

M1W/9C739

acs academic computing services Newsletter

Volume 24, Number 1

University of Minnesota, Twin Cities

January, 1990

In this Issue

EQS on VX
EQS has been upgraded to Version 3.0 on VX. 4

Minitab 7 now default
Minitab 7 is now the default on VX. 5

New VX Briefs
Information on EDT, printing files, and equivalents to NOS commands is now available. 7

Selecting storage media
Storage media: capacity, speed, and space. 8

**Short Course
Schedule for
Winter 1990.**
See page 16.

**Holiday Hours
for January.**
See page 7.

ACS's New VMS Cluster System

Marisa Riviere
MARISA@UMNACVX

On Sunday, December 17, ACS clustered its VAX 8650 (VX) system with a new VAX 6400 system. The new system will run specific applications for one of our major VMS users. With the addition of the 6400 machine, our other VMS users will get better response time and additional CPU cycles on the VX.

We plan a further expansion of the ACS VAX cluster for February. At that time we will add a new VAX 3100 system, which we will call VZ. The 3100 will allow us to provide a subset of the VX's applications and languages for another group of special users. With this change, again, more of the CPU power of VX and additional software such as BASIC will be available for University researchers and students.

We are excited about these cluster systems. As with any new addition, you may want to become familiar with it and learn how to benefit from these improvements. Clustered ACS systems will result in new options and choices for shared and distributed resources for you and your department.

It is likely that this article on the VMS cluster is the first of a series of short articles on the subject. Here is the first "hint" about the cluster that we want to give you: If your terminal session seems to hang or the system appears to be down, do not panic; it could be a normal delay. Please wait a moment or two.

Let's see why: As members of the same cluster, VX and the 6400 are to a certain degree interdependent in their production activities. When one member of a cluster goes down—which we hope will not happen too often—the other members will apparently "hang," or become inactive, for several seconds while attempting to reestablish the broken connection.

The brief disadvantage of this apparently "hung" status is compensated for in this way: When any one of the members of the cluster crashes, the others will keep the shared disks mounted and operational. This avoids the long delays that occur when some disks have to be rebuilt after system crashes.

In this newsletter we will continue sharing with you new ideas and different perspectives on using clustered systems as our VMS cluster develops.

Help Page

ACS HELP-LINES

Central Systems (UX,VX,NV,CA):

626-5592 8 am to 5 pm, weekdays

Artificial Intelligence:

625-8332 3 to 4 pm, weekdays

Data Base:

626-1887 10 to 11 am, weekdays

Liberal Arts, Text Analysis:

625-8332 3 to 4 pm, weekdays

Statistics:

626-1887 1 to 3 pm, weekdays

Other HELP-LINES

LUMINA (communications questions):

626-2272 8 am to 5 pm, weekdays

Microcomputer and Workstation Networks Center:

626-4276 9 am to 4 pm, weekdays
(Closed 12:00 to 1:30 pm,
Monday, Tuesday, and Friday.)

CONSULTING

Walk-In

ACS, East Bank:

128C Lind Hall 10 am to noon and 1 pm to 4 pm, Monday through Friday

Microcomputer and Workstation Networks Center:

125 Shepherd Lab 9 am to 4 pm, weekdays
(Closed from 12:00 to 1:30,
Monday, Tuesday, and
Friday.)

Electronic Mail Consulting

Consulting is now available via the mail facility on all ACS systems (the UX, VX, NV, and CA). Send mail to user name CONSULT for questions after hours and for low-priority questions that are not critical to your immediate computing work. Replies will be sent to your account through the mail facility on your system.

Instructional Computing Consultant

Department instructors may call 626-0200 for assistance in choosing ACS systems (ENCORE/UNIX, VAX/VMS, CYBER/VE, CYBER/NOS), software, and for answers to any other inquiries on using computers for instructional computing.

COMPUTING INFORMATION CENTER

128A Lind Hall, 625-7397, MAD@UMNACVX, MAD@VX.ACS.UMN.EDU
8 am to noon and 1:00 to 4:30 pm, Monday through Friday

Computing account and grant applications available for ENCORE, VAX, and CYBER computers.

Short course enrollment. Short course schedules and class descriptions available.

Assistance in ordering vendor documentation. Vendor documentation is not always available in the University bookstores and may be ordered directly from the company.

Complete documentation collection. Reference copies of vendor and all other documentation for ACS software.

Free ACS documentation. General information and central system information available.

