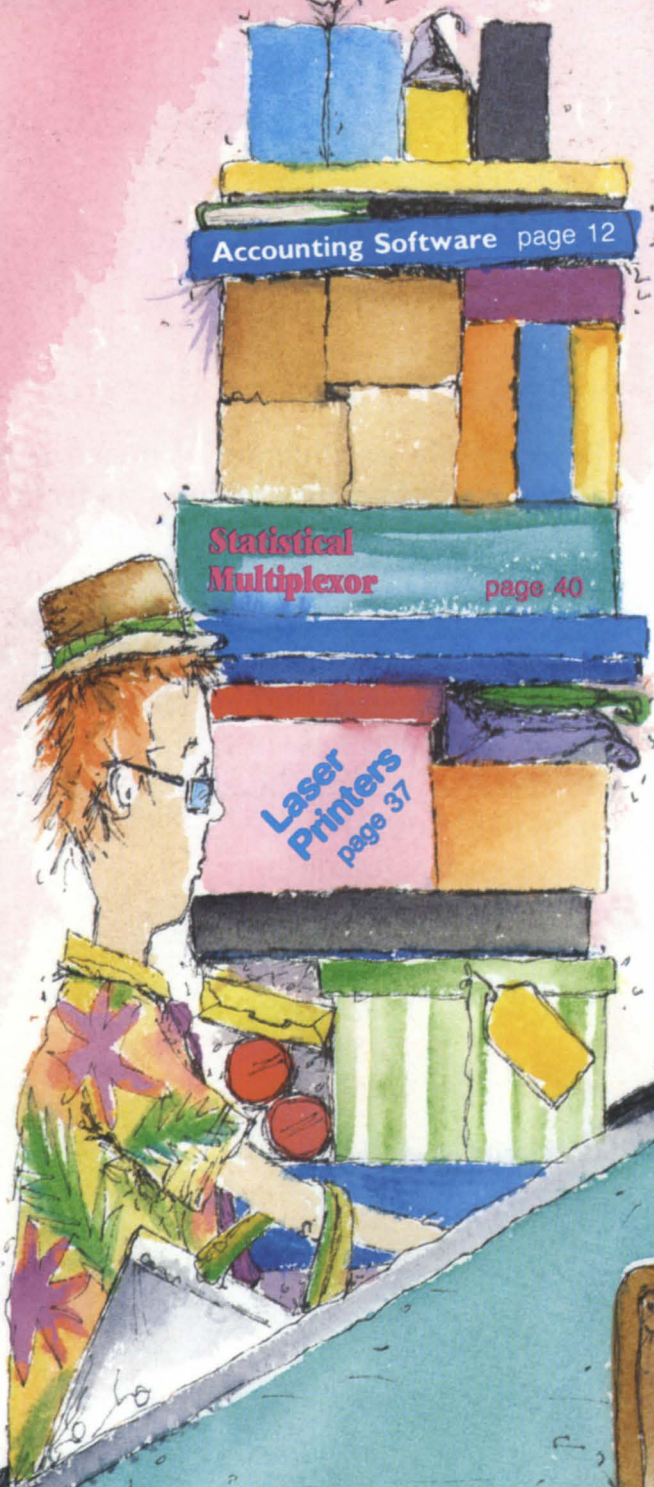


July 1987

# FOCUS

The Magazine of the North American Data General Users Group



Accounting Software page 12

Statistical Multiplexor page 40

Laser Printers page 37



## GOING SHOPPING



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

Soto

MICOM  
M/COM  
MA&ON  
MAXON  
MAXON



## MICOM ACCOUNTING SOFTWARE

## GENERAL LEDGER ACCOUNTS PAYABLE ACCOUNTS RECEIVABLE

**Responsible purchasers of accounting software demand proof of performance — up front.**

**They call MAXON for a demonstration.**

Ask MAXON to demonstrate Micom Accounting Software — award winners for three consecutive years.

Ask MAXON to show how Micom software is designed, optimized, and continues to be enhanced for the Data General environment.

Ask MAXON about Micom's high functionality and unparalleled performance.

Ask about installation.

Ask about training.

Ask about support.

Seeing is believing.

**MICOM MAXON**  
COMPUTER SYSTEMS INCORPORATED

AUTHORIZED **DataGeneral** SYSTEM DISTRIBUTOR

Call: (212) 227-1922

**Informed buyers make  
better buys.  
Experience Micom Accounting  
Software.**

- I want more information about Micom Accounting Software.
- Contact me regarding a demonstration.

Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

State \_\_\_\_\_

Zip Code \_\_\_\_\_

Mail to: MAXON COMPUTER SYSTEMS  
INCORPORATED

575 Madison Avenue, Suite 1006  
New York, New York  
10022

85 Scarsdale Road  
Toronto, Ontario, Canada  
M3B 2R2



# Quality.

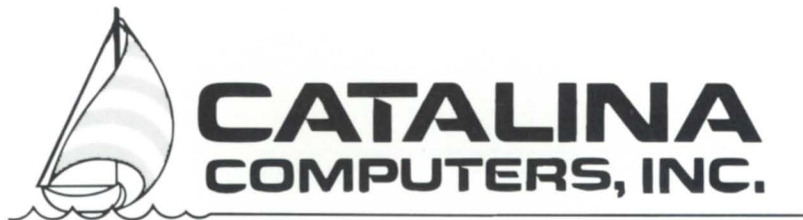
DG users appreciate it.

They know the only way to be the best is to demand the best.

If you're in the market for pre-owned Data General equipment, you need a dealer who appreciates quality as much as you do.

Catalina Computers.

Service, selection, and value have earned us a reputation for quality.



1001 W. Arbor Vitae St., Inglewood, CA 90301

**(213) 215 - 0641**

FAX # 213/649-1065

**BUY**

**SELL**

**TRADE**

Systems • Peripherals • Communications • Spare parts

# FOCUS

The Magazine of the North American Data General Users Group



## THE PRESIDENT'S PAGE

I come not to bury Caesar . . .  
But to praise him  
by Calvin Durden

4

## LETTERS

Comments from our readers

6

## ROUNDUP

News from NADGUG and its affiliates

8

## FOCUS ON: ACCOUNTING

### The bottom line

How to buy accounting software  
by Jim Hughes

12

## FOCUS ON: ACCOUNTING

### What to expect from accounting packages

by Jim Hughes

12

## FOCUS ON: ACCOUNTING

### . . . And not as I do

How NOT to computerize your accounting  
by O.B. Weiser

17

## FOCUS ON: ACCOUNTING

### Computerizing your accounting department

It's a big change, but it doesn't have to be disruptive  
by Jane E. Varty

19

## FOCUS ON: SMTP

### It's in the mail

Simple mail transfer protocol (SMTP)  
by Richard T. Kouzes

22

## FOCUS ON: SECURITY

### Decoder rings and bit buckets

A painless introduction to encryption. Part II  
by Tom Gutnick

26

## INSIDE ICOBOL

### Stringing them along

It's not easy to do string-handling in ICOBOL,  
but it's worth the trouble  
by Tim Boyer

30

## AOS{VS} TRICKS

### Sorry, I can't let you do that!

Restricting program use to certain directories  
by John A. Grant

34

## OA TODAY

### A lesson on lasers

Learning about printers can help you select one  
by Charlene Kirian

37

## INTELLIGENT WORKSTATIONS

### Distributed networks

Intelligent workstations place new demands on  
data base applications  
by Brad Friedlander

39

## SYSTEM MANAGER'S LOG

### The good, the baud, and the ugly

B.J.'s guide to purchasing statistical muxes  
by Brian Johnson

40

## DISCOVERIES

### The ECO system

Don't let undone ECOs spoil a friendship  
by Jim Sigman

48

## PRODUCT SPOTLIGHT

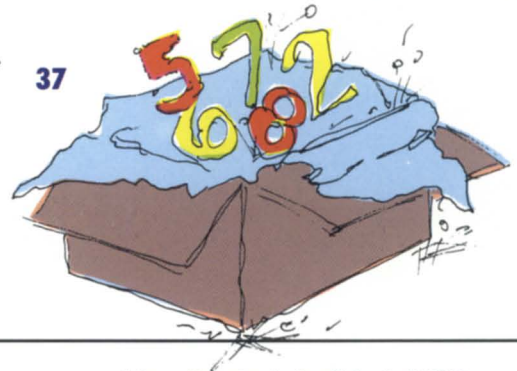
The latest products for DG systems

52

## PRISM

Brief notes from the DQ community

60



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

### NADGUG's electronic bulletin boards

(300 or 1200 baud modem)

Rational Data Systems . . . . . 415/924-3652

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

representative) . . . . . 800/325-3065

In Massachusetts . . . . . 800/952-4300

In Canada . . . . . 416/823-7830

### NADGUG membership, address changes

NADGUG staff . . . . . 617/898-4067

### Editorial questions, comments, article suggestions

Greg Farman or Carolyn

Kelly (please send product  
announcement to the address

listed below) . . . . . 512/345-5316

### Information about advertising in FOCUS

Sharon Park . . . . . 512/345-5316

### Back issues of FOCUS

Turnkey Publishing staff . . . . 512/345-5316

### Addresses:

#### NADGUG staff

c/o Data General Corporation, MS 9S, 3400  
Computer Drive, Westboro, MA 01580

#### FOCUS Magazine

c/o Turnkey Publishing, 5332 Thunder Creek  
Road, Suite 105, Austin, TX 78759-4022

Focus, the Magazine of the North American Data General Users Group (ISSN 0883-8194) is the official monthly publication of the North American Data General Users Group (NADGUG) in cooperation with Turnkey Publishing. Editorial and Business offices are located at 5332 Thunder Creek Road #105, Austin, Texas 78759-4022, phone 512/345-5316. NADGUG Headquarters are located at NADGUG, c/o Data General Corporation MS 9S, 3400 Computer Drive, Westborough, MA 01580.

Postmaster: send address changes to Subscription Department, Turnkey Publishing, 5332 Thunder Creek Road #105, Austin, TX 78759-4022.

Focus Magazine is distributed to members of the North American Data General Users Group. Mem-

bership fees: Individual members \$30 per year, Installation members \$100 per year. For all memberships outside North America, add \$50 to defray costs of mailing. For information on NADGUG membership, call 617/898-4067. Address all other correspondence to Focus Magazine, c/o Turnkey Publishing, 5332 Thunder Creek Road #105, Austin, TX 78759-4022.

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.

Advertisements in Focus do not constitute an endorsement of the advertised products by NADGUG or Turnkey Publishing.

Copyright ©1987 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.

Just about everyone in the Data General world knows the name WordPerfect. What DG customers may not know is the popularity of WordPerfect in many other markets.

WordPerfect is

the quality of the software you receive.

In the last year, we have more than tripled our development resources in the DG Division to upgrade existing

products and develop new software. Word processing is only a part of our product line.

After just four months in the market, WordPerfect Library for AOS/VS, our office automation solution for DG systems, is now installed on more than 150 machines. The integrated electronic mail, calendar, scheduler, shell, and phone message systems are proving to be valuable office tools.

In *Data Base Monthly*, Tom Robinson described WordPerfect Library: "Their technique for putting jobs on hold and switching among them is easy to use, easy for users to grasp, fast, efficient, and just plain clever."

In addition to WordPerfect Library, MathPlan (our spreadsheet) and P-Edit (our program editor) round out the WPCORP product line for DG hardware.

**More on the way**

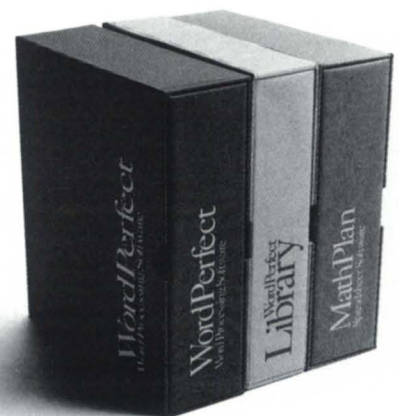
As DG introduces more machines, we're ready with the software to get the best perfor-

mance. Our price for WordPerfect on the new MV/15000 is \$5000 for Model 8, \$6000 for Model 10, and \$7000 for Model 20. The prices are the same for WordPerfect Library on each of the three models, and MathPlan runs \$3000, \$3500, and \$4000 for models 8, 10, and 20, respectively.

We are committed to a growing product line and improved customer support. For a

closer look at our products, give us a call and we'll send you an evaluation copy for the cost of media and handling. See why WordPerfect is the world's most popular word processing product.

WordPerfect Corporation  
288 West Center Street  
Orem, Utah 84057  
(801) 227-4100



**WordPerfect**  
CORPORATION

# WordPerfect is world's most popular wp product

not only the most popular word processing product in the U.S. PC market, but it holds more than 50% of the PC market in Norway and 75% in Holland. Its fast, easy, resourceful style is well known throughout Australia, Canada, Europe, Scandinavia, and even the Far East.

In addition to software for DG and IBM PC computers, we also have versions for the VAX and Apple IIe/IIc/IIgs. Later this year, we will be running on the Macintosh, Amiga, Atari ST, IBM 370 mainframes, and some UNIX computers.

## Down-home concern

Such widespread success in other markets does nothing but strengthen our commitment to the DG Division.

To enhance our telephone support, we recently hired Chuck Swank, previously the Factory MIS Manager at Ore-Ida foods. We've also organized a new testing group to carefully inspect

# I COME NOT TO BURY CAESAR . . .



## But to praise him

By Calvin Durden  
NADGUG President

Over the last couple of months a lot of analysts have called me to talk about something that seems to be a favorite topic right now: "What's wrong with Data General?" Most of them wanted to know if I felt, from the perspective of people who use DG equipment, that the company would survive.

Talk about loaded questions!

The trade press has been full of stories concerning "problems" at Data General. Some of the problems are real, of course, but when you run through the whole litany, you begin to see a pattern of DG bashing:

- No growth—sales have been flat for the last few years.
- They are not providing what the market needs.
- They are trying to be "all things to all people" and are thus ignoring "their niche."
- They depend too much on the end-user markets and have abandoned their OEMs.
- They depend too much on their OEMs.
- They are trying to sell into the same markets as Digital and IBM—isn't everybody?—and will surely lose.
- They have too many ex-IBMers.
- With Robert Miller's departure, all the ex-IBMers are abandoning the company.

**My reaction to all** of this? Sure, DG has some problems, but I believe troubled times can make a company stronger. Data General is showing how a company with the right stuff can use a period of difficulty to identify problems and do something about them. During the last 18 months or so, they have completely revamped their product line. In my opinion—and in the opinion of others I have talked with—they can compete with anybody. Their responsiveness to end-users is better than it's ever been; they have completely overhauled the OEM marketing

side of the business to strengthen it; and losing a key person or two to another company is a pretty common thing in the computer industry. After all, Mr. Miller *was* an ex-IBMer!

Is the Data General market dying? Hardly. How do I know? Some of the best evidence I could give you comes from our own NADGUG statistics. Did you know that NADGUG received almost 90 requests from users who want to present papers at Conference 87? And almost 60 companies have sent requests to exhibit their products. You've probably heard about the impressive rate of growth for individual memberships in NADGUG, but did you know that we're seeing the same growth in our regional and special interest groups? New RIGs are now forming in Orange County, Florida; New Orleans; Cincinnati and Columbus; St. Louis; Milwaukee; El Paso; and Willamette Valley in Oregon.

Of course, NADGUG's growth is at least partly the result of our efforts to promote membership and participation. Our NADGUG staff has published new information packets for prospective members and RIG/SIG startups, and they've made a series of special offers and promotional mailings that have yielded very good responses. I would have to contend, however, that you don't get that kind of response unless you're making the offer to the right audience. The audience I'm talking about is people who use DG equipment and like it well enough that they expect to keep using it.

In other words, NADGUG's record of growth convinces me that Data General is in the fortunate position of having a large base of satisfied customers. I can think of quite a few computer companies that would love to be as well off.

To paraphrase, with apologies to Mark Twain, "The reports of Data General's death have been greatly exaggerated."

I invite you to judge for yourself the products and services available from DG and the suppliers at the upcoming NADGUG Conference 87. It should be the best ever!  $\Delta$

# FOCUS

The Magazine of the  
North American  
Data General Users Group

## NADGUG LEADERSHIP

**President:**

J. Calvin Durden

**Vice President:**

Joyce Carter

**Treasurer:**

Donald W. Clark

**Recording Secretary:**

David Angulo

**Planning Committee:**

Rene Dominguez

**Publications Committee:**

Jim Siegman

**SIG/RIG Committee:**

Paul Duck

## FOCUS MAGAZINE

**Editorial Advisory Board:**

Tim Boyer

Brad Friedlander

Lee Jones

Steve Kristan

Jim Siegman

Wes Thomas

**Editor/Publisher:**

Greg Farman, Ph.D.

**Associate Editor:**

Carolyn Kelly

**Assistant Editor:**

Geri Farman

**Contributing Editors:**

Tim Boyer

Brad Friedlander

John A. Grant

George Henne

Brian Johnson

Charlene Kirian

Tim Maness

Jim Siegman

**Contributors:**

Tom Gutnick

Jim Hughes

Richard T. Kouzes

Jane E. Varty

**Art Director:**

Ann Soto

**Production Artist:**

Pat McMurray

**Production Assistant:**

Michael Obershan

**Marketing Director:**

Sharon Park

**Business Manager:**

Brenda Millet

**Administrative Assistant:**

Michelle Petty

# Performance Problems?

At last, an add-on memory alternative that can boost performance without boosting your budget.

## Adding memory may be the solution to your performance problems.

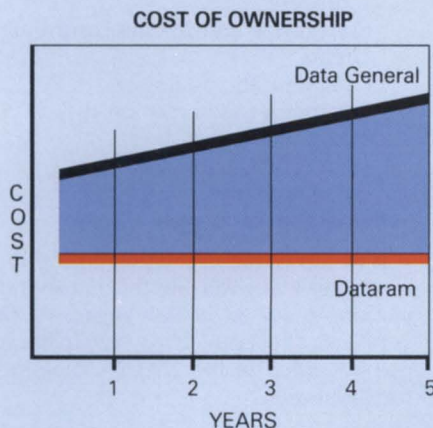
It's a fact. By simply adding memory to your present Data General system, you can:

- immediately improve response time
- run existing applications faster
- serve more users without degrading performance
- add new applications.

And memory expansion is completely painless. Absolutely *no modification* to existing software is required.

## At last, a real alternative.

Dataram offers a unique alternative to MV/4000, MV/10000 and S/280 users. With Dataram's low cost, maintenance free add-on memory, you can preserve your present system investment and get the boost in overall performance you demand.



Note: Based on current Data General list price for add-on memory and maintenance.

## Save at least 60%

Dataram understands your budget constraints. We offer at least a 60% savings over the cost of add-on memory from Data General. And since no maintenance is required, *your overall cost of ownership can be reduced by as much as 75%!*

## Lifetime Warranty

We believe that a manufacturer's warranty is an indication of the reliability of its products. That's why we offer a *Lifetime Warranty* on our DG compatible add-on memory.



And Dataram memory will not affect your Data General service contract in any way.

Our memory is designed and manufactured to require absolutely no maintenance. Should you or your Data General service representative determine that a Dataram memory board is not operating properly, just give us a call, and we'll express ship a replacement to you . . . free. In fact, we'll even pay for the cost of that service call.

## Installation

On-site installation is available, though many users take advantage of the additional savings by doing the simple installation directly. Either way, our memory fully supports all Data General system diagnostics.

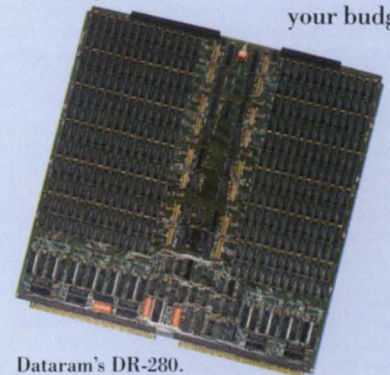
## Dataram— a total commitment to memory.

Dataram Corporation was founded over 20 years ago and soon emerged as a major provider of memory to leading minicomputer manufacturers. Dataram was one of the earliest independent suppliers of memory to Data General and has built a reputation for quality that endures. With over 50,000 high performance, low cost memory systems delivered worldwide, and a long term commitment to Data General users, Dataram is uniquely qualified to address your memory requirements.

## Here's an opportunity to give us a try.

You can take up to 30 days to evaluate our memory running your most demanding applications. If not completely satisfied, return it to us for an immediate, full refund.

Call us today at **1-800-822-0071** and prove to yourself that Dataram's add-on memory alternative will boost system performance without boosting your budget.



Dataram's DR-280. Available in 2MB, 4MB and 8MB capacities.

**DATARAM**

DATARAM CORPORATION  
P.O. BOX 7528  
PRINCETON, NJ 08543-7528  
(609) 799-0071 (800) 822-0071

## AOS/VS Consulting

System Tuning  
Networking/Communications  
DG/DBMS PRESENT  
INFOS CEO  
TRENDVIEW C/SCRIPT II  
UNIX RM/COBOL

## Commercial Applications

Development Installation  
Support

## Tool Packages

MENUMANager  
BACKUPMANager  
SPOOLMANager

## Conversions

ICOBOL→AOS COBOL  
COBOL→RM COBOL

## Turnkey Applications

A/P, A/R, P/R, GL, OE, INV, PO  
Mes AMIS Apparel Manufacturers  
Information System

## Upgrades

Authorized Data General  
System Supplier

**VANTAGE SOFTWARE, INC.**

**212-302-7711**  
**1500 Broadway, Rm. 812**  
**New York, NY 10036**

Circle 47 on reader service card.

## DIMENSION

### THE ORIGINAL BUSINESS BASIC APPLICATION GENERATOR

A fourth generation language  
for all Data General Systems

Don't settle for a mere program generator. DIMENSION is a complete, mature, tried and proven six year old data base oriented application generator that works. Develop complete, sophisticated applications in weeks instead of years.

Standard features include:

- shorthand coding commands
  - data dictionary
  - screen builder/editor
  - full function text editor
  - intelligent spooler
  - translator/compiler
  - support utilities
  - automatic documentation
  - program generators (entry, maintenance, and report)
- Literally any Business Basic application can be developed with DIMENSION. Available today for RDOS, AOS and AOS/VS, Desktops through MV/10000.



**COMMERCIAL DATA SYSTEMS  
CORPORATION**

1000 South Pioneer Drive • Smyrna, GA 30080  
404/799-1000

Circle 6 on reader service card.

## LETTERS

### Software library: check it out

NADGUG needs a formal software library. There is a lot of public domain software out there for Data General systems; for example, the AOS{VS} "goodies" tape. I obtained a copy of that tape several years ago, but I wouldn't know how or where to find it now.

DECUS (The DEC User Group) publishes a catalogue from which public domain software can be ordered for a nominal fee, and there is a formal DECUS library tape. The NADGUG software library could be patterned after the DECUS library.

At the very least, the NADGUG software library should be:

1. unique—there should be only one software library, and it should consolidate everything currently available
2. available only from one central source
3. formalized as a recognizable product with availability listed in *Focus*.

Some of the questions that must be answered are:

1. Should the library consist of .PR files only or just source files? (I think both.)
2. Should CLI macros be accepted? Should there be any attempt to weed out the trivial CLI macros which are simply repackaged CLI commands?
3. What should the charge be for the software? Should the software be dumped on as many tapes as required and just charge for the entire set? Should the selection of individual programs to allowed, with individual charges for each?
4. Should all/some/none of this material be available on an electronic bulletin board for downloading (maybe later—do 9-track first)? Whose machine will be used? Should this bulletin board allow uploads from contributors also or only direct 9-track donations? (Uploads would be difficult for the librarian to manage.) What protocols should be supported (Kermit, XMODEM, BLAST)?
5. Should there be any attempt to validate or test the software or just offer it "as is" with a disclaimer? Who will test it? (It is easier to offer it with a disclaimer—most people will accept that.)
6. Should there be any attempt to rate software and reject that which is

trivial or similar to other items in the library?

7. Should the software be checked for implied licenses (i.e., pirated). Perhaps, the contributor should be listed for each piece of software.
8. Should there be a catalogue? (Yes! Send a copy each year to every NADGUG member.) Each entry in the catalogue might be listed as follows:  
  
Name: XXXXX  
Type: program/procedure  
Files: PRG, PRV, source  
Language: F77, C, assembler  
Environment: CEO, INFOS, MV/UX, DG/UX  
Category: communications, system management, general purpose, CEO, financial  
Description: a brief description  
Contributor: name, address, telephone

9. Should the library be a money-making operation, or should the charges simply cover the costs?
10. Should a signed release be required from all contributors to avoid future legal entanglements (i.e., "I offer this software without restriction for public domain use. It is provided 'as is' without any warranty . . .")?
11. The final question is, "Who is going to be the librarian?" Should it be handled entirely by the NADGUG staff or one of the member organizations? Should there be a salary, or do we look for a volunteer (not me). The librarian(s) should be required to:
  - receive the tapes of contributed software
  - categorize and list the contributed items
  - maintain the catalogue
  - maintain the library on disk
  - make the tapes
  - print the catalogues
  - mail the tapes
  - mail the catalogues.

It would be nice if the first tape and/or catalogue was available for distribution at Conference 87 in Las Vegas. At the very least, the issue of a software library can be added to the NADGUG agenda for discussion.

John A. Grant  
Geological Survey of Canada  
601 Booth St., Room 591  
Ottawa, Ontario, K1A 0E8 Canada

Δ



**DEVELOPING AOS OR AOS/VS COBOL APPLICATIONS UNDER DG'S INFOS II?**

**DEVELOPING INTERACTIVE COBOL APPLICATIONS?**

Software Only  
Leases Available

Would you like to:

- Prototype with COBOL
- Have standardized, error-free source code—No debugging needed
- Generate complete, full-featured file maintenance and update/report programs with code guaranteed to work the first time.

You can with C/SCRIPT II

C/SCRIPT II addresses the needs of everyone developing business applications in AOS, AOS/VS or Interactive COBOL. C/SCRIPT II increases productivity, standardizes program development and provides a reliable menu system with security for your runtime environment.

**ANNOUNCING**

Training  
Consultation  
&  
Design Assistance  
by

**Gerry Manning**  
"He speaks ICOBOL.  
FLUENTLY"

## Announcing C/SCRIPT II Enhancers

C/SCRIPT II enhancers now available from Lee Yosafat, C/SCRIPT II distributor. Developed using the C/SCRIPT II **customizable skeleton** file system.

- Sequential file support in the update/report generator.
- Header/scrolling detail maintenance and inquires.
- Scrolling look up of supplemental files.

Trade-in available for users of PROXI and MAGIC.

**(205) 821-0075, ext. 33**

In the United Kingdom call: **COMPACT 3000 SYSTEMS LTD.**—0902-880088  
or Contact any Data General Sales Office

**Threshold, Inc.**

# Resource Accounting System

- Complete Resource Chargeback and Project Accounting System
- Monitor CPU, Disk and I/O Usage
- Print invoices for individuals or groups
- Adjust rates for prime and non-prime time usage or for different user groups
- Uses standard SYSLOG data
- No overhead processes required
- Supports XODIAC networks

**801-484-3333**

**DMS Systems, Inc.**

Your Backup and Recovery Experts

1111 Brickyard Rd. • Salt Lake City, UT 84106

Circle 17 on reader service card.

## DEC • DG • IBM

Color DG/10SP	Stock
DG/10, DG/20 Pkg.	Stock
512KB DG/20 memory	550.
USAM-1, USAM-4	Stock
Cart. Tape for Desktop	Stock
5-14513 Desktop Converter	Stock
4436 Mouse	Stock
D-214, D-215, D-411, D-461, CRT	Stock
D-410 CRT	700.
D-200 CRT	250.
MV/2000	Stock
C/300	495.
C/150 w/o Memory	795.
MP 100/200	Stock
Nova 4C, 5 Slot Chassis	95.
Cassette I/O w/512473 Cable	295.
Comm. Basic I/O	900.
IAC-8, IAC-16	Stock
ALM-8	250.
ALM-16	350.
TCB's	Stock
9165 TCU	50.
6097-B Dual Quad Fpy S/S	500.
6236 354MB Disk S/S	Stock
6239 592MB Disk S/S	Stock
6161 147MB Disk S/S	Stock
ERCC for S/140	500.
BMC for S/140	Stock
8537 Expansion Chassis	300.
8655 128KB Memory	400.
64KB Eclipse SC Memory	50.
6026 Controller	Stock
6125 Unhard Tape S/S	1800.
Used 2686-A HP Laser Jet Ptr	1195.
HP Laser Jet Series II Ptr	1800.
4518 Printer (Unused)	Stock

**Ames Sciences, Inc.**  
Chancellor Pt. Road  
Trappe, MD 21673  
**301-228-8100**

Circle 2 on reader service card.

## ROUNDUP

# L.A. EDGE COASTS ALONG

## Los Angeles group sets RIGorous but successful standards

by Carolyn Naber  
Special to Focus



The board of directors of the Los Angeles End-users of Data General Equipment (L.A. EDGE) is excited about our first year, and expects that next year will be even better.

At our first meeting in September 1986, 72 people attended with 76 paid memberships. We have met every month since then. As of May, we had 142 paid memberships with meeting attendance growing each month.

