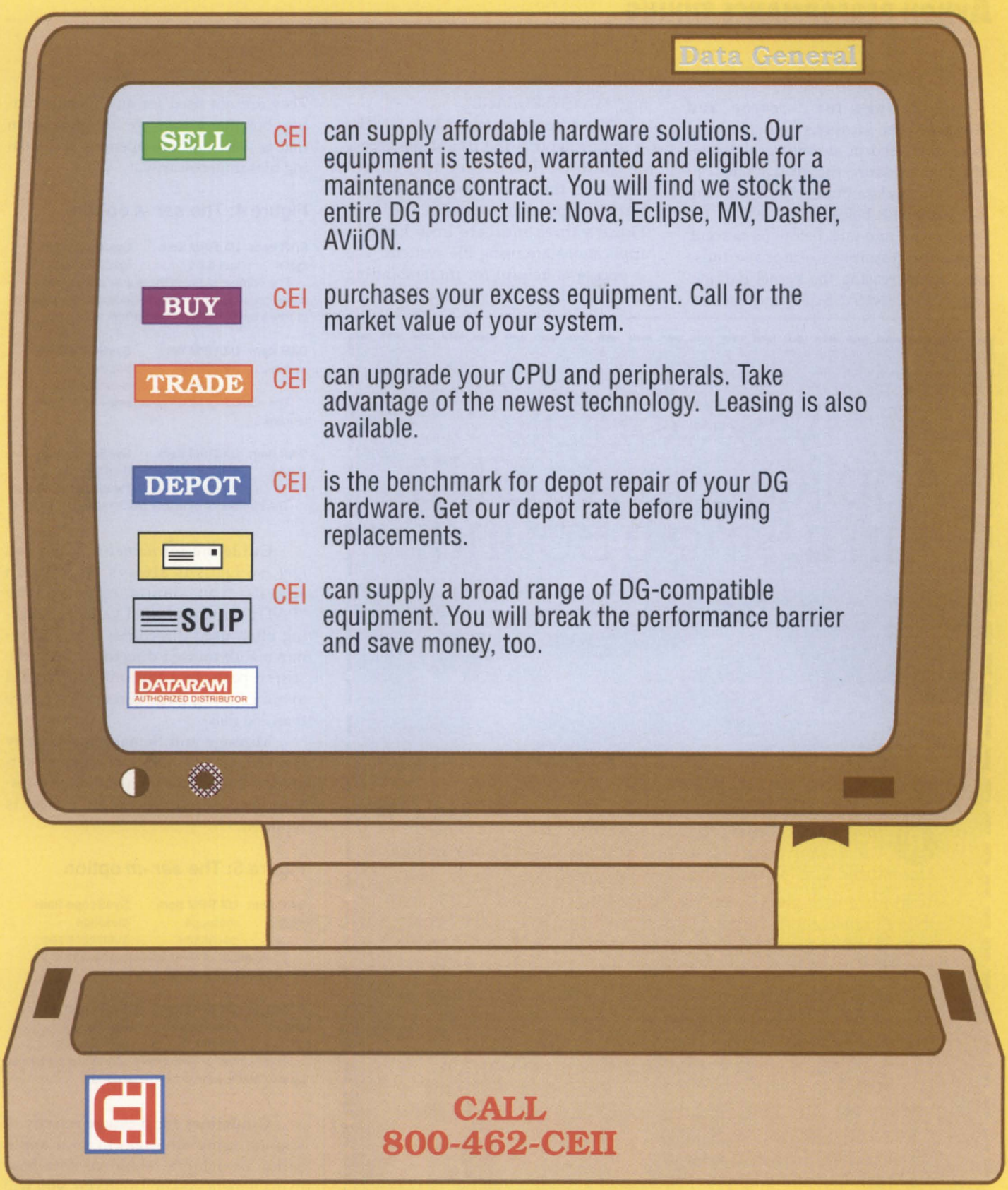
The average percentage of write requests satisfied by updating existing system buffers rather than disk requests.

SAR item	UX/RPM item	SysScope item
%pread/s	none	MD physical read reqs/sec

The number of metadata read requests from disk.

SAR item	UX/RPM item	SysScope item
%pwrit/s	none	MD physical writes reqs/sec

The number of metadata write requests to the disk.



Computer Engineering International

2231 Star Court
P.O. Box 81755
Rochester, MI 48308
MI Phone: 313-853-0770
FAX: 313-853-0775

Circle 8 on reader service card.

Guidelines for *%rcache* and *%wcache*. The *sar* items you should be most interested in are the cache hit ratios that measure the effectiveness of system metadata buffering. If the read cache rate falls below 95 percent, or the write cache rate falls below 65 percent, it may be possible to improve these rates by increasing the kernel parameters, "PERCENTSYSBUF," and decreasing "MAXSYSBUFAGE".

File-access operations (*sar -a*). The *-a* option reports the use of file-access operations. The larger the values reported, the more time the DG/UX kernel is spending to access user files. These values indicate how heavily applications are using file systems. The *-a* option is helpful for understanding how disk-dependent the application is. They are not used for any specific tuning, but many indicate an application that is wasting time opening and closing files unnecessarily.

Figure 4: The *sar -a* option

SAR item	UX/RPM item	SysScope item
iget/s	Iget calls	Iget calls/sec

The number of times there was a file system name cache miss. It does *not* indicate the number of times the file system media was accessed.

SAR item	UX/RPM item	SysScope item
namei/s	pathname searches	pathname searches/sec

The number of times pathnames have been resolved.

SAR item	UX/RPM item	SysScope item
dirbk/s	directory block Reads	directory block Reads/sec

The number of directory block reads per second.

Guideline for *namei/s*. *Namei* call *iget*, so *iget/s* is always larger than *namei/s*. You should optimize the "PATH" environmental variables, placing often used directories first and removing all unused directories from the search path. In addition, you should avoid creating large directories (more than 256 files).

Message and Semaphore Activity (*sar -m*). The *-m* option reports on interprocess communication activities. Message and semaphore call usage is reported.

Figure 5: The *sar -m* option

SAR item	UX/RPM item	SysScope item
msg/s	message operations	message operations/sec

The number of messages sent by way of the *msgsnd* call per second.

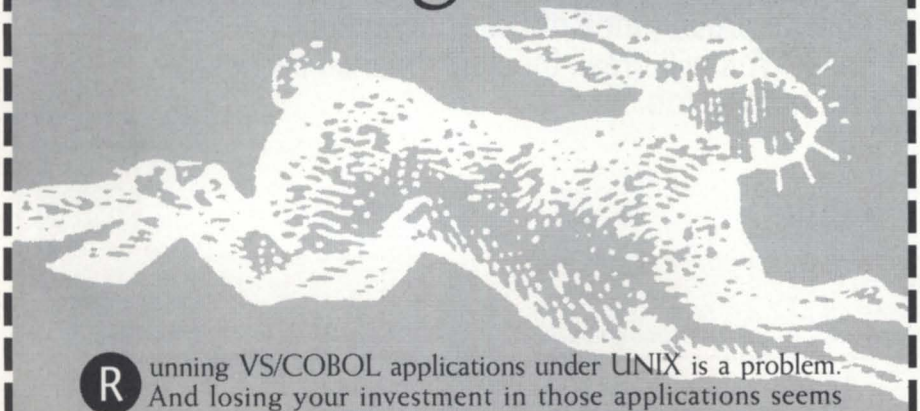
SAR item	UX/RPM item	SysScope item
sem/s	semaphore operations	semaphore operations/sec

The number of semaphore operations performed by way of the semop call per second.