Computing Newsletters. Subscribe to the *ACS Newsletter*. Newsletters from other computing centers are also available for reference.

acs

Academic Computing Services

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The *ACS Newsletter* is published monthly by Academic Computing Services of the University of Minnesota, Twin Cities. Deadline for articles is the 5th of the month preceding publication; deadline for short announcements is the 10th.

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MAD@VX.ACS.UMN.EDU. On-campus address changes *must* include your department name and address.

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The *ACS Newsletter* is produced with an Apple Macintosh Plus running Microsoft Word, FullPaint, MacDrawII, Adobe Illustrator, and Aldus PageMaker software, with camera-ready copy produced on an Apple LaserWriter Plus.

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HELP PAGE	2
SYSTEMS	
VAX VX	
ACS's New VMS Cluster System	1
SOFTWARE	
Statistics	
Upgrade to EQS 3.0	4
Minitab 7 Default on VX	5
SERVICES	
Documentation	
New VMS Briefs	7
Data Storage	
Capacity, Speed, and Space for Storage Media	8
HOLIDAY HOURS	7
INDEX TO VOLUME 23	10
COMPUTING REFLECTIONS	13
SHORT COURSES	16
PHONES/HOURS/LABS	19

Upgrade to EQS 3.0

Bruce A. Center
BAC@UMNACVX

We have upgraded EQS on VX to Version 3.0. EQS is a structural equations package, useful for confirmatory factor analysis, path analysis and in general specifying, estimating, and testing hypothesized interrelationships among a set of variables.

EQS uses a fairly simple and straight-forward control language (based upon BMDP) to describe the model to be analyzed, and provides extensive syntax error checking. However, the package has no data-cleaning or exploration features. The user must rely on other facilities for these features and to ensure that complete raw data or covariance data are provided for input.

The most important new feature in Version 3.0 is the ability to handle multiple populations. It also can accept models with structured means including models with missing data. Other improvements (anyone still reading?)

include the ability to write statistics to external files for further analysis, greater print control, additional statistics for least-squares estimation, robust standard errors that remain correct under distributional mis-specification, the Lagrange Multiplier (to determine whether restrictions on a model are appropriate), Wald tests for distribution-free estimation, and the ability to vary estimation methods across groups in multi-sample covariance structure analysis.

Documentation

EQS 3.0 is documented in the *EQS Structural Equations Program Manual* by Peter M. Bentler. The manual is available for reference at the Computing Information Center, 128A Lind (625-7397).

A limited amount of on-line Help is available. Type:

`$ EQS3 HELP`

at the VMS dollar-sign prompt.

Running EQS

You can invoke EQS 3.0 on VX by typing:

```
$ EQS3 IN=EQS input file DATA=data file OUT=output file -  
      LEN=number of words MODE=NORMAL or LARGE$BATCH
```

LEN is the number of words required to run the model. The default is 25,000 words. If this is insufficient EQS will terminate but tell you how many words you need. MODE is either NORMAL (submitted to the standard SY\$BATCH submit queue) or LARGE\$BATCH, which runs at a lower priority and is designed for large jobs. The default is NORMAL.

Only the EQS input file is required. Output will go by default to EQS.LOG in your current directory. The data may be placed directly in the EQS input file or on a file referred to by the EQS keyword /SPECIFICATION.

You can also invoke EQS with this simple command: `$ EQS3`. EQS3 will then prompt you for each of the parameters above, and one or two more.

Minitab 7 Default on VX

Bruce A. Center
BAC@UMNACVX

Concurrent with upgrading the VMS operating system, we have made Minitab 7.1 the default version of Minitab on VX. Minitab 7 is a superset of Minitab 5; all Minitab 5 commands should continue to work with this new version.

Minitab is perhaps the best of the general-purpose interactive statistical packages aimed at the instructional market. It is straightforward, easy to use, tolerant of errors, and provides the user with broad data manipulation capabilities as well as the ability to retain many intermediate statistical results for subsequent analysis.

To use the new Minitab 7.1, just type:

```
$ MINITAB
```

or

```
$ MINITAB inputfile outputfile
```

You cannot specify an output file without an input file. To do that, use:

```
OUTPUT filename
```

from within Minitab, just as you did in Minitab 5.1.

The command **HELP MINITAB** will display information explaining how to use Minitab 7.1 in batch mode.