Our organization is fiscally sound, and we expect a healthy surplus at the end of our fiscal year. We are officially incorporated as a nonprofit organization, a California corporation, and we have obtained a federal ID number.

The L.A. EDGE is the third attempt to start a user group in Los Angeles. We have learned many things from our predecessors. Our current board of directors, which founded the group, made decisions and commitments to ensure success.

### The board

We handpicked strong, energetic, and reliable people. We didn't wait for volunteers, but rather, conscripted the active people in our area.

### Money

Money problems can quickly destroy good intentions of a user group, so a decision was made for strong policies regarding dues and memberships. There are no exceptions.

1. One must be a member to attend the meeting; however, a membership can be temporarily transferred for the evening if a member cannot attend. This allows companies represented at the L.A. EDGE to buy several memberships and dinner payments and float them around to various employees.
2. Our annual membership dues are \$100 for the first member from

each company and \$25 for each additional member from the same company. There are no free members, including Data General employees.

3. Dinners must be paid one week in advance of the meeting. To facilitate this, we invoice each member for the cost of the dinner three weeks in advance, and we provide two options. They can pay \$35 on a monthly basis, or pre-pay for the fiscal year and pay \$25 for each dinner. The latter option saves a member as much as \$100 for the year. Currently, we have about 60 percent of the people pre-paying dinners and the other 40 percent paying on a monthly basis.

### Direct marketing

Our computer system flags members and potential members for specialized mailings. The system aids in the accounting of our membership dues, dinner payments, invoicing, and preparation of payment confirmation letters. Many members have indicated that this system of invoicing and payment confirmations has helped them process the dues and dinner payments through their own accounting departments with greater success than they would have had otherwise.

### Meetings

We wanted to create a meeting place where our members would look forward to coming each month. Some of the ways we decided to implement this include meeting at the same place each month; choosing a restaurant with good food and a large, comfortable meeting room; having some of the cocktail hours hosted by vendors; greeting members at the door; and introducing members to each other.

Every attempt is made to keep the topics at the meetings interesting. We

# CUSTOM CONFIGURE ANY DATA GENERAL SYSTEM TO YOUR SPECIFICATIONS

And We Mean Your Specifications



## WE LISTEN

When you order a system from us, you get it complete — down to the last nut, bolt, and cable. When you require specific revision levels on your system components, that's what we deliver.

## DELIVERY TO MEET YOUR SCHEDULE

When you specify a delivery time, that is important to us. Whether it's a complete system or just a cable. We make every effort to assure that your equipment arrives when you need it.

## HARDWARE THAT LASTS

We check out, and if necessary totally recondition, every item we sell. Nothing leaves our facility without being:

- Fully tested
- Completely cleaned — like new
- Properly packaged

## A GUARANTEE YOU CAN COUNT ON

We guarantee every piece of equipment we deliver to be complete, fully operational, and eligible for servicing by the maintenance company of your choice.

## WE'RE KNOWN BY THE SATISFIED CUSTOMERS WE KEEP

Our many present customers already know about our high quality, superior service, and competitive prices. That's why we've grown to be one of the largest volume Data General used equipment dealers. They also know we offer the best deals on purchasing used Data General equipment. Buy your next Data General system or peripheral from us, and discover the Security Computer Sales difference for yourself!



Security Computer Sales, Inc.  
622 Rossmor Building  
500 North Robert Street  
Saint Paul, MN 55101

PHONE: (612) 227-5683 FAX: (612) 223-5524

## GET A FREE 5" TV WITH YOUR NEXT ORDER

We're so sure you'll like doing business with us, we're offering a special bonus just to have you give us a try.

With any order of \$1,500 or more, we will send you a Deluxe 5" Bentley Portable TV (retail value \$169.95), with 82-channel receiver and VHF/UHF electronic tuner. This ultralight, compact (5 pound) TV operates on "D" batteries or, with AC/DC adapters, from standard household current or the cigarette lighter of your car, boat, or mobile home.

Just make your best deal with one of our salespeople, and send in the coupon with your order.

Circle 40 on reader service card.

My Order Is Enclosed. Please Send Me My FREE Bentley 5" Portable TV.

NAME: \_\_\_\_\_

COMPANY: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CITY: \_\_\_\_\_

STATE: \_\_\_\_\_ ZIP: \_\_\_\_\_



have had two surveys and many unofficial straw polls to find out what our members want to hear about. We select speakers that are not only informative, but entertaining. We prepare in advance a meeting booklet, which is spiral bound and contains brochures from vendor presenters and/or meeting outlines.

Because of our sound finances and the commitment we ask of our members, we also try to give back. At our

Christmas party, the L.A. EDGE paid for the dinner of each member's spouse and provided a disc jockey. We publish a monthly newsletter called *On The EDGE*, and each member can advertise in it for free. We are in the process of publishing a directory including each member's name, address, and computer configuration.

#### Where do we go from here?

The L.A. EDGE board of directors is preparing for the next year. We are cur-

rently securing commitments for next year's leadership. Our goals include starting satellite groups throughout the Los Angeles area. Southbay, Westside, and Orange County have many Data General installations that could support a more localized group. We are also trying to locate DG users in the L.A. Basin.

*Los Angeles End-users of Data General Equipment, P.O. Box 50107, Pasadena, CA 91105.* Δ

**Can you run  
your ICOBOL  
programs on:**

**MS-DOS,  
PC-DOS,  
XENIX,  
UNIX,  
VAX/VMS or  
PC networks ?**

**We Can!**

Our *Choice!* software runs your ICOBOL programs and data files totally unmodified on all types of computers, from small PC's to large mainframes.

Call today!  
(303) 442-0324



**wildhare**  
COMPUTER SYSTEMS INC.  
P.O. BOX 3581 BOULDER, CO 80307

## Start-up meeting held for New Orleans RIG

Organization of a regional interest group for the New Orleans area is underway. The Data General sales office in Metairie, just outside of New Orleans, held a two-day "User Appreciation" for their customers on May 7 and 8 at the Gateway Hotel, where users took the first step in organizing a local group.

The first day consisted of several sessions addressing such topics as networking, communications, DG strategy and product updates, XODIAC, and IBM compatibility. Those who attended were also able to gain some hands-on experience at a demonstration center set up at the Gateway. Several companies, including Oracle, Henco, DMS, and DEST Corp. showed their products, in addition to several DG demonstrations of CEO, Trendview, Present, and the DG/One.

In the afternoon, Barbara Hoogasian of the NADGUG staff in Westboro gave a presentation outlining the reasons for organizing or joining a local group, and the steps to follow to get one started. Chester Plauche, the DG general branch manager in Metairie, then called an informal meeting of people interested in actively organizing the group.

Since that time, four people along with Plauche have held an organizational meeting. They are Al Parking, NALO; Kathy Sharp, Martin-Marietta; Tony Bumpers, Biloxi Public Schools; and David Smith, LOOP. Currently, they are putting together a letter and a survey that they plan to send to approximately 400 DG users in the area. The first official meeting will be held July 16 at the Gateway Hotel.

*Anyone interested in joining or helping the New Orleans group should contact Tony Bumpers, 601/374-1810; or David Smith, 504/368-5667; or Kathy Sharp, 504/257-1222.* Δ



# FAST TRACK SYSTEMS

WHEN DISASTER STRIKES, YOUR NEXT MOVE IS

## FAST TRACK SYSTEMS

Smart companies aren't leaving the next move to chance. They know that disasters strike American businesses with increasing regularity. Fires, floods, power failures, structural collapse — any of these can happen next year or next month. The result: irretrievable loss of business records and, worse yet, drastically reduced operating effectiveness.

Rather than risk their futures, they're turning to FAST TRACK SYSTEMS, INC., a provider of comprehensive disaster recovery services for Data General users. Subscribers to FAST TRACK SYSTEMS have access to FAST TRACK'S fully

equipped disaster recovery centers on a moment's notice.

And they can communicate with FAST TRACK processors from remote sites, from the FAST TRACK hot sites or from a FAST TRACK Mobile Recovery Center delivered right to the office or plant.

So make your next move now. Call FAST TRACK SYSTEMS today to find out how you can join the smart companies that are prepared when disaster strikes.

**FAST TRACK SYSTEMS, INC.**  
61 Broadway, NY, NY 10006  
(212) 422-9880

# THE BOTTOM LINE

## How to buy accounting software

by Jim Hughes  
Special to Focus

What do you do when the head of your accounting department tells you that he wants to put the company's books on something more sophisticated than a PC? Suppose the company bought a new division, and now accounting needs a system that is multi-company? You'll have to start a search for accounting software.

Here are some suggestions on the least painful way to buy accounting software. Notice I said "least painful." It's an important decision—one that will have a direct impact on your company's profit—but there's no way to make it fun. You'll have to put in quite

*The people I've seen who have been most successful have formed a team with members from the accounting department and the data processing area.*

a lot of time and effort (and even learn some of accounting's arcane vocabulary), but it is worthwhile.

My company, (HBI), has written and markets accounting software for Data General computers. Before I was involved with this company, I managed DP installations, and was responsible for purchasing software, so I've been involved on both sides of the transaction. I'll be sharing with you some hints on how to shop and what to look for in accounting software.

### Schedule adequate time

I'd recommend at least two months for finding and purchasing the software, and then additional time for installation.

### Get help

The people I've seen who have been most successful have formed a team with members from the accounting department and the data processing area. The team was responsible for selecting, purchasing, and installing the software.

## What to expect from accounting packages

by Jim Hughes  
Special to Focus

Here are some guidelines about features that should be in a software package, based on my own experience and on requests from clients for features they wanted. As a matter of fact, many of these items apply to any system.

### General features

**Security.** You need to protect the system's data, so you need a sign-on procedure that requires the user to enter a unique password to get onto the system. In an accounting system, you also need to preserve separation of duties. This means, for example, that the same person who adds new vendors to the accounts payable system shouldn't be able to authorize payments to that vendor. Therefore, in an accounting system, the security system must be able to specify which functions an operator can perform.

**Overnight/batch functions.** DG computers, in general, are used and perform best in an interactive mode. A lot

of the jobs in an accounting system (check writing, invoice printing, payroll calculating, G/L reporting, etc.) are not interactive, but batch. That is, they read through a file, collect data, perhaps sort it or update another file, and then print the results. Look for a system that lets you run these jobs in a batch process or lets you save the jobs to be run when the interactive load is light.

**Lookups.** The system's users shouldn't have to memorize vendor numbers, client numbers, or employee payroll numbers. Anytime users need a record, they should be able to enter a name or portion of a name, let the system display the record that matches, and pick one.

**Inquiry.** Users should be able to display all the information they need about a vendor, client, employee, or G/L account. These systems (especially A/P and A/R) are a principal way for outsiders to deal with your company, and the speed with which you can respond to their requests significantly affects your image.

**Balancing.** Your system must balance. You must be assured that the pile of checks you handed to a clerk to enter all got into the system. Accountants are especially sensitive to this, after all, they handle real money (or at least

checks). So look for systems that are easy to balance, and that make it easy for you to list and total the transactions entered.

**Correction.** Everybody makes mistakes. Data entry people are especially prone at the busiest time of the month. You need systems that will let you correct mistakes with no more effort than it took to make them. In addition, the system should help you prevent mistakes. Nothing will prevent the operator from entering 11 instead of 10 in an amount field, but nothing should allow an entry date of 04/32/87.

### Accounts payable features

The A/P system pays invoices submitted by your vendors. It should at least:

- enter invoices and charge them back to the correct G/L accounts (forcing the chargeback to balance with the invoice)
- list and balance the daily entries
- age and list unpaid invoices
- allow the operator to select invoices for payment (either through due date or by individual invoice)
- print checks
- void checks
- account for checks written outside of

# The disk backup system that pays for itself in 18 seconds.



That's about how long it takes to load a MegaTape cartridge and start the backup process.

Now comes the crucial MegaTape difference: with our 630 MB capacity (formatted), you can back up the entire contents of any popular disk drive without changing cartridges. Translation: *turn out the lights and go home.*

Every other backup system requires multiple media changes, with all the attendant waiting around and labeling and storage headaches. Fact is, an independent University of California study found that savings in time and media can pay for the entire MegaTape system in less than a year.

So stop wasting all those hours. Pick up the phone now and call MegaTape.

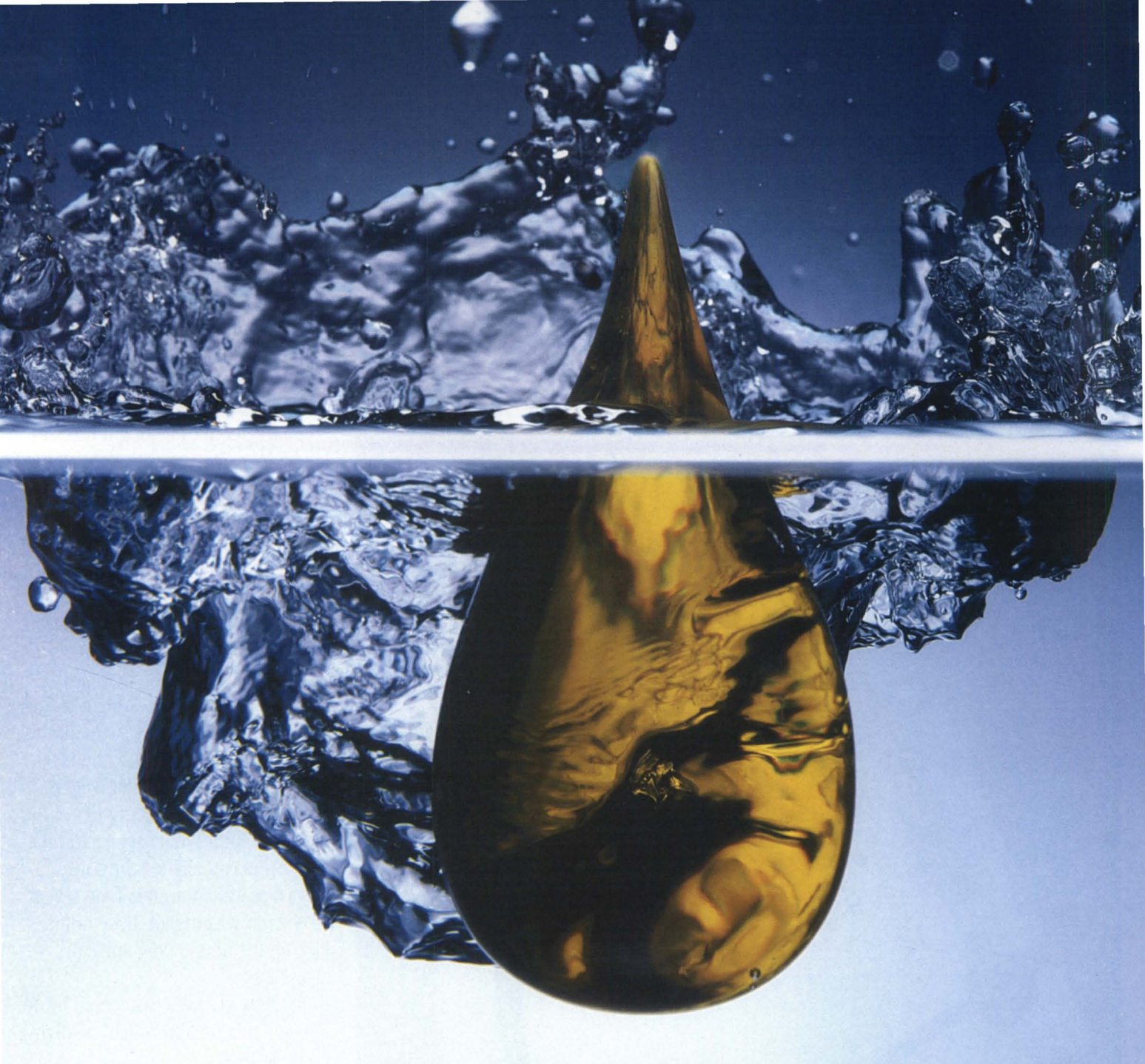
In a few seconds, you could be on the way to a breakthrough in solving your backup problems.



 **megaTape**

1041 Hamilton Road  
Duarte, CA 91010-0317  
(818) 357-9921  
TELEX 510 600 7131

© 1986 MegaTape Corporation



## WITHOUT DATA GENERAL, INTEGRATING YOUR SYSTEMS IS LIKE MIXING OIL AND WATER.

FOR FULLY INTEGRATED  
BUSINESS AUTOMATION, TALK TO  
DATA GENERAL.

Ultimately, a business needs to integrate all its resources. Blending people, departments and computer systems together. Data General's Business Automation Systems integrate all these vital elements.

Our CEO<sup>®</sup> software gives you the most integrated business automation essentials. With tools that help you make faster, better informed business decisions.

We give you the most complete IBM compatibility. We also adhere to industry standards like Ethernet<sup>®</sup> and X.25.

Our solutions integrate all levels of your company. From PC's to mainframes. From the next room to the next continent.

Our MV/Family systems lead the industry in price/performance. And give you a low cost of ownership along with service, training and support.

Today, over 165,000 CEO users have discovered true integrated business automation. To find out more, call 1-800-DATAGEN (Canada call 1-800-268-5454.)



 **Data General**  
a Generation ahead.

©1987 Data General, 4400 Computer Drive, MS C-228, Westboro, MA 01580. CEO is a registered trademark of Data General. Ethernet is a registered trademark of Xerox Corporation.



Make sure the accounting people are involved early in this process.

Making them integral members of the team has two advantages. First, because you are looking at software for the user, their involvement in the earliest stages will help you narrow the field quickly and save you time. Second, their involvement in the entire process of selecting, purchasing, and installing the software will make them feel responsible for it, and inspire them to work harder with you to ensure a successful installation.

Suggesting that users should be involved in this process may seem an obvious point, but I have been involved in some horrible installations when the software was purchased *for* the users, but without the users' assistance.

### Make up a wish list

Compose a list of the things you need and want your accounting package to do. Separate the items into things you must have, things you would like to have but aren't required, and "blue sky" items (things you would like but seem too farfetched to ask for).

*I advise you to pick the vendor with the best references.*

Brainstorm with the members of your team when making up this list. Don't forget to ask the people who will use the software daily (entry clerks, etc.) what they need to make their job easier. An interesting way to get this list started is to ask people what they don't like about their current system.

Although the items on this list will primarily be accounting issues, you should be sure that data processing issues are addressed. In addition, you need to make up a list of absolute data processing requirements, that is, the type of machine you will run that software on, the operating system, and the language requirement.

### Research available packages

You can compile a list of packages from entries in software directories, DG-oriented publications like *Focus*, and advertisements. If you belong to a user group, ask other members about their recommendations and experiences.

Once you have a list to go by, call the vendors and request information about their packages. It is best to have one of the members of your accounting team do this. Armed with your DP requirements, they can eliminate packages that won't run on your configuration, and they will be better qualified to explain your software requirements.

### Arrange for a demonstration

Make sure the vendor sends you a list of current customers and references for you to check. Clients with the configuration closest to yours that use the product you're interested in should be indicated. This is very important. Don't waste your time with a vendor who will not supply references.

If possible, you should call the references before you go to the trouble to see a demonstration. You should be most

- the system (manual checks)
- list checks (including voided and manual checks)
- display vendor transactions
- update the G/L system with the A/P information.

In addition, it would be nice if the system:

- automatically entered recurrent bills (such as the monthly telephone bill)
- listed cash required to pay the bills in the system
- provided 1099 reports
- provided a reconciliation system for the checkbook
- provided for multiple checkbooks
- provided more extensive reports including vendor history and analysis.

### Accounts receivable features

The A/R system records how much your clients owe you and what they have paid. It should at least:

- quickly and easily record receipts
- record invoices
- list and balance the daily transactions
- list invoices (paid or unpaid)
- apply payments (match receipts and the invoices they pay)
- print customer statements
- display a client's transactions

- update the G/L with the A/R information.

In addition it would be nice if the system:

- printed invoices and updated A/R files
- computed service charges.

### Payroll features

The payroll system issues paychecks for the company's employees. It should at least:

- accept employees' hours (time cards)
- list and balance employee time cards
- accept employee deductions (insurance, etc.)
- print deduction register
- print paychecks and payroll register (list of checks)
- display employees' history (including paychecks)
- update G/L with payroll information
- provide an easy way to update tax, FICA, and unemployment tables
- provide state and federal reports (941s and W2s).

In addition, it would be nice if the system:

- provided a check reconciliation system for paychecks
- provided automatic payment of sala-

- ried personnel
- provided labor distribution.

### General ledger

General ledger records and reports on the financial transactions of the company. It should at least:

- easily set up a chart of accounts
- accept journal entries (forcing balanced entries)
- list chart of accounts
- list journal entries
- list general ledger (each account and its transactions)
- display chart of accounts, journal entries, and general ledger
- display the accounting equation (capital + assets + liabilities = income + expenses)
- provide a report writer to print financial reports (P & L, balance sheet, etc.)
- provide budget capabilities.

In addition, it would be nice if the system:

- could send information to (and accept from) a spreadsheet, either on the DG computer or on a PC
- display reports from the report writer
- provide for recurrent journal entries
- provide for automatic account allocation. Δ

concerned with how responsive the vendor has been to these customers' problems. How satisfied were the customers with the training and installation time provided? How useful is the documentation? How willing is the vendor to make changes to the software (and how costly is it)? Don't be too concerned with the functions of the software, you'll cover that during the demonstration, but you should get a feel for how easy it is to work with the vendor.

During the demonstration, make sure someone from your team acts as a recording secretary and checks off the product against a copy of the wish list. You'll be able to compare products later by comparing the wish lists.

The demonstration is an opportunity for you to evaluate the product. Also, you can find out if the vendor can make changes to the software to meet your requirements. If changes are required, make sure that the vendor understands what is needed.

#### Get offers from the vendor

Make sure your agreement answers

the following questions:

- Exactly what software are you getting?
- What modifications will be made?
- Do you get the source code, and if not, is the source in escrow and available to you?
- How much training time is included, and where will the training take place?
- How much installation time is included?
- What guarantee applies to the software, and for how long?
- After the guarantee, is maintenance available, and what does it entail?
- How is the software updated?
- What is the delivery time for a copy of the software?
- What are the costs, including modifications, training, installation, and maintenance?

#### Evaluate the software

Based on the information you have gathered, your team should be able to pick the best software at the most reasonable cost. I've seen elaborate schemes for assigning scores and weights to the elements of the wish list,

thereby getting numerical scores. If that's fun for you, fine, but I think these things usually come down to a couple of vendors. I advise you to pick the one with the best references.

#### Make a counter offer

At this point, you can negotiate the price, or any other part of the vendor's deal. I always try to get more installation and training time.

In any case, you should set up a payment schedule so that you don't pay for the software until it's installed, and you have had adequate time to test it.

#### Uncross your fingers

If you have done your homework, you won't need any luck. You should have purchased a properly running and efficient accounting system that suits the particular needs of your company. Δ

---

*Jim Hughes can be contacted at HBI Business Systems, 7503 Weatherby Dr., Rockville, MD 20855; 301/869-2355.*

---

## TOTAL DATA GENERAL SYSTEMS SUPPORT

From the Desktop Generation to the MV/20000

- Custom Programming
- Consulting, Field & Systems Engineering
- Hardware Sales — New & Used
- MV/7800 Upgrades
- 4GL Languages
- Fuel Oil (Jobber) Distribution Package
- 911 & Custom CAD Packages
- Accounting - Desktop RDOS or AOS thru MV/20000 AOS/VS, etc.
- System Timesharing
- Emergency Backup — Hot Site
- Media Conversions (Including MV/2000DC)

AUTHORIZED  DataGeneral OEM

**MONTHLY SPECIAL**

**FREE!** Your first two hours of time-sharing *free* with any order of 10 hours or more of MV/class timesharing! **and/or**

**FREE!** Your first month of hot site backup *free* with a one year hot site service contract!

For more information call  
Mike Collins, V.P. of Sales at

**301-247-5244**



**COMPUTER ENGINEERING ASSOCIATES, INC.**

3922 Vero Road, Baltimore, MD 21227

Offices in: Baltimore, MD • Cambridge, MD • Washington, DC • Pittsburgh, PA

SUPPORT SERVICES AVAILABLE IN: DC, MD, VA, PA, DE, OH, WV

Circle 7 on reader service card.

## ... and not as I do **How NOT to computerize your accounting**

by O.B. Weiser

What follows is a sad story about how things went wrong during the installation of our accounting system. Every word of it is the unvarnished truth. Well, maybe not *every* word—I probably enhanced it a bit in places. However, as Kurt Vonnegut said, just because it didn't happen that way doesn't mean it isn't the truth.

It's often said that experience is the best teacher. That may be true, but in this case, experience involved a lot more hard knocks than were absolutely necessary to teach me a good lesson. The bright side is that I can now make a legitimate claim to be an expert on the subject of how *not* to computerize a company's accounting. My narrative is punctuated with some of the lessons I learned in the School of Deserved Anguish.

**Lesson #1:** Never assume that you aren't the other guy.

I have to admit at the outset that I should have known better. Most of my problems stemmed from taking shortcuts. I thought the advice I had seen in magazine articles was intended for that other guy—you know, the poor, ignorant soul who has to do a lot of extra homework to protect himself from pitfalls that would be obvious to anybody as well-informed as me.

We already had a DG Desktop system that we used for word processing, spreadsheets, electronic mail, and file transfers. It was doing yeoman service, and I thought I knew quite a lot about managing it. Meanwhile, we were running up against all the limits of the PC-based accounting system we had been using. We needed to be able to keep detailed account histories and get flexible financial reports, and we needed to have a systematic way to manage our backups and archives.

Clearly, it would make a lot of sense to add an accounting package to our existing DG system. And since I was doing such an exemplary job of managing the existing system, I figured I was qualified to analyze our needs and select accounting software that would serve our needs and keep us operating efficiently.

**Lesson #2:** If you decide to be your own consultant, you will have a fool for

a consultant. Knowledge is power, and some knowledge is better than no knowledge, but a little knowledge can get you into a lot of trouble.

I knew we wouldn't be able to stay with our Desktop forever, and I knew I should be planning for a future migration path. To me, that meant only that the software should be written in either Business BASIC or Interactive COBOL, so the same programs and data could move to a bigger machine when the time came. That wasn't a bad strategy I guess, but unfortunately, it was as far as my strategy went.

I didn't consider what would happen to performance on our Desktop when we put just one more application on it. It wasn't until the accounting software was installed that I discovered we were perilously close to being out of memory, CPU, disk space, and ports, all at the same time. I guess Alvin Toffler would call it Future Shock: the future—and the need to spend a lot of money upgrading our hardware—arrived a lot sooner than I had expected.

**Lesson #3:** Adding just one application to an existing computer system is about as unlikely as eating only one salted peanut.

If I had taken the time to get good advice on what the new software would do to our Desktop, I might have chosen to upgrade our hardware right away, and then add the accounting software to a system that had comfortable excess capacity. Even if I had decided to put it on the Desktop, I wouldn't have been so surprised at the final cost. If I had realized what the true cost was likely to be, I would probably have spent more time on the selection process.

Which brings us to the selection process. You've probably heard that it's a good idea to write out specifications for the system you need, and then invite a number of vendors to submit a bid so you can evaluate their offerings carefully to select the one that's best for you.

Well, I was busy. I had heard that package X was pretty good, and I had a friend who was an X dealer. He said he could make me a good deal.

That pretty well describes our selection process. (You may have guessed by now that O.B. Weiser is a pseudonym. I'm writing under a pen name because I don't want every salesman in the

world to know what I pushover I was.)

The chances are pretty good that I would have selected package X anyway. However, I probably would have selected a different dealer to buy it from if I had done my homework. I wasn't paying enough attention to how important it is to have a vendor who thoroughly understands the package and is prepared to offer assistance with installation, training, and technical support.

**Lesson #4:** Decide in haste, repent at leisure.

The dealer and I agreed on a price, and then we set a date for the installation. He suggested that we get the last year's worth of financial records together for the installation. That way we could get our training by installing the system and setting up the chart of accounts, then entering the data from the month-end reports for the last year. That would familiarize us with the software while getting the historical data onto the system. Once the G/L historicals were entered, we would bring up accounts payable, and finally, accounts receivable.

Not a bad plan. Unfortunately, the installation didn't go well. Our dealer loaded the tape, but couldn't get past the security on the new accounting software. He deduced that when his technician prepared the tape, he forgot to load some of the security files and system management macros. Most of the rest of the day was spent on calls back to his office (in another city, of course) trying to identify and transfer the missing files. Between calls, we talked about the software and reviewed the manuals, but we never did get any hands-on training. As the dealer was leaving for the airport, he asked when he could send an invoice. I said I'd pay him as soon as the accounts payable module could produce a check. Those prophetic words were uttered at the end of October.

**Lesson #5:** Always reserve a part of the payment until the system is operating as expected.

The next day we used a modem connection to load the missing files, and the real work began. Without any help from our dealer, we pored over the manuals to figure out how to set up the

chart of accounts and make the G/L entries for the last year. Unfortunately, we didn't realize that we needed to close the beginning balance entries before making the monthly entries. When we tried to close the first month of historical data, we were stuck: the beginning balances hadn't been processed, and

the system wouldn't process them now that the monthly entries had been made.