Guidelines for message activity. If you are using messages in your application or using a relational data base management system (RDBMS), you will most like need to increase the message kernel parameters. The most common message kernel parameters that need modifying are "MSGMNI" (the maximum number of message queues that may exist in the system at one time; "MSGTQL" (the maximum number of

VS/COBOL to UNIX

VS/COBOL Applications to UNIX in a Single Bound.



Running VS/COBOL applications under UNIX is a problem. And losing your investment in those applications seems unavoidable. Until now.

Wild Hare now gives you a way to migrate your VS/COBOL and INFOS applications to open systems in a single hop. You benefit from UNIX and other industry standards while saving time, money and effort.

Let us migrate your code and data to open systems. Your applications will use industry standards such as UNIX, DOS, and networks, and run on virtually any platform.

It's a simple leap to open systems. It protects your investment. And we can do it in a fraction of the time, for a fraction of the cost. So give us a call.

VS/COBOL applications to UNIX. Yet another great reason to run with the Hare.

Call Wild Hare at 303-442-0324 for more information.

wild hare™ COMPUTER SYSTEMS INC.

2820 Wilderness Place Boulder, CO 80301 USA Tel: 303-442-0324 Fax: 303-440-7916

WILD HARE CONSULTING

All trademarks and registered trademarks are the property of their respective owners. Copyright © 1992 Wild Hare Computer Systems, Inc. All rights reserved.

Circle 51 on reader service card.

outstanding messages that may exist in the system at one time); "MSGMNB" (the maximum number of bytes that a message queue may contain); and "MGSMAX" (the maximum number of bytes that a message may contain). Refer to your RDBMS-tuning documentation.

Guidelines for semaphore activity. If you are using semaphores in your application or using an RDBMS, you will most likely need to increase the semaphore kernel parameters. The most common semaphore kernel parameters that need modifying are "SEMOPM" (the maximum number of semaphores that a semaphore net may contain); and "SEMUME" (the maximum number of semaphore undo entries per undo structure). Refer to your RDBMS-tuning documentation.

Terminal device activity (*sar -y*)

The *-y* option monitors terminal device activities. If the system performs a high amount terminal I/O, use this report to determine if there are bad lines or whether an asynchronous controller is a bottleneck.

Figure 6: The *sar -y* option

SAR item	UX/RPM item	SysScope item
rawch/s	TTY raw input	raw input chars/sec

The total number of characters read in raw mode from terminal devices per second.

SAR item	UX/RPM item	SysScope item
canch/s	TTY canonical input	canonical input chars/sec

The total number of characters read from terminal devices and process in canonical mode per second.

SAR item	UX/RPM item	SysScope item
outch/s	TTY output characters	output chars/sec

The total number of characters output to terminal devices per second.

SAR item	UX/RPM item	SysScope item
rcvin/s	receive interrupts	receive interrupts/sec

The total number of receive interrupts from terminal devices per second.

SAR item	UX/RPM item	SysScope item
xmtin/s	transmit interrupts	transmit interrupts/sec

The total number to transmit interrupts sent to terminal devices per second.

SAR item	UX/RPM item	SysScope item
mdmin/s	modem interrupts	modem interrupts/sec

The total number of modem interrupts per second.

Guidelines for terminal device activity. Just as the disk or any other device can become a system bottleneck, the asynchronous I/O controllers can slow terminal response.

One possible problem for poor terminal performance is the terminal's definition file in the *terminfo* library. Use the *infocmp* utility to verify that the terminal description does not have unnecessary millisecond waits. The waits are denoted as "###".

For certain terminals, some of the waits are necessary, but in most cases you can remove the wait or decrease it

Screen Demon

Something for everyone!

The user: Faster displays, electronic mail, screen print, redraw screen, hot keys

The developer: Easy windows, pop-up menus, dialog boxes, line drawing

The system manager: View and control other terminals, inactive terminal auto-logoff

Threshold, Inc.
118 N. Ross Street
Auburn, AL 36830

(205) 821-0075
Fax (205) 821-0122

If you like Screen Demon, you'll love:

Who_Locked_It?
- Find out who has that record locked! Automatically retry reads on locked records. Force other users to release locked records.
- Available for: AOS/VS - ICOBOL
  UNIX - AcuCOBOL

AcuCOBOL to Word Perfect Office Interface
- While running an AcuCOBOL program, you have:
  - Pop-up window notification of new WP Mail
  - WP Shell Hot-Keys with automatic screen redraw
  - Write to and retrieve from the WP Clipboard

Threshold Consulting Services
- We have extensive experience in:
  - AOS/VS and UNIX
  - VS/COBOL, VS/Assembler, C
  - ICOBOL, ICHOST, AcuCOBOL
  - Program and data file conversions
- Thinking of migrating from AOS/VS to UNIX?

Write, call or fax today for more information.

Circle 47 on reader service card.

by two-thirds. Begin by creating a *terminfo* source terminal file, then use the *tic* command to recompile the *terminfo* source terminal file. For more information, see the online manual pages on *tic* and *infocmp*.

Another problem that causes poor terminal performance is issuing a high amount of "stty" setting commands. This causes the controllers to reset line discipline that is a very slow operation. Applications should use library calls to change terminal settings.

Although the I/O rates of the asynchronous controllers will vary according to line discipline settings, a VDA/255 should be able to handle around 55 K characters per second, and a VTC should be able to handle around 200 K characters per second. These numbers will vary depending on the size of write requests, and the use of older model VDC/16s, VDC/8Ps, termservers, and other communication equipment.

Input rates are slower. The *sar outch/s* value reports the character output rate. The *rawch/s* and *canch/s* rates often appear the same. The controllers used on the Aviion system do not provide the data necessary to distinguish between cooked and raw character counts (character processing known as "cooking" is processed at the controller level).

Often high input rates are due to unterminated lines, modem and multiplexors issuing noise. If you notice higher-than-normal *char/s* rates after installing a new modem or multiplexor, check that it is not caught in an infinite loop and "chattering," that is, sending and receiving hundreds of characters that are unnecessary. Also, check that the setup is correct in "/etc/termdefs." For more information, refer to the online manual pages on *termdefs*.

Summary

Performance monitoring and tuning the DG/UX assists you in determining where the system is spending its limited resources, and why. The three areas where the system could be spending its time are in system mode (*%sys*), user mode (*%usr*) or idle time (*%idle*). The Unix system activity reporter (*sar*) is the front-line utility in any performance investigation. Δ

Thomas E. Soukup, currently serving as the worldwide benchmark coordinator, is a member of the Technical Services Group at Data General Corporation in Schaumburg, Illinois. He has been active in benchmark performance at DG for three years, and has assisted system engineers worldwide with DG/UX performance tuning and monitoring. Tom is currently a Ph.D. candidate in computer science and engineering at the University of Illinois at Chicago. *Copyright © 1993 by Thomas E. Soukup and Total Environmental Systems Services Corporation. All rights reserved. Edited by Edward A. Sepich III, Total Environmental Systems Services Corporation.*

RAVE IS AUTHORIZED BY SUN®

Rave Computer Association is an authorized reseller of remanufactured Sun products at incredible savings.

- Complete Sun® inventory (Sparc 1 to MP 690)
- 90 Day Warranty direct from Sun®
- All systems include 2 User right-to-use license
- Rave is an authorized service agent for Sun®
- Used equipment available, with license
- In-house financing
- Immediate delivery
- In stock refurbished Sun® equipment
- All at incredible savings!