You can still access the old Minitab 5.1 with the command

```
$ MINITAB5
```

Incompatibilities with the Minitab 5.1 Worksheet

Minitab 7.1 can read Minitab 5 worksheets, but alphabetic variables stored in Minitab 5 worksheets have to be converted to Minitab 7 format. Use the **ALPHA** command:

```
ALPHA C . . . C
```

where *C* is an alphabetic variable.

Improvements In Version 7

A number of new statistical procedures have been added, along with increased flexibility in data manipulation and Minitab utilities. Changes in procedures include:

- **ANOVA:** Minitab has finally added a general analysis of variance and covariance with unequal cell sizes (**GLM**). They have also added **ANOVA** and **ANCOVA**, which respectively perform analyses of variance and covariance on balanced designs (i.e., equal or proportional cell sizes).
- **Regression:** Minitab has added:
 - BREG** which performs a "best subsets regression" by maximizing R^2 .
 - RREG** which does a "robust regression" based on ranks.
- **Non-parametric statistics:** Minitab has added:
 - MOOD:** The Mood median test: a nonparametric alternative to one way analysis of variance.

continued on page 6

Software

continued from page 5

FRIEDMAN: A non-parametric two way analysis of variance.

WDIFF: All possible sets of differences ($x_i - y_j$). These differences are useful for nonparametric tests and confidence intervals (i.e. on the Mann-Whitney U).

WSLOPE: robust estimates of the slope of a line

KRUSKAL-WALLIS and **MANN-WHITNEY** now print additional statistics.

- **Multivariate:** Minitab has added multivariate discriminant analysis (**DISCRIMINANT**) and principal components analysis (**PCA**).
- **Shewhart Charts:** Minitab has added a section on statistical process control. This can print charts of sample means, standard deviation and ranges, charts of moving averages, exponentially weighted moving averages and moving ranges, as well as charts for number or proportion of nonconformities and for Poisson counts, or Poisson counts per unit.

Other changes include:

- **Alphabetic data:** An expanded alphabetic data capability. All input and output commands (**READ, SET, INSERT, RETRIEVE, PRINT,**

WRITE and **SAVE**) now handle alphabetic data fields up to 80 characters (A80). Also, all of the data editing and manipulating commands except **CODE** and **LET** can handle alphabetic data up to 80 characters long. **INFO** indicates which columns contain alphabetic data by displaying an "A" in front of each alphabetic column number.

- **Arithmetic:** **LET** now accepts the comparison and logical operators: **EQ, LT, LE, GT, GE, AND, OR,** and **NOT**. If the outcome of a comparison or logical operation is true, the answer is set to 1; if the outcome is false, the answer is set to 0.
- **Macros:** Macros can be made conversational by allowing for yes/no questions to be asked.
- **SORT** now permits multiple columns, descending sorts and sorts of alphabetic variables.
- **Portable files:** **SAVE** can create portable files which can be transported to any other computer running Minitab 7, and **RETRIEVED**.

Documentation

Minitab 7.1 is documented in the *Minitab Reference Manual, Release 7*. It is available for perusal at the Computing Information Center, 128A Lind Hall.

Holiday Hours for January

Martin Luther King Day, January 15, is a University holiday, but our systems will be available during normal system hours. ACS offices will be closed that day and our HELP-Lines and other consulting services will not be available.

New VMS Briefs

Steven Brehe
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In the Computing Information Center (CIC) in 128A Lind Hall are copies of these new VMS Briefs:

Editing Files with EDT

Getting Output from the VAX VX

VMS Equivalents to NOS Commands

Also in the CIC are this year's edition of the Twin Cities Campus Computing Facilities map and the 50 or so other Briefs that we publish. See our October issue for a full list.

acs

Capacity, Speed, and Space for Storage Media

Lawrence Liddiard

When we're trying to preserve our computer information as something other than electronic signals, we usually select a medium upon which to store it. We make the selection on the basis of our short-term and long-term needs, and we also consider other factors. For example, sometimes we have to transport our information to other computer installations or preserve it at a separate location to ensure its survival.

In the early computer days a typical computer system had devices to put holes into paper media (punch cards or paper tape) or to position an electron beam to write directly into a film. Later we stored information in a surface layer of iron or chromium oxide on magnetic tapes and disks. Currently it's possible to use the modern laser to burn binary signals much faster onto Write Once, Read Many (WORM) laser disks or heat layers for magneto-optical disks. Other devices either bring a read/write head to the proper position on a fairly rigid surface (magnetic and laser disk tracks or a page scanner) or pass a flexible medium against a read/write station (magnetic tape reels and cartridges, microfilm, laser printers).