We called our dealer. He wasn't sure what caused the problem, but he said he'd begin looking for the reason. Meanwhile, he said, the chart of accounts wasn't affected, so we could go

ahead with setting up accounts receivable. And by the way, he was sending out an invoice. It was now the beginning of November.

Again, we pored over the manuals to figure out A/R. Setting it up went pretty smoothly. The Ides of November arrived, and it was time for the first check run. We still don't know what happened—it was probably an operator error—but the check data that we printed somehow didn't get cleared out of the system. When we tried to print checks again at the end of November, we found the old data was keeping us from printing the next set of checks, and we couldn't seem to clear it out.

It was time for another call to the dealer. By the way, we asked, what about the problem with G/L? We had been busy getting A/P going, and were about to start on A/R, but we couldn't have a working system until G/L was brought up to date.

I began badgering the dealer for answers. It was past Christmas when we finally had a fix for the G/L problem. On the brighter side, A/R was working smoothly by mid-January. On the darker side, it took several more weeks to get G/L current so we could close 1986. After all our frustrations, we were pleasantly surprised to find that getting the three modules to work together was relatively simple.

**Lesson #6:** Allow at least twice as much time as your highest reasonable estimate for how long it will take to complete the transition to a new accounting system.

Don't be in too much of a hurry to get started. For example, we would have been better off if we had gotten our training with simulated data instead of hurrying to load our real data before we really understand the software. And we should have just thrown away some of our first data entry when we ran into problems. Starting over would have been faster in the long run than trying to recover from those early errors.

It's now May. The system works very nicely—if you don't count the fact that A/P still won't write checks. Our bookkeeper has recovered her sweet personality, but still lapses into language that would make a sailor blush if anybody mentions our dealer. As for the dealer, he doesn't return our calls anymore.  $\Delta$

*O.B. Weiser is older but wiser.*

## Selecting Accounting Software for Your Data General MV?

Ask the right questions....

Find out if the other software company offers:

- **Full Support** on their products with:
  - **Toll-Free Support Hot-line,**
  - **Dial-up Modem facilities,**
  - **Semi-Annual Enhancements** and upgrades?
- Reasonably priced, **Custom Modifications,** on-time?
- Excellent user and technical **Documentation?**
- Outstanding system **Functionality** and **Ease of Use?**
- **Data file Creation, Installation and Conversion Services?**
- The ability to allow your **Financial Accounting Information to be passed to a Spread Sheet, automatically?**
- **On-Site Training ?**

We'll give you the right answers....

Our packages include:

- |   |   |
|---|---|
| <input type="checkbox"/> <b>General Ledger with Spread Sheet Interfaces</b> | <input type="checkbox"/> Fixed Assets           |
| <input type="checkbox"/> Subsidiary Ledger                                  | <input type="checkbox"/> Professional Invoicing |
| <input type="checkbox"/> Accounts Payable                                   | <input type="checkbox"/> Order Entry/Inventory  |
| <input type="checkbox"/> Accounts Receivable                                | <input type="checkbox"/> Purchasing             |
|   | <input type="checkbox"/> Payroll                |



## LIONS GATE SOFTWARE INC.

**A Qualified Data General Independent Software Vendor**

**Call us for more information**

**From the United States toll-free: 1-(800)-663-8354**  
From other countries: 1-(604)-437-0001

\* Also available under the UNIX, XENIX, MS/DOS and PC/DOS operating systems.

Circle 28 on reader service card.

# COMPUTERIZING YOUR ACCOUNTING DEPARTMENT

## It's a big change, but it doesn't have to be disruptive

by Jane E. Varty  
Special to Focus

Implementing a computer system in the accounting department doesn't have to make a shambles of your operation. It can be done on schedule, and could even be a positive experience for everyone involved. Based on our experiences from the past 10 years, here are some simple steps for making sure your transition to computerized accounting is predictable and organized.

### Getting started

Pick a project leader or project team members who have knowledge of accounting functions (including financial statement preparation). The project leader must have a positive attitude and know the accounting requirements of the organization. The bookkeeper is a likely candidate. Someone with little knowledge of accounting shouldn't be given key responsibilities. You are selecting systems to assist the accounting department, and the people in that department are the best qualified to learn and implement the systems they need. The decisions you make from the outset will dictate the reorganization of your accounting procedures, and you may have to live with those decisions for a long time.

A successful implementation begins with a positive attitude. Encourage each person in the department to "sign up." If they are happy with the tools you are providing, you will probably be happy with the results. Give users the opportunity to express their concerns.

The three stages of computerization that cause the most anxiety are: prior to implementation, during the training process, and after installation. Prior to implementation, review your current office procedures, and think about how they may change. Meet with the users to discuss how computerization will al-

ter their current job functions. During the training process, invite the users to keep you informed about how it's going, and supply positive feedback to encourage good attitudes about the new system. After the system has been functional for a month or so, meet with the users to verify that any changes in procedure are working effectively.

If someone starts telling horror stories they've heard about computerization, the project leader must be there with a positive attitude. Expect statements like, "We've always done it this way" and, "It's too much trouble." They can be countered with, "Why type the accounts payable checks when the system can do it for us?" Reassure users who are afraid of the keyboard and terminal, and allow them time to feel comfortable.

### Vendors

You will probably receive the best help if you have chosen a vendor that has customers using the same software in the same type of computer environment as yours. You should contact these other customers and, possibly, visit their sites, so you can pick up installation hints in addition to those provided by the vendor.

During the initial implementation process, your vendor should supply you with the name of the person who will be training your users. Make sure the trainer has some accounting knowledge and is prepared to do more than read the screens to your staff. You can expect the vendor to give both pre-installation training and on-site training. They should provide you with procedures for setting up your system, worksheets for setting up the master files, and hints and suggestions for designing any forms printed by the system. You will be working closely with your vendor's training department. Make sure they will be available when you need them.

### Software

Compare your current accounting procedures with the features offered with your new software, and outline what will have to change. Of the options provided by your software, which

functions will you want to use immediately, and which will wait until later? Inevitably, you will have to reorganize some job responsibilities. Although the vendor will provide you with training and user manuals when the system is installed, it is still advisable for you to learn as much as you can about the software, as soon as you can.

Learning all the accounting applications prior to implementation may change your ideas on how to structure the master file. The supervisor of each of the accounting areas should become familiar with all aspects of their software application. In some areas of accounting, clerks may need to learn only selected application programs.

When designing your chart of accounts, plan for future reporting requirements. Your cash line on the balance sheet may represent only one account in the general ledger. If in the future you want to open a separate bank account for payroll or petty cash, allow for this in the initial structure of the chart of accounts.

When identifying your vendors to the system, you might want to segregate the quick-pay vendors from the 30-day suppliers. A different sequence of numbers identifying both types of vendor to the system would allow you to create checks for one type of vendor without producing checks for both types. *Read* your manual, and set up test data if that helps you become more familiar with system. *Think* about how the software can be used to your best benefit.

### Hardware

Plan where the CRTs will be placed in the accounting department to benefit the persons using them. Ensure that there is enough table space for the CRT, leaving enough room for data and other paperwork that will be used as entry documents. Place the CRT in a position that has a minimum of glare (i.e., not facing a window). You might consider special computer workstations. Make your staff feel like you are taking care of them.

### Conversion

When converting from a manual to a

computerized system, you may consider hiring temporary help. This is especially helpful for setting up your customer and supplier files if your accounting personnel are overworked. When converting an existing computer system to a new system, you may want to convert some existing files to your new systems' files.

Customer and supplier file conversion can be easy and inexpensive, eliminating the data entry on your new system. You should consider entering your financial data manually. The conversion process gives you the advantage of restructuring the general ledger chart of accounts, which may affect your reporting capabilities.

Running parallel with your current accounting system should also be considered, although it is time consuming. The same postings must be made to both the old and new accounting systems to effectively run parallel. Because most properly designed software follows accepted accounting principles, you may find that running parallel only uncovers inconsequential errors about

your current system that would not be discovered otherwise.

## Training

Pre-installation training can get your staff started in a relaxed and positive manner. Typically, it will familiarize users with the requirements for setting up the master file data. Hands-on training is vital—users should get experience with the keyboard before they must enter any critical data.

Once the master files are set up, on-site training should be provided. At this point, users know enough about the system to ask more technical questions of the software supplier. Post-implementation training seminars should be available from your vendor for future employees of your organization.

## Documentation

Make sure you have enough manuals for your users, and make them available immediately after the pre-installation training process. Up-to-date system documentation manuals will answer any questions users may have about

setting up the master files (i.e., chart of accounts, suppliers, customers, etc.). Teach them how to read the manual. Although program-by-program documentation tends to be lengthy, it usually provides a quick reference for a particular program or screen layout. When program modifications are implemented, ensure that the up-to-date reference manuals outline the use of the enhanced software.

Balanced manual records, comprehensive software, and an understanding of both will ensure a successful transition to computerized accounting. Converting with a positive attitude can only achieve positive results.  $\Delta$

*Jane E. Varty has been systems coordinator of Maxon Computer Systems Inc. for eight years. She is responsible for demonstrating Maxon's Accounting and Bookstore packages, implementing customer requests for enhancements to the packages, documenting products for users, and training. She can be reached at 85 Scarsdale Road, Suite 200, Don Mills, Ontario M3B 2R2, Canada; 416/445-4823.*

# Hardware that works



**L**et Essex Computer Service, Inc. conquer your hardware dilemmas. Our problem solving system is built around a complete inventory of Data General equipment and compatible subsystems. We have found Data General products to be among the most reliable and versatile in the computer industry. It is these qualities that enable our configuration specialists to build a system you can rely on.

Every system, peripheral or component part purchased from Essex is thoroughly system tested previous to shipping and carries a full warranty which is backed by our National Product Repair Center. Instal-

lation and maintenance is available through our expert staff of qualified technicians.

We also offer MV computer time and customized programming under RDOS or AOS/VS. Call our office for further details.

Essex Computer Service, Inc. in business to serve you since 1980.

**Essex Computer Service, Inc.**

263 - 267 Cox Street, Roselle, New Jersey 07203

**(201) 245-8300**

Circle 19 on reader service card.

## ALGOMA UNIVERSITY D200/210 EMULATION +

Here at Algoma University we have more IBM PC/XT/AT's connected to our DG system than DG terminals!

Here's why:

A PC is more versatile than a dedicated terminal. Keys may be programmed on the fly to provide single keystroke commands in CLI, SED, CEO, IDEAS, etc. Snapshots of screens may be saved on the PC's disk. A PC makes possible file transfers between the PC's disk drive and DG.

If you desire these capabilities and more, write or phone us today. If you have any ideas that you feel would improve our product, let us know and we'll make every effort to incorporate them into future revisions of our software. As we improve and develop our product, all old customers will receive updates for just the cost of the disk and shipping.

Now for the unbelievably low price of \$99 U.S., you can have D200/210 emulation, programmable keys, file transfer, and dedicated customer support.

So why go any other route?

## ALGOMA UNIVERSITY

Computer Services

1520 Queen St. E.

Sault Ste. Marie,

Ontario, CANADA

P6A 2G4

705-949-2301

Circle 1 on reader service card.

# “TRIM financial and management software gives you the impossible: rich functionality and ease of use.”

Ray Sims, President, Integrated Computer Systems

## It's hard to combine the two?

You bet it is. As you well know, software that does a lot of things well is usually hard to operate, and vice versa. The exciting thing about TRIM is that it gives you both without compromises.

## What do you mean by “rich functionality”?

TRIM, which stands for “Total Resource Information Management,” has the widest range of software applications and capability available on the DG system. The software was designed to meet the demanding needs of companies with multi-faceted financial structures. There are twelve fully integrated modules that cover a range from financial and personnel information to special requirements such as vehicle and equipment management. Features like interactive entry and editing prevents errors and real-time processing and updating, to provide timely and accurate information. This all translates to improved decision making in a business.

## And it's easy to use?

We can install and have it running in six hours. With our formatted screens, HELP and SEARCH functions, the average operator can get up to speed in no time at all. As

a result, DP departments find that they can get more out of their equipment and people without added expense. That's a tribute not only to the design of the software, but also to the quality of the support we provide.

## Tell us about your support services.

Right. A couple of things are important to remember here. First of all, since we are the authors of the software, we can customize a program with ease. Many packages marketed today are not supported by the original authors, making changes to the programs

difficult and expensive. Second, we have been a DG VAR for over 13 years. We know the hardware, how it works, its capabilities. Usually, any problems that arise can be handled with just a phone call. Last but not least, we have been in the business a long time, which gives the customer assurance that we'll be there when we're needed.

## Anything else we should know about TRIM?

When we set out to develop TRIM, we wanted to create as perfect a product as possible. That's why seventy percent of the design came directly from input we sought from our users. We're also the only system around to take full advantage of the architecture of DG's 32 bit MV family of machines. In addition, TRIM is written in ANSI COBOL, utilizing structured coding principles and extensive copy facilities. We're talking real power and flexibility.

## Seeing is believing. Can you arrange a demonstration?

Just give us a call on our toll-free number. We can either set up a demo over phone lines or in person in your office. You really do have to see TRIM work to appreciate the power and potential of the system.

### TRIM Software Modules

General ledger  
Accounts payable  
Accounts receivable  
Investment management  
Payroll  
Personnel/human resource management  
Vehicle/equipment management  
Inventory management  
Purchase order  
Sales processing  
Fixed assets  
Project management

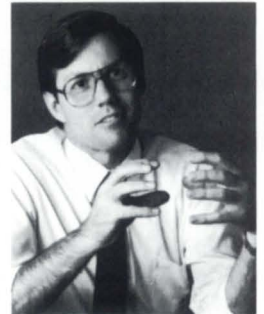
TRIM does a lot of things well, and is easy to use.



The software takes advantage of DG's 32-bit architecture.



You can get more out of your equipment and people at no added expense.



Integrated Computer Systems  
2400 Lakeside Blvd.  
Richardson, TX 75081

1-800-445-2407

**ICS**

# IT'S IN THE MAIL



## Simple mail transfer protocol (SMTP)

by Richard T. Kouzes  
Special to Focus

Many of you have already read my article on networks in the December 1986 issue of *Focus*, so I won't repeat the introduction to simple mail transfer protocol (SMTP), which is a part of the TCP/IP suite of communications protocols. But, just to remind you, I will say a few words about TCP/IP.

First, two follow-up remarks on developments since the last article. I am pleased to say that Data General's TCP/IP became a solid product as of December 1986. It no longer crashes intermittently, and it now functions as one would expect.

Apparently, DECnet connectivity is now a reality on Data General MV machines under AOS/VS. The first of four agents under Ki Research's DECnet communications services is now available. The DECnet agent provides for cooperating tasks on a VAX and DG MV to exchange data using the DECnet protocol suite. For more information contact Ki Research at 301/730-0675.

### TCP/IP: In brief

Transmission Control Protocol/Internet Protocol (TCP/IP) is a standard suite of communications protocols allowing remote logon (TELNET), file transfer (FTP), simple mail transfer (SMTP), and the availability of services for user defined protocols. TCP/IP is widely implemented (it was developed for the Department of Defense for use on ARPANET), and it is the standard network implemented in Berkeley Unix. Data General has a TCP/IP product for both the DG/UX and AOS/VS operating systems.

Under AOS/VS, Data General has the TELNET virtual terminal and file transfer capability, but the simple mail transfer protocol is not implemented. (There are rumors of an SMTP mail product in beta test, however.) Since we needed this capability, I developed my own SMTP, which turned out not to be too difficult once I bought the Department

of Defense specifications for TCP/IP. Fortunately, the Data General manual for TCP/IP gives fairly complete information on how to use the relevant system calls, including a sample program. It would have saved me a lot of typing if they had just included the routines

on the release tape, though I did have to convert their sample C programs into a more sensible language.

### SMTP

The purpose of mail is to send someone a message (or a file) even if you

**Figure 1: MAIL.CLI macro**

```

COMMENT THIS IS THE MODIFIED MAIL MACRO ORIGINALLY FROM THE SYSGEN MANUAL
PUSH

COMMENT /F to fetch back mail sent
[IEQUAL, %0/F%,]
WRITE
DELETE/V/2=IGNORE &
:MAIL:[IEQUAL,%1%,]+[ELSE]<%1-%>[IEND]_FROM_[IUSERNAME]
WRITE
[ELSE]

COMMENT *****THIS IS THE SEND PART OF THE MACRO*****
[IEQUAL,%0/S%,/S]
[IEQUAL,%1%,]
WRITE
WRITE *** NO ADDRESSEE SPECIFIED ***
WRITE
[ELSE]
CLASS2 IGNORE
COMMENT *****THIS WAS CHANGED IN ORDER TO RECOGNIZE NICKNAMES*****
COMMENT *****THIS REQUIRES THAT DIRECTORIES IN UDD HAVE +,R ACL'S*****
COMMENT *****TO PUT BACK TO ORIGINAL, CHANGE ...%1%... TO %1%*****
STRING :MAIL:[IEFILENAME [IPATH:UDD:%1%]]_FROM_[IUSERNAME]

COMMENT /N to send network mail
[IEQUAL,%0/N%,/N]
STRING SMTPMAIL.TMP
DELETE SMTPMAIL.TMP
[ELSE]
CLASS1 IGNORE
[IEQUAL, [FILENAMES :UDD:%1%],]
WRITE This user does not exist or access denied! [IASCII 207]
CLASS1 ERROR

POP
POP
EXIT_THIS_MACRO_VIA_A_FORCED_ERROR
[IEND]
[IEND]
CREATE [ISTRING]
[IEQUAL,%0/N%,/N]
WRITE/L+SMTPMAIL.TMP %1%
[IEND]
PUSH

COMMENT The user types the message in if no filename is given
[IEQUAL,%2%,]
STRING :MAIL:[IPID].MAIL.TMP
DELETE [ISTRING]
WRITE Type in a message. Terminate with a right parenthesis on a&
new line.

CREATE/I [ISTRING]

PROC/BLOCK/OUTPUT=@NULL SPEED/I=CRTOLF [ISTRING]
[ELSE]
STRING %2%
[IEND]

```



# Is down-time toppling your business?



## Don't get shaken, call CRC.

With our new **UPTIME** service, the Data General experts at CRC can guarantee that every part you need for every piece of equipment under contract will be on hand at our headquarters. We can doubly guarantee the fastest possible delivery offering 24 hour service seven days a week. We never close.

As a subscriber to our **UPTIME** service, just call in the replacement parts your system requires and CRC will immediately send these parts to your business. Our average door to door delivery is a mere 6 hours anywhere in the

the U.S.A. All you have to do is send us the malfunctioning parts within 24 hours after you've placed your order!

And if there's a problem with your system that has your own service professionals perplexed, our technical support team has the expertise to walk you through it quickly and accurately.

So whether you're a third party service contractor looking to increase your capabilities without increasing your overhead, or someone who just cannot afford downtime, whatever your business, **UPTIME** is the service you've been waiting for.



*BECAUSE THERE IS NO UPSIDE TO DOWNTIME*

19 NORFOLK AVE., SOUTH EASTON, MA 02375

(617) 238-2090/1-800-225-5615

*A Subsidiary of American Express*

Circle 11 on reader service card

```

WRITE/L=[ISTRING/P]
WRITE/L=[ISTRING/P] *****
WRITE/L=[ISTRING/P] SENT BY [IUSERNAME] AT [ITIME] ON [IDATE]
WRITE/L=[ISTRING/P] *****
COPY/A [ISTRING/P] [ISTRING]
[IEQUAL,%O/K%,]
WRITE/L=[ISTRING/P] *****END OF LETTER*****
[!END]
[IEQUAL,%2%,]
DELETE [ISTRING]
[!END]
POP

COMMENT If /N, proc up the SMTP mailer program
[IEQUAL,%O/N%,/N]
PROC/BLOCK/DEF/IOC SMTPMAIL
DELETE SMTPMAIL.TMP
[!ELSE]
ACL [ISTRING] %1% OWR [IUSERNAME] OWR + OWR
NOTIFY %1%
[!END]
[!END]

[!ELSE]

COMMENT **DONE WITH /S SWITCH SEE IF MAIL, THEN DO /R OR/L OR/D OR /H**
[IEQUAL, [!LOGON],CONSOLE]
STRING ([!FILENAME] &
:MAIL:[IUSERNAME]_FROM_[IEQUAL,%1%,]+[!ELSE]<%1-%>[!END])
[IEQUAL,[ISTRING],]
WRITE You Have No Mail Use MAIL/H for help
[!ELSE]
[IEQUAL,%O/%,]
FILESTATUS/SORT/TLM/LENGTH &
:MAIL:[IUSERNAME]_FROM_[IEQUAL,%1%,]+[!ELSE]<%1-%>[!END]
WRITE
WRITE *** USE "MAIL/R" TO RECEIVE MAIL; MAIL/H FOR HELP ***
WRITE
[!ELSE]

COMMENT /L to print the mail on LPT
[IEQUAL,%O/L%,/L]
LISTFILE @LPT
[!END]

COMMENT /L to print the mail on LQP
[IEQUAL,%O/U%,/U]
LISTFILE @LQP
[!END]

COMMENT /R to read the mail
[IEQUAL,%O/R%,/R]
TYPE%O/L% &
:MAIL:[IUSERNAME]_FROM_[IEQUAL,%1%,]+[!ELSE]<%1-%>[!END]
WRITE%O/L% END OF MAIL
CHARACTERISTICS/OFF/PM
[!END]
[INEQUAL,%O/D%,]
DELETE/V/2=IGNORE &
:MAIL:[IUSERNAME]_FROM_[IEQUAL,%1%,]+[!ELSE]<%1-%>[!END]
[!END]
[!END]
[!END]

COMMENT /H for help
[INEQUAL,%O/H%,]
WRITE MAIL/R Receives Mail
WRITE MAIL/S Sends Mail e.g. MAIL/S RTK or MAIL/S RTK filename
WRITE MAIL/S/N Sends Network Mail e.g. MAIL/S/N RTK@PUPCYC
WRITE MAIL/L/R Receives Mail and Prints It
WRITE MAIL/L/R/U Receives Mail and Prints It Upstairs
WRITE MAIL/D Deletes All Your Mail
WRITE MAIL/F Deletes All Mail You Sent
WRITE MAIL/H Gives Help Information
WRITE For More Info See CLI Manual Page 5-9
[!END]
[!END]
[!END]
[!END]
POP

```

don't have an account or write access to the computer where the recipient has his account. SMTP is a specific protocol for delivering mail over a TCP/IP-based network.

The SMTP I have implemented uses the same MAIL.CLI macro we use for sending and receiving local mail. In addition, there is an SMTPMAILER.PR program that is PROCED by the MAIL.CLI macro whenever mail is being sent out over the network, and an SMTP.PR program PROCED by our UP.CLI macro to receive incoming mail from the network.

## MAIL.CLI

The MAIL.CLI macro we use is basically the one listed in the Sysgen manual. We made a few changes and additions shown in Figure 1.

The first change is near the top, where the macro allows for nicknames to exist in UDD as links to actual usernames. The value of STRING is set to the actual name in UDD using pseudo-macros !FILENAME and !PATH. This requires that all users have +,R ACLS on their directories, which is acceptable in our environment, but maybe not in yours.

The second change is in the middle of the MAIL.CLI macro where the SMTPMAIL.PR program is PROCED when the /N switch is used to indicate network (SMTP) mail.

The third change occurs three lines later where NOTIFY.CLI is invoked. This macro (shown in Figure 2) looks to see if the user given as its argument is logged on any console. If so, it sends a message that new mail is waiting.

These macros could be improved and generalized, but they work well in our environment.

## HOSTS

The :NET directory contains a file called HOSTS that contains the names of all the host machines on our local network. The user will send his mail to one of these machines—or via one of these machines (gateways) to other remote machines. For example, I might send mail from my machine to someone at Los Alamos National Laboratory via one of the Princeton gateways by using the address:

```
@jvncc:mno%XYZ.xnet@lanl.arpa.
```

I do not have to worry about the actual routing, which will send my message through dozens of machines, as

**Figure 2: NOTIFY.CLI macro**

```
COMMENT This macro, in 3 parts, is used to notify a user who is
COMMENT logged onto the system that mail is waiting.

±[EQ,%0/PART2%,/PART2]
DELETE/2=IGNORE/L=JUNK.TMP %1%
NOTIFY/PART3 [JUNK.TMP]
[ELSE]

[EQ,%0/PART3%,/PART3]
[INEQUAL,%2%,]
SEND %2% [IASCII 207] You have new mail waiting [IASCII 207]
[END]
[ELSE]

COMMENT SEE IF ARGUMENT 1 (USERNAME) IS LOGGED ON IF SO SEND A MESSAGE
COMMENT CALLS SELF/PART2 WITH EACH USER:CONSOLENAME
COMMENT THIS CALLS SELF/PART3 WITH WHO RESULT
PUSH
PROMPT POP
NOTIFY/PART2 %1%:CON92,4,5,6,7,8,9,10,11,12,13,14,15,16,18,19,&
20,21,22,23,24)
DELETE/2=IGNORE JUNK.TMP
POP
[END]
[END]
```

long as the first gateway (jvncc) knows about part of the destination (arpa).

The `hosts` file gives the Internet Address (such as 128.112.24.1) corresponding to the more convenient host name (such as pupcyc) that is given as the destination address.

Our MV/10000 is on a local TCP/IP network with several VAX, Ridge, IBM, and Sun computers. In addition, gateway machines provide connections to BITNET, NSFnet and UUCP. The SMTP mail facility gives us a way to send messages to and receive messages from thousands of locations all over the world through these and other interconnected networks.

### SMTPMAIL.PR

When a user tells the `MAIL.CLI` macro that it wants to send network mail, the `SMTPMAIL.PR` program is `PROCD` up and given the destination address and the filename to send. `SMTPMAIL.PR` scans the `HOSTS` file for a match to the first destination machine given. It then follows a fixed sequence of system calls to make the remote connection and transfer the data.

The example given in Data General's TCP/IP manual fortunately shows how to make all the system calls needed for carrying out a TCP/IP conversation. The first subroutine, `CONNECT`, makes four system calls (`?PNAME`, `?ILKUP`, `?GPORT`, and `?CON`) to become a TCP/IP customer. The second subroutine, `NCALL`, makes an active call across the network to the destination using the `?IS.R` system call specifically for the SMTP Network Process Name (NPN)

file connection. The NPN file makes the association between the symbolic name SMTP and the TCP/IP protocol type (025) for SMTP. The `?is.r` system call sends and receives IPC (Inter Process Communications) messages between `SMTPMAIL.PR` and the `TCPIP.PR` process that was initiated when the network was started up.

The third subroutine, `NWRITE`, writes data across the network, and the fourth subroutine, `NREAD`, reads data from the network (both of them use the `?is.r` system call). Finally, the fifth subroutine, `NCLOSE`, uses the `?is.r` system call to close the network connection.

The protocol that `SMTPMAIL.PR` uses to send mail is quite straightforward. After `CONNECT` and `NCALL` make a virtual circuit to the remote destination machine, a dialogue in the form of single lines of ASCII text takes place between the local and remote machines. For example, the dialogue shown below would send mail from my machine (pupcyc) to a user (bob) at another machine (anlphy) over BITNET via a gateway (princeton-gw).

```
Remote sends: "220 SMTP Ready"
Local responds: "HELO SMTP from pupcyc"
Remote responds: "250 Okay"
Local sends: "MAIL FROM:<kouzes@pupcyc>"
Remote responds: "250 Okay"
Local sends: "RCPT TO:
<@princeton-gw:bob@anlphy.bitnet>"
Remote responds: "250 Okay"
Local sends: "DATA"
Remote responds: "250 Okay"
Local sends: (This is where the body of the
message is sent to the remote as a series of lines
```

each terminated by a carriage return and line feed. The message is finally terminated by a line that contains only a period.)

Local sends: "..."

Remote responds: "250 Okay"

As you will note, the first three characters indicate the message content. The dialogue is simple, and error recovery procedures are clearly spelled out in the SMTP standard. A call to the `NCLOSE` subroutine closes the virtual circuit.

Assuming this conversation occurred without errors, the mail message is on its way, and will usually arrive at its destination within a few hours—often within a few minutes. If a gateway cannot deliver the mail within a few days, it is supposed to return it to the sender, but this is not guaranteed. We have found that if we are able to send mail to a destination once, it will always get there. One difficulty we have found is that some gateways are not smart enough yet to decipher some of the destination addresses in use on the network, so we have to wait for some programmer halfway across the country to update his code to handle the evolving network names.

### SMTP.PR

Our `UP.CLI` macro `PROCS` up a program `SMTP.PR` that receives incoming TCP/IP mail. It works very much like `SMTPMAIL.PR`, except it calls the `NACALL` subroutine, which waits for an incoming SMTP packet.

Once `SMTP.PR` has carried out a successful mail dialogue like the one above and written the data to a file, it invokes the `MAIL.CLI` macro to deliver the file to the local user.