We also sell **Data General**

SELL · BUY LEASE · RENT

Rave Computer Association, Inc.

Sun Microsystems Computer Corporation Refurbished Products Reseller

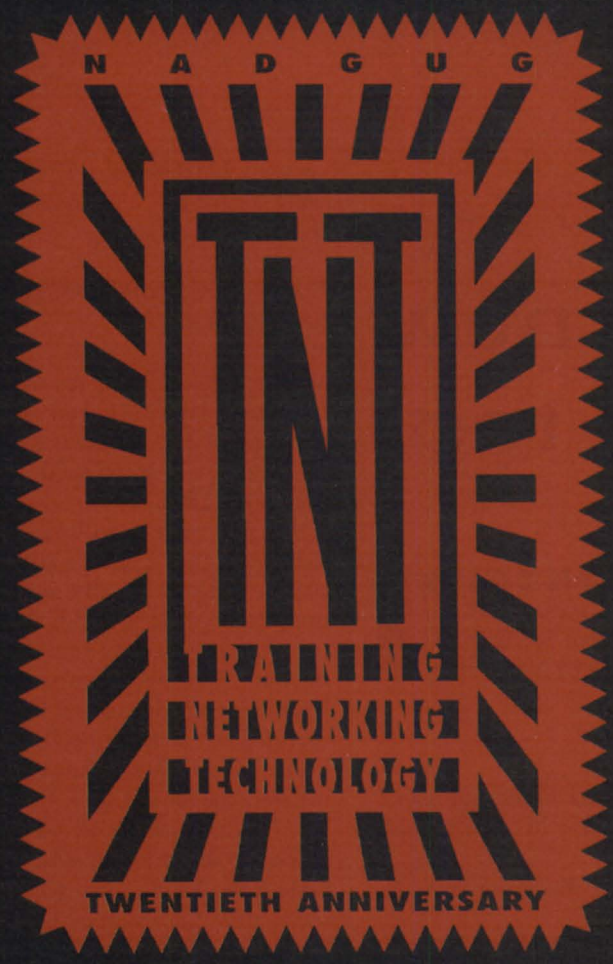
RIDE THE WAVE — RAVE COMPUTER ASSOCIATION, INC. — SAVE WITH RAVE

36960 Metro Court.
Sterling Heights
MI, 48312
(313) 939-8230
Fax: (313) 939-7431

1-800-966-7283

Sun is a registered trademark of Sun Microsystems, Inc.

Circle 36 on reader service card.



New for 1993

Executive Seminars including:

- Migrating to an Open Systems Environment
- Downsizing and your Enterprise

Training Seminars including:

- Network Strategies for the 90's
- How to Select the Right AViiON Database Management System
- Recent Developments in AOS/VS II

An Extensive Exhibit of the Latest Products & Services

Unlimited Networking Opportunities

NADGUG 20th Anniversary Celebrations

OCTOBER 25-28, 1993
THE INFORUM
ATLANTA, GEORGIA

NADGUG 93

will blow you away...

Don't miss this opportunity to be part of the largest Data General gathering in the world!
Watch your mailbox for further details or for more information call 1-800-932-6663 ext. 1234

Circle 29 on reader service card.

FSCOPY: a new backup tool

SYNOPSIS

If you have a lot of data to back up, and you need a consistent, fast solution, FSCOPY will likely satisfy your needs.

by Mark Wilding
Special to Focus

When you receive AOS/VS II 3.01, you will find a surprising addition to the AOS/VS II product—a new backup tool named FSCOPY (a compact way of saying, "Filesytem COPY"). It offers the following features:

- *Consistent backup.* FSCOPY allows on-line, consistent backup while users continue to work.
- *Fast backup.* FSCOPY allows backup of up to 20 GB of data in an operator shift, especially when using Data General's Clariion tape array.
- *LDU backup and recovery.* FSCOPY allows LDU backup and restoration (like LDCOPY), but backup occurs while LDUs are in use.
- *File recovery.* Individual files can be restored from the LDU backup.

Backup

Backup with FSCOPY is easy. It can be done interactively or in batch. If your cartridge tape or Clariion tape array has enough capacity to hold an entire LDU, you can perform your backups without an operator present. Assume that you have a 5 GB tape (@MTJ0) and a 5 GB LDU (:UDD) to back up. The following steps are all that's required:

1) Bring your system to a stable state (checkpoint data bases, get users out of editors, etc.), just like you would for any backup.

2) Start FSCOPY. For example, type

```
FSCOPY/BACKUP/DISPLAY
:UDD @MTJ0
```

to tell FSCOPY to back up the LDU ":UDD" onto the tape @MTJ0.

3) After FSCOPY displays a message that the backup is in progress, allow users to do work again. This will happen in less than a minute.

Now FSCOPY will take a "snapshot" backup while users continue working on the system. What this means is that any recovery operation will recover files as they were when FSCOPY started. Any files changed or created after the backup starts will *not* be included as part of the backup.

FSCOPY backs up all allocated blocks on the LDU as they were when the backup started. FSCOPY calls these "backed up blocks." If a block is modified by a user, FSCOPY takes the original copy of the data in the block *before* it is modified and puts this information on the backup tape. FSCOPY calls these "copied blocks."

Recovery

You can choose to recover entire LDUs or individual files. If you have a catastrophic disk failure, you will likely want to use full LDU recovery. Again, this is easy. Just type

```
FSCOPY/RESTORE/DISPLAY UDD
:UDD @MTJ0
```

This tells FSCOPY to recover the LDU UDD from tape MTJ0 and load the contents into :UDD. While this recovery is taking place, no user can access any files in the LDU.

If you only need to recover some individual files, perhaps because someone accidentally overwrote some important work, you can use FSCOPY to recover these individual files. Because FSCOPY performs an LDU backup, two passes of the tape are required to recover files. The first pass builds a file system index; the second recovers the file or files.

This first pass looks at all the data blocks on the tape and sets aside all file system blocks. Because the AOS/VS II file system has unique "block IDs" on file system blocks, FSCOPY can build a file system index from the backup tape, then use this index to find all blocks in the specified file during the second pass. The following example recovers the files ":UDD:DAVE:IMPORTANT_WORK:# ":

1. Create the index. Type

```
FSCOPY/RESTORE/DISPLAY/INDEX=
UDD_INDEX UDD @MTJ0
```

This reads through the tape and creates a file system index. These index files can take up to 5 percent of the disk space used by the LDU.

2. Next, generate a list of files from the index. Type

```
FSCOPY/RESTORE/DISPLAY/INDEX=
UDD_INDEX/LIST=UDD_FILES
```

This creates a list of pathnames that can be recovered from the tape.

3. Now, create the list of files you want to recover. Use your favorite editor, search for the files you want (everything that begins with :UDD:DAVE :IMPORTANT_WORK:) and copy these

filenames to a different file—for example, FILES_TO_RECOVER.

4. Now restore the files. Type

```
FSCOPY/RESTORE/DISPLAY/INDEX=
UDD_INDEX/FILES=FILES_TO_RECO
VER & UDD @MTJ0
```

The files are recovered as they were when the FSCOPY backup started.

Because we started the restore operation with the /DISPLAY switch, FSCOPY displays how much has been recovered and projects an estimate of how long the recovery will take.