All of these storage media require special care:

If it is magnetic, then keep it away from strong magnetic fields.

If it is made of paper, then keep it away from moisture, and do not fold, staple, or mutilate.

If you live in cold climates, then warm it up to room temperature before using.

If you live in hot climates or the sun beats down, then protect the media from the heat.

If you do not have another copy of the information on this media, then immediately duplicate.

If you ever want to use it again, then shield the media from dust, liquids, and all foreign substances.

To provide a general overview of storage media, in the tables on the facing page I have provided the capacity, speed, and space for selected media. As you read the tables you may find media that you did not know existed, or some (like the magneto-optical) that have not yet graduated into a standard format. These are just a few of the factors you should consider when selecting a storage medium.

Recent experience also indicates that the life cycles of both computers and media have been contracting; so a medium could outlast the device used to read it. In the tables, I use the printed page as a unit since it is likely to still be a useful medium 25 years from now. (On the other hand, your old punch cards are very likely going to outlast our one remaining card reader, and ACS no longer can read paper tapes and has eliminated microfilm readers.) *Caveat Emptor*. Let the user beware.

Capacity Table

<u>Media</u>	<u>Example</u>	<u>Capacity in K Bytes</u>	<u>Approx. Media Cost/Example</u>	<u>Media Cost of One Megabyte</u>
Paper Tape 10 chars/inch	3.5 inch roll	22	\$1	\$46.30
Punched Cards	Box 2000 IBM 80 cols	160	\$8	\$50.00
3.5 inch Floppy Disk	Macintosh high density	1,440	\$3	\$2.08
Printed Pages (5000 bytes)	500 sheets of 8.5 X 11	2,500	\$25	\$10.00
Microfilm (5000 bytes/page)	Reel of 2000 EBR pages	10,000	\$15	\$1.50
Microfiche	100 - 208 pages/fiche	104,000	\$150	\$1.44
6250 GCR Magnetic Tape	3M 2400-foot tape	145,000	\$20	\$0.14
3480 Tape Cartridge	DEC TA90 media	200,000	\$10	\$0.05
Removable Disk Pack	DEC RA60 pack	205,000	\$600	\$2.93
Erasable Laser Disk	Next-Sony	256,000	\$60	\$0.23

Speed Table

<u>Media</u>	<u>Example</u>	<u>Speed of Example</u>	<u>Example Device K Bytes/Second</u>	<u>Life In Years</u>
Punched Cards	CDC 405 card reader	1200 cards/minute	1.60	20
	CDC 415 card punch	250 cards/minute	0.33	
Paper Tape	Ferranti paper tape reader	350 chars/second	0.35	20
	Teletype paper tape punch	60 chars/second	0.06	
3.5 inch Floppy Disk	Macintosh high density	500,000 bits/second	62.50	?
Printed Pages (5000 bytes)	Xerox 8700	70 pages/minute	5.83	10
Microfilm (5000 bytes/page)	3M E B recorder	20,000 lines/minute	26.67	10
Microfiche	100 16 X 13	?	?	50
6250 GCR Magnetic Tape	CDC 679 150 ips	0.94 megabytes/second	940.00	20
3480 Tape Cartridge	DEC TA90 media	2.7 megabytes/second	2700.00	30
Removable Disk Pack	DEC RA60 drive	2.0 megabytes/second	2000.00	15
Erasable Laser Disk	Next-Sony	0.9 megabytes/second	900.00	10?

Storage Space Table

<u>Media</u>	<u>Example</u>	<u>Size in inches of Encased Example</u>	<u>Cubic Inches of Example</u>	<u>Cubic Inches One Megabyte</u>
Paper Tape 10 chars/inch	3.5 inch roll	1.75 radius X .875	8.42	389.74
Punched Cards	Box 2000 - 80 cols	14.5 X 8 X 3.5	406.00	2537.50
3.5 inch Floppy Disk	Macintosh high density	3.5 X 3.75 X 0.14	1.84	1.28
Printed Pages (5000 bytes)	500 sheets 8.5 X 11	2 X 8.5 X 11	187.00	74.80
Microfilm (5000 bytes/page)	2000 page EBR reel	1.75 radius X 1	9.62	0.96
Microfiche	100 16 X 13	6 X 4.25 X .7	17.85	0.17
6250 GCR Magnetic Tape	3M 2400-foot tape	6 radius X 1	113.10	0.78
3480 Tape Cartridge	DEC TA90 media	5 X 4.5 X 1	22.50	0.11
Removable Disk Pack	DEC RA60 pack	7.5 radius X 4	706.86	3.45
Erasable Laser Disk	Next-Sony	6.5 X 5.5 X .75	26.81	0.10