### The point

The point of all this isn't just that, given good documentation and strong motivation, you can write an application program based on system services. It is also that at all levels, communications protocols aren't very difficult to understand. They simply consist of a set of rules and procedures. Δ

---

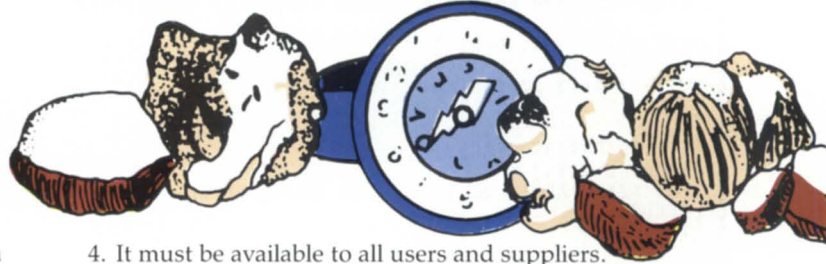
*Dr. Richard T. Kouzes is a research physicist at Princeton University where he conducts research in nuclear physics and instrumentation. He is a member of the IEEE Technical Committee on Computer Applications in Nuclear and Plasma Sciences. He may be reached at Princeton University, Department of Physics, Jadwin Hall, P.O. Box 708, Princeton, NJ 08544; 609/452-4425, or at 0457523@PUCC on BITNET.*

---

# DECODER RINGS AND BIT BUCKETS

## A painless introduction to encryption. Part II

by Tom Gutnick  
Special to Focus



Last month's article described the concepts of substitution and transposition ciphers. This month, I'll talk about how these techniques are used for protecting computer data.

### Encryption today

In the past, ciphers were created with simple algorithms (in its simplest form, it's like kids sending messages with decoder rings). Both the algorithms and long keys had to be kept secret if information was to be kept secure. Today, thanks to computers, the philosophy has reversed: the algorithms themselves are so complex that it isn't necessary to keep them secret, nor do the keys have to be long. If the key itself is kept secret, a cryptanalyst doesn't have much chance of successfully deciphering information.

Nowadays, the most widely used encryption scheme for data processing equipment is the Data Encryption Standard (DES). The National Bureau of Standards (NBS) started the search for a suitable encryption scheme in 1972. They wanted an algorithm meeting the following criteria:

1. It must provide a high level of security.
2. It must be completely specified and easy to understand.
3. Its security must not depend on secrecy of the algorithm.

4. It must be available to all users and suppliers.
5. It must be adaptable for use in diverse applications.
6. It must be economical to implement in electronic devices and be efficient to use.
7. It must be amenable to validation.
8. It must be exportable.

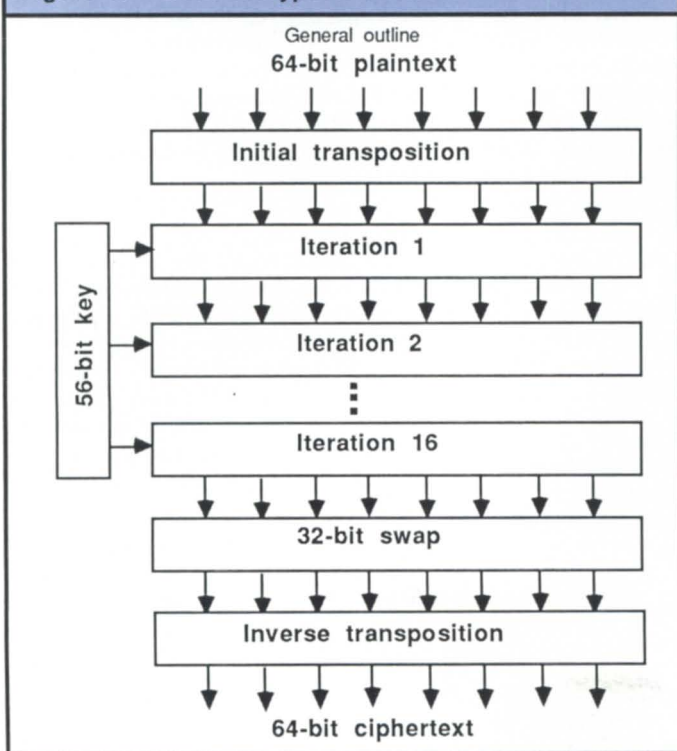
The most promising scheme was one submitted by IBM. In the early 1970s, IBM developed the Lucifer cipher for use in automatic bank teller machines. It was based on a 128-bit data block encrypted with a 128-bit key.

NBS submitted IBM's algorithm to the National Security Agency (NSA) for technical analysis. (The National Security Agency, sometimes called the Puzzle Palace, is where our government's codes are developed, and where other governments' codes are cracked.) NSA recommended that the algorithm be modified to encrypt a 64-bit block with a 56-bit key. (More about that later.)

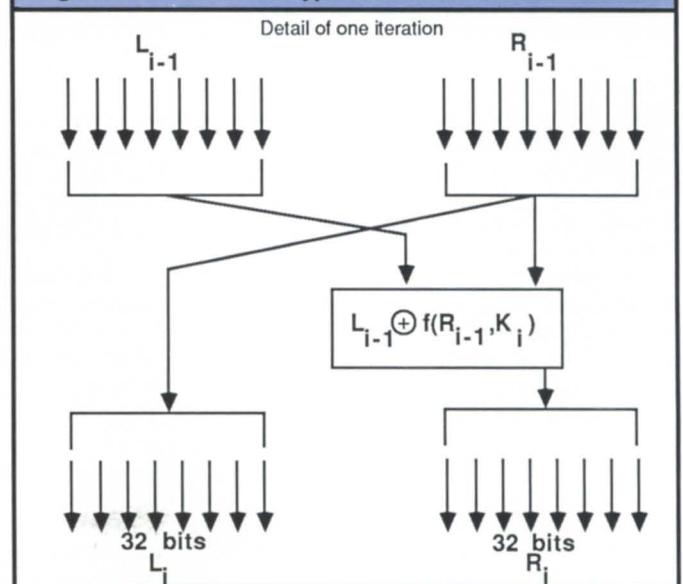
IBM agreed to grant nonexclusive, royalty-free licenses for the manufacture or sale of DES devices in the United States. In November 1976, the Data Encryption Standard was formally adopted by NBS, as a Federal Information Processing Standard. As it turned out, the first seven of NBS's criteria were met. (More on that later, too.)

The algorithm for the Data Encryption Standard basically combines S-boxes and P-boxes, resulting in both substitutions and transpositions. Figure 1 shows the basic processing involved in DES encryption, while Figure 2 shows what goes on in each of 16 iterations.

**Figure 1: Data encryption standard**



**Figure 2: Data encryption**



During the DES encryption process, blocks of 64 bits are processed and encrypted with a 56-bit key. Decryption is accomplished by using an inverse algorithm, but with the same key. (Thus, DES is known as a symmetric cipher.) Since the algorithm has been published and is public knowledge, the secrecy of DES-encrypted information depends on the secrecy of the key. Fortunately, with 56-bit keys, there are theoretically over 72 quadrillion possible key combinations, and anybody trying to guess a key with brute-force techniques (trying every possible combination) could expect, on average, to have to make 36 quadrillion tries!

Unfortunately, human nature being what it is, keys are usually taken from the printable ASCII character set, and selected to be easily remembered. Take all the words from a dictionary (the American Heritage Dictionary used by CEO has about 74,000 entries), add in all the possible combinations of three initials and the common first and last names from a phone book, and you will have well under a million likely keys—making brute-force techniques much more feasible.

As noted above, if you use an insecure key for DES encryption (or any other form of encryption, for that matter), your data is not secure, either. But the use of DES has been marred by other controversies, as well.

The brute-force technique requires extensive computing power. If a system takes 100 milliseconds per attempt, it would take 228 million years to test all possible keys. Even if we can get it down to 5 microseconds per key, it would still take over 11,000 years. But some people project that within a few years it will be possible to build a monster machine with one million DES chips. Such a machine would be able to do an average search in only 10 hours; the machine could cost something on the order of \$20–200 million.

Another issue concerns the S-boxes contained in the algorithm. With suitable values for the S-boxes, it is possible to weaken the security of the encipherment, while at the same time concealing to some extent the weak S-box structure. Has this been done? If the design criteria used by IBM and NBS had been published, this would not be an issue. But NSA asked that the criteria be withheld—the algorithm's designers came across principles of cryptographic design that NSA considered to be of importance to national security.

Suspicious also abound concerning the use of the 56-bit

key instead of the original 128-bit key. Presumably, the NSA doesn't want anybody sending messages that they can't read, so many assume that NSA already has sufficient computing power to decipher messages encrypted with the 56-bit key, but not with the 128-bit key.

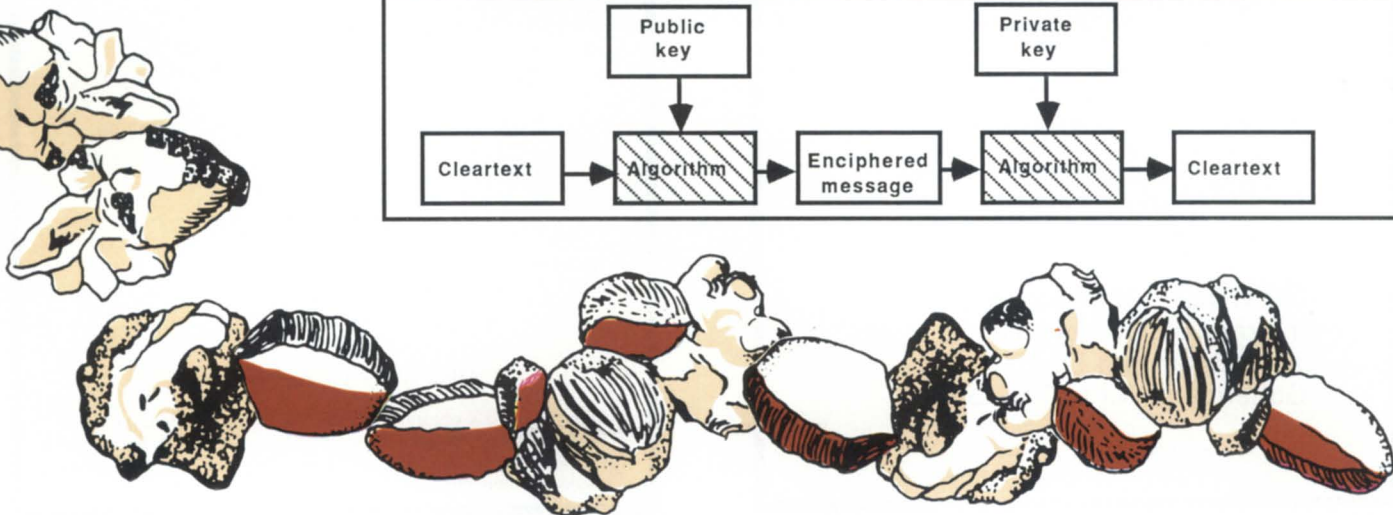
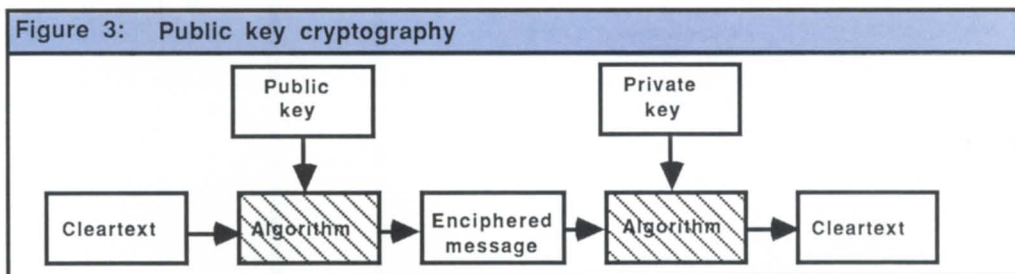
To add more confusion to the issue, last summer NSA announced that it will not re-certify DES when it is reviewed in January 1988. According to NSA, the use of the DES algorithm for sensitive applications has made it an attractive target for U.S. adversaries. NSA, which historically has been responsible for creating the codes and ciphers used by the U.S. government, will provide secret algorithms of their own design for U.S. commercial use (meaning that they will be able to read the messages encrypted).

So what's the best way to implement DES encryption? Software is inexpensive—a good programmer can probably write the code in a day—but it's slow. One test I saw under AOS/VS ran encryption at about 300 characters per second. By contrast, hardware implementations can encrypt fast enough to keep up with a 9600 baud (or faster) communications link. A multiple-chip set from Fairchild can encrypt or decrypt at 1.6 megabytes per second. Several semiconductor manufacturers make chips for DES, and a number of vendors now provide boxes (some built into modems) for DES.

### Public key cryptography

One of the big problems of using DES is the management of the keys: both the sender and the recipient of a message (or at least their encryption devices at each end) must know the key—the key which must be kept secret if the information is not to be compromised. If I want to change my key, how do I let you know the new one without anybody else finding out?

An area in which a lot of research has been going on is public key cryptography. The general idea is that every user has two keys: a public key, which is published in a directory to be used by anybody encrypting a message to that user; and a private key, known only to that user for decrypting the message. Thus, only one person knows the key which needs to be kept secret. (Since the encryption and decryption routines are identical, but the keys are different, this is known as an asymmetric cipher.) Figure 3 shows this.



Assume that Big Bucks Bank needs to send a message to Small Savings & Loan. Big Bucks Bank goes to its directory (similar to a phone book) to get Small S&L's public key, and encrypts the message. Small S&L uses their private key, known only them, to decrypt the message.

One nice feature of public key cryptography is its ability to send a verifiable signature. In the example shown in Figure 4, Big Bucks Bank needs to ask Small S&L to transfer \$5 million, which Small S&L obviously doesn't want to do without some assurance that the request is genuine. Big Bucks starts by encrypting a "signature" (such as a pre-arranged identification code, concatenated with the current date and time) with their private key. Then, the encrypted key plus the message itself are encrypted using Small S&L's public key.

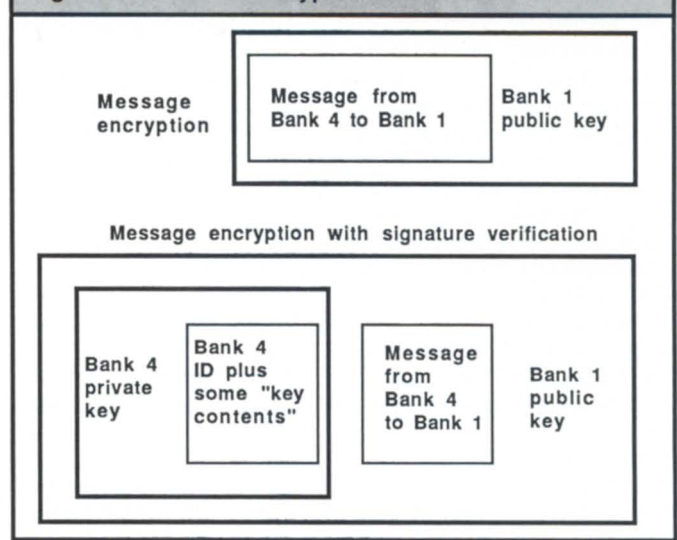
When Small S&L decrypts the message, using their private key, they end up with a plaintext message requesting the transfer of some money, along with the encrypted signature. Remember that the signature, if it is valid, was encrypted with Big Bucks' private key. If decrypting the signature with Big Bucks' public key gives the expected results, we know that it had to have been encrypted by Big Bucks, and nobody else.

### AOS/VS encryption facilities

In AOS/VS rev 6.0, a password encryption facility was added for use by application software; EXEC began using the facility in rev 7.50.

The password encryption facility is available via the

**Figure 4: Public encryption**



?PWDCRYP system call. Using DES, ?PWDCRYP encrypts a password of up to 32 bytes, using the password as its own encryption key. Why? Well, if we used a constant key, anybody with access to operating system source code would be able to figure out how to decrypt any password. (Instead, we have a

*(continued on page 58)*

## SUPERIOR SOFTWARE SERVICES from INFODEX

### SYSTEMS

- 16-Bit to 32-Bit Macro Assembler Conversions
- RDOS to AOS & AOS/VS
- Migration to and from Data General

### APPLICATIONS

- Communications
- Design & Implementation
- Real Time and/or Process Control Programming

### SUPPORT

- Facilities Management
- Documentation and Software Maintenance

**Call us today at  
(201) 662-7020**

**INFODEX Incorporated**  
Information Systems Consultants  
7000 Boulevard East  
Guttenberg, NJ 07093-4808

(Note: INFODEX Incorporated is a "software only" firm. We are not an OEM, nor do we sell hardware.)

Circle 23 on reader service card.

## \$24.95 Test Protect your software products with new, improved MACROLOCK™

Send us your blank tape and a check for \$24.95 and receive a demonstration copy of the new MACROLOCK utility for protecting all your proprietary programs running under AOS and AOS/VS. You'll find MACROLOCK is easy, fast and comprehensive.

### Consider these features:

- not a hardware device
- 1 copy protects all
- does not affect disk structure
- allows "date-locks" for license expiration on renewable software
- unlocks by password

### See it in action!

Mail to: **INFODEX Incorporated**  
7000 Boulevard East  
Guttenberg, NJ 07093-4808  
(201) 662-7020

*Allow seven days for delivery.*

Other INFODEX products: Filemax for RDOS/ICOBOL tells you when its time to reorganize your file. Automax establishes set up for running your RDOS/ICOBOL reorganization. Creates a command file dialogue.

Circle 24 on reader service card.

# IF WE LISTED EVERYTHING WE HAVE, THIS AD WOULD GO ON FOR PAGES.

What good is a DG equipment dealer if they haven't got a huge selection of new and pre-owned equipment? Data Investors Corporation has made a point of getting every possible model they can, so you won't have to go hunting. Furthermore, each machine is thoroughly tested before shipment, and is guaranteed to be eligible for Data General service contract. Call Data Investors to buy, or to sell, any kind of DG equipment on the market. Our selection just gets bigger and bigger.

## NOW IN STOCK

### MEMORIES

8871	8MB MV/4000/10000	.....	\$12,900
8708	2MB MV/8000	.....	2,500
8755	1MB S/140	.....	3,500
8716	1MB C/150	.....	2,500
8754	512KB S/140	.....	2,500
8687	256KB S/140	.....	.650
8387	256KB NOVA/4	.....	.500
8656	256KB ECLIPSE	.....	.395
8637	64KB ECLIPSE	.....	.195
8547	64KB NOVA/3	.....	.325

### TERMINALS & PRINTERS

D-214, D-215, D-411, D-461, D-470C	.....	CALL
D-210, D-211, D-410, D-460, USED	.....	CALL
6130 D-400	.....	\$.395
4364 600 BAND D.C.S./S	.....	5,900
4327 300 BAND D.C.S./S	.....	2,900
4215 600 LPM D.C.S./S	.....	2,900
6074 180 CPS LP-2	.....	.395
6190 180 CPS LP-2	.....	.495
4221 DESKTOP PRINT CTRL	.....	.400
005-8096 D.C. CONTROLLER	.....	1,100
NEC 7725 55CPS SPINWRITER	.....	.850
GE TERMINET 510 300 LPM RS-232	.....	.750
OKIDATA PRINTERS NEW	.....	CALL

### DISK DRIVES & MAG TAPES

6239	592MB ARGUS S/S	.....	CALL
6236	354MB ARGUS S/S	.....	\$14,500
6161	147MB WINCHESTER S/S	.....	7,500
6160	73MB WINCHESTER S/S	.....	4,700
6234	50MB WINCHESTER S/S	.....	3,500
6122	277MB DISK S/S	.....	4,900
6061	192MB DISK S/S	.....	2,500
6060	96MB DISK S/S	.....	1,195
6070	20MB DISK S/S	.....	.800
6045	10MB DISK S/S	.....	.800
6100	25MB WINCHESTER W/1.28	.....	1,200

6103	25MB WINCHESTER S/S	.....	.800
6026	DUAL MAG TAPE S/S	.....	3,700
6125	1600 STREAMER S/S	.....	1,295
6021	MAG TAPE S/S	.....	.850
6123	MICRO STREAMER	.....	2,600
6270	DESKTOP CARTRIDGE TAPE	.....	1,200

### COMMUNICATIONS

4358	IAC-16	.....	\$4,400
4367	IAC-8	.....	3,000
4380	ISC-2	.....	1,850
4340	AMI-8	.....	.395
4257	ALM-16	.....	.495
4255	ALM-8	.....	.95
4254	DCU-200	.....	.395
4250	DCU-50	.....	.395
4241	ULM-5 4-LINES ASYNC	.....	.150
4242	ULM-5 1 LINE SYNC	.....	.150
4233	ULM-5 4-LINES WITH SYNC	.....	.225
4240	IPB	.....	.500
5898	MCA STAR	.....	CALL
4206	MCA NO CABLES	.....	.850
4345	SLM MOD 2	.....	.295
4463Z	USAM-4	.....	.750

### SYSTEMS & PROCESSORS

9780I	MV/8000 MOD-2 PACKAGE	.....	CALL
90199	MV/4000 2MB, DMT, 345 MB	.....	CALL
8678V	S/140 ECLIPSE 1MB	.....	\$ 495
8678N	S/140 ECLIPSE 256KB	.....	1,695
8732R	S/120 ECLIPSE 512KB	.....	2,900
8633	C/350 ECLIPSE 2MB	.....	4,900
8622V	C/150 ECLIPSE 1MB	.....	1,900
91297	DESKTOP 10/SP 256KB, 15MB	.....	4,300
8395N	NOVA 4X 256KB 16 SLOT	.....	1,295
8392H	NOVA 4X 256KB 5 SLOT	.....	.895
8390H	NOVA 4C 64KB 5 SLOT	.....	.395
221X	DG/One	.....	CALL

**CALL FOR OTHER UNLISTED EQUIPMENT ON SALE**

## SUPER SALE

91357-A MV/2000, 4MB, 160MB DISK, 28 LINES, TAPE	.....	\$23,500
9600 MV/8000 WITH 2MB	.....	7,800
8765 2MB MV/4000/10000	.....	
6168 D-210 CRT	.....	2,500
6108 D-200 CRT	.....	.395
4342 ATI-16 WITH EIA DB	.....	.175
	.....	1,395

**DESKTOPS, NEW IN STOCK  
20% OFF LIST**

## DATA INVESTORS CORPORATION

6 West 18th Street  
New York, NY 10011  
(212) 675-1000

## STRINGING THEM ALONG

*It's not easy to do string-handling in ICOBOL,  
but it's worth the trouble*

### Major mistake department

Well, I have just committed my first serious mistake—at least, the first that anyone has told me about. In my column, "Vive la dif," I wrote that vectors were the number of records and tuples were the number of fields. It is the other way around. I read the manual backward.

You may be asking yourself, "How could that happen? Doesn't he even test these programs?" That's the same thing I asked myself when a reader called and said that his manual didn't agree with my article. Except in this case, not only did I test the program, I use the program—frequently. I looked at the program to check the code, and sure enough, it's the opposite of what the manual says. I ran the program, sent it to Lotus and . . . the .WK1 file turned out perfect.

Is this a case of Tim Boyer being right and the rest of the world being wrong? Nah. The rest of the world isn't wrong nearly as often as it was when I was in high school. It just turns out that Lotus doesn't care. I reversed the fields, tried again, and the files matched. I eliminated the fields, and the resulting files still matched. Lotus just ignores the vectors and tuples fields.

The bottom line is that I screwed up—but it doesn't matter. Your programs will work anyway, at least on Lotus. I have no idea about other programs, so reverse the vectors and tuples fields and your DIF program will work just fine. But enough mea culpas—on to the ICOBOL stuff.

Last month was our yearly audit, and it went like most audits—lots of parties and festivities with much goodwill among all. This year's audit was particularly onerous because the person who has done the physical inventory count with me for the last

seven years quit, and her replacement wasn't quite up to speed, yet.

When the people who count tires bring the completed sheets to the office, the tens of thousands of tires written up on these sheets have to be coded and keypunched. Key punching is not much of a problem—coding is. A particular tire may be written up as an "Industrial." Well, we've got "Industrial Lugs," "Industrial Rib," "Industrial Highway," "Industrial N.D.T.," and so on.

In order to make life a little easier for the new person, I decided to write a string-handling program in ICOBOL. This way, she could enter a string, and the program would bring up any tire in the item file that contained that string. Trivial problem on a microcomputer, right? All you need to do is fire up BASIC or Turbo Pascal and do an INSTR command. Not so easy in ICOBOL, however.

I couldn't just truncate the item description and compare it to the string, because if "Lug" were entered, the program would ignore "Industrial Lug"—which is one of the tires that needs to be found. Even worse, a tire might be written up as an "NDT," but be listed in the item file as an "N.D.T." In this case, I needed the ICOBOL equivalent of the RDOS command LIST -N-D-T.

Here is the general flow of things. First, we have to accept the string to be searched for. The data item looks like this:

```
01 WS-STRING.  
03 SEARCH-STRING OCCURS 30 TIMES  
PIC X(1).
```

and we want to ACCEPT WS-STRING. Then, all the program will do is run through this string and do an INSPECT for each character. Simple enough—but there are a few pitfalls.

The first problem is to find the length of the search string, in order to cut down on the number of times we have to search the item description. After all, if you're searching for "NDT," you don't want to continue the search for a full 30 characters.

If we restrict ourselves to a string with no imbedded spaces, then all you would need is an INSPECT FOR CHARACTERS BEFORE INITIAL SPACE. I see no reason for this restriction. We can't use an INSPECT FOR ALL CHARACTERS statement because this will return "30" every time, so we have to go about this backward! Start at the end of the string, and go back until you find a nonblank character.

```
PERFORM P-DUMMY VARYING STRING-LENGTH  
FROM 30 BY -1 UNTIL STRING-LENGTH (1  
OR SEARCH-STRING(STRING-LENGTH) NOT  
= SPACES.  
P-DUMMY.
```

\* A PROCEDURE WITH ABSOLUTELY  
NOTHING IN IT \*

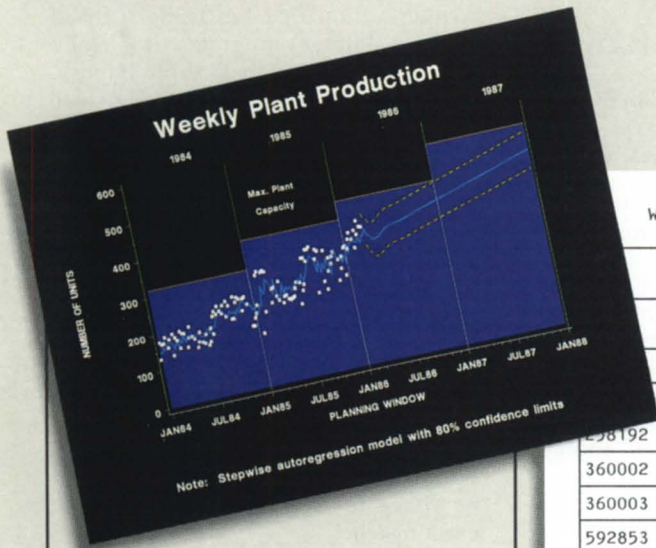
This will result in the length of the string in the variable STRING-LENGTH. It doesn't allow for trailing blanks—I have to draw the line somewhere. Then, use a PERFORM to run through the string, like this:

```
READ-A-RECORD.  
READ INVENTORY-ITEM-FILE NEXT  
RECORD.  
IF INVENTORY-ITEM-FILE-STATUS =  
AT-END  
GO TO END-OF-PROGRAM.  
  
PERFORM INSPECT-ITEM VARYING SEARCH-  
INDEX  
FROM 2 BY 1 UNTIL  
SEARCH-INDEX LENGTH-OF-STRING.  
  
IF TALLY ZERO  
DISPLAY DISPLAY-THE-LINE.
```



# The SAS<sup>®</sup> System

## The Data Analysis Tool You Won't Outgrow.



Warehouse Inventory Report - 16JAN87

	Quantity on Hand	Quantity on Order	Projected Reorder Date
	123980	10000	THU, FEB 12, 87
	89450	5000	FRI, FEB 20, 87
	258192	1000	MON, MAR 30, 87
	360002	8585	TUE, FEB 10, 87
	360003	15985	TUE, FEB 10, 87
	592853	469120	WED, FEB 18, 87

For details, send us your name and address. Or call a Software Sales Representative today.

**The SAS System. It's the most widely installed tool for data analysis among VMS users\*... And more.**

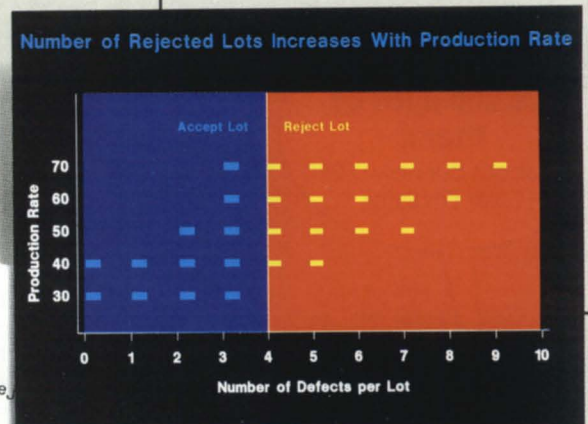
If your job demands a powerful data analysis tool, the SAS<sup>®</sup> System is your solution. The SAS System gives you ready-to-use procedures for performing every kind of analysis—from simple descriptive statistics to advanced regression, analysis of variance, discriminant analysis, clustering, scoring, and more.