How FSCOPY compares

Compared with DUMP_II/LOAD_II, FSCOPY is faster and provides a "snapshot" backup. While both products allow file recovery, LOAD_II is quicker in recovering files. However, FSCOPY is faster when doing full backups. FSCOPY and DUMP_II/LOAD_II can be used together as a backup strategy. Use FSCOPY to perform full backups, then DUMP_II/LOAD_II to perform incrementals. This is possible because FSCOPY optionally creates a timestamp file (using the /TIMESTAMP switch). This file is created with the date and time when the FSCOPY backup snapshot occurred. If a small percentage of data changes on an LDU between backups, using DUMP_II for incremental backups makes good sense. If large amounts of data change, it may be quicker to use FSCOPY to back up the entire LDU.

FSCOPY makes LDCOPY obsolete. FSCOPY is faster, and allows the backup to occur on-line, while LDCOPY requires that the LDU be released while the backup occurs. Some sites use disk mirroring as part of their backup strategy. At these sites, synchronized LDU images are broken off, then the broken image "snapshot" is backed up while work continues on the remaining image. The disk mirror is later synchronized, making access to the LDU slow. FSCOPY provides this same "snapshot" feature without using mirroring.

The following performance numbers will make the trade-offs clearer. FSCOPY, LDCOPY, and DUMP_II were run using the same 1 GB LDU to the same tape drives. The LDU was constructed on a RAID-0 Clariion disk array connected to an MV/35000. The backup was performed to a Clariion tape array with five 4 mm DAT tapes. All tape-buffer sizes were set to 32768. Each test was run three times with the average shown. At the same time, the CPU usage was measured for each backup program.

Figure 1: Backup to Clariion tape array

Backup Tool	Time (hrs/min/secs)	CPU usage
DUMP_II	01:01:25	54.0 %
LDCOPY	00:27:33	43.9 %
FSCOPY	00:22:26	26.6 %

Continued on page 43.

U/FOS - INFOS under UNIX

Exciting opportunities for U/FOS Migration Partners and Migration Consultants

U/FOS is the product that's liberating DG MV INFOS users and enabling them to gain the financial and operational benefit of Open Systems. Its success is creating exciting opportunities throughout the world for Migration Partners and Migration Consultants to work with Transoft and its U/FOS-related products to help users migrate rapidly and smoothly to the AViiON and other major UNIX platforms.

If you believe you can offer the skills, experience and high professional standards required, we will be pleased to hear from you. All enquiries will be treated in confidence.

Please respond to:

TRANSOFT®
Portability and Productivity

Joe Rous, Sales Manager
Transoft Inc.
1100 Circle 75 Parkway, Suite 800
Atlanta GA 30339 USA
Tel (404) 933-1661
Fax (404) 933-1662

Paul Holland, Sales Director
Transoft Limited
Nash House, Datchet Road
Slough SL3 7LR England
Tel (0)753 692332
Fax (0)753 694251

Circle 53 on reader service card.

YOU NEED DATA GENERAL EQUIPMENT.
YOU NEED IT NOW. YOU NEED IT PRICED RIGHT.
AND IT HAS TO MEET YOUR SPECIFICATIONS.

CPU's

MV 20000 Mod 1 & 2	CALL
MV 15000 Mod 20	$6,900
MV 10000	$1,900
MV 7800 XP w/4 MB	$3,500
MV 7800 w/4 MB	$2,200
MV 4000	$900
MV 2500	$2,900
MV 2000	$2,500
S280	$1,500
S/140	$1,200
Nova 4X	$900
Desktop Systems & Peripherals	CALL

DISK & TAPE

MV 2000 Disks and Tapes	CALL
6239 592MB S/S	$1,500
6236 354MB S/S	$600
6161 147MB S/S	$900
6299 6250 BPI Tape	$1,500
6125 Tape S/S	$595
6026 Tape S/S	$595

MEMORY

MV 9600 32MB	$6,500
MV15 & MV20 32MB	$3,500
MV15 & MV20 16MB	$2,300
MV15 & MV20 8MB	$800
MV4 & MV10 8MB	$500
MV4 & MV10 4MB	$800
MV4 & MV10 2MB	$400
Memory For All Other DG Processors IN STOCK	

CRT's & PRINTERS

BP1500 Printer	$5,000
4374 Printer	$3,900
B1000 Printer	$2,900
B600 Printer	$1,500
B300 Printer	$975
D461 CRT	$350
D460 CRT	$220
D411 CRT	$225
D410 CRT	$175
D462 CRT	CALL
D216 CRT	CALL

COMMUNICATIONS

IAC/16	$400
IAC/8	$200
ATI/16	$150
AMI/8	$150
LAN Controller	$2,000
LAC-12	$400

LARGE SELECTION OF EARLY-MODEL EQUIPMENT

"THE SOLUTION"

SECURITY COMPUTER SALES

Phone: **(612) 227-5683**
FAX: (612) 223-5524
622 Rossmor Building
500 N. Robert Street
St. Paul, MN 55101

Circle 41 on reader service card.

AD INDEX

Company	PG#	RS#
Ames Sciences, Inc.	19	1
Asset Remarketing	9	3
Async Systems, Inc.	19	4
CDS	34	5
Claflin & Clayton, Inc.	29	6
Claflin & Clayton, Inc.	26	7
Computer Engineering International, Inc.	35	8
Computer Wholesalers, Inc.	21	9
Contemporary Cybernetics Group	14	44
Data Bank Associates, Inc.	13	11
Data Bank Associates, Inc.	16	12
Data General Corporation	3	13
Data General Hot Site	10	10
Data General Professional Services	16	14
Data Investors Corporation	28	15
DataLynx	47	16
Digital Computer Consulting, Inc.	31	17
Digital Data Systems	19	18
Digital Dynamics, Inc.	15	19
Eagle Software, Inc.	7	20
Eagle Software, Inc.	11	21
Gerry Manning & Associates	31	22
Hanson Data Systems, Inc.	44	23
Intelligent Information Systems, Inc.	12	25
International Computing Systems, Inc.	6	24
Mac Data, Inc.	17	26
MarcAlan Software, Inc.	22	27
Minitab Statistical Software	43	-
Monarch Software, Inc.	C4	28
NADGUG	39	29
NADGUG	23	30
National Computer Dynamics	34	31
NSTS	27	32
Park Place International	45	33
PereLine Data Systems	43	-
Persoft, Inc.	5	34
Productivity Systems Development Corporation	33	38
R&D Computers	31	35
RAVE Computer Association	38	36
Rhintek, Inc.	25	37
SCIP	46	39
Scott McIntyre & Associates	C3	40
Security Computer Sales, Inc.	41	41
Strobe Data, Inc.	27	42
Sysgen Data	13	43
Threshold, Inc.	37	47
Transoft Ltd.	C2	48
Transoft Ltd.	41	53
Wild Hare Computer Systems, Inc.	1	50
Wild Hare Computer Systems, Inc.	36	51

PRODUCTS AND SERVICES

Company	PG#
Contemporary Cybernetics Group	46
Data Bank Associates, Inc.	45
Eagle Software, Inc.	44
Monarch Software, Inc.	44
Plus III Software, Inc.	46
Productivity Systems Development Corporation	45
Transoft Ltd.	47
Wild Hare Computer Systems, Inc.	44
Wild Hare Computer Systems, Inc.	46

ON-LINE HELP

***Who to call for answers about* NADGUG *and* FOCUS**

NADGUG address:
c/o Danieli & O'Keefe Associates, Inc.
Chiswick Park, 490 Boston Post Rd.
Sudbury, MA 01776
FAX: 508/443-4715

FOCUS Magazine address:
c/o Turnkey Publishing, Inc.
P.O. Box 200549
Austin, TX 78720
FAX: 512/335-3083

NADGUG

Membership, RIGs, SIGs
NADGUG staff **800/253-3902**
(Outside the U.S and Canada.) **508/443-3330**

Electronic bulletin boards
(300,1200, 2400, or 9600 baud modem)
Rational Data Systems **415/499-7628**
DASH bulletin board (2400 bps modem) **800/DASH-CSC**
Data General Customer Support Center **800/344-3577**

FOCUS Magazine

512/335-2286

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

Information about advertising.....Susan de Blanc

FOCUS back issues .....Turnkey Publishing staff

Continued from page 41.