Index

Index to Volume 23 (1989)

Issue	Pages
January	1-20
February	21-36
March	37-60
April	61-72
May	73-116
June	117-160
July	161-172
August	173-188
September	189-212
October	213-260
November	261-272
December	273-296

INDEX TO VOLUME 22 (1988)	16
Additions to 1988 Newsletter Index	34

NETWORKING

Networking at ACSS	117
The State of the Network	248

Access

Access by Hardwired Terminal	122
Access by Internet	123
Access by Phone	121
Interactive Access to ACSS Central Systems	121
Using the Network Terminal Server	123

Communications

Electronic Conferencing Software: VAX Notes	94
Network Utilities on VX	96
New VAX Notes Conference: CONSULT	95
Old Dial-up Number for UX to be Discontinued	51

Electronic Mail

Are Your MAIL Message Lines Too Long?	199
The Electronic Postmaster on UX and VX	140
Elm and Mush: Mail Packages on UX	200
Introduction to BITNET Utilities and Services	137
Macintosh/UX POPmail Accounts Now Available	286
Using E-Mail	135
VMS Electronic Mail	93

File Transfer

Transferring CYBER SPSS* Export Files Using FTP	287
Transferring Files Using FTP	144
Transferring Files Using Kermit	146

Internet

The Campus Internet and Beyond	129
MSUSnet/University Internet Gateway	132
What's an Internet?	128

Networks

BITNET and CSNET Form CREN	251
BITNET Topology Update	287
CICNet Completed	51
DECnet over CICnet: New Network Connections for VMS and Ultrix Systems	201
New Internet Host Names at ACS	202

Printing

Connecting Printers to ACSS Systems	149
---	-----

SERVICES

ACSS Becomes ACS	189
ACSS Income Decreases; Staff and Services Cut	173
Future ACS Services	273
A Review of Recent Changes	250
Welcome to ACS	213

Accounts and Grants

Get an ACS Computing Account	217
Getting a VX Account	77
Computing Grants on Central Systems	213

Classifieds

For Sale	54
For Sale	114
For Sale	202

Computing and You

A New Focus on Computer Screens	252
---------------------------------------	-----

Computing Information Center

The Computing Information Center, 128A Lind	217
Documentation Now in Libraries	61

Contract Services

Problems? Contract Services Can Help	218
--	-----

Documentation News

ACS Briefs	225
ACS Manuals	224
ACSS Documentation	165
Learning about VX: Training and Documentation	78
New Manual: <i>A Guide to Using VAX VMS Magnetic Tapes</i>	165

Engineering Services

The Care and Feeding of Computers: Static Electricity and Electrostatic Discharge	52
Engineering Services: A Wide Range of Services	221

Getting Output

Connecting Printers to ACSS Systems	149
Getting VX Output	84

Holiday Hours

Holiday Hours for December and January	273
Holiday Hours for January	3
Holiday Hours for July	156
Holiday Hours for May	114
Holiday Hours for November and December	266
Holiday Hours for September	185

Instructional Computing

IBM Higher Education Software Consortium	64
Instructional Computing Consulting	223
Need a Computer in Your Classroom?	198

Short Courses

ACS Fall Quarter-1989	207
ACS Fall Quarter-1989	257
ACS Fall Quarter-1989	268
ACS Winter Quarter-1990	289
ACSS Spring Quarter-1989	55
ACSS Spring Quarter-1989	66
ACSS Spring Quarter-1989	111
ACSS Summer Session-1989	157
ACSS Summer Session-1989	169
ACSS Winter Quarter-1989	13
ACSS Winter Quarter-1989	32
MWNC Fall Quarter	209
MWNC Fall Quarter-1989	269
MWNC Winter Quarter-1990	290
SPCS Short Courses-1989	69
SPCS Fall Quarter-1989	208
WBCS Fall Quarter-1989	258

Operations

Hours Changed for Attended Central Systems and Tape Librarian	167
---	-----

User Services

ACS Consulting Services	219
Disk Storage Now at Bulk Rates	185

SOFTWARE

Artificial Intelligence

Artificial Intelligence Facilities	92
Artificial Intelligence Services and Software	231
Lisp and Prolog for Instructional Use	194
Natural Language Parsers	65
Neural Network and Parallel Computing Symposia	6
New Version of PCL on VX	153
Prolog	276