The SAS System reads data in any structure from any kind of file. You can create new variables, modify old ones, combine files, detect errors, and accumulate totals. Once your analysis is complete, you can report your results in lists, tables, charts, or plots.

And as your needs grow, the SAS System grows with you. All the tools you need for color graphics, forecasting, modeling, "what if" analysis, project management, optimization, and quality control are available in the SAS System. You choose the products you need, and enjoy the same easy-to-use language and syntax in each. Plus, you can use the same software on your personal computer.



SAS Institute Inc.  
Box 8000 □ SAS Circle  
Cary, NC 27511-8000  
(919) 467-8000  
Fax (919) 469-3737



\* Computer Intelligence, January 1986.

The SAS System runs on these minicomputers: Digital Equipment Corp. VAX<sup>™</sup> 8xxx and 11/7xx series under VMS<sup>™</sup> and MicroVAX II<sup>™</sup> under MicroVMS<sup>™</sup>; Prime Computer, Inc. Prime 50 series under PRIMOS<sup>®</sup>; and Data General Corp. ECLIPSE<sup>®</sup> MV series under AOS/V5. The SAS System also runs on IBM 370/30xx/43xx and compatible machines under OS, CMS, DOS/VSE, SSS, and ICCF; IBM XT/370 and AT/370 under VM/PC; and IBM PC XT and PC AT under PC DOS. Not all products are available for all operating systems.

SAS is the registered trademark of SAS Institute Inc., Cary, NC, USA. Copyright © 1986 by SAS Institute Inc. Printed in the USA.

Production Rate

Rate	Lots Tested	Lowest	Highest	Mean	Percent
30	4	1	4	2.5	0
40	6	1	6	3.5	33
50	6	3	8	5.5	66
60	6	4	9	6.5	83
70	7	4	10	7.0	85

Rejected Lot Statistics

# FINALLY!!!

an  
**ORACLE  
TEMPLATE**

for your  
**DG Terminal**

Quality Laminated  
\$9.95 plus shipping

**parsystems**  
INC.

West Mall Office Plaza · 845 Central Avenue  
Albany, NY 12206 · (518) 438-3886

Circle 34 on reader service card.

## FOR IBM PC'S

**Why is the  
fastest D200 terminal  
emulator also the  
cheapest?**

**Because  
we sell a lot of  
them!**

Ask about our new D-220  
Color Emulator.

Rhitek's  
**EMU**<sup>®</sup>  
Discounted  
USA Price: \$95.



**Rhitek, Inc.**  
P.O. Box 220  
Columbia, MD 21045  
301-730-2575

Circle 38 on reader service card.

## INSIDE ICOBOL

GO TO READ-A-RECORD.

INSPECT-ITEM.

MOVE ZERO TO TALLY.

INSPECT ITEM-DESC-LINE-1  
TALLYING TALLY FOR ALL

SEARCH-STRING(SEARCH-INDEX)

AFTER INITIAL

SEARCH-STRING(SEARCH-INDEX-1).

IF TALLY = ZERO

MOVE 30 TO SEARCH-INDEX.

Say, for example, that you were trying to find the string "Rib Tread," and the description of the first item that you read is "Industrial Lug." The first time through, *INSPECT* finds an "I" after the initial "R." The next time, there is no "B" after the initial "I," so the index would be set to 31, the *PERFORM* would stop, the *TALLY* is zero, and the program would go back to read another record.

Ah, but there's a problem. If my string was "NDT" and I ran into a "Denman Traction Loader," it would display the tire. Why? Well, there's a "D" after the initial "N," but where's the "T" after the "D"? These bloody computers. They just do what they're told. What we want to say is, "Find the 'D' after the initial 'N,' and then, starting from that point, find a 'T.'"

That's not what's happening. The computer finds the "T" in "Traction" after the "D" in "Denman"—not what we wanted at all. What we need is an instruction that tells the computer to ignore the characters that it has already skipped over. Easy enough:

INSPECT WS-DESC-LINE-1

TALLYING TALLY FOR ALL

SEARCH-STRING(SEARCH-INDEX)

AFTER INITIAL

SEARCH-STRING(SEARCH-INDEX-1)

REPLACING CHARACTERS BY SPACE

BEFORE INITIAL SEARCH-STRING (SEARCH-INDEX).

This will move spaces to the characters skipped over each time, and make the search work just fine. You may notice that I am inspecting *WS-DESC-LINE-1* instead of *ITEM-DESC-LINE-1*. Like everyone else, I tend to use old programs to make up new ones. More than once, I have taken an old program, made the file I-O instead of *INPUT*, rewrote, and found out that somewhere deep in the code I had a statement left over from the old program that does something like *MULTIPLY 1000 BY ITEM-PRICE*.

I've made it a policy never to change live fields—even if the file is opened in-put. Move the field to a dummy field, and perform the operation on the dummy field—you'll sleep better at night. Now that I have this routine written, I find that I'm using it in all kinds of different programs. It is really handy for our A/R history file inquiry.

We tend to sell to a relatively small number of accounts and then ship to their customers—of which there may be thousands. So, while it's an easy task to find a particular bill-to, it can be mind-numbing to look through the whole file for a ship-to. To make matters worse, none of our salespeople use the correct ship-to name. If we make a shipment to Frederick and Irving's Four Wheel Drive Off Road Center, Inc., a salesperson will come in and ask when was the last time that we shipped to Fred and Irv's. With this program, I can bring up anything that matches, and not have to worry about it being an exact match.

The routine is also handy to use with our personnel file. The person that everyone knows as Ben Jones may be in the file as Benedict T. Jones, Jr. And who would ever guess that Bert Santell's real name is Umberto?

**But now for the big question.** How much time are all of these *INSPECT* loops going to take? After all, you've got a potential of 30 *PERFORM* statements, each doing an *INSPECT REPLACING*. That's going to slow the system down. A program like this isn't going to do any good if it takes longer to find the item on the computer than to look it up on paper.

So, I ran some timing tests on our item file. I ran through the 1,700 record file looking for a string 12-bytes long. In the first program, all I did was read the records. This took 35 seconds. In the second program, I did the search and display. It took a total of 39 seconds, and I found 23 matches. Your penalty for all of this string manipulation is 4 seconds in a 1,700 record file. Not too shabby, ICOBOL! Believe me, it's better than searching through an 80-page inventory report.  $\Delta$

*Tim Boyer is EDP Manager at Denman Tire Corp. and president of the Northern Ohio Data General Users Association. He may be reached at P.O. Box 951, Warren, OH 44482; 216/898-2711 or on the NADGUG bulletin board at 415/924-3652.*

# There's More Than One Way to Find Information

## **DATALIB**

### The System That Finds It *Your* Way

Plenty of companies are out to sell you their way of managing your records. But only one system invites you to do it *your* way: **DATALIB**.

We'll help you design your own data base... materials you'll want to search, what they'll look like and how you'll find them. What's more, with full Boolean logic, you'll find what you're looking for.

But the ability to customize your record formats is just one advantage that has led government agencies and Fortune 500 companies to **DATALIB**.

A client recently told us that **DATALIB** is "the only system that does everything I want it to do."

It handles acquisitions, cataloging, on-line retrieval, circulation, serials and more.

As for help when you need it, **DATALIB** comes with its own hotline answered by computer/library professionals. So, when you're looking for the right

information system to fit your library's needs, remember this: There's only one you'll find to your liking in every way...because there's only one that does it your way: **DATALIB**.

For more information, call us at 800-843-4850 or (301) 984-3636.

## **CENTEL**

**Sigma Data Services Corporation**

**A Subsidiary of  
Centel Business Information Systems  
12730 Twinbrook Parkway  
Rockville, Maryland 20852**

Yes, I'd like to find out more about how **DATALIB** can help me manage my information center.

- Please send me more information.  
 Please have an Information Specialist call me.

## **DATALIB**

Name \_\_\_\_\_

Title \_\_\_\_\_

Organization \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_

Number of volumes/titles \_\_\_\_\_

## SORRY, I CAN'T LET YOU DO THAT!



### Restricting program use to certain directories

This marks the beginning of the second year of my "AOS/VS Tricks" column. If you've implemented all of them, you now have interactive application programs with pop-up CLI everywhere, ^C interrupt sequences, minimally unique switches, write-ring detection, fast character translation, program revision lookup, and batch-mode detection. But now your programs won't run on anything except AOS{/VS}. Who cares! Let them write their own tricks. Stay tuned for more . . .

System performance tuning often involves playing around with priorities and process types. Another way to improve system performance is to balance the workload for each physical disk in your system and to match disk performance with the requirements of the application. You don't want a program that creates and uses large data bases or other disk files to run on the same physical disk as users who are editing and compiling because it will slow down the product development cycle. Similarly, you want to keep your system LDU as clear as possible for system paging and swapping. (See what happens when you run a 20 MB program with only 10 MB of disk space on your system disk.)

One way to place users on different disks is to create LNK entries in :UDD. For example, you can put user SMITH on a disk other than your system disk by creating a link entry in :UDD to :DISK2.

Figure 1: subroutine GET\_DIRECTORY

```

subroutine GET_DIRECTORY(directory,l_directory)

include          "qsym.f77.in"  !system call stuff
character*(*)   directory
integer         l_directory
integer*4       ac0,ac1,ac2,ier
integer*4       isys           !fortran 77 intrinsic

c>>>begin
ac0=byteaddr("=")             !current directory
ac1=byteaddr(directory)      !b.a. of buffer
ac2=len(directory)           !length of buffer
ier=isys(?gname,ac0,ac1,ac2)
if(ier.ne.0) then
call errcode(ier,0)          !list error, continue
l_directory=0
else
l_directory=ac2              !excluding null
end if
return
end
    
```

```

) SUPERUSER ON
*) DIR :UDD
*) RENAME SMITH XXX
*) CREATE/LINK SMITH :DISK2
*) MOVE SMITH XXX:#
*) ACL SMITH SMITH,OWARE
*) DEL XXX
    
```

where DISK2 is INITIALIZED in the system's UP macro.

Now you have put certain heavy disk users or accounts on their own private disk pack. These people will be using application programs that create and manipulate large files. Perhaps they will run a program that reads many tapes and creates a large data base on disk.

One day, you notice your system disk is running very slowly, and that your

available disk space has dropped by about 30 MB. (This actually happened on my system.) Checking around, you discover that someone has run *that* program and copied 20 tapes to disk in the wrong account (and the wrong physical disk). The files must now be MOVED and DELETED. If that person doesn't have write access to the destination directory for MOVE, the files must be DUMPED to tape and RELOADED in the correct directory. Another possibility is to DELETE the files and start all over again.

(By the way, don't you wish the CLI RENAME command would accept pathnames so it could MOVE files from one directory to another?)

To ensure that this doesn't happen again, you decide to write a macro as a

front-end to the program: it will check the [!USERNAME] or current [!DIRECTORY] before starting the program. Access to the macro and/or program can also be controlled by the ACL, but this may not be practical; the ACL list will get a bit long if you only need to deny the use of the program to one or two users. In addition, it is easy to bypass the macro and just execute the program directly.

*Let's fix this once and for all. As I have said before, "Nothing replaces a macro better than hard code"*

If the program has been "hidden" in a directory that is not on the current searchlist, the pathname can be obtained by examining the macro. The subversion may not be deliberate: a new employee may not know to use the macro, and a novice user often doesn't realize the importance of using subdirectories to group or contain files belonging to each project. Perhaps the user thinks there is a valid reason for bypassing the front-end (only to regret later not trusting the infinite wisdom of the program developer). I'm not particularly fond of front-end macros for programs because it means the program actually exists in two pieces; I prefer each .PR file to stand alone.

Let's fix this once and for all. As I have said before, "Nothing replaces a macro better than hard code." All you have to do is look up the name of the current directory, and if it is not correct, terminate the program with an error message or instruction. Depending on the application, there may be several cases to consider. For example, in order to run a particular program you may require the current directory to be:

1. any directory but :UDD:SPECIAL-PROJECTS
2. :UDD:SPECIALPROJECTS
3. :UDD:SPECIALPROJECTS:PROJECT\_XYZ
4. any subdirectory in :UDD:SPECIAL-PROJECTS.

# Three Easy Steps To Improve System Performance

1. Insert MVM1 Memory Board
2. Turn On Power
3. Save \$20,000+

## MEMORY CONTENTION: A PAINLESS CURE

The price of speeding up has just gone down. Introducing the MVM1 memory for DG's MV4000, MV10000 & S/280, available at prices 60-70% less than comparable DG Memory.

## TEST THE SOLUTION BEFORE YOU PAY

We're experts on every aspect of your DG minicomputer because we've specialized exclusively in DG equipment for the past decade. We'll work with you to identify your specific problem areas and find the best solution. In fact, in most cases we insist that you evaluate the effects of adding memory to your system *before* paying a single penny.

## EASY INSTALLATION

Unlike other memory boards, no hardware reconfiguration or software modifications are necessary. We have a comprehensive Technical Guide with numerous diagrams and a customer service Hotline number.

## MAINTENANCE FEES ELIMINATED

The MVM1 requires no maintenance, which eliminates the added expense of a service contract. If service is ever needed, we'll ship you a replacement unit within 24 hours of contact, free of charge. We even give you a choice of the type of warranty plan you'd prefer, ranging from two years to a lifetime.

## SIMPLIFIES SYSTEM MAINTENANCE

The MVM1 won't alter your present service contract in any way and is designed to assist in the isolation of hardware problems with an enable/disable switch.

Choose from the standard  
2, 4 and 8 MB versions  
and

## INTRODUCING THE FIRST 6 MB VERSION

Buy or lease today and see why DG users like G.E. and the U.S. Navy chose the MVM1 Memory.

**Computer  
Technology  
Inc.**



**(714) 538-2344  
FAX 714-538-0329**

1442 W. Collins, Orange, CA 92667

® Registered Trademarks of Data General Corp.

Sometimes you want to restrict a program from certain directories, and sometimes you want to force a program to be run only in a certain directory. For example, you may require a program that reads many tapes and creates a large data base to execute in :UDD:SPE-

CIALPROJECTS and in a subdirectory of that directory (i.e. the name of the project).

If the current directory name does not begin with :UDD:SPECIALPROJECTS, then tell the user to log on the correct account. If the account is correct, then

check that the directory name contains a subdirectory and, assuming that any subdirectory is allowed, continue the program. If a special subdirectory is required, perhaps use :UDD:SPECIALPROJECTS:MONTH using the name of the current month.

Then you can compare the subdirectory name to the month obtained from the system clock. If it does not agree, you can terminate on an error or set the current directory to the appropriate subdirectory. Wherever possible, you should change the current directory within the program rather than terminate on an error; this will make the program easier to use and a little bit friendlier.

You will need two routines to manipulate these directory names: GET\_DIRECTORY (Figure 1) and SET\_DIRECTORY (Figure 2).

Figure 3 shows an example of how to use GET\_DIRECTORY.

You can also look up the username with system call ?GUNM, but you still need the directory name to check subdirectories.

If you use SET\_DIRECTORY to change the current directory, you will probably want other programs you swap to (such as CLI.PR) to start up in the same current directory. This can be ensured by always setting the contents of ?PROC packets at offsets ?PDIR and ?PDIR+1 offsets to 0 instead of -1. Modify your CLI subroutine accordingly (see the July 1986 issue of *Focus*).

Some of the text in last month's article on EBCDIC/ASCII conversion was mangled in transmission. A subtheme of the article was to illustrate the way in which MASM strips off multiple underscore characters, and the kludges required to emerge with the correct entry name. That's why I used a long name with underscores (EBCDIC.TO.ASCII) instead of a simple name like ETOA.

In addition, the ¼ symbols just above the .ENDC in the STORE macro (page 35, center of listing) should have been ^^ (two up-arrows) symbols. The correct line should read:

^a\*400 + ^b ; 1 pair of args per word Δ

John A. Grant is a geophysicist with the Geological Survey of Canada. He is also system manager, chief cook, and bottle washer for the Exploration Geophysics Subdivision's MV/4000. He may be contacted at 601 Booth St., Room 591, Ottawa, Ontario, K1A 0E8: 613/996-2325.

Figure 2: subroutine SET\_DIRECTORY

```

subroutine SET_DIRECTORY(directory,ier)
include "qsym.f77.in" !system call stuff
character(*) directory
character*256 temp_directory
integer*4 ac0,ac1,ac2,ier,isys
integer l_space

>>>>begin
c-->setup bytepointer to directory
if(directory(1:1).eq."<0>") then
ac0=0 !working directory
else
temp_directory=directory
l_space=index(temp_directory," ")
temp_directory(l_space:l_space)="<0>"
ac0=byteaddr(temp_directory)
end if

c-->set directory
ac1=0 !reserved
ac2=0 !reserved
ier=isys(?dir,ac0,ac1,ac2)

return
end

```

Figure 3: Program example

```

program example

character*256 dir
integer l_dir

c>>>>begin
...
call GET_DIRECTORY(dir,l_dir)

if(dir(1:21).eq.":UDD:SPECIALPROJECTS") then
if(dir(22:22).eq.":".and.l_dir.gt.22) then
continue
else
write(10,*)"you must be in a sub-directory"
write(10,*)"to run this program"
stop
end if
else if
else
write(10,*)"you must be logged in to"
write(10,*)"SPECIALPROJECTS to run this program"
stop
end if
...

```

## A LESSON ON LASERS

### Learning about printers can help you select one

"Laser" is an acronym for Light Amplification through Stimulated Emission of Radiation. You'd never know it from the acronym, but a laser printer operates much like a photocopier does. Unlike the earlier generation of letter-quality printers that struck a ribbon with a daisy-wheel or a thimble to produce a fully formed character, it is a non-impact printer. It is capable of producing high-quality printed documents with a considerable increase in output speed. Unlike the impact printers, the laser printer defines characters electronically and forms them with very fine matrices of small dots, so it can mix character sizes and font styles freely.

Here are some of the terms that are commonly associated with laser printers. You'll need to be familiar with them as you evaluate the various products that are now available.

- Fonts—the set of all the characters of type of the same size and style
- LPP—lines per page
- PPM—pages per minute
- Portrait mode—printing on a page 8½ inches wide by 11 inches high
- Landscape mode—printing on a page 11 inches wide by 8½ inches high

#### Evaluation criteria

A lot of companies are evaluating laser printers to determine whether the new generation of "desktop" laser printers can replace traditional letter-quality printers. Criteria that should be explored include:

- ease of use
- better quality
- increased speed
- reliability

- reduced costs
- reduced noise
- reduced "footprint" size
- additional functionality

Non-impact printers tend to meet the users' needs better than traditional impact offerings, because they can handle high loads and operate at high speeds. They are also less expensive.

Printer intelligence is another issue to consider. With the advent of desktop publishing, vendors are now supporting Page Description Languages (PDL) such as Postscript. Most printer manufacturers have either developed their own PDL or announced that they will support one of those that are commercially available. Third-party vendors are manufacturing boards to plug into the printers to provide specific PDL capabilities. It will be important for the vendors to support the PDL that does become the industry standard.

The reliability of a printer is equally as important, if not more important, than cost, speed, and intelligence. Most of them are installed and maintained by the user. Except for electrical problems, they should be user-maintainable. When the cumulative output reaches the maximum specified for that model, a service call should be able to restore it back to maximum. Ideally, the printer can last as long as the user needs it.

The number of desktop lasers on the market continues to increase, and keeping up with them is getting harder. I'm not going to recommend one model over another, but I will share the criteria I established for comparing different printers. You can modify them as necessary and set up a table similar to a spreadsheet.

#### Maintenance

1. Mean time between failures—average amount of hours that unit is available between failures
2. Ease of user maintenance—con-



- sumable parts easily replaced
3. Repairable in-house—most repairs can be made by in-house technical staff
4. Mean time to repair—average time it takes to repair a unit

#### Features

5. Print quality
6. Number of fonts supported with unit
7. Maximum number of pages printed per month
8. Compatibility with PC
9. Compatibility and support with DG
10. Number of paper trays
11. Number of ppm/cps—number of pages printed per minute or characters printed per second
12. Sizes of paper used
13. Prints envelopes/additional costs—determine if unit prints envelopes without additional hardware and if there are additional costs for hardware
14. Produces transparencies
15. Graphic capabilities—determine if graphics output is available
16. Output feed—determine if output needs to be collated
17. Multiple terminal access—ability to print documents from various terminals
18. Total memory—amount of memory imbedded within printer
19. Paper quantity—amount of paper that trays can hold at one time
20. Emulation—determine types of printers that the laser will emulate
21. Noise—determine if unit requires an acoustical cover for sound control

#### Costs

22. Cost of unit—initial purchase price
23. Cost of supplies/length of use—amount spent for consumable supplies and average length of use
24. Cost of sheetfeeder—additional costs for adding dual bin sheetfeeder

**CEO applications**

Using CEO, only one font per document is available, unless specific pages are printed using different printer names. This is because the CEO word processor doesn't accommodate codes within a document to allow multiple fonts. This means that for each font used there must be a new printer definition. Each laser printer connected to

the system will need multiple printer names, which the user will have to specify at print time, to allow use of the different fonts.

At present, the only desktop lasers supported by Data General using CEO are the DG 4337 (text only), DG 4338 (text and graphics), and the Hewlett-Packard LaserJet Plus (model 2686A). However, support for the LaserJet Plus

won't be enhanced, according to internal sources. This will become a problem with future revisions of CEO for companies that have already committed to purchasing the HP LaserJet.

As I understand, it will continue to function, but enhanced capabilities (tray selection) will not be supported. The same sheetfeeder that will be supported with the DG lasers (Ziyad PaperJet 400) fits the LaserJet Plus, but will not function properly because of certain code changes made by Data General. I have addressed this issue with DG management, but continue to receive the same answer: they won't support another laser when they manufacture their own.

Borrowing from an article in the OASIS "Word for Word" newsletter, I want to share with you the codes required to make the Ziyad sheetfeeder work with the LaserJet. These instructions come from Janet Elston of Beneficial Management in Peapack, New Jersey.

**General instructions**

Tray commands tell the feeder from which tray to feed. The six commands are as follows:


Command	Description
//0//	manual feed into the printer
//1//	lower tray (#1), feeder
//2//	upper tray (#2), feeder
//3//	internal (#3), printer
//4//	envelope tray, feeder
//5//	feeder trays 1 and 2 starting with 1 until empty, then continuing with 2

Paper length commands tell the printer the length of the paper that will be fed into it. If you use anything other than the default length (8½ inches by 11 inches), and pagination does not occur properly, then you have to use paper length commands. The paper length command for a page must precede the tray command for that page. You can use either upper case or lower case letters for the commands. They are as follows:

Command	Description
//S//	standard paper (8½ inches by 11 inches or Monarch 7½ inches by 10½ inches)
//L//	legal paper (8½ inches by 14 inches)

*(continued on page 57)*

# It All Adds Up to Customer Satisfaction . . .



It's your money, and we think you should be choosy about your accounting software. Our customers aren't easy to please, but they tell us the **HBI Financial Package** gives them a lot to smile about.

**General Features:** All HBI packages are designed with customer satisfaction in mind. The HBI menus help users master advanced features without a long learning curve. There's even a report writer that integrates directly with Lotus® or MathPlan® spreadsheets.

**Accounts Payable**

- Easy vendor lookup
- Virtually unlimited G/L distribution
- Automatic G/L updating
- Recurring invoice/credit memo entry

**Accounts Receivable**

- On-screen client information
- Invoice writer
- Quick input for cash receipts
- Statements include application and aging summary

**General Ledger**

- On-screen checking of account summaries, details, and journal entries
- Report writer integrates with Lotus® or MathPlan®

**Payroll**

- Multi-state capability
- Easy update of tax tables
- Distribution to cost centers and job types
- Check reconciliation

**We Help Your Computer Help Your Business**



**CALL TODAY  
301/869-2355**

13 East Deer Park Drive, Suite H  
Gaithersburg, MD 20877

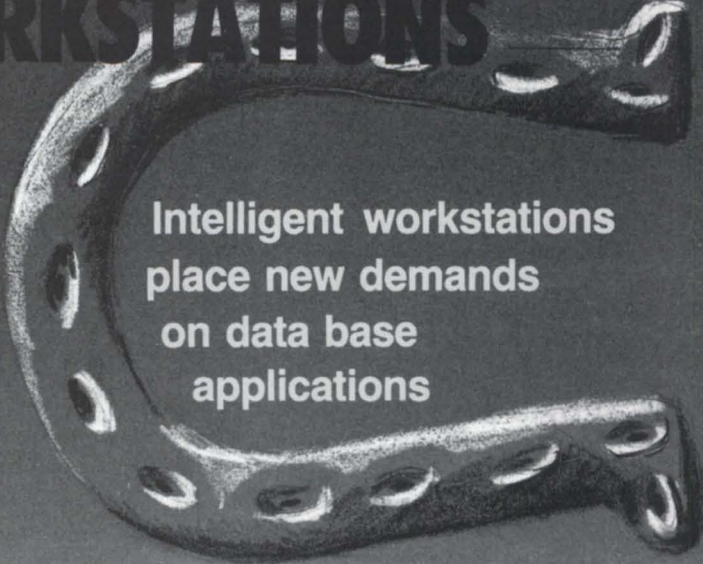
Circle 22 on reader service card.



# INTELLIGENT WORKSTATIONS

BY BRAD FRIEDLANDER

## DISTRIBUTED NETWORKS



Intelligent workstations  
place new demands  
on data base  
applications

After reading my last column in *Focus* (May 1987, page 36), an acquaintance of mine said, "I plug my DG/One into our MV/15000, upload a few files, download a data base extract, disconnect, and then process the new data locally. I'm using an intelligent workstation in a distributed environment, right?"

**Wrong.** Obviously, I hadn't made it clear what I really mean when I talk about using an intelligent workstation in a distributed network. This month, I will try to get a better understanding of what it means and what problems exist.

My friend's example failed to meet the requirements of a distributed processing environment on a couple of points. First, there is no shared knowledge in the network. The host processor (in his case an MV/15000) does not know what the intelligent workstation (the DG/One) is doing, and vice versa. Second, the DG/One is really acting as a dumb terminal (with what appears to be a fast keyboard) during the upload and download phases. It is not part of the network when any real processing is done.

So, what is needed? It's easy to say that his example was inadequate; the more important thing is to state what has to occur in order to have a real distributed network.

First, the host processor (or the owner processor) needs to be aware of any data that may be modified. When distributed workstations access information for which the host is responsible, the host needs to know whether the purpose of the access is just to read the information or to modify the data. If the data might be modified, then the host has to ensure that other users con-

tinue to have a consistent view of the data base.

This last point becomes critical when two or more related sets of data elements are being modified. For example, the header and line item records of a purchase order must always be updated together. Of course, this is nothing new to anyone developing data base applications on a multi-user system. The point is that the distributed network retains all of the needs for control that previously existed—and adds some new ones.

The second requirement is for the workstation to receive and transmit the data in a structured form and not as a stream of bytes. In order to maintain the controls that exist within the host processor, the workstation needs to handle the information as a set of data elements with the same characteristics that they had on the host.

Failing to do this will lead to the introduction of errors when updates are made, and to incorrect usage of the information that was received. The workstation has to be cognizant of the data element definitions and domain restrictions that exist in the owner's environment.

As if this isn't enough, there is a third requirement. The DG/One to MV/15000 interface must be "seamless." By seamless, I mean that the user should be unable to determine whether he is executing a program on the host processor or on his workstation—with the possible exception of response time, if a low-speed communications link is involved. The user should be unaware of the actual communications between the two systems. In effect, this requires that cooperative programs be running in both environments.

**Does it exist today?** By this time, you may be thinking the same thing as my friend: what exists today that meets these criteria? Haven't I described something that's impossible to create? This is the very issue that I would like to discuss in future columns. I'd like to hear from you about your candidates for solutions to these requirements. I see two categories of solutions: Roll Your Own (RYO) and generalized.

RYOs are solutions developed for specific applications. These exist today, but can only be used as templates for "creating" similar systems.

The generalized solution relies on a software vendor (Data General and others) to provide flexible tools that allow us to develop systems that can operate easily in this manner. I have seen some that begin to meet the requirements, but they're not truly general purpose.