After these tests were run, some time was spent analyzing the results. Since the 4 mm DAT tapes in the Clariion tape array offer data compression, we ran an alternate, similar test with some highly compressible data and found that a 1 GB LDU could be backed up using FSCOPY in 11 minutes, 24 seconds. The data on our first test LDU (used in the preceding table) were not easily compressed, resulting in longer backup times. In general, FSCOPY backups of a 1 GB LDU to a tape array will take less than 20 minutes.

The other interesting result was CPU usage. FSCOPY is largely implemented inside of the AOS/VS II file system. Since the data being backed up do not get looked at until recovery time, little time is needed to setup the I/O. As a result, FSCOPY uses very little of the CPU, leaving plenty of spare CPU cycles for users to get work done. Clearly, DUMP_II became limited by the speed of the file system, unable to back up our 1 GB LDU in less than an hour. FSCOPY was always limited by the speed of the tape. As Data General introduces faster backup devices, FSCOPY will take advantage of them.

LDCOPY was always just a little slower than FSCOPY and used more CPU to do the backup. The results prove that FSCOPY is more desirable than LDCOPY, especially when you consider that the LDU can be used while FSCOPY runs.

Conclusions

FSCOPY provides a backup option that you must consider. If you have a lot of data to back up, and you need a consistent, fast solution, FSCOPY will likely satisfy your needs. While it has some drawbacks, such as longer time, the benefits of FSCOPY will likely outweigh any of its shortcomings. Δ

Mark Wilding is senior section manager for tools, file systems, and drivers in Data General's AOS/VS II Development Group. He has been employed at Data General for 14 years, and has worked on AOS/VS and AOS/VS II software for 10 years. Special thanks to John Johnson for gathering the performance data used in this article.

EQUIPMENT

FOR SALE

DG model 6587-A 1/2" tape drive.
New, still in crate. $6,000.00.
Call 1-800-235-1285.

NADGUG

for **NADGUG**
Membership information
contact:

Danieli & O'Keefe Associates, Inc.
1-800-253-3902 (U.S. and Canada only)
508-443-3330

The North American Data General Users Group is an incredible resource when you need answers.

So, don't go it alone - join **NADGUG** *today!*

SOFTWARE

Statistical Software
- Powerful
- Fast
- Easy-to-use
- Inexpensive

MINITAB
STATISTICAL SOFTWARE
3081 Enterprise Dr., State College, PA 16801
814-238-3280

DG410 Emulation/Modem Communication Software
Background file transfers, over 45 modem definitions, extensive script language plus additional terminal emulations. Security features. Only $39.95. 60 day money back guarantee.
Pereline Data Systems
(408) 364-2770

***FREE!* to NADGUG members!**

- Focus Magazine/12 issues
- Electronic Bulletin Boards
- NADGUG software library
- Member Directory
- Networking with other DG users
- Access to RIG/SIG network
- Communication channel to DG
- Discounts on conference

HANSON
DATA SYSTEMS, INC.

Hanson Data Systems carries the exact replacement printers for these Data General model numbers:

Datasouth
AMERICA'S HIGH PERFORMANCE PRINTER COMPANY

Datasouth	DG	Our Price
XL300-DD	6788	$1325
XL400	6594	$1545
Performax	6789	$2135

GENICOM
Printers that work as hard as you do.

Genicom	DG	Our Price
3840EP	5405M	$1783
4410XT	5405AX	$4646
4440XT	5405BX	$5846
4470XT	5405NX	$9993
7170 Laser	5405Q	$3258

Dataproducts
The high performance printer people.™

Dataproducts	DG	Our Price
9034MD	6514	$636
9044MD	6515	$778
LB615-4	4596	$6235
LB1515-5	4597	$12363

MANNESMANN TALLY
A MANNESMANN and Siemens Company

Mannesmann Tally	DG	Our Price
MT661 w/GPO & Stand	6618	$5872

CIE America, inc.
A C.Itoh/Citizen Company

Special!!!
CIE America
CI-5000 $1225

Hanson Data Systems, Inc.
734 Forest Street
Marlboro, MA 01752
(508) 481-3901
(800) 879-4374
FAX (508) 460-0593

Circle 23 on reader service card.

The latest products for DG systems

Migration solutions

Raleigh, NC—Monarch Software announced availability of two new products for Data General's high-speed Avion series of computers running DG/UX: Open Electronic Office (OEO) and Open File Manager (OFM).

Open Electronic Office is an integrated office-automation package for the Aviion that provides all the CEO capabilities that MV users have depended upon and asked for on open systems. OEO is keystroke-for-keystroke compatible with CEO and provides interoperability. OEO works with existing character-based terminals and does not require PCs or workstation clients. Since OEO is compatible with CEO, retraining current users is not necessary.

Open File Manager is a high-performance, high-reliability, file-management product providing Infos capabilities that users have requested on DG/UX. OFM uses the same application program interface (API) as Infos II, so Infos programs and applications won't have to change when migrating to open systems, avoiding conversion costs for existing VS Cobol programs. OFM offers greatly improved relational-like recovery capabilities while keeping all underlying logical file structures consistent with Infos. Monarch also provides a complete Application Migration Package, which includes OFM, a Cobol runtime system, and a sort/merge, all in one bundle.

Pricing for OEO is based on the number of users, starting at $125 per user. Pricing for OFM is also user-dependent, beginning at $95 per user.

Monarch Software, Inc., 4904 Waters Edge Drive, Raleigh, NC 27606; 919/851-5408.

Online optimization

Salina, KS—Eagle Software and Expert Systems, Inc., announced the release of revision 2.00 of "DISK_PAK OnLine!", the only online disk optimization software for Data General MV- class computers.

This new revision supports online bitmap verification and correction on both AOS/VS Classic and AOS/VS II systems. With this feature, AOS/VS II users can now more easily recover the thousands of disk blocks that can be lost each time a system failure occurs, without releasing disks to run on Disk Polisher.

Revision 2.00 will be shipped at no additional charge to all "DISK_PAK OnLine!" users currently covered by software support. Pricing for the product is based on CPU class and ranges from $950 to $6,450.

Eagle Software, Inc., 123 Indiana Avenue, Salina, KS 67402-0016; 800/477-5432.

ICobol 1.7 support

Boulder, CO—Wild Hare Computer Systems announced that its ICobol products fully support ICobol rev 1.7. The "Choice!" ICobol runtime system and the Axis ICobol compiler are 1.7 binary compatible on all platforms, enabling ICobol users now to utilize all of the features available in ICobol 1.7 on more than 60 platforms and 18 operating systems, including PCs as well as Data General's MV and Aviion.