Data Bases

Data Base Management Packages	86
Data Base Packages: Software and Services	233

Graphics

Calcomp Plotter Removal	255
Calcomp Plotter Removal	283
Changes to Graphics Facilities:	28
Varian Plotter Will Go	
MNCORE Will Go	
PVI Driver for XEROX Printer	
Final Reminder: Varian Plotter to be Removed	152
Future, GrafLib Available on CA	196
Getting Postscript Output from VX Graphics	6
Graphics Software and Services	234
Graphics Software on VX	84
Plotting with SPSS ^x and PicSure	278
Reminder: Varian Plotter to be Removed	64
Three Graphics Packages to be removed from CA	198

Liberal Arts

Computer Simulation and Communication Theory: Shared Group Fantasies	29
Consulting and Software for Liberal Arts Research	229
EndNote: A Bibliographic Data Base Program for the Macintosh	179

New Versions of GENCORD, GCORD on VX; IBM-PC GENCORD Now Available	180
Text Analysis on VX	87

Math and Engineering Packages

ANSY Version 4.4 on VX	284
Correction: Accessing IMSL 10.0 on CA	30
Final Reminder: IMSL 9.2 Will be Dropped from CA and VX	153
GAMS on VX	285
Harwell Subroutine Library on VX	265
IMSL 10.0 Now Available on VX	44

Index

MACSYMA News for VX	47	The Last Upgrade: CA Will Go to NOS 2.7.1	25
Math and Engineering Software and Services	88	A Look at VMS for NOS Users	98
Math and Engineering Software and Services	237	New MORE Command on CA	261
NBS Core Math Library (CMLIB) on UX and VX	154	New XCAT to Replace CATLSYS	26
New ACM Algorithms	44	A Reminder: CA Will Freeze at NOS 2.7.1	26
New ACM Algorithms on VX	184	Use of the UN Parameter on ROUTE and PRINT	253
A Reminder: IMSL 9.2 Will be Dropped from CA June 11	30	CYBER NV	
Programming Languages		NV Upgrade to NOS/VE 1.4.1	26
Programming Languages	240	NV Upgrade to NOS/VE 1.4.1	43
Programming Languages and Environments	90	ENCORE UX	
Statistics		Free Advanced UNIX Seminars in Spring	37
Minitab 5 Available on CA	48	UX SBU Rate Cut December 1	5
Minitab 7 on VX	182	VAX VX	
Minitab 7.1 Becomes Default on September 18	194	DEC Systems	243
RATS on the VAX!	65	DEC Systems Support Contract: News For The Coming Year	254
SAS/Graph on VX	7	Electronic Conferencing Software: VAX Notes	94
SAS/IML Installed on VX	192	Getting a VX Account	77
SAS Upgraded to Version 5.18 on VX	31	Getting VX Output	84
Sorting Multi-Record Files with SPSS ^x	107	Learning about VX: Training and Documentation	78
SPSS ^x Data Entry Facility Now on VX	110	ListDoc, a Documentation Retrieval System for VMS and Ultrix Systems	205
SPSS ^x Tables with PostScript on VX	11	A Look at VMS for NOS Users	98
SPSS ^x 3.1 Becomes Default on VX	50	March Upgrade to VMS 5 for VX	21
SPSS ^x 3.1.1 Default on VX	181	Network Utilities on VX	96
Statistics Packages	80	New VAX Notes Conference: CONSULT	95
Statistical Packages	226	New VX Disk Drives	152
Transferring CYBER SPSS ^x Export Files Using FTP	287	New Version of Watch	5
Text Processing		Tape and Disk Management	103
The Basics of TeX and DVIALW on UX	12	TAPEPROCEDURES: VX Tapes Made Easy	177
Help for TeX Users	156	Tools for Instructional Administrators on VX	106
Last Call: SCRIBE Leaves VX on December 31	283	VAX Notes, a Tool for the Classroom and Other Applications	41
Reminder: SCRIBE Will be Removed from VX December 31	198	VMS Upgraded to 4.7 December 18	5
SCRIBE Will be Removed from VX	30	VMS 5 Upgrade on March 25	42
Text Editing Software	82	VMS 5.2 Update in December	264
Text Processing Consulting Ends	164	VX Changes	168
Text Processing on VX	82	VX Downtimes	167
SYSTEMS		The VX Tape Manager	203
ACS's Central and Network Configuration	247	Welcome to VMS	73
FY90 Rates Revisited	206	What are MIPS, After All?	104
System and Rate Changes for Fiscal Year 1990	150	Your VMS User Name: Its Privileges and Restrictions	100
CYBER CA		CORRECTIONS	
CA Will Freeze at NOS 2.7 March 25	40	Correction	156
CYBER CA Will Freeze at NOS 2.7	1		