As I see it, we are close to realizing versatile, generalized solutions that will allow us to develop fully distributed networks using intelligent workstations. However, close only counts in horseshoes. Until then, happy programming . . . .  $\Delta$

---

*A consultant with Arthur D. Little, Inc. and a past president of NADGUG, Brad Friedlander specializes in the implementation, operation, and maintenance of mini and microcomputer systems. He is a new contributing editor to Focus and serves on the magazine's Editorial Advisory Board. Readers with questions, suggestions, and ideas for articles can contact him at Arthur D. Little, Inc., Information and Telecommunications Systems Section, 17 New England Executive Park, Burlington, MA 01803; 617/864-5770.*

---

# Minicomputer Exchange

## Minicomputer specialists since 1973 Data General and Compatible Equipment

Used

New

Sell

Buy

### SYSTEMS & CPUs

MV 10000 System, 2MB .....	CALL
MV 6000, 2MB (8724-C) .....	\$ 13,750
MV 4000, 2MB .....	6,000
ECL S230, 256KB, EAU 1&2 .....	1,450
ECL S140, 256KB, 16 slot .....	2,950
ECL S120, 16 slot, 512KB .....	2,600
NOVA 4X, 16 slot, 256KB .....	2,495
NOVA 3, 64KB .....	695

### MEMORY

MV Universal Memory, 8MB .....	\$ 13,500
MV Universal Memory, 2MB for MV4/10000 .....	2,500
S140 256KB (8687) .....	650
MOSTEC 256KB .....	495
ECL 256KB MOS Memory, (DG-8656) .....	450
NOVA 4 256KB (8387) .....	650
NOVA 3 32KB (8343/8543) .....	150
Desktop 512KB (8736-RT) .....	695

### PRINTERS

DG 5997 600LPM Serial Band Printer .....	\$ 3,750
DG 6193, TP2, 180CPS, RO Printer .....	750
DG E-6194, 180 CPS KSR Printer, Earthtone .....	1,295
DG 4327, 300LPM Band Printer .....	3,750
DG 4366, 600LPM Band Printer .....	3,050
DG 4434 Desktop Multifunction Printer .....	650
Printronix P300, 300LPM Printer .....	1,650
Trilog T-100, 300LPM Printer .....	1,250

### DISK & TAPE

6070 20MB Disk S/S .....	\$ 550
6060 96MB Disk S/S .....	950
6061 192MB Disk S/S .....	1,950
6310 38MB Add-on w/Power Sup for Desk Top .....	1,695
CDC 9766 300MB Rem'l Pack SMD.. from	2,500
Priam 6650-20 68MB Disk .....	875
6021 800BPI Tape S/S .....	from 800
6026 800/1600BPI Tape S/S .....	from 3,300
6125 Streaming Tape S/S .....	1,950
CIPHER F880 Tape Drive .....	1,650
CIPHER 910 Tape Drive .....	1,650
6060/6061 Controller/Adaptor Set .....	350
6160/6161 Disk Interface, "Kismet" Ctrl. ....	1,050
MSC 1300 Disk Interface, SMD .....	650
SPEC 20 Disk/Tape Interface .....	900
ZETACO 295 SMD Disk Controller .....	750

### VIDEO DISPLAYS

DG 6053 Dasher D-2 CRT w/Detached Keyboard .....	\$ 275
DG 6106 Dasher D-100 CRT w/Detached Keyboard .....	225
DG 6108 Dasher D-200 CRT w/Detached Keyboard .....	295
DG 6168 Dasher D-210 CRT w/Keyboard ..	450

### DG MISCELLANEOUS

DG Cabinets .....	from \$ 250
DG 5 Slot Chassis .....	250
DG 16 Slot Chassis .....	1,200
DG 16 Slot Chassis—FCC compliant .....	1,750
DG 4241 ULM 5 .....	250
DG 4255 ALM 8 .....	250
DG 4257 ALM 16 PCB only .....	350
DG 8663 ECL S/140 Hdwre Floating Point PCB .....	800

**Much more equipment available.  
Call with your requirements.**

Prices quoted are cash with order, FOB Sunnyvale,  
California, and include standard MCE warranty.

Depot repairs • DG terminals • Disks • Boards

**(408) 733-4400**

FAX: 408-733-8009

• all equipment subject to prior sale •

**Call:**

## THE GOOD, THE BAUD, AND THE UGLY

### B.J.'s guide to purchasing statistical muxes

#### :STAT.MUXES

A couple of months ago, I installed a pair of statistical multiplexors and modems to deal with four terminals located about three miles away from the MV/4000 I use.

Two of the terminals are attached to humans: a D400 and a DG/One emulating a D210 using either the ROM emulator (because I prefer its key mapping, especially the function keys), or SmarTerm 400 and Pereline (when file transfer is involved). The other two are low-speed printers: a 1200 baud NEC letter-quality printer and a 2400 baud Okidata 92A, both of which are driven by EXEC queues.

The last time I was responsible for purchasing stat muxes was in 1981. Since then, I've helped a number of clients and others install and configure about 20 sets of stat muxes. Unfortunately, I usually get contacted after the mux salesperson has shipped the wares and fled. Not infrequently, the mux ends up being impossible to configure for proper AOS{/VS} operation, and the client ends up having to replace it.

I could make a few friends—but a lot more enemies—among the mux manufacturers by simply listing the model numbers of muxes that are and aren't compatible with AOS{/VS}. Instead, I'm going to recount my decision-making process for you. I hope that it will save you from making the same mistake that some of my clients did.

#### :GOALS

My goal was to find a rig that could support all of the following:

- four terminals simultaneously
- XON/XOFF flow control
- binary file transfers to and from AOS{/VS} using all eight data bits
- the highest speed possible assuming normal switched network modems and finite funds

- expandability to at least eight terminals at a later date using plug-in expansion modules.

#### :STEP.1:SHOP.AT.HOME

The first step was to survey the current stat mux market to see what had happened since my last stat mux exercise. A search of the files turned up a new copy of the Glasgal catalog. For those of you who don't recognize the name, Glasgal is a distributor of electronic things. It's the Sears catalog of communications equipment. (I recommend the ModTap section at the back to any of you who like telephone technology wiring for your terminals.)

Anyway, the results of the market survey can be summarized as follows: stat muxes fall into three categories.

The first category is what I call "dumb" stat muxes. They simply multiplex the data from the competing asynch ports onto the single link between the muxes. They use either proprietary protocols or jury-rigged versions of traditional protocols (i.e., SDLC). These muxes typically support XON/XOFF and/or hardware flow control (CTS or DTR, but typically not on character boundaries) to throttle the asynch ports when mux buffers start to reach capacity.

In the old days, dumb muxes usually lacked fancy but noncritical features such as down-line loading of configuration parameters from the master unit to the slave unit (useful when the slave end is unmanned, or is staffed by "dumb" humans), and baud rate conversion (a partially effective way, but currently the only way, to handle multi-speed, dial-up modems on AOS{/VS} systems).

These days, many of the dumb muxes support both down-line parameter loading and baud rate conversion. However, their efforts to optimize throughput are usually limited to stripping the start

and stop bits from asynch characters before sending them across the link, and adding them back in at the other end. For 10-bit data (1 start, 8 data, 1 stop), this results in a 25 percent gross throughput increase. However, this translates to more like a net 10 percent increase after adjusting for the link framing character overhead.

The second category is what I call "smart" stat muxes. In addition to doing everything a dumb mux does, they include some valuable optimizations. One optimization recognizes the dislike humans have for spongy character echoing on full duplex keyboard devices, and deals with it by sensing which ports have low-speed, keyboard-like traffic, and boosting their priority relative to the other ports when it comes to allocating precious slots on the link.

Another optimization boosts the apparent link speed by compressing repeated character occurrences at one end of the link and decompressing them at the other end. In addition, smart muxes usually allow software/hardware flow control to be selected on both a per-port and a per-direction basis (in vs. out). It is this last feature that renders them AOS{/VS}-compatible. Muxes (and buffered modems) that do not allow software flow control to be selected according to the data direction have zero chance of working with DG terminals and software, and must be replaced with equipment that does. They also have to provide hardware flow control (CTS or DTR) that only drops on a character boundary, or they won't work with certain old (and some new) DG muxes, terminals, and printers.

The third category is what I call "sneaky" stat muxes. In addition to doing everything the dumb and smart muxes do, these muxes combine proprietary link protocols, exotic traffic

analysis algorithms, and data compression schemes, which can result in link speed acceleration ratios of 2:1 minimum, and sometimes as high as 4:1, depending upon the traffic pattern and data compressibility. These are the same sorts of tricks that are used to make the new black magic 9600 baud dial-up modems work on phone lines

with a bandwidth that is barely sufficient to sustain 2400 baud traffic.

Unfortunately, the microprocessor horsepower required to accomplish these feats is prodigious. Sneaky muxes typically have a bizarre number of ports and cannot be expanded. Two examples of sneaky muxes are the Concord Data Systems CDS 224 Super Duplex,

which supports three 9600 baud ports using a 2400 baud link, and the Data Race RACE 2, which supports one 9600 baud terminal and a background low-speed printer channel using a 1200 baud link.

As you might expect, the per-port cost of sneaky muxes is very high.

## :STEP.2:QUEST.FOR.INFO

Step 1 yielded a list of about five potential smart muxes. Dumb muxes were eliminated simply because they don't work with AOS{VS}. Sneaky muxes were eliminated because of the lack of expandability and high per-port cost.

The problem with shopping at home is that catalogs are necessarily brief when it comes to describing the more exotic features of the muxes. So, the next step was to contact the individual mux manufacturers (not the distributors or dealers) to obtain more detailed information about the features. It also provided a good chance to assess the capabilities of their technical support personnel.

If you decide to try this yourself, let me give you some advice. Take a couple of calm pills before you get on the phone. Some of the people I contacted must have had the title of Corporate Bozo. Several outfits I talked to didn't have the foggiest idea how their stuff worked; they simply recited their own brochures to me. One person actually claimed that no stat mux manufacturer had data compression of any sort. In one case, I went so far as to order (and pay for) a copy of the manual for a particular mux that I thought had possibilities, but the technical support staff there had no idea how the product worked.

Sometimes I think the only requirements to succeed in business are to know what you're doing and treat your customers well. You don't need an exceptional product. Hmm.

Anyway, I finally called one manufacturer where the conversation went something like this (TSP = Technical Support Person):

**BJ:** Does your mux do anything to accelerate the link speed?

**TSP:** Yep. It removes start and stop bits prior to transmission and restores them at the other end. It compresses any repeated character sequence received on any of the ports, but only if the port is overrunning the link. Otherwise, we don't waste time compressing and decompressing. In addition, we have a

## We're Now In The Big Leagues

*Be Part Of Our Winning Team*



You've Always Known Us For Our Technical Knowledge...

*...Now Copley Systems has expanded its product line.*

### DataGeneral

- Desktops
- MV
- Memory
- IACs
- Disks
- DG/Ones
- Printers
- CRT's

### Hewlett Packard

- NEW** LaserJet Series II, 8 pages/minute
- NEW** LaserJet 2000, 20 pages/minute
- A thru E size plotters
- HP Calculators
- Desktop Publishing

*Always In Stock For Immediate Delivery!*

# COPLEY SYSTEMS CORPORATION

185 Second Avenue, Needham, MA 02194

CALL US TODAY!  
(617) 449-5566

Outside Massachusetts  
1-800-4-COPLEY  
1-800-426-7539

proprietary algorithm for compressing the link data, which I'm not at liberty to discuss. I can tell you that it is not quite as effective as those used in the RACE 2 or Super Duplex muxes, but it's the best we can do while allowing for expansion to eight ports using reasonably priced microprocessors. Typically, a 2400 baud link will support a throughput of 3800 to 4200 baud.

**BJ:** Does your hardware flow control always drop CTS (or DTR) on a character boundary so that the vintage TP1 printer I have in the basement will work?

**TSP:** Of course, doesn't everybody? (chuckling)

**BJ:** Do you allow inbound and outbound software flow control to be separately selected for each port?

**TSP:** Yep. But let me ask you a question: why do you need this?

**BJ:** Because the system I use has an archaic cursor addressing scheme that involves sending the row and column to the terminal as binary bytes. If the mux at the CPU end supports inbound flow control, then a column or row value of 19 will appear to the mux to be an xOFF character, and the mux will cease transmitting until the CPU sends an xON. That might not happen before hell freezes over, because the CPU doesn't know it sent an xOFF.

**TSP:** Have I got a deal for you! Let me explain how we handle software flow control. When we see an xOFF from the CPU, we cease transmitting to the CPU, but we resume transmission on the next character we receive, even if it isn't an xON. In addition, we pass the original xOFF through to the terminal end regardless. Not only does this mean that your bizarre cursor addressing scheme will work just fine, it also means you can leave inbound flow control enabled so that the mux will respond instantly to real xOFFs from the CPU.

Otherwise, we wouldn't cease sending to the CPU until the remote terminal/PC saw the xOFF, ceased transmitting, and any traffic already buffered had been sent to the CPU. This is vital during high-speed text file downloads from PCs at the terminal end into the host in order to avoid overrunning the CPU's buffer. When the CPU is transmitting binary data to the remote terminal/PC, any xOFFs in the data stream will be canceled by the next data byte sent.

**BJ:** I'm sold. Who's your favorite stocking distributor?

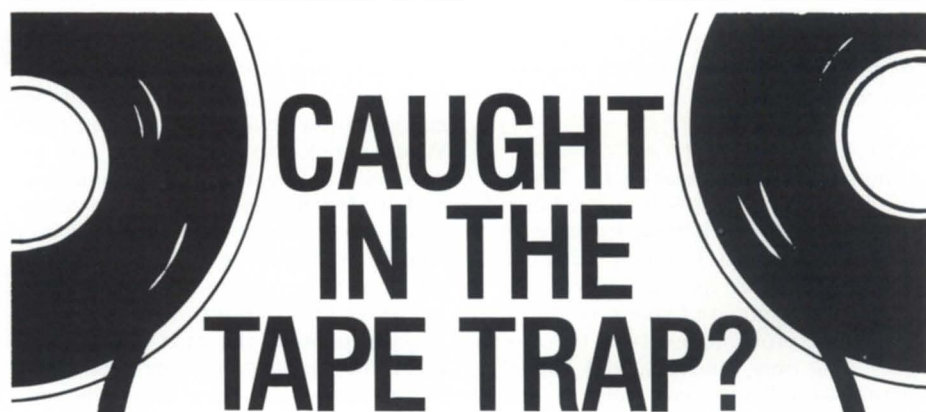
Two things really impressed me about this conversation: the TSP knew what he was talking about, and he knew his competition. This guy will probably run the company some day.

Based on this conversation I also de-

finied a new mux category: "clever."

### :STEP 3: SPRING FOR IT

As luck would have it, the distributor was one of the manufacturer's authorized conduits for surplus production. As a second bonus, the distributor's inside man (let's call him Fred) was an ex-employee of the mux manufacturer,



Manage your way out of the tape trap with the Tape Management System from Data General.

As computer installations get bigger and busier, tape libraries get harder to keep under control. The Tape Management System helps avoid this by tracking your tapes, managing your retention cycles, and telling you when to scratch tapes. All under AOS/VS, from a centralized database—in standalone or across distributed environments.

The Data General Tape Management System is a sophisticated, highly efficient management tool for ECLIPSE MV/Family system users with growing tape libraries. It lets you control your tape population, instead of it controlling you.

So, if you are beginning to feel the grip of the tape trap, contact your nearest Data General office, or call 1-800-DATAGEN. Or write us:

Tape Management System  
Data General Corporation, M.S. C-234  
4400 Computer Drive  
Westboro, MA 01580

ECLIPSE is a registered trademark of Data General Corporation.

 Data General  
a Generation ahead.

Circle 13 on reader service card.

and so was as knowledgeable about the product features as the TSP I talked to. Too good to be true.

When I told Fred what I wanted, he put together a price for the whole package: a pair of stat muxes, a pair of 2400 baud synch/asynch modems, and a pair of synch cables. The muxes were refurbished, but the modems, which were sold as refurbished, were actually new. The equipment models were roughly four years old, but functionally identical to the current models, except for packaging and a few superfluous features.

#### :STEP 4: HOOK IT UP

The stuff arrived a week later. It was up and running in less than an hour, including the time it took to drive to the remote location. Can't be that easy, right? Right. Two problems occurred during installation and checkout.

The first problem involved the modems. The only modems Fred had at the time were "intelligent" versions that were designed for asynch users: they had both a DIP switch configuration and a menu-driven configuration using

a terminal connected to the data spigot. Unfortunately, the character sequence that triggered the modem into menu mode was a common bit sequence in synch mode, and the modem would respond by outputting a menu to the stat mux. Its response was understandable: "Say what?"

The solution involved hooking my DG/One up to the modems and specifying "Y" for the "Incredibly stupid?" menu option.

The second problem was caused by my NEC low-speed printer, which I later discovered had an improperly set configuration switch in the printer. When it ran out of ribbon, it sent an XOFF followed by a BREAK, went off-line, and waited for its human slave to replace the ribbon. After the ribbon change, putting the printer back on-line caused an XON to be sent as a signal to resume output to the printer.

Unfortunately, the mux had already taken the garbage characters generated by the BREAK as a signal to resume output, and characters were lost. A quick peek at the mux manual revealed an option to disable the 1st-char-after-

XOFF-is-XON logic in favor of waiting for an explicit XON. The option could be configured on a per-port basis at either or both ends of the mux. I set the option for the printer line only, and at the remote end only. The problem disappeared.

I also discovered from reading the manual that the wait-for-explicit-xon option (called DSS, for DEC Slow Scroll) was specifically designed to deal with DEC's VT family terminals using slow scroll mode. Slow scroll mode on both the VT100 and DG terminals causes the terminal to use XOFF/XON to throttle the incoming data to match the scrolling rate. However, hitting keyboard keys during slow scroll would be taken as virtual XONS by the mux, and it would resume output.

I tried using this option on my D400 and DG/One lines for a while, but it caused occasional hangs during XMODEM (binary) file transfer from the DG/One to AOS/VS, so I went back to the default 1st-char-after-XOFF mode. The problem was caused when a binary data record contained an XOFF data byte, but no XON. The mux would re-

## Data General 210/211 Terminal Emulation

Standardize your Company's PC Communications inexpensively using the *PereLine Data Communications Package for MS/DOS 2.0 or later!* PereLine is more than just a terminal emulation and file transfer program -- Its a ...

### COMMUNICATION PRODUCTIVITY TOOL

- *User customized menus*
- *Converse with 2 separate computers simultaneously*
- *Learn mode builds scripts by copying your keystrokes so you can replay them whenever you want*
- *Terminal emulations DG 210/211/ANSI/VT100/VT52/IBM3101/VIDTEX*
- *Error free file transfers XMODEM/YMODEM/Kermit/TELINK/Capture*
- *Command recall that remembers your last 25 commands.*
- *Remote operation*
- *Unattended operation*
- *Automated Logons*
- *Printer pass through support*
- *Keyboard lockout to clear screen and stop access by snoopers when you are away*
- *Automate CEO file transfers*
- *Flexible Script Language*
- *Auto dialing directory*
- *250+ page user guide*

#### Terms

Personal/Company Checks,  
Cashiers Check/Money Order  
Add \$3.00 shipping/handling  
CA residents add 7% sales tax

#### Make Checks Payable To:

**Peregrine Data Systems, Inc.**  
5365 Baron Drive  
San Jose, CA 95124  
(408) 356-6105

**Note: PereLine works great on the new IBM PS/2 Systems ...  
(3 1/2 inch format diskettes available)**

Circle 35 on reader service card.



★ ★ ★  
★ Only ★  
★ \$69.95 ★  
★ ★ ★

fuse to pass through the ACK from the file transfer program on AOS{/VS} until an explicit XON was seen (i.e., never).

As it turns out, the DSS option is unnecessary on DG terminals using slow scroll (or D2xx terminals that do frequent XOFFS/XONS), because they're too slow to keep up with fast baud rates. DG tubes, and even later model DEC tubes, are smart enough to simply issue another XOFF if the mux resumes sending data before the terminal does an XON. No data is lost because the initial XOFF was sent prior to the terminal buffer filling up completely (typically at 90 percent full).

Now that I've found and fixed the incorrectly set option on the NEC that was causing it to send a BREAK during alarm conditions, I've disabled DSS on all lines in favor of the default 1st-char-after-XOFF mode.

## :HOW\_FAST?

One of the major problems I had was determining what speed to set the

printers and terminals.

The printers were easy. I just set them to the next speed above their maximum print rate: 1200 baud for the 55 cps NEC and 2400 baud for the 165 cps Okidata. Any higher and they would have been unnecessarily disruptive to the terminals.

The terminals were a bit trickier. In order to take advantage of the data compression, they had to be set higher than the 2400 baud link speed. Remember, the TSP mentioned that compression only occurs when the link traffic gets backed up. Unfortunately, when the link gets backed up, characters that you expect to act immediately (CTRL-O and CTRL-C CTRL-X sequences) can take quite a while to show up because they have to wait their turn behind previously buffered traffic. Experienced users can usually deal with this problem, but novices have trouble. I ended up setting the programmer's terminal (D400) at 4800 baud, and the secretary's terminal at 2400 baud.

While researching the optimum speed, I tried various combinations of mismatched baud rates (i.e., 9600 at the terminal and 4800 at the CPU, and vice-versa), but none produced any benefit compared to the simple 4800-4800 and 2400-2400 configurations.

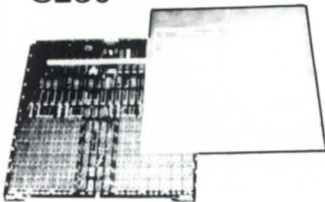
## :PLEASANT\_SURPRISES

The technique of honoring an XOFF, but still passing it through to the other end, typically to the CPU, has the beneficial effect of throttling AOS{/VS} so that it doesn't needlessly pre-fill the mux buffers to capacity. It also minimizes the delay on the 4800 baud terminal between the time you hit CTRL-O or CTRL-C CTRL-A and the time that output ceases, although it certainly does not eliminate it.

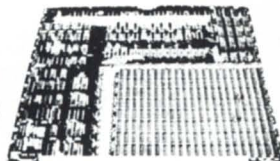
In addition to automatically optimizing the link in favor of low-speed keyboard traffic via adaptive prioritization, a perusal of the manual showed that several of the mux channels could be forced to low priority. The manual rec-

## MEMORY EXPANSION I/O PERFORMANCE

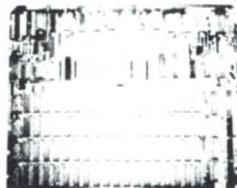
**MV10000  
MV4000, &  
S280**



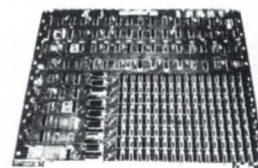
**NOVA 4 &  
ECLIPSE S140**



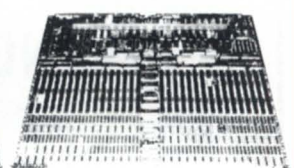
**DESKTOP &  
ECLIPSE S20**



**NOVA  
DISK**



**PAGING  
DISK**



**MV410-4MB  
\$3950  
To 16MB**

**MS140-1MB  
\$2450**

**MD023-1MB  
\$890  
To 2MB**

**CD019-2MB  
\$2150  
To 4MB**

**CD063-4MB  
\$6900  
To 8MB**

Compatible and affordable memory from SCIP can immediately increase response time, serve more users without degrading performance or allow an updated operating system or application to be added. SCIP's reliable and convenient to set up memories fully support all Data General system diagnostics without modifications.

Whether main memory expansion or I/O performance boost, from the Desktop thru the MV10000 we have a solution that will address your performance problem including being within budget. Unqualified satisfaction guaranty, 30 day return/full refund.

Call us today at (213) 282-8700, we'll dispatch a spec sheet or elaborate on the benefits of SCIP memory beyond being compatible ..... Boost your system's response, not your cash flow.

Quantity discounts assured

===== **SCIP**

449 SO. BEVERLY DRIVE • BEVERLY HILLS • CALIFORNIA 90212 • 213 836-4426

Circle 39 on reader service card.

# 24 HOUR POWER

*Just When You Need It! On Our MV/4000s*

■ No matter why you need to timeshare, we offer **dedicated** CPUs running current release of AOS/VS with up to 1.5 Gigabytes of disk storage per CPU.

■ No matter where you are in the country, take advantage of our remote processing capabilities. Each system is equipped with an 800/1600 bpi tape drive and dial-up modems.

■ 24 hours, 7 days a week, full operator services and assistance.

Call Wayne Kingry at  
303-756-8811 or  
1-800-525-8577 for extended  
usage discounts.

**BUTLER  
COMPUTER  
GRAPHICS, INC.**

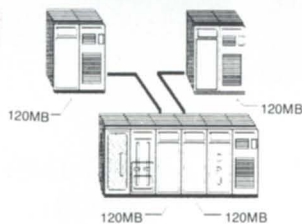
Circle 3 on reader service card.



**Delphi Data**

Your VAR/OEM Support Group

## EXPANDED DESKTOP SYSTEM



**NEW!!! 120MB for Desktop**  
Standard Data General Modules & Controllers  
now can support up to four (4) 120MB disks  
under AOS.

**CALL FOR DETAILS!**

### Desktop Upgrades

15MB - 38MB ..... \$2,495  
15MB - 71MB ..... 3,495  
38MB - 71MB ..... 2,995  
15MB/38MB/71MB - 120MB .. CALL

### MV2000 or MV4000DC Add-on Disks

70MB ..... \$3,430  
120MB ..... 5,880  
160MB ..... 6,650

### MV2000 or MV4000DC Upgrades

70MB - 120MB ..... \$5,430  
70MB - 160MB ..... 6,200  
120MB - 160MB ..... 5,450

### Transport Disk (Bundy Box) for Desktop/MV2000/MV4000DC

15MB ..... \$ 895 120MB ..... 5,880  
38MB ..... 1,995 160MB ..... 6,650  
71MB ..... 3,695

Special Heavy-duty Aluminum carrying case for any Transport Disk \$150

24-hour Response All Items - No Extra Cost!!

VAR'S - OEM'S - Call for YOUR prices.

**(714) 354-2020**

12155 Magnolia • Suite 6C • Riverside • California • 92503

Circle 16 on reader service card.

ommended using this feature for printers when they share the same mux with terminals. I enabled the feature for my two printer ports, and *voila*, the printers now have a near-zero impact on the terminals when both are competing for the mux link.

When I discovered this feature, I was struck by its similarity to the standard advice I give on batch stream priorities (see my *Focus* column of May 86): forcing the stream priorities below that of the on-line users saves the AOS{/VS} scheduler the time and trouble of having to characterize them as CPU hounds when they first start executing.

### :CURRENT PROBLEMS

When doing XMODEM downloads to AOS{/VS} from the DG/One, it is still common (about every 256 blocks) for the last byte of a packet to be an XOFF character. The mux honors it and, seeing no subsequent character, refuses to pass through the ACK from AOS{/VS} to the DG/One. That causes the DG/One to time out waiting for the ACK and to resend the block. The mux takes the first character of the retransmission as an XON, but locks up again when it sees the XOFF in the last byte. For some reason, this problem never occurs using SmarTerm 400 (perhaps it sends a pad byte at the end of each message). When Pereline hangs, simply hitting a key causes transmission to start working again. When I figure out why, I'll let you know.

### :NET.NET

Except for the problem I just described, the whole setup works slicker than a Times Square shell game.

Some measurements with :PERFMGR have shown mux throughput rates from 2600 to 7200 baud, depending upon the compressability of the text. For example, TYPEing this column on my screen happened at 3000 baud, but TYPEing a file with lots of white space due to indentions, like a COBOL source file, happened at 4200 baud.

Hours of file transfer using BLAST and XMODEM have caused zero problems, so the 1st-char-after-XOFF logic appears to be sound. Δ

*B.J. is the president of B.J. Inc., a San Francisco-based consultancy specializing in system auditing, system management, and performance analysis. He can be reached at 109 Minna St., Suite 215, San Francisco, CA 94105; 415/550-1444, Telex 296544.*



**If your search for a reliable  
Data General source  
has you turning in all directions...  
turn to McIntyre's  
Mini Computers.**



**We'll steer you  
in the right direction.**

McIntyre's is the world's largest second source Data General dealer. We buy, sell and trade previously-owned Data General equipment.

We will help you assess your equipment needs and, since we deal exclusively in Data General equipment, we can have the equipment immediately available and delivered just as fast.

Equally important is the care and service you receive after your equipment is installed. We stand

behind our products with a 30-day warranty.

In addition, our staff of experienced engineers is readily available to answer your technical questions.

So when it comes to selecting a Data General source, go the right way...go with McIntyre's Mini Computers.

**TLX: 810-232-4866  
Answer Back: MCDATAGEN TROY**

575 E. Big Beaver

Troy, Michigan 48083-1301

(313) 524-4900





## THE ECO SYSTEM

### Don't let undone ECOs spoil a friendship

I have known a lot of people who bought used Data General equipment from other end-users. Most have been perfectly happy. On a couple of deals, however, the parties involved felt they got burned. Neither user intended for it to happen, but by skipping one step of what should be customary for this type of sale, some data processing managers lost friends, time, and the company's money.

Here's a typical scenario: company A agrees to buy company B's old equipment with the condition that it is certified to be under DG maintenance.

In some cases, company A has also purchased other certified equipment elsewhere. After installation, something doesn't work. DG comes on-site and says that the boards in the system are not up to rev level, and must be upgraded before it will work. Of course, this is not covered by contract, so company A and B argue over who pays it, frequently generating fireworks worthy of the 4th of July.

Lurking at the bottom of this is the ECO (Engineering Change Order). An ECO is a change made to a piece of hardware after it's designed. There are two types, which I call internal and external. Internal ECOs occur prior to the release of the hardware to the public, so they are pretty much invisible as far as users are concerned. External ECOs are those that have an effect upon the installed customer base. These eventually can turn into a Field Change Order (FCO), but I will refer to them as an ECO throughout the article.

Some years ago, DG had four classes of ECOs. I tried to find out if this system is still current, but no one at our local office was sure it was still that way. I still haven't been able to verify it, but everyone said it sounded right. I'll try and get a definite answer and will print any corrections in my next column.