Another Wild Hare product, "HareStylist," complements "Choice!" and Axis as a RAD (rapid application development) tool that allows programmers to add windows, hot keys, menus,

and context-sensitive help systems using time-saving, object-oriented techniques.

Wild Hare Computer Systems, Inc., P.O. Box 3581, Boulder, CO 80307; 303/530-2221.

Compressed libraries

Germantown, MD—Data Bank Associates, Inc., announced release of its Arc compressed-file library program for 88K, HP, and Coherent Unix systems. Arc libraries are compatible on Unix (including Data General's Aviion), AOS/VS, MS-DOS, or OS/2-based operating systems.

Arc/UX retains the functionality of the MS-DOS and AOS/VS versions while demonstrating efficient operation in a multiuser environment. Arc/UX runs at more than 20 times the speed of the AOS/VS version. And while Arc/UX uses the Unix filenames, it automatically generates an "aka" (also known as) name for the PC. Unlimited users can simultaneously extract or run programs from a common Arc library.

An Arc/UX license may be purchased either as a single-user version or for unlimited mode of operation. Initial licenses include one year of software subscription and hot-line support.

Data Bank Associates, Inc., 20010 Century Blvd., Suite 104, Germantown, MD 20874-1118; 301/540-5562.

Cobol application development

Summerville, SC—Newly released revision 2.51 of Datagen, from Productivity Systems Development Corporation, is intended for data-processing shops that develop application software in Cobol. Datagen writes interactive file-maintenance programs and supports multiple files, multiple screens, user-definable function keys, multiple parts to records, and user-activated field duplication. Datagen programs create new files or access existing files. Principal enhancements in the new release include:

• The generator will search for custom-written copy books to include with a generated program at a variety of entry points, allowing the programmer to generate new versions of the program repeatedly without destroying previously added custom coding.

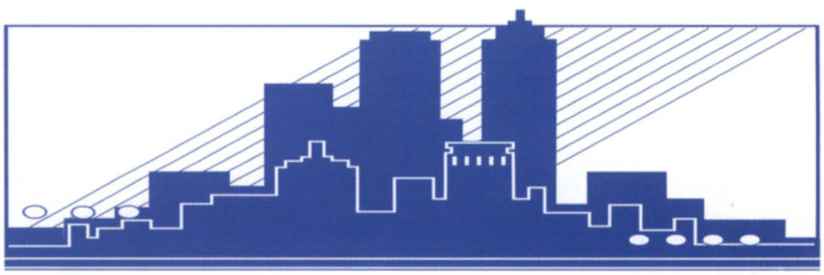
• Fields from multiple files and/or working storage may appear on the same screen, making custom changes easier and permitting the use of relational files.

• Defining specifications to the generator is semi-automatic, using information obtained from imported copy books; this minimizes the programmer effort required to input program specifications.

• Datagen can use pre-existing SELECT copy books so that an existing file will be correctly accessed.

• Record locking is supported; program time-outs are supported, as are program time-outs.

• Generated programs will not



Park Place International

7209 CHAGRIN ROAD
CHAGRIN FALLS, OHIO 44023

DATA GENERAL
COMPUTER HARDWARE SPECIALISTS

THOUSANDS OF ITEMS IN STOCK!

AVIION	BUY	CPU
MV	SELL	DISK/TAPE
NOVA	LEASE	COMM/CONT
"S" SERIES	RENT	MEMORY

In addition to Data General hardware check out our selection of after market and O.E.M. products from 3-Com, Kyocera, Micom, Data Products, SCIP, Best, Wyse, Genicom, Codex and many more!!

(216) 247-2650
Fax (216) 247-2604

☛ Let us handle all of your Data General needs, from terminal cables through your next major upgrade-at competitive prices!

☛ Call today for up-to-date pricing!

Circle 33 on reader service card.

More Splash For Less Cash

Whether you're buying a new system or improving performance of an existing one, consider our memory value.

You probably bought Data General because you got more processing power for your dollar. Well, **SCIP** memory will complement your choice by providing you even more splash for less cash.

We design and manufacture a full line of memory for DG systems.

MV2500
MV3200, 3500, 3600
MV5500 & MV5600
MV7800XP
MV9300, 9500, 9600
MV15000 - MV20000
AViiON Servers and Workstations

Bottom line . . .

✓ a fraction of the cost
✓ 100% compatible
✓ lifetime warranty
✓ accepted by DG service
✓ trial evaluation

. . . so give us or your dealer a call for value . . .

(310) 282-8700
FAX (310)839-4464

SCIP

441 S. Beverly Dr. #2
Beverly Hills, CA 90212

Circle 39 on readerservice card.

rewrite a record that has not been altered. In addition, a warning is issued if the user attempts to bypass the code to rewrite an altered record, thus reducing demand for system resources.

• One-dimensional arrays are supported, as are group accepts and displays.

Datagen is priced at $12,500 per license (United States), regardless of machine size. It includes a two-day training program at the user site or in Summerville. Productivity Systems will generate Datagen source code for a fixed per-program fee for any customer without sufficient programming volume to justify purchase.

Productivity Systems Development Corporation, P.O. Box 1931, Summerville, SC 29484-1931; 803/851-6577.

Optical-disk libraries

Newport News, VA—Contemporary Cybernetics Group (CCG) announced the Model 10C/20C, a desk-side optical jukebox that offers room to expand as storage requirements grow. The basic configuration (10C) features one high-performance, optical-disk drive, the CY-3000, that can store 650 MB on each of 16 erasable or WORM disks. When users need more capacity, they simply add a second optical-disk drive and another 16 disks for capacity of 20.8 GB (20C).

The Model 60C/100C is a free-standing optical jukebox that can store between 57.2 GB and 93.6 GB, depending on the configuration. The base configuration (60C) features two or four optical-disk drives and 88 erasable WORM platters for a capacity of 57.2 GB. By adding two more drives and 56 optical disks, capacity can reach 93.6 GB (100C).

Optical jukebox storage is ideal for companies involved in applications that demand nearline data access. Users involved in CAD/CAM, CASE, financial services, imaging, engineering, construction, technical publishing, multimedia, or geophysical exploration will appreciate both the high capacity and the 27-millisecond average seek time. Disk exchange times are fast—under 8 seconds.

The MTBF (mean time between failutres) rate for optical-disk storage is 80,000 hours; the MSBF (mean swaps between failures) rate is 300,000 swaps. Optical platters offer an archival life of more than 40 years.

All of these library models are compatible with virtually all SCSI computer systems.

Contemporary Cybernetics Group, Rock Landing Corporate Center, 11846 Rock Landing, Newport News, VA 23606; 804/873-9000.

ICobol debugger

Boulder, CO—RAID, a flexible debugger for ICobol applications from Wild Hare Computer Systems, combines simple command operation with multiple overlapping windows, pull-down menus and mouse support in a powerful yet easy-to-use interactive environment. RAID's debugging environment makes maintaining and testing Cobol applications faster and easier.

RAID simultaneously monitors break points, variables, perform status and source code in separate windows, allowing you to immediately zoom in on the problem. The result is faster debugging and more productivity. All RAID capabilities are simultaneously available by using simple command-line control or by using menu selections, giving users the option of using the control method most convenient for you at any particular moment.

RAID is an integrated part of the "Choice!" ICobol runtime system and the Axis ICobol compiler. RAID is portable along with all other Wild Hare products. It is a free upgrade to Wild Hare end users with annual product-support contracts, and to value-added resellers (VARs) with annual VAR-support contracts, who are running version 4.0 of "Choice!" and version 1.4 of Axis.