At the Liquidation Auction of ETA Systems

Lawrence Liddiard

VX and BITNET: LIDDIARD@UMNACVX

UX: LAL

The cover of the 40-page brochure bore these words:

AUCTION
By Order of
Control Data
Super Computer Division, ETA Systems
Complete liquidation of state-of-the-art high density multi-layer printed circuit
manufacturing and super computer research & assembly facility

<p style="text-align: center;">AUCTION Thursday, November 16th, 10:00 AM <i>Preview:</i> Monday, Tuesday & Wednesday November 13th, 14th & 15th 9:00 AM - 5:00 PM, 1450 Energy Park Drive St. Paul, MN</p>	<p style="text-align: center;">Featuring</p> <ul style="list-style-type: none">• Automated Wet Processing• Film Processing• Circuit Board Drilling & Routing• Auto Insertion• Cryogenic Equipment• Electronic Test & Measurement• Chemistry Laboratory Equipment• Facility Equipment• Furniture & Fixtures• CAD/CAM• Integrated Circuits & Passive Components
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ROSS-DOVE COMPANY, INC. AUCTIONEERS SINCE 1937
ASSET CONVERSION CONSULTANTS & APPRAISERS TO CORPORATE AMERICA

continued on page 14

Computing Reflections

continued from page 13

The brochure indicated that Lots 1-400 and Lot 3000 were to be seen at 1200 Energy Park Drive (ETA headquarters), Lots 600-700 at 1380 Energy Lane (Warehouse #104) and Lots 800-2000 at 1450 Energy Park Lane (Control Data's ETC facility).

Preparation

The Monday before the auction, Michael Skow, ACS's director, took a preview tour and found a number of auction items that would be useful at our facility or could be used by our SUN and Zenith maintenance services. Pete Bartz of Operations and I went on Wednesday and made lists of possible items that ACS would bid on. Mark Zierdt of Engineering Services and Richard Folden of Operations made separate tours. For ACS, we found tape cabinets, new computer workstation tables with chairs, uninterruptible power systems (UPS's), used CDC Sabre 1.2 gigabyte disks, a Tektronix 4109 graphic display unit, and auction lots containing four Herman Miller blue swivel arm chairs. For Engineering Services, Mark found working and non-working Suns; a number of Zenith PC's; and Wyse terminals in lots of four, identical to ones being maintained for Boynton Health Service; and he also checked the serial numbers on 51 CDC Sabre 1.2 Gbyte disks.

A number of us also wanted to bid on some specific items for ourselves. Since my son goes to Holy Angels Academy, I was interested in a group of four bays of lockers that could be useful to the school. In addition, my slide projector screen is 35 years old and there were both screens and two Kodak projectors in the auction. When I got back to work from my preview tour at 4 pm I tried calling Holy Angels Academy to see if they could use 96 additional lockers; but a recording informed me that the school office had closed. Later that night my wife, Helen, and my son, Patrick, asked if I really wanted to bid on the lockers. I figured my spending limits would be \$300 for the lockers, \$150 for the cart of slide projectors, and \$10 for a projector screen.

Meanwhile, at ACS we were evaluating what to bid on the specific groups. We needed uninterruptible power for our network and some computer systems that are required to operate 24 hours, seven days a week. Pete Bartz and I had

poked around in the warehouse and the UPS's seemed to be almost new. The UPS boxes had 8-19-89 OK written on them, and had the manufacturers telephone number in an accompanying booklet. Pete called the manufacturer and the person answering was surprised to find the units being auctioned. ETA had purchased them, had sent them back to be upgraded, and they were returned after the ETA shutdown. The taller units were newer; but each unit was worth about \$5,400. We put down about \$2,000 as our maximum bid. A call by Michele Lewis to Tektronix found that a 4109 terminal was worth about \$2,000 as-is or \$4,500 refurbished, so I set a maximum (or cap) bid of \$1,000. Pete and Dick examined office supply catalogs to determine the value of tape cabinets, blue swivel arm chairs, and new computer workstation tables with chairs, and set cap bids on all of these items.