The classes of ECO can be loosely defined as this:

1. a critical change to be installed in all units immediately (translate immediately to ASAP)
2. an important change to be installed on all units at the next available moment (such as your next preventive maintenance)
3. a change that is configuration specific and will only be field installed on request
4. something minor that can wait until the board is returned to depot.

A class 1 ECO is a rare and expensive occurrence. It is equivalent to Ford issuing a recall to all owners of a car model because the brakes are faulty. The car owners bring it back immediately for repair.

A class 2 ECO is less critical. The best example I can think of is happening right now with the MV/2000 series (at least I assume it is a class 2 based on the wording of the letter to the users). Recently, DG announced an ECO for the ERCC circuitry and other parts necessary to allow addition of certain peripherals and procedures. If you take advantage of the order within 180 days, it costs you nothing except a little

downtime. There are a number of disadvantages to not installing this ECO, and I can't imagine why anybody would pass it up.

A good example of a class 3 ECO was a minor flaw in the ALM-8 boards for the communications chassis in the 16-bit Eclipse line. If my memory serves me correctly, the problem occurred only if you were using CTS (Clear To Send) hardware handshaking. When the receiving device dropped the signal (to indicate a full buffer, off-line condition, etc.) the ALM would cease transmissions instantly, even in the middle of a character. When it resumed, it would finish the current character and start a new one. This caused one character to become two garbage characters, and frequently all subsequent characters became garbage as well. The fix was to make sure that CTS was checked only between characters.

I can't think of an example of class 4 ECOs, but they are minor problems that normally wouldn't be fixed unless you were taking care of something else at the same time. For example, it might be adding a resistor to the front panel to reduce the frequency of burnout of the power light. Problems of this magnitude don't warrant the time and expense of field upgrades but will be taken care of sometime when the part is being overhauled or reconditioned.

Getting back to the original scenario, if company B (which was selling the system) had requested that Data General verify that all boards were up to ECO level for class 1, 2 and 3, by contract DG would need to inspect it for compliance. Furthermore, if company A had found out that the missing ECOs were class 4, then their local office would have had no reason to reject the system.

If one Data General field office certified that the hardware is OK, how could another say that the same hardware isn't acceptable until it's brought up to the appropriate ECO level? The answer is probably that neither field office wants the cost of installing the ECOs.

At the original site the system could have been running for years without the ECO in question. The de-installing field office would wonder why it should bother to install it now that the hardware is going away. However, at the new site the hardware may be used in an application that requires the ECO. The receiving office could legitimately claim that the ECO should have been installed before changing sites. Neither office may want to install the ECO, but as a practical matter, most offices want an upset customer even less.

Therefore, if you are planning to sell your system, it might be a very good idea to have the field engineer take a little extra time on preventive maintenance and verify all the ECO levels. Scheduling this in advance will usually cause no problem at the field office. It also certifies that the receiving office would have no grounds at all for rejecting the system due to ECO levels.

#### Back to the future

About six months ago, I said I didn't know of any compiler for ICObol other than those based on DG machines. Since then, I have obtained a copy of Ace COBOL for the IBM PC. It is based on ANSI 74 COBOL, but has enough extensions so that it can accept ICObol source code, Ryan-McFarland COBOL source, and many others. In addition, it provides

networking with more than a dozen operating systems on a variety of machines with data file sharing transparent to the source program.

Unfortunately, I don't have enough memory in my PC to run the compiler (yes I have it on order), so I have had only limited time for testing. I hope to report more on this in the future. Incidentally, it doesn't use the standard .PD and .DD program files or the .NX and .XD data files. Data would have to be put in a "flat" file and reloaded. That's not really a bad idea anyway, since you would probably be using BLAST to move it from one machine to another.

**Now to the mailbag . . .**

Gary Hulme of Texaco Canada Inc. has sent in his version of DOW.CLI. Although it is limited to current century only, it is so simple and fast that it would be a shame to keep it all to myself. It uses VAR0, VAR1, and VAR2 to calculate the day of the week and set the STRING to the proper day. I have modified the syntax so that it takes less column space. This is shown in Figure 1.

I have detected a minor flaw in Hulme's macro that will produce incorrect results roughly 4 percent of the time. The first person to submit a working, corrected version wins a free dinner (advertised specials only) at the NADGUG conference next October. If you've been to Las Vegas, you'll know that I'm not talking about a whole lot of money.

**Figure 1**

```

Comment - To use, call DOW [!explode [!date]]
Comment - VAR0 = Day of year (without Feb 29)
Comment - VAR1 = Day of century
Comment - VAR2 = Day of week
var0 0
[!eq (FEB), (%4%%5%%6%)]var0 31[!end]
[!eq (MAR), (%4%%5%%6%)]var0 59[!end]
[!eq (APR), (%4%%5%%6%)]var0 90[!end]
[!eq (MAY), (%4%%5%%6%)]var0 120[!end]
[!eq (JUN), (%4%%5%%6%)]var0 151[!end]
[!eq (JUL), (%4%%5%%6%)]var0 181[!end]
[!eq (AUG), (%4%%5%%6%)]var0 212[!end]
[!eq (SEP), (%4%%5%%6%)]var0 243[!end]
[!eq (OCT), (%4%%5%%6%)]var0 273[!end]
[!eq (NOV), (%4%%5%%6%)]var0 304[!end]
[!eq (DEC), (%4%%5%%6%)]var0 334[!end]
var0 [!uadd, [!var0], %1%%2%]
Comment - Add a day for each leap year
var1 [!uadd [!var0] [!uadd [!udiv %8%%9% 4] &
[!umul %8%%9% 365]]]
var2 [!umod [!var1] 7]
[!eq ([!var2]), (0)]string SUN[!end]
[!eq ([!var2]), (1)]string MON[!end]
[!eq ([!var2]), (2)]string TUE[!end]
[!eq ([!var2]), (3)]string WED[!end]
[!eq ([!var2]), (4)]string THU[!end]
[!eq ([!var2]), (5)]string FRI[!end]
[!eq ([!var2]), (6)]string SAT[!end]
    
```

for Nova, Eclipse, and MV Users



# GIGA-RIG<sup>®</sup>

- ❑ Gigabytes of Disk Storage
  - ❑ Plus Tri-Density Magnetic Tape Drives
- It's a GIGA-RIG!**
- ❑ The custom package takes only 6ft<sup>2</sup> of floor space
  - ❑ Choose your combination, or start small and add on:  
Fixed or Removable disks emulating Data General's  
Models 6236/37 and 6239/40 (Argus Compatible)  
Magnetic tape at 800/1600/6250 BPI



Model "Big City" GIGA-RIG  
(8 disk drives, & 6250 BPI tape drive)

## System Technology Associates

15111 Mintz Lane, Houston, Texas 77014

Service Nationwide, area offices ...

Austin - Dallas - Kansas City - St. Louis

Minneapolis - Chicago - Atlanta - Orlando

**(800) 553-5124**

In Texas (713) 440-8340

Argus is a registered trademark of Data General Corp.  
GIGA-RIG is a registered trademark of System Technology Associates

In the case of multiple correct letters with the same postmark date, the final winner will be chosen by random drawing (as is appropriate for Las Vegas).

**George Hardy of UNISYS** is looking for documentation on parts breakdown and bill of materials lists for Data General hardware. Some of this can be obtained through TIPS (call 617/366-8911 for ordering information). Data General used to hand out this type of literature freely when most users were technically oriented. The terminal guides are the most obvious sign of the trend that I've seen. Some of the first 6053 terminals I ordered included both a user manual and a technical manual that had parts lists, schematics, and other goodies. Since the D-211s and later, this is no longer the case. Specifically, what you are after would be the 015- series of documentation.

**William D. Cosby of Virginia Credit Union** writes: "I would like to know if Data General has a tape management system available for a small to moderate size tape library. It should have the following features: view information, index by tape number or by tape type, easy update, and report generation. Library size—1,000 to 5,000 tapes."

Unfortunately, I was not able to find anything for this specific application. I'll put the question to the user community, and anyone that knows of one can contact Mr. Cosby at 804/786-2511 or send in a Quick Connect card.

**Mary Ann Esfandiari of NASA/Goddard** asks: "I am a new DG MV/4000 user, and I am looking for a way to interrupt a Fortran program using some form of unsolicited I/O. This is useful if you have a long iterative process going, and you would like to stop the process under program control."

Your card came from the April issue. By now, you have most likely seen the article by John Grant in the May 87 issue. It tells all you need to know.

**Craig D. Campbell of Boise Cascade** is looking for "books or flyers on performance factors or tips for heavy use systems with CEO and multiple disk packs."

I would first refer you to Brian Johnson's articles in the January 87 and February 87 issues. That probably represents the greatest single published collection of disk performance data to date. Also, if you are not in touch with OASIS, you should be. Their newsletter is dedicated to the management and use of CEO systems. Add to that Paul Duck's article (April 87, page 21), and that should be more than enough data to digest for your first lesson. Δ

*Jim Siegman is a contributing editor to Focus, chairman of the NADGUG publications committee, and treasurer of the Chicago Area Data General Users Group. Send comments or questions to him c/o of Focus Magazine, 5332 Thunder Creek Road, Suite 105, Austin, TX 78759-4022.*

**HARDWARE • SOFTWARE SPECIALISTS**

**WE  
MEAN  
BUSINESS**

DG and MCBA. The right combination for your business.  
Now, through Westwood Systems Group, updated COBOL/COBOL versions of MCBA General Accounting and Distribution plus MCBA's full Manufacturing System.  
We do mean business for you.  
DG HARDWARE FOR QUICK DELIVERY  
• MV SYSTEMS • MV 7800 UPGRADES • CRTS • PRINTERS •

**WESTWOOD • SYSTEMS • GROUP, INC.**

161 MORSE STREET • NORWOOD, MA 02062 • (617) 769-6335

Circle 48 on reader service card.

- **Do I have enough memory?**
- **Is my cache adequate?**
- **What's my response time?**
- **What's my bottleneck: CPU, memory or disk?**

:PERFMGR can help you find the answers to these and other questions about your AOS/VS configuration.

Includes a logging facility with report generator, real-time screen monitor, file structure analyzer and performance analysis tutorial.

**AOS/VS :PERFMGR** \$399  
**10 DAY TRIAL COPY FREE!**

**:SYSMGR**

Software for System Managers  
A Division of B.J. Inc.

109 Minna Street, Suite 215  
San Francisco, CA 94105 (415) 550-1454  
TELEX: 296544 BJ INC SFO UR

Circle 43 on reader service card.

# NPA

SYSTEMS, INC.

EVERYTHING YOU'RE  
LOOKING FOR IN  
DG EQUIPMENT

AND A GROUP  
OF PEOPLE  
WHO STAND  
BEHIND IT.



Specializing In:  
**PURCHASE, SALE, TRADE,  
LEASE, RENTAL, AND SERVICE**  
Of

 **Data General**  
EQUIPMENT

**20,000 SQ. FT. DISASTER RECOVERY FACILITY**

**NEW YORK**  
761 Coates Avenue  
Holbrook, NY 11741  
**516/467-2500**  
Telex #510-222-0882  
Fax #516/467-5609  
Manhattan  
800 322-0324  
**CALIFORNIA**  
NPA Systems of CA.  
2322 Fifth Street  
Berkeley, CA 94710  
**415/848-9835**  
Fax #415/845-1665

BRANCH OFFICES IN USA & ABROAD

## DATA GENERAL SYSTEMS

### SYSTEMS

MV20000, 32 Mb,	
AOS/RTU .....	Call
MV10000, 16 Mb, AOS ..	Call
MV8000-II, 8Mb, AOS ..	Call
MV8000 9300 Series, FPU,	
2MB .....	\$9,000
MV8000 9600 Series, 2Mb,	
FPU .....	\$11,000
MV4000, 2 Mb, AOS ..	Call
C-350, BBU, 3 Bay ..	\$1,500
S-20 Systems .....	Call
Nova 4C, 64 Kb .....	Offer
MPT 100 .....	\$400
Model 20, 256 Kb, SGL FPY,	
15 Mb, USAM4 .....	Call
Model 10, 256 Kb, SGL FPY,	
15 Mb, USAM4 .....	Call
8745 BBU-MV8000-II ..	\$1,800
8746-B Expansion Chassis,	
BBU .....	\$1,800
8762 Expan. Chass.,	
MV4/8/10000 .....	Call

### DISK/TAPES/PRINTERS

6161 S/S, 147 Mb	
(New & Used) .....	Call
6161-A, 147 Mb (New) ..	\$6,900
6160 S/S, 73 Mb	
(New & Used) .....	Call
6160-A, 73 Mb (New) ..	\$5,500
6061 S/S, 192 Mb ..	\$5,800
6122 S/S, 277 Mb ..	\$5,800
6236-A, 354 Mb .....	\$13,800
6236, 354 Mb .....	\$15,500
6237, S/S, 1.06 Gb ..	\$44,500
6239, 592 Mb .....	Call
6123 Streamer Micro-Nova	
(New) .....	\$3,100
6026 S/S, 800/1600	
(New & Used) .....	Call
6026-A 800/1600	
(New & Used) .....	Call
6125 1600 bpi .....	\$2,900
4374 1200 LPM .....	\$15,000
4373 890 LPM .....	\$15,500
4327 300 LPM .....	Call
4364 600 LPM	
(New & Used) .....	Call

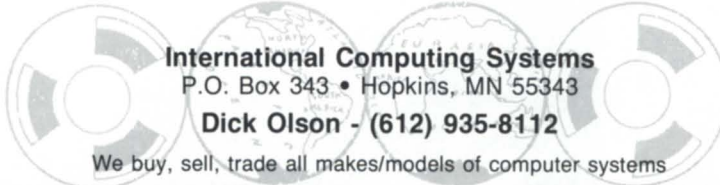
### COMM/CRTs

D215 (New) .....	\$685
D211 .....	\$550
D200 .....	\$350
D400 .....	\$425
IAC-16 .....	\$4,200
IAC-8 .....	\$3,200
ATI-16 .....	\$1,900
AMI-8 .....	\$1,100
ALM-16 .....	\$950
TCB-16 .....	Call
TCB-8 .....	Call

### MEMORIES

MV20000, 16 Mb ..	\$26,000
MV15000, 16 Mb ..	\$26,000
MV10000, 2 Mb	
MV10000, 4 Mb	
MV10000, 8 Mb	
MV8000, 2 Mb	
MV8000, 256 Kb	
MV4000, 2 Mb	
MV4000, 4 Mb	
MV4000, 8 Mb	
S120, 512 Kb	
Mod 20 & 30 all sizes up to	
2 Mb boards	

Our  
prices  
beat any  
advertised  
price!  
Call!



**International Computing Systems**  
P.O. Box 343 • Hopkins, MN 55343  
**Dick Olson - (612) 935-8112**  
We buy, sell, trade all makes/models of computer systems

Circle 26 on reader service card.

## PRODUCT SPOTLIGHT

### DG offers new Model 2T laptop computer

Westboro—Data General has introduced the DG/One Model 2T computer, a full function, laptop PC that weighs under 12 pounds. It features a backlit, supertwist LCD screen, a dual-speed CPU running 80 percent faster than the previous model, a 10 MB Winchester hard disk, and internal, removable batteries.



The laptop runs at a user-selectable dual processing speed of 7.14 or 4.77 MHz. The price of \$1,695 includes 512 KB RAM memory and one 3½-inch diskette drive. A similarly configured system with a light emitting, electroluminescent screen is available for \$2,695. All systems include a one-year warranty.

The Model 2T can be configured with up to 2.5 MB of memory. The EL model can run on an external battery pack for up to two hours.

The Model 2T is IBM PC/XT-compatible, and runs PC-compatible software programs such as Lotus 1-2-3 and WordPerfect in the 3½-inch diskette format. MS-DOS 3.2 is also included.

The 80C88 dual-speed processor is switchable to 7.16 MHz or 4.77 MHz, allowing the user to choose the speed necessary for a specific application.

The LCD system has a set of removable NiCad batteries, which can be easily replaced with a new set when recharging. Battery life is up to five hours, depending on system configuration and application. In addition to the integral trickle charger, which slowly recharges the system battery overnight, an optional external quick charger unit recharges batteries in two hours.

Both a parallel printer port and an asynchronous serial communications port are standard with the system. A serial asynchronous interface for either an 82C51 and 82C50 communications controller is also available.

Options include a letter-quality ink-

- Proven Software Packages
- Stand-alone or Integrated Modules
- National Support



1000 South Pioneer Drive • Smyrna, GA 30080

**(404) 799-1000**

- Hardware
- Vertical Systems
- Turn-Key Solutions
- Superior Documentation

## CDS Business BASIC Software

State-of-the-Art Packages For Data General Desktop to MV/15000-M20 RDOS, AOS and AOS/VS

- **Wholesale Distribution:** Purchasing, Inventory Control, Order Entry, Sales Analysis
- **Office Automation (WordPerfect):** Word Processing, Calendar, Electronic Mail, Spreadsheet
- **General Accounting:** Accounts Receivable, Accounts Payable, General Ledger, Payroll, Fixed Assets

- Wholesale Wall Covering Distribution
- Wholesale Uniform Distribution
- Wholesale Shoe Distribution
- Telemarketing
- Auction Management
- Application Generator (Dimension)
- Office Products Distribution

Also: EDS Business BASIC Software & MCBA ICObOL Software

Authorized  **Data General** System Supplier

Circle 5 on reader service card.

jet printer, an external numeric keypad with inverted T cursor arrangement, a 5/4-inch external disk drive, an 8087 floating-point unit for mathematical calculations, and a carrying case. An adapter is available to recharge the battery through an automobile cigarette lighter. Δ

## PowerHouse supports DG SQL

Ottawa, Ontario—Cognos has released PowerHouse 5.00, a fourth generation language that supports Data General's relational data base, DG SQL. The new rev is able to read and write concurrently to both DG SQL and INFOS II files.

"PowerHouse 5.00's support for both relational and traditional file management systems protects the investment our DG customers have made in INFOS II files, and allows them to use relational technology," said Ron Nordin, vice president of product marketing for Cognos. "In addition, this release features support for INFOS II's multilevel Data Base Access Method (DBAM), and offers enhanced CEO integration and improved performance."

DG SQL is DG's implementation of IBM's Structured Query Language, an ANSI standard interface to relational data base products that performs data definition and manipulation.

Version 5.00's data dictionary, PhD, can create both standard DBAM and multilevel DBAM data structures that can then be manipulated by the standard components of PowerHouse. These include Quick, an on-line transaction processor and screen builder; QTP, a volume processor; and Quiz, a report generator. An index entity provides full support for external keys and partial records in DBAM data structures.

Support for CEO has been extended to allow a user to monitor CEO activity from within PowerHouse. Support for the CEO interrupt function enables users to switch from a PowerHouse application to CEO without exiting and re-entering the application.

PowerHouse 5.00 allows developers to remap function keys, so they perform customized functions for all users within an application, saving keystrokes and data entry time.

Cognos Corporation, 2 Corporate Place  
1-95, Peabody, MA 01960; 617/720-1503. Δ

# DATA GENERAL

BUY • SELL • TRADE

★ SPECIAL - MV 10000 w/BBU ..... \$47,000 ★

**CPU's:**  
 MV 8000 9600 Series w/2MB .... \$14,900  
 DT Mod 10 w/256KB 15MB Flpy .... 1,900  
 Eclipse S/140, w/256KB, 16 Slot ... 1,950  
 Eclipse C/350 w/256KB ..... 1,900  
 MV 4000 w/2MB ..... 10,900  
 Nova 4, S/140, 16 Slot Chassis ..... 750  
 Nova 4/X w/256KB, 16 Slot ..... 1,700

**MEMORIES:**  
 8871 8MB MV4/MV10 Mem ..... \$9,900  
 8708 2MB MV 8000 Mem ..... 2,750  
 8687 256KB S/140 Mem ..... 490  
 8656 256KB MOS Eclipse Mem ..... 490  
 8765 2MB MV Universal Mem ..... 2,900  
 Nova 4 256KB Mem ..... 490

**DISKS AND TAPES:**  
 6161 147MB Disk S/S ..... \$6,900  
 6061 192MB S/S ..... 2,490  
 6160 73MB Disk S/S ..... 3,500  
 6122 277MB Disk S/S ..... 3,200  
 6026 800/1600 BPI Mag Tape S/S .. 3,500  
 6125, 1600 BPI, S/S ..... 1,750

**CRT's:**  
 D214 New ..... \$630  
 6106 Dasher D100 ..... 195  
 6120 Dasher D400 ..... 490

**COMMUNICATIONS:**  
 IAC16 w/TCB ..... \$4,500  
 SBS MUX w/TCU ..... 190  
 4257 ALM 16 w/4 EIA Interface ..... 500  
 4340 AM18 ..... 550  
 4342 AT116 ..... 1,800

**PRINTERS:**  
 2290 900LPM ..... \$1,500  
 4327 300LPM Band w/DCH ..... 2,900  
 DG 4215 600LPM Drum ..... 900  
 6190 LP2 Enhanced ..... 950

**CONTROLLERS:**  
 Floating Pt. for S/140 ..... \$1,200  
 25MB, 10MB, 20MB, Controllers ..... 400  
 Comm Basic I/O ..... 1,200  
 Kismet 73/147MB Controller ..... 1,100



**COMPUTER WHOLESALERS**

MARK BRADY 404 455-4542  
 3246 Marjan Drive Doraville, Georgia 30340

Circle 9 on reader service card.

## We've got a bang-up solution for your growing pains.

**S**o you need more computer power. Your best bet is to talk to us, Hanson Data Systems. We've got a complete lineup of newly reconditioned Data General equipment. All types of processors, peripherals, memory, communications, controllers—everything. And at prices as little as 50% of what Data General charges.

Plus repair service, depot repair and training. You can read all about it in the next issue of the HANSON HOTLINE. So get on our mailing list, or call Hanson Data Systems, 60 Brigham St., Marlboro, MA 01752. (617) 481-3901. Outside Mass.: (800) 225-9215. FAX #: 617-460-0593.



**HANSON**  
 DATA SYSTEMS, INC.

**Data General's Only  
 Single-Source Second Source.**

## EVB offers reusable Ada software components

Frederick, MD—EVB Software Engineering, Inc. now offers CPU-based licensing for its Ada software components library, GRACE (Generic Reusable Ada Components for Engineering).

GRACE is a set of 275 generic reusable Ada building blocks, based on a component taxonomy developed by Grady Booch and enhanced by EVB. Each component includes source code listings, all design documentation, at least one test program, and a bibliography. GRACE is generic in the sense that it can be used with any Ada software application. GRACE is also hardware and operating system independent. The only requirement for GRACE is a validated Ada compiler. All GRACE software is guaranteed, and there are no maintenance fees.

EVB has offered GRACE on a corporate site license basis since June 1985.

Prices range from \$4,725 for a single-user PC/workstation to \$26,250 for a mainframe.

EVB Software Engineering Inc., 5320 Spectrum Dr., Frederick, MD 21701; 301/695-6960. △

## O'Neill Data Systems opens disaster recovery center

Lenni, PA—O'Neill Data Systems announces the opening of a computer disaster backup and recovery service for companies using Data General equipment. The center is located in Lenni, Pennsylvania, approximately 30 minutes from Philadelphia.

According to John O'Neill, president, the service provides DG users with a full contingency plan in the event of a computer emergency. The service includes access to a hot site with a fully configured MV/10000 system and office space for processing and management staff.

If a company's operations are disrupted for any reason (such as fire, smoke, water, explosion, or sabotage), the entire operation could be functional again within two hours at the O'Neill center.

For an annual fee, O'Neill Data Systems prepares a disaster recovery plan for a client, outlining emergency measures. Company operational procedures are programmed into the mainframe for immediate retrieval if necessary, and an inventory of equipment is prepared for insurance purposes.

In the event of a problem, O'Neill consultants assist in the transition of people and operations to temporary quarters in Lenni. The 6,500-square-foot facility is equipped with standard office equipment and furniture to house approximately 70 clerical personnel and 20 managers.

The offices and computer equipment are available to clients 24 hours a day, every day of the year. O'Neill recommends a quarterly "fire drill" to familiarize personnel with the system.

O'Neill said investing in a disaster recovery plan is fiscally sensible. Many in-

# SYSGEN DATA Ltd.

MARKETING

## Data General COMPUTERS & PERIPHERALS WORLDWIDE

SYSTEMS	CPU	CRT & PRINTERS
MV 8000, 9600 SERIES 4MB, AMI-8, ATI-16 6026 TAPE DRIVE IN STOCK/CALL	MV 8000, 4MB ..... \$10,775 MV 8000 II 4MB ..... \$28,750 MV 4000 2MB IN STOCK-CALL MV 10000 4MB IN STOCK-CALL M/600, 1MB ..... \$2,000	6053 TP 2 D-200 LP 2 D-214 NEW B-300 D-215 NEW 900 LPM D-411 NEW 4218 S/S D-461 NEW
MV 4000, 2MB, 6161 1AC-8, 6125 IN STOCK/CALL		
M/600, 1MB, 6026 ALM-8, ALM-16 B/B ..... \$3,800		
	DISKS & TAPES	COMM
	6236 6122 6239 6026 6061 6299	IAC-8 ATI-16 ALM-16 IAC-16 ALM-8 4251 AMI-8
MEMORY	SPECIALS	
ECLIPSE 256K NOVA 256K MV 4000-2MB MV 10000-8MB MV8000-2MB	MV8000-2MB ..... \$8,500 ATI-16 ..... \$1,375 AMI-8 ..... \$995 6053-M CRT ..... \$150 TP2 BLUE w/KSR ..... \$650	DG LASER ..... \$2,850 4327-A ..... \$2,350 4244-900LPM ..... \$1,850 6026 S/S ..... FROM \$2,850

END USER FINANCING    SHORT AND LONG TERM LEASING

PRICING SUBJECT TO CHANGE WITHOUT NOTICE  
QUANTITY DISCOUNTS AVAILABLE ON ALL ITEMS  
ALL EQUIPMENT SOLD IS WARRANTED FOR 30 DAYS

WE ALSO DISTRIBUTE IBM PC, XT, AT, COMPAQ & PERIPHERALS

77 AIR PARK DRIVE, RONKONKOMA, NY 11779    (516)737-4300    fax: (516)737-4317

Circle 42 on reader service card.

# PC/VS™ PopTerm/ 200™

...the Rational  
approach to personal computing

From the experts in  
LANs and micro-mini integration

# Rational Data Systems

5725 Paradise Dr. Corte Madera, CA 94925  
415/924-0840

Circle 37 on reader service card.



insurance companies offer favorable rates for computer-dependent businesses that have a thorough backup program. "Without computers, invoicing and revenue collection would be seriously curtailed. At this point, a firm might have to choose expensive financing or damage to credit. We can eliminate this problem altogether. Our program hits home in dollars and cents," said O'Neill.

In addition to disaster recovery services, O'Neill Data Systems offers data processing consulting services, contract programming, and Data General hardware sales. Clients can also use the computer facilities for production during the client's busy periods.

O'Neill Data Systems, 714 Market St., Suite 500, Philadelphia, PA 19106; 215/238-7171. Δ

## DG announces key-to-disk data entry

Westboro—Data General Corporation has announced AOS/VS Keyspeed, a key-to-disk software utility for the Eclipse MV family of superminicomputers. Designed for high-volume data entry applications, Keyspeed handles standard data entry functions including record entry, verification, deletion, and movement. It supports up to 20 data entry stations per process and operates on any standard DG terminal. An on-line screen definition and modification capability is provided.

The product is suitable for organizations with significant data entry requirements, such as government prime contractors, state businesses, and bank and credit organizations. The statistical reporting capability keeps track of operator keystrokes, so performance can easily be monitored.

Keyspeed conserves system resources by reducing terminal and disk input/output. With Keyspeed software, keystations are enabled and disabled interactively, so there is no need to reconfigure the entire computer system.

Other features include full batch control, an automatic operator activity log, and automatic restart/recovery capabilities. It also provides supervisors with global control of jobs in progress.

Keyspeed incorporates a menu-driven supervisor interface and function key oriented operator commands. Supervisors can monitor keystation activity; assign attributes to restrict access to a job file; or specify certain data entry functions. Operator activity listings

record work sessions and keep statistics on job files in use such as time; date; number of records entered, verified, deleted, or corrected during verification; and average number of keystrokes per minute.

To ensure accurate data entry, Keyspeed incorporates a series of verification procedures and allows the user to install additional verification routines.

Keyspeed controls and tracks records that have been entered, released for verification, and verified for all job files. As a result, operators are prevented from verifying records that the data entry operator has not yet released.

Prices for Keyspeed start at \$5,250. Delivery takes 30 days after receipt of order. Δ

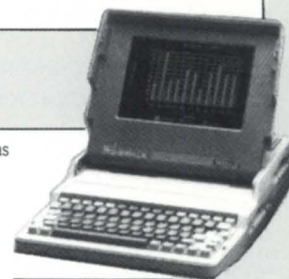
## BRAND NEW DATA GENERAL HARDWARE AT USED HARDWARE PRICES!



### BRAND NEW EQUIPMENT

D-214	\$ 605.
D-215	685.
D-411	905.
D-461	1,135.