Wild Hare Computer Systems, Inc., P.O. Box 3581, Boulder, CO 80307; 303/530-2221.

New geo module

Atlanta, GA—Plus III Software released Geodetic Survey, the newest module in the Terramodel software system. Geotronics North America and Plus III Soft-

ware, Inc., were awarded a multi-million-dollar contract by the U.S. Army for total stations and software for use in the civil engineering and surveying departments.

The Geodetic Survey Module was developed to include routines to reduce celestial observations in order to accurately compute the astronomical azimuth of a line. It also includes more than 600 state plane, UTM, and latitude/longitude coordinate conversions, using various data such as NAD-27, NAD-83, and WGS84. The new module is fully compatible with all Terramodel modules.

The Terramodel system is composed of the following modules: Terramodel CADD, CADMAP Transfer, Coordinate Geometry, Geodetic Survey, Drafting, Contour, Deep Mining, DTM Cross Sections, Hydrology, Kork Transfer, LEGAL Writer, Mapping, Microstation Transfer, Sewer Design and Analysis, Site Design, Roadway Design, and 3-D View.

Terramodel is available for MS-DOS and popular Unix workstations.

Plus III Software, Inc., One Dunwoody Park, Suite 250, Atlanta, GA 30338.

Unix migration for Infos

Slough, England—A full Unix implementation of Data General's proprietary AOS/VS Infos data base management system was announced by Transoft Ltd.

Called U/FOS, the new data base product allows a smooth, rapid migration of Infos-based Cobol, Fortran, and PL/I applications from MV machines with the DG AOS/VS operating system to a choice of major Unix platforms, without the need for costly redevelopment or retraining.

Transoft will market the product worldwide, both directly and through a network of approved migration partners and value-added resellers (VARs).

U/FOS offers complete functional compatibility with Infos, but also offers a large number of improved data base management features, such as online backup, improved checkpointing, and RDBMS-level "COMMIT" and "ROLLBACK" functions. Transoft's product retains the indexed hierarchical data base structure of Infos, and includes commonly used utilities such as "ICREATE", "IVERIFY", "INQUIRE", and "DDUMP".

Transoft provides consultancy services and application conversion tools to help users migrate their entire applications and data to Unix. The company also plans to publish an Application Programming Interface (API), which will allow third-party products to interface with U/FOS. Δ

Transoft Ltd., Nash House, Datchet Road, Slough SL3 7LR, England; +44 753 692332.

The secret for success in managing a data processing facility is finding and using the best System Software.

DataLynx is your source for system security and management tools from around the world.

GUARDIAN - The de-facto worldwide standard for profile and access security software. Now available for AOS/VS, DG/UX, Sun, IBM, HP, ICL and Dell.

ProGUARD - Protects your application environment by controlling and monitoring all program execution.

SCREEN DEMON - Hot-keys, pop-up windows, e-mail and more for AOS/VS programs from Threshold.

THE ULTIMATE - The INFOS maintenance, management and inquiry tool from Le Software Man.

UMTB - The complete AOS/VS and UNIX system management and scheduling package from SYSINFO.

ARC, AIM & TURBOTRAN - The complete set of data compression and PC transfer utilities from DBA.

DataLynx 6659 Convoy Ct. - San Diego, CA 92111
(619) 560-8112 - FAX (619) 560-8114

Circle 16 on reader service card.

DASH Items...

Category: DG/UX

Author: Marlin Lee
Subject: **Mounting File System**

I would like to mount a separate file system to hold the print jobs for *lp* to print, i.e.: */var/spool/lp/tmp*. I also have two other Aviion systems printing to this one, so there are three host directories in this area. What is the best way to do this? Can I mount a file system as */var/spool/lp/tmp* and will the three host subdirectories need to be recreated? Or should I create three different logical disks to be mounted as */var/spool/lp/tmp.host1*, */var/spool/lp/tmp/host2*, etc. . . . P.S., this is an AV 4620 running DG/UX 5.4.2.

Reply by: DG/UX Support

Create a soft link from *tmp* in */var/spool/lp* to a *tmp* directory on a file system with more space. For example:

```
lrwxrwxrwx     1 root         other
7 Apr 26 15:16 /var/spool/lp/tmp/tmp/lp
```

The extra space does not have to be in */tmp*, just any file system that has the space you require. To make this smooth, allow all the print jobs to complete. Empty the queues. Stop the scheduler. Create the link. Start the scheduler. The host directories will be recreated.

Author: Allen Barkley
Subject: **DG/UX 5.4—SCRIPT FILE**

I am writing a script file using the Bourne shell, and am having difficulty in "incrementing" a variable I would like to use as a "control variable" in a "while" loop. For example, if I define a variable "i" as follows—i =1—and then try increasing it by one each time through the loop, it does not work, e.g., $i=$1 + 1 is taken as a literal, and "i" takes the value of "$i + 1", and not the value 2, which is what I want. The documentation I have is silent on numeric operators in the Bourne shell.

Reply by: Doug Morgan

The syntax I have used to accomplish this is:

```
i=1
i=`echo $i + 1|bc`
```

Reply by: David Dennis

You can also use this (recommended) syntax:

```
var = `expr $var + 1`
```

Author: Gerry Duprey
Subject: **UUCP via a Termserver**

Here's a suggestion for you: is there a way to get UUCP to use a modem that is connected to a Termserver? I noticed in the Devies file an entry for "TCP", but I couldn't find any docs on it. We have one of the 10-port DG Termservers and no free ports on our Aviion itself. So, I was wondering if I could convince UUCP to connect to a given port (the modem port has its own IP address assigned, so you can Telnet directly to it) and dial the modem.

Reply by: Janet Harrison

It is described in the Nutshell handbook, "Managing UUCP," but the TCP device is a built-in dialer device in *uucico*. Insofar as the port that you have connected your modem to, just give it a name and assign that name in the Systems file (/etc/uucp/Systems).

Author: Janet Harrison
Subject: **Microplex Termserver**

Does anyone have any idea how to configure the microplex terminal server to work in DG/UX? The termserver emulates a BSD *lpd* spooler, but I cannot get anything to print.

Reply by: DG/UX Support

DG has enhanced the *bsd* protocol portion of the System V.4 *lpsched/lpNet* subsystem for DG/UX 5.4 Release 2.01. I recommend that you upgrade to this pass or install the DG/UX 5.4.2 patch *dgux_5.4.2.p78*. If you have a support contract, then your local support center will provide this patch to you. On the Aviion, under *sysadm Device->Printer->Systems->Add* add the host name of the microplex termserver. This host must be defined as a "bsd" host. This *sysadm* menu executes the *lpsystem(1M)* command. See its man page for more info. Since your termserver emulates a *bsd* server, then ignore the DG/UX documentation in Chapter 11 of the "Managing DG/UX" manual in favor of the remote BSD printer server documentation. To my knowledge, your configuration is not officially supported, however, this should get you started. If you are still having problems, take a sniffer trace between the two devices and open a call with the CSC.

Category: Other stuff

Author: Gerry Duprey
Subject: **Policy regarding DG responses**

I was wondering what the policy was in regard to DG personnel responding to posts to DASH. I've noticed that a lot of people post queries to the board that are never answered, responded to, or acknowledged. I think it reduces the usefulness of the service if the only thing they can do is go through the formal STR mechanism.