The Day of the Auction

At 10 am on the day of the auction, four ACS employees arrived—Richard, Mark, Pete and I—among five to six hundred others.

We were glad that we were not bidding until about lot 180, as it gave us time to understand how the auction worked. The auctioneers needed to get through about 300 lots each hour, so while large valued items would go singly, smaller identical lot items would be put into a larger group. For example, an Applied Visions System 8700 Inspection Station went for \$75,000, while nine lots of single Olympus SZ4 Stereo Zoom Inspection microscopes went as a group bid for \$1,300 each. In the grouped lots, the top bidder would be allowed to take as many as desired; then, if there were remaining items, other bidders could also take at that top bid. Then if any items remained, they were bundled as a single group with the next winning bid taking all.

When the four bays of lockers were being auctioned, I raised my auction number. I had held my eyeglasses in my hand as I wrote down the previous winning bids, and thought I was still in the bidding when it went for \$225. Oops, without my eyeglasses to see who the auctioneer was pointing at, it went to another bidder. (My wife says I should get bifocals, but I only need glasses for driving.) Well, one lesson learned: Keep those eyeglasses on when bidding!

Single new Steelcase computer tables were the next items that ACS bid on. Our bid of \$1400 (\$233 each) for the six was the winner, and later we found that the red chairs that were included were worth \$750 each. Our bid of \$1750 each won the two newer UPS systems, and we took the next group of 7 older UPS systems on our bid of \$1500.

By 6:15 pm ACS had acquired, among other items: three as-is UPS systems for \$90; six as-is Sun 3/50 workstations for \$1,500, and twenty Wyse terminals for \$175 each for Engineering Services. As the day wore on, we learned to wait until others had bid up to a hesitation point on items we wanted. Then, if the bid was over our cap price, there was no need to raise our auction number; otherwise we would enter the fray. The Tektronix display group went too high and the CDC Sabre drives went for \$3,150; \$1,150 over what Mark believed them to be worth. I missed a Solbourne computer at \$7000 and did not enter the bidding when a group of new Visual X-Window terminals went for \$1,800 each (\$200 more than the U's price).

The projectors and grouped screens went beyond my caps, so I left without any items for myself and went home. Dick and Pete stayed until closing at 8:45 pm and obtained blue office chairs to replace twelve ugly orange and powdering foam chairs that ACS had purchased in 1978. Many other University departments were also able to obtain needed items. The following Monday we managed to get through the crowded loading docks to move our bid items to Lauderdale.

A Second Chance

Two weeks later, on December 1, the Control Data person in charge informed us that the University, the University of Minnesota at Duluth, the College of St. Thomas, and other educational institutions would each be allowed an hour to walk through and select from the remaining items before a scrap dealer came to take the remainders away. Since most of these items were furniture, we asked a person from the University's Property Accounting to go

with us. Mark found several Zenith PC's and twelve anti-static mats (value \$60 each) for Engineering Services to use when working with computer components. In the warehouse Pete found three pallets of accessories (drawer and keyboard cages) for Steelcase computer workstation tables. Also still available were a Tektronix 4115 graphic display for Michele, two projector screens, a security camera and monitor, and three magnetic tape cabinets for Lauderdale. About fifteen tables and benches, four vinyl marker boards, ten file cabinets, and several chairs went into Property Accounting's holdings.

Gains

Control Data obtained several million dollars in additional revenue and writeoffs. A number of Twin City startup companies obtained low-cost office and work sections. Somebody in Texas now has a lot of Apollo computers. ACS's computer room has the neatest console area with *red* swivel chairs and workstation tables. The UPS systems will be installed in the next few months for higher ACS system reliability. Many ACS staff at Lauderdale have new swivel chairs. Mark said that one Sun processor board for repair work alone was worth the \$1,500 for the Suns. Some of the Wyse terminals will be used in University instructional labs.

Losses

A number of former ACS members and University graduates worked for ETA and their jobs are now gone. Honeywell has gotten out of computing, Unisys and Cray have had layoffs, and CDC is still spinning off fragments to keep alive. Thus the Twin Cities have lost another high-tech employer, and the corresponding synergy that comes from such a grouping of computer manufacturers has been reduced again. It was good for the United States and Minnesota to have two major players in building supercomputers. In the long run the University is definitely poorer, for the ETA auction signaled yet another contraction in the University's sphere of influence.

Short Courses

ACS Central Systems Winter 1990

Central Systems courses are *free*. To register