Price listed includes monitor, keyboard and power cable. OEMs and volume buyers call for quantity discounts.



CALL FOR PRICES ON THE MV/2000™

Data General has introduced a new line of CRTs and Alpha-Kenco has them at rock bottom prices. Now you can purchase brand new Data General terminals priced lower than compatibles. This new line of Data General CRTs features: screen-saver — for extended life; soft set-up — for easy installation; blink, dim, reverse video and underscore on a character-by-character basis; alphanumeric display; low-profile, ergonomically-designed keyboard with tactile feedback; small footprint packaging; industry-standard asynchronous communications interface; Data General Dasher™ D-200 and D-400 series compatibility.

From cables to Desktop Generation™, from the MV/2000™ to the MV/20000™, from the Data General/One to the Dasher/One, for printers, memory and communications we are the one stop source for all your Data General needs. All equipment is brand new, in stock, fully warranted by Data General, eligible for a service contract and of course sold at the lowest price.

For further information and FREE catalog call:

**TOLL FREE 800-44-KENCO**  
In New York State (718) 417-8000

Telex: 251554 KENCO UR · FAX #718-417-8683

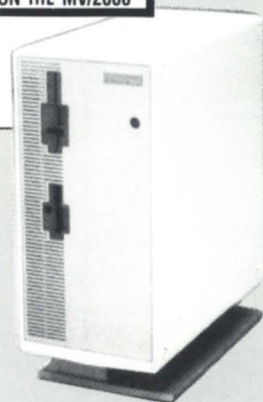
**KENCO DATA SYSTEMS**  
SYSTEMS & ELECTRONICS

57-18 Flushing Avenue, Maspeth, NY 11378

Formerly Alpha-Kenco Inc.

Dasher, Dasher/One, Data General/One, Desktop Generation, MV/2000 and MV/20000 are trademarks of Data General Corp. Photos courtesy of Data General Corp.

©Kenco Data Systems Inc.



Circle 27 on reader service card.

## Dataram offers add-on memory for MV/7800

Princeton, NJ—Dataram has announced the DR-7800, a memory product designed for users of Data General's

MV/7800 processor. With options for 4 MB, 8 MB, and 10 MB capacity, the DR-7800 is available for July shipments.

According to Patrick Carr, product manager for Dataram, the DR-7800 is the only third-party alternative for MV/7800 memory expansion.

Dataram claims the following benefits for the DR-7800:

- Initial purchase cost savings—Dataram offers a matching discount program that guarantees a 40 percent cost savings.
- Lower cost of ownership—According to Dataram, the memory boards require no maintenance, which reduces the cost of ownership during a five-year period by as much as 70 percent.
- Reliability—Dataram uses 1 MB memory chips, so it doesn't use as many components or solder connections. It also doesn't require as much power.
- Easy installation and troubleshooting—The DR-7800 can be installed by users with help from the installation guide. For troubleshooting purposes, a memory on-line/off-line switch, which is accessible from the rear card edge, allows the electrical disabling of memory without physically removing the board. By taking the DR-7800 off-line when servicing the system, any possible confusion over the source of a problem is eliminated.
- Lifetime warranty—A lifetime warranty/express spares program, service call reimbursement policy, and risk-free trial period are part of the standard offering for MV/7800 users.

Dataram Corporation, P.O. Box 7528, Princeton, NJ 08543-7528; 609/799-0071. Δ

## ECO board designed for 6021 power supplies

Orange, CA—Computer Technology Inc. has introduced the T-ECO, a device that eliminates the frequent problem of transistor burnout in the power supplies of Data General 6021 tape drives. These drives can be found in older models, specifically the Novas. T-ECO alleviates transistor failures associated with most 6021 tape drives manufactured before 1976.

The 1-inch x 3-inch daughter board modifies the duty cycle of the transistors to reduce heat stress, which is the primary cause of transistor failures. Previously, repair options available were limited to replacing transistors as they failed, swapping components, or buying a new tape drive.

Power supply repair and installation of T-ECO is \$400. It comes with a one-year warranty, and is available immediately.

Computer Technology Inc., 1442 W. Collins Ave., Unit B, Orange, CA 92667; 714/538-2344. Δ

## AOS/VS®, CEO®, and INFOS® users across the country sing the praises of the VS TOOLBOX™

*"I estimate that the VS TOOLBOX has helped us defer a decision on acquiring a larger computer for at least a year."*

*"Our only regret is that we didn't have the TOOLBOX a few years earlier."*

Fresno, California

About the REBUILDER, a utility that will reorganize any INFOS file:

*"I have been regularly rebuilding all our INFOS files and have had some dramatic improvements."*

*"...I wish all our software suppliers were as knowledgeable and cooperative as your company has proven to be."*

Roseland, New Jersey

About the TERMINATOR, a utility that eliminates inactive or unwanted processes:

*"...our user community no longer complains that they can't get on the system ... we won't have to purchase additional IACs to handle our current user population for at least another year."*

*"The VS TOOLBOX ... has proven to be a valuable and cost-effective solution to our problems."*

Coral Springs, Florida

## EAGLE Software, Inc.

P.O. Box 16 / 169 E. Cloud  
Salina, Kansas 67402-0016

**(913) 823-7257**

AOS/VS®, CEO®, and INFOS® are registered trademarks of Data General Corp.

VS TOOLBOX®, REBUILDER®, and TERMINATOR® are trademarks of EAGLE Software, Inc.



(from page 38)

Commands will not print in your document. Each command must be on a line by itself followed by a carriage return. They can appear on the first page for the entire document. If not, the feeder thinks it is text and will print the command. The command will stay in effect in the printer until a new command is received. The printer will return to the default tray (number 2 within the printer) once a print request is complete. Also, note that new tray commands will not affect the paper length command that is already in effect.

Tray commands for several pages are written on a balance page. An example is shown as follows:

Command	Description
//L//	feeds legal paper from tray 1
//S//	feeds letterhead from tray 2
//4//	feeds envelope from tray 4

Using the above banner page, you can print a chart on legal paper along with the envelope and the accompanying letter or memo. Your text will begin on page two of the document.

**Important warnings**

1. Do not attempt to fix the feeder and printer by randomly pressing buttons. This will most likely make the problem worse. Most importantly, do not turn the Ziyad or the HP LaserJet off by using the power switch. Doing so will put the printer/feeder in a locked state. Follow these steps for turning the unit off and on:
  - a. power off the HP LaserJet
  - b. power off the Ziyad feeder
  - c. power on the Ziyad feeder
  - d. power on the HP LaserJet
2. You cannot have two paper commands on the same page of a document, or the feeder will not work.
3. After printing from tray 1 or 2, the manual feed light will stay on. Do not press the manual feed button. This will

cause the printer to feed two sheets of paper: one from the feeder and one from the HP LaserJet.

4. A legal tray is not allowed in tray 3. This will cause an error, and PC-LL will flash on the display.
5. Attempts to co-mingle letters and envelopes in one document have been unsuccessful. Print all of the letters and then all of the envelopes.

In the end, cost will be one of the major factors in the selection. With the number of lasers on the market, competitive pricing is imperative. Installations will find some way of making unsupported units work, rather than paying a premium to replace them with models supported by CEO. Δ

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

**TRI-US AT TRI-DATA**

**We Buy-Sell & Trade**

**CPU's & MEMORIES:**

MV 2000/4000/6000/8000/10000  
MV, Eclipse & Nova Memory  
S/140, Nova 4, Nova 3/12  
Model 10/20/30 15MB

**DISKS & TAPES:**

6070 20MB Disk S/S  
6045 & 6095 10MB Disks  
6060 96MB Disk S/S  
6101 12.5MB, 1.26 S/S  
6067 50 MB Disk S/S  
6021 800BPI TAPE S/S  
6026 800/1600 BPI S/S  
6125 1600 BPI TAPE S/S  
6236 354 MB

**PRINTERS:**

4034-G 300 LPM S/S  
6174 TP2 180CPS w Keyboard  
4215 600LPM S/S  
4364 600LPM S/S

**CRT'S:**

6130 D-400  
6134 D-450  
6134 D-410  
6246 D-460  
6108 D-200  
6168 D-210  
6053 D-2

**COMMUNICATIONS:**

4255 ALM-8  
4241 ULM-5  
4368 IAC-16  
4257 ALM-16  
4007/10 Cassette I/O  
IAC-8

**SOFTWARE FOR:**

Construction, Distribution, Manufacturing,  
Trucking, High Technology, Video Stores,  
Professional Time & Billing  
and Retail point of sale

Call for prices on Equipment not Listed

All Equipment Guaranteed  
For Data General Maintenance.

**TRI-DATA**  
SERVICES INC.

3220 Beta Ave., Burnaby, B.C.  
Canada V5G 4K4 604-291-2360  
FAX #604-291-9162

**R.J. & ASSOCIATES, INC.**  
**25 YEARS OF COMMITMENT**

**BUILT ON:**

- TOP QUALITY EQUIPMENT
- COMMITMENT TO DEADLINES
- COMPETITIVE PRICES

**BUY • SELL • TRADE • LEASE**

**CPU & SYSTEMS:**

MV/20,000 System  
MV/10,000 System  
MV/8,000 System  
Eclipse S/280 w/512 KB  
Eclipse S/120 w/512 KB  
Eclipse C/350 Sys.  
Eclipse C/330 w/256 KB  
Eclipse C/150 w/256 KB  
Eclipse S/140 w/256 KB  
Nova 4/16 Slot, 256 KB  
Nova 4/16 Slot, 64 KB  
Nova 3/12 w/64 KB

**DISK & TAPE:**

6045 10 MB Disk S/S  
4234 10 MB Disk S/S  
6160 73 MB Disk S/S

6161 147 MB Disk S/S  
6236 354 MB Disk S/S  
6067 50 MB Disk S/S  
6060 96 MB Disk S/S  
6061 192 MB Disk S/S  
6122 277 MB Disk S/S  
6125 Streamer Tape  
4196-A Tape Drive  
6026 Tape Drive S/S  
6021 Tape Drive S/S

**CRT & PRINTER:**

6052 D1 CRT  
6053 D2 CRT  
6106 D100 CRT  
6108 D200 CRT  
6169 D211 CRT  
4218 300 LPM Printer

4327 300 LPM Band Prtr.  
4364 600 LPM Band Prtr.  
6194 TP 2 Prtr. Console

**COMMUNICATIONS:**

4251 Comm. Chassis  
4255 ALM-8  
4257 ALM-16  
4241 ULM-5  
4340 AMI-8  
4263 SLM-2  
4060 Quad-Mux  
4250 DCU-50  
4254 DCU-200

**MEMORIES:**

MV/8000 Memory  
8656 Eclipse 256 KB Mos.  
8655 Eclipse 128 KB Mos.

8655 256 KB S/140 Mem.  
Nova 2 Memory

**MISCELLANEOUS:**  
8537 12 Slot Exp. Chas.  
1144-A 1 Bay Cabinet  
1144-B 2 Bay Cabinet  
1012-P 1 Bay Cabinet  
4034 Prt. Controller  
6045 Disk Controller  
4068 PIT Board  
Zebra Disk Cont. & Adapt.  
Nova 3 Triple Option  
8532 NOVA 3 BBU  
Basic Cassette I/O  
Data Channel Prt. Cont.

**MONTHLY SPECIAL:**

MV/15,000 Mod. 8 w/8mb  
(Call For Price)

CALL FOR COMPLETE  
PRICE LISTING:

**404-980-1586**  
**R.J. & ASSOCIATES, INC.**

- All Data General Equipment Guaranteed for DG Maintenance
  - We Pay \$\$\$ For All Used Equipment
  - All Prices Negotiable
  - Software Services Available
- 2262-E NW Pkwy. • Marietta, GA 30067 • (404) 980-1586

Circle 46 on reader service card.

Circle 36 on reader service card.

(from page 28)

*Since AOS/VS is used on nearly every continent, it can't include a full encryption facility without running afoul of export restrictions.*

one-way encryption facility—once a password has been encrypted, there is no way (short of brute-force processing) to decrypt it.

(Side note: when I started using AOS back in 1978, the system manager's manual stated that there was no way to look up a user's password if it was forgotten—all we could do was issue a new password. We all figured out that this wasn't really true, once you knew how to look at a file in :UPD. But not any more; if a user forgets a password which has been encrypted, the only option is to run PREDITOR to assign a new one.)

Your next question is probably, "How can EXEC verify my password, if my password can't be decrypted?" Easy. EXEC encrypts what you just typed, and if it matches what was stored in the profile in :UPD, then what you typed must have been correct. (Using this scheme also means that a core dump is less likely to contain information that could be used to compromise the system.)

Now, it would seem logical that AOS/VS would also have a CRYPT system call to do DES encryption and decryption. But it doesn't. It seems that federal directive ECCN-1750A makes it unlawful to export "auxiliary military equipment," including cryptographic devices. Software performing DES encryption, for some strange reason, is covered—even though the algorithm is public knowledge and easily implemented by any programmer. Since AOS/VS is used on nearly every continent (Antarctica is the only one I'm not sure about), it can't include a full encryption facility without running afoul of export restrictions.

## Applications

Having been through all this, what now? If your facility is totally secure, none of this may matter. But if you're concerned about maintaining the confidentiality and integrity of data being transmitted over communications lines or of files subject to the roving eyes of your privileged users, you might want to consider using encryption.

For protecting data transmissions, I recommend a black box—it would be tough to write software that could keep up with the necessary data rates. A number of manufacturers sell devices to perform DES encryption and decryption. Some of these boxes just handle the DES stuff, while others have been incorporated into modems. Your friendly local supplier of modems and multiplexors should be able to help.

If you're worried about personal computers (and if my valuable data were floating around on floppies or even on hard disks in computers that would fit in my briefcase, I'd be worried), you can also buy black boxes to encrypt data when written to disk and to decrypt when read.

Finally, if you've got too many superusers on your system, and the director of personnel is worried about the confiden-

tiality of his files, you probably want to write some encryption software. (Just to prove to myself that it could be done, I have successfully prototyped a CEO user application for encrypting and decrypting CEO documents.) I suggest that you use DES, rather than developing your own algorithm. Don't make the mistake that the folks at Lotus did. They put a file encryption scheme into 1-2-3 and Symphony, and since none of their hotshots were able to crack it, they figured that nobody else could either. But somebody else did—with a 5 KB Pascal program.

Now that you know all about decoder rings, what about bit buckets? That's easy—if you start encrypting, just don't lose your keys! Δ

---

*Tom Gutnick is a regional systems engineering consultant in Data General's Washington, D.C., commercial branch, where he specializes in system security and performance issues. He was the newsletter editor for the AOS and AOS/VS Special Interest Group from 1981 to 1984. He can be reached at 703/827-9600.*

---

## Additional reading

Davies, D.W. and W.L. Price,

*Security for Computer Networks: An Introduction to Data Security in Teleprocessing and Electronic Funds Transfer.* Chichester: John Wiley & Sons, Ltd., 1984.

Gaines, Helen Fouche,

*Cryptanalysis: A Study of Ciphers and Their Solution.* New York: Dover Publications, Inc., 1956.

National Bureau of Standards,

Federal Information Processing Standards Publication 46, Data Encryption Standard, 1977.

Smith, Laurence Dwight,

*Cryptography: The Science of Secret Writing.* New York: Dover Publications, Inc., 1955.

Tanenbaum, Andrew S.,

*Computer Networks.* Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1981. Δ

## Erratum

*The Focus staff got a little carried away with transposition ciphers last month—we transposed parts of two paragraphs on pages 31 and 32. The paragraphs should have run as follows.*

How do we go about implementing a cipher machine electronically? Transpositions and substitutions can be done with very simple circuits (or even software algorithms). Figure 4 shows a P-box, which can apply a permutation, or transposition, to a string of bits. The binary number 01011010 (octal 132) would transpose to 11001010 (octal 212). With appropriate internal wiring, any of 8! (40,320) possible transpositions can be effected.

Figure 5 shows the schematic for an S-box—an electronic implementation of a substitution cipher. In Figure 5, a 3-bit plaintext input selects one of the eight lines exiting from the first stages and sets it to 1; all the other lines are set to 0. The second stage is a P-box, which transposes the bits, so that a different line is input into the third stage for conversion into binary again. With the wiring shown, 0 would be encoded to 2, 1 would encode to 4, 2 to 5, and so on. Again, depending on the P-box, any desired substitution can be performed.

*We apologize for our error.* Δ

## SOFTWARE

### Interplot™

Calcomp, Tektronics (Preview), Zeta, & Houston Instruments Fortran 77 plot interface for DG GKS supported graphics devices. ICDI 11017 Francoise Houston, Texas 77042 (713) 266-9227

### The Documentation Specialist™

Creates Program Documentation. AOS/VS Fortran 77, Fortran 5, Cobol & Assembly. Isaacs Consulting & Development, Inc. 11017 Francoise Houston, Texas 77042 (713) 266-9227

### Reformat™

'Reformats' program source code to a standard, easy to read format. Fortran 5 Isaacs Consulting & Development, Inc. 11017 Francoise Houston, Texas 77042 (713) 266-9227 DG AOS or AOS/VS

### The Professional Programmer™

Programming subroutines for Fortran 77 with AOS/VS or Fortran 5 AOS, AOS/VS. Isaacs Consulting & Development, Inc. 11017 Francoise Houston, Texas 77042 (713) 266-9227

# B32

- Fully DG Business Basic Compatible
- 32 Bit Implementation
- Greatly Improved Performance
- Powerful New Features
- Up to 512K Program Size

## MAXON

COMPUTER SYSTEMS INCORPORATED

575 MADISON AVENUE SUITE #1006 NEW YORK, NEW YORK 10022 (212) 227-1922

85 SCARSDALE ROAD SUITE #200 TORONTO, CANADA M3B 2R2 (416) 445-4823

## Communicate

DG to DG DG to PC DG to ??

Convert, upgrade, and share data quickly and easily—use **BREAKTHROUGH**.

**XMODEM** Error-free industry standard.  
**SPEED** Written entirely in Assembler.  
**PRICE** \$195 to \$345.  
**SYSTEMS** AOS/VS, AOS, RDOS, DOS, ICOS.  
**(815) 229-0189**

Applied Computer Solutions, 2606 Broadway, P.O. Box 7902, Rockford, IL 61126

## WORDPERFECT. MADE EASY WITH PERFECT TEACHER.

(Now available for the 4.05 Version of WordPerfect)

A complete and comprehensive video training program for WordPerfect users. All versions can be ordered in Beta, VHS, and U-Matic formats. Please write or call:

CMS DATA Post Office Drawer 10588 Tallahassee, FL 32302-9990 (904) 878-5155

## EMPLOYMENT

### Programmer/Analyst

Medical software company. Experienced individual with minimum 3 years of developing and maintaining software utilizing ICOBOL under RDOS and/or AOS. We are a rapidly growing company offering competitive salaries. Qualified applicants should submit resume to Nova Data Systems, 2 Seaview Blvd., Port Washington, New York, 11050, attention Robert E. Orzel.

Needed Data General senior field engineer. Dallas/Ft. Worth area. Minimum 5 years experience. Must know MV/ to Nova's all inclusive. Send resume and salary requirements to: Compuplan International Inc., P.O. Box 1676, Duncanville, TX 75138.

## Ad INDEX

Company	PG#	RS#	Company	PG#	RS#
Algoma University	20	1	Isaacs Consulting & Development, Inc.	59	-
Ames Sciences, Inc.	8	2	Isaacs Consulting & Development, Inc.	59	-
Applied Computer Solutions	59	-	Kenco Data Systems	55	27
Butler Computer Graphics, Inc.	46	3	Lions Gate Software Inc.	18	28
Catalina Computers, Inc.	1	4	MAXON Computer Systems Incorporated	C2	29
CMS/DATA	59	-	MAXON Computer Systems Incorporated	59	-
Commercial Data Systems Corporation	52	5	McIntyre's Mini-Computer Sales Group Inc.	47	30
Commercial Data Systems Corporation	6	6	MegaTape Corporation	13	31
Computer Engineering Associates, Inc.	16	7	Minicomputer Exchange	40	32
Computer Technology Inc.	35	8	Nova Data Systems	59	-
Computer Wholesalers	53	9	NPA Systems, Inc.	51	33
Copley Systems Corporation	42	10	PAR Systems	32	34
CRC	C3	12	Peregrine Data Systems	44	35
CRC	23	11	R.J. & Associates, Inc.	57	36
Data General Corporation	14	-	Rational Data Systems	54	37
Data General Corporation	43	13	Rhintek, Inc.	32	38
Data Investors Corporation	29	14	SAS Institute Inc.	31	-
Dataram Corporation	5	15	SCIP	45	39
Delphi Data	46	16	Security Computer Sales, Inc.	9	40
DMS Systems, Inc.	8	17	Sigma Data Services Corporation	33	41
Eagle Software	56	18	Sysgen Data Ltd.	54	42
Essex Computer Service, Inc.	20	19	:SYSMGR	50	43
Fast Track Systems, Inc.	11	20	System Technology Associates	49	44
Hanson Data Systems, Inc.	53	21	Threshold, Inc.	7	45
HBI Business Systems	38	22	TRI-DATA Services Inc.	57	46
INFODEX Incorporated	28	23	Vantage Software, Inc.	6	47
INFODEX Incorporated	28	24	Westwood Systems Group, Inc.	50	48
Integrated Computer Systems	21	25	Wild Hare Computer Systems Inc.	10	49
International Computing Systems	52	26	WordPerfect Corporation	3	50
Isaacs Consulting & Development, Inc.	59	-	Zetaco	C4	51
Isaacs Consulting & Development, Inc.	59	-			

Senator Robert C. Byrd recently praised Data General and MountainNet, Inc. for their "initiative and entrepreneurial spirit." Byrd said he hopes a new venture between DG and MountainNet will be the forerunner of many such agreements between national corporations and small West Virginia businesses.

MountainNet, located in West Virginia's "Software Valley," is using an MV/8000 II to give its customers access to Ada, artificial intelligence, and expert systems software. Subscribers to the service use their own personal computers or terminals and MountainNet's network to tap into the system. MountainNet used its agreement with the Software Valley Corporation to obtain the DG Ada Development Environment, and Mike Dignan, the company's president, says his firm will offer the service with an attractive price reduction to the 1100 Software Valley associates.

Data General's "Pegasus" project (also known as the Data General In Concert series) was an off-Broadway hit. After successful appearances in Houston and Chicago, DG scheduled the traveling expo for New York's Marriott Marquis Hotel (*on* Broadway). Reporters and consultants were promised a demonstration of new networking products—and a buffet luncheon afterward.

Vince O'Connell, president of Security Computer Sales, had something to cheer about late in May. "We won what we believe to be the largest buy of second market DG computers ever," he said. SCS's winning bid of \$518,000 was for seven MV/10000s, three MV/8000s, 30 disk drives, 20 IAC-16s, and seven (yes, seven) DG terminals. The seller was 3M Corporation. O'Connell credits Paul Berglund, SCS vice president, for much of the work that led up to the contract. Their reward will be to spend a lot of time on the phone trying to resell the equipment—which they expect to bring about \$725,000.

"Computer Associates is now the largest independent software company in the world," said Anthony W. Wang, the company's president and CEO. A strong fourth quarter pushed CAI past two milestones: \$100 million for a single quarter, and \$300 million for the

year. Annual revenues and net income were up 62 percent and 97 percent, respectively.

Penta Systems International received an order from Combined Communication Services for a \$560,000 publishing and text processing system built around two MV/7800s. CCS, one of the largest printing businesses in the United States, produces some 150 monthly trade journals and magazines. C. Victor Meyer, Penta's president and CEO, said this was the tenth major commercial account this year to select Penta to replace a competitive system.

After a seven-year business relationship, Data General decided to buy the technology assets of Easinet Pty. Ltd., the Australian developer of DG's TEO/3D engineering data base software. DG is offering most of Easinet's employees jobs in the Applications Business Unit that reports to vice president Donald McDougall.

There was an interesting story behind DG's announcement of the new DG/One Model 2T. Since the units are manufactured by Nippon DG, it looked as though they would run afoul of the recent executive order penalizing Japanese-made 16-bit computers. However, the Commerce Department exempted the DG/One on the grounds that its 16-bit 80C88 microprocessor has an 8-bit data path.

3CI Incorporated signed a reseller agreement with WordPerfect Corporation after testing a preliminary integration of 3CI's InFoCen relational DBMS and the WordPerfect shell and library functions. Word processing users can access InFoCen from the WordPerfect shell, or access WordPerfect while executing InFoCen, and data can be migrated between the two systems. 3CI says additional levels of integration will build on InFoCen's textual data management capabilities and WordPerfect's file management functions.

Software Escrow Services, Inc. is marketing a service called CompuSafe to provide safe storage of proprietary software. Software developers and publishers usually don't want to release their source code to users, but users want to be sure the sources will be available in case the supplier can't con-

tinue to support the software. According to SES, CompuSafe is contractually bound to both parties, which makes it a fair and impartial custodian. For more information, call 303/798-5352.

Data General has signed new Independent Software Vendor agreements with WordPerfect Corporation and Access Technology, Inc. that will let DG sell the WordPerfect word processor and Access Technology's 20/20 spreadsheet directly to its customers.

Health Data Sciences Corporation has signed a three-year contract with Data General valued at more than \$11 million. DG will provide approximately 10,000 specially developed hospital bedside terminals for use with HDS's Ulticare software, a hospital information system intended to improve the quality of patient care and shorten the length of hospital stays. The 14-inch terminals are specially designed with screens that will not shatter if the terminal falls, and wiring that minimizes shock hazards. A special data/voice board carries voice and data over the same line, while a variety of paging, windowing, and video display attributes enhance usability.

FEDRAG is the newsletter of the NADGUG Federal Special Interest Group, but you don't have to be a Federal employee to find it interesting. The April issue carried an article by George W. Muller (Office of the Inspector General, U.S. Department of Labor) about IGMENU.PR, a multilevel menu program that insulates nontechnical users from the CLI with a series of 1-digit choices. It uses less memory than CLI, and its CPU usage is minimal. Best of all, it's free. Because it was developed on Federal time and computers, it's in the public domain. For more information about FEDSIG, contact Milo Naranjo, president (also in the DOL's Office of the Inspector General, 202/523-2813).

MAXON Computer Systems' MICOM accounting packages have won awards in McLean Hunter's Directory of Software for the third year in a row. The accounting software awards are based on user surveys ranking hundreds of U.S. and Canadian packages for support, documentation, efficiency and cost. Δ

# CRC sales. Where USED is not considered a four letter word.

At CRC, we can offer you, the customer, USED computer components to meet your needs. We offer top-quality USED hardware at highly competitive prices.

We pride ourselves on the excellent condition of our entire USED inventory. We recondition and test all equipment until it looks and functions like new.



And once we close the sale — we don't close the door. Our sales and service staff team up to provide ongoing support. In fact, we guarantee your first follow-up call no later than 5 days after you receive your order.

At CRC, USED equipment makes sense. Sense for the industry and cents for our customers.

## CRC


*BECAUSE THERE IS NO UPSIDE TO DOWNTIME*

19 NORFOLK AVE., SOUTH EASTON, MA 02375

(617) 238-2090/1-800-225-5615

*A Subsidiary of American Express*

Circle 12 on reader service card.



## *Enter a New World of Performance for MV Systems*

Now you can make a high performance system even faster: Zetaco's Argus-emulating disk controller, Model ARZ-1, will improve the through-put of your Data General Eclipse/MV.

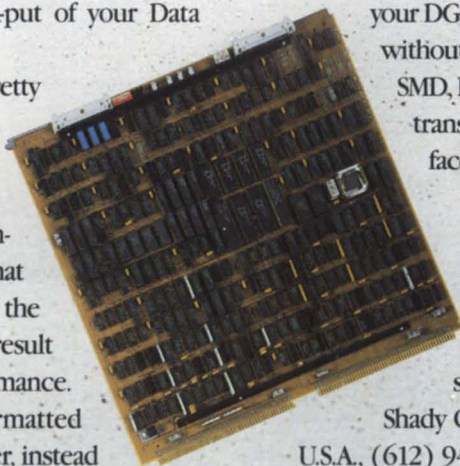
ARZ-1 isn't just another pretty interface. It is the most intelligent controller ever designed for the DG world. It acts as a co-processor, off-loading the data command functions from the CPU so that your MV can do other tasks while the controller manages the disk. The result is significantly faster system performance.

ARZ-1 offers greater formatted storage capacity, too. The controller, instead of the software driver, maps the disk, thereby obtaining maximum use of the available capacity.

No longer does the drive need to fit a specific head/cylinder/sector configuration to work with your DG system. The ARZ-1 does the work - without patching, without hassle. Any four SMD, HSMD or SMDE disk drives, with data transfer rates up to 3 MB/sec, can interface the ARZ-1 via the high-speed BMC.

The ARZ-1 Disk Controller. Fast. Efficient. Designed to reach new horizons of higher performance.

Call or write for complete specifications: Zetaco, Inc., 6850 Shady Oak Road, Eden Prairie, MN 55344 U.S.A., (612) 941-9480, telex 290975. European Office: 9 High Street, Tring, Hertfordshire HP23 5AH England, (44)44282-7011, telex 827557.



**ZETA** 

*The Link To Tomorrow.*