While I suppose you couldn't guarantee a response time, making sure that each message got some sort of response would make this a very valuable service. As it stands now, it's just a black hole of unanswered questions.

Reply by: Bryan Scoggins, Manager Software Support

Our specialists review the bulletin board comments during non-busy periods and answer questions. During busy periods when we're supporting our Support Plus customers, questions may sit unanswered for several days. This bulletin board is designed so that anyone can answer a posted question and our desire is for the bulletin boards to be self-sufficient. We do recommend that customers who are entitled to phone support open an incident rather than asking the question in the bulletin board, so that we can track and ensure a prompt answer. As we move toward having Unix expertise onboard at the CSC 7 days a week and 24 hours a day, more cycles should be available to answer questions. Δ

DASH runs on an Aviion 5200 server located at the Customer Support Center in Norcross, Georgia. The bulletin board is available 24 hours per day, 7 days per week, free of charge. Call 1-800-DASH-CSC (1-800-327-4272) for the modem rotary.

SCOTT McINTYRE & ASSOCIATES, INC.

"YOUR GLOBAL SOLUTION FOR D.G. & MOTOROLA"

313-299-0040

*** BUY * SELL * TRADE * DATA GENERAL & MOTOROLA ***

PRICE!

"Your prices, the equipment and delivery time have always been as you promised, excellent!"

Amr Allouba
Managing Director
TEA Computers, S.A.

PERFORMANCE!

"Scott McIntyre & Associates, Inc. has earned the respect of all the executives at our company for their honesty and diligence. They have always been flexible and accommodating!"

Andy Michael
Sales Director
Quiss Tech., Plc
London, England

QUALITY!

"Many other resellers in the USA would like to deal with us in Australia, and on some occasions we have brought from them. However, the quality of the goods and service has never matched what we get from Scott McIntyre & Associates, Inc."

Alan Frazer
Managing Director
Frazer & Associates PTY. LTD.

DELIVERY!

"It is good to know that there are still people out there who conduct their business with honesty and integrity."

William E. Herr
Director of Computer Operations
The Bon-Ton Store

VISA MasterCard AMERICAN EXPRESS

"Fall Specials"

MV3500 W/8MB, 150 MB CTD & 662MB DISK IS ONLY $6,900

"NEW!" D1400I CRT W/KB IS ONLY $450

6685 1GB SCSI DISK IN PHU IS ONLY $2,350

6590 2GB CTD IN PHU IS ONLY $2,350

D460 CRT W/KB IS ONLY $150

6760 10GB 8MM CTD IN PHU IS ONLY $5,300

"OVER $1,000,000 IN STOCK!"
"CALL FOR OUR FALL PRICE CATALOG!"

"Call Today"

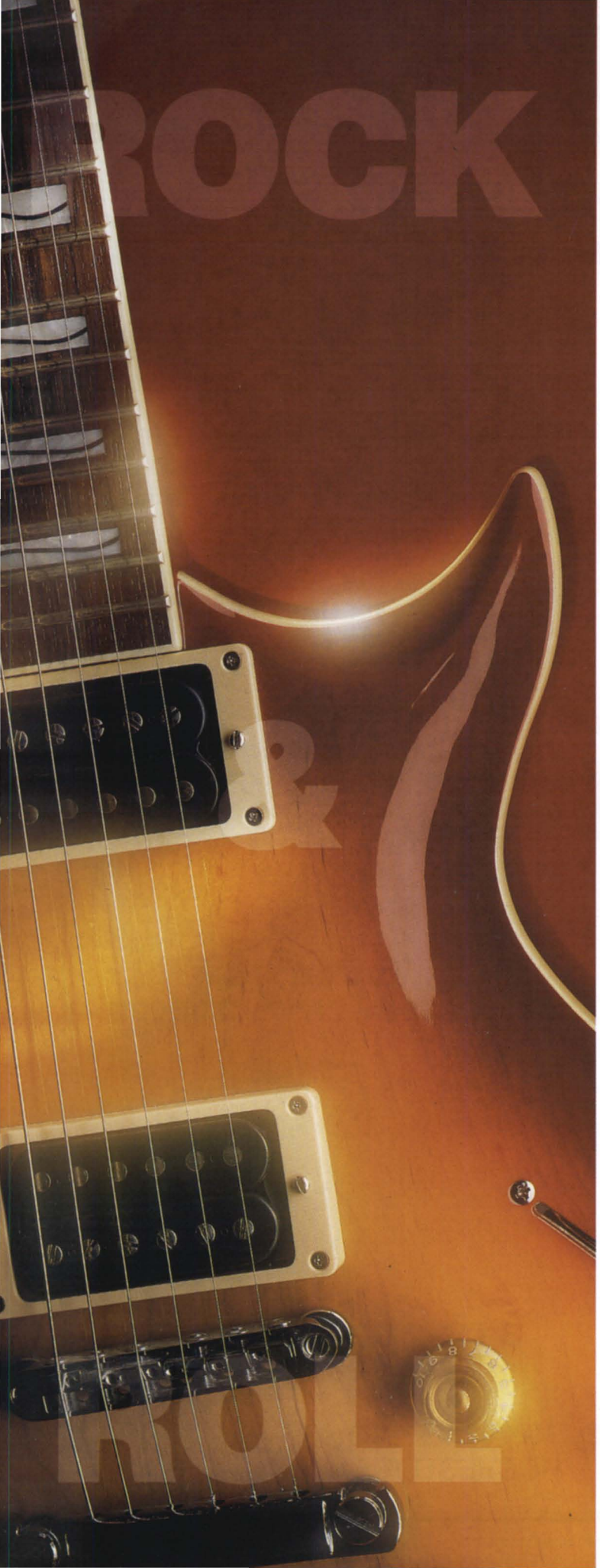
***Scott McIntyre * Terry Smith ***
*** Robert McIntyre * Michael Nowacki ***
*** Lorraine LaCroix ***

313-299-0040

FAX: 313-299-0041

P.O. BOX 82115 • 1856 STAR-BATT DR.
ROCHESTER, MI 48308-2115

Circle 40 on reader service card.



Plug And Play And Rock All Day!

***NOW PLAYING from* Monarch Software** ♪♫
Here's what you've been waiting for! The first indisputably easy migration path to DG/UX® for **INFOS**® and **CEO**® users.

OPEN ELECTRONIC OFFICE ™ (OEO ™)

Open Electronic Office is the only easy migration path for **CEO** users moving to DG/UX. **OEO** is keystroke-for-keystroke compatible with **CEO** and provides a familiar setting that ensures users will maintain, and even improve, their productivity. **OEO** also provides multiple choices in PC integration and MV interoperability.

OPEN FILE MANAGER ™ (OFM ™)

Open File Manager is the only high performance, high reliability migration path to DG/UX for **INFOS** applications. **OFM** uses the **INFOS** API so your programs won't have to change to take advantage of the improved performance and greater recoverability features designed into **OFM**. We also offer a VS COBOL-compatible run-time system and a sort/merge, all in one cost-effective bundle.

For More Information about easy migration to open systems call: 1-800-MIGRATE

Monarch Software™

4904 Waters Edge Dr. • Raleigh, NC 27606
Phone: (919) 851-5408
Fax: (919) 851-9508
E-Mail: info @ monarch.com

Open Electronic Office and Open File Manager are trademarks of Monarch Software, Inc. CEO, INFOS, and DG/UX are registered trademarks of Data General Corporation.

©1993 Monarch Software, Inc.
Circle 28 on reader service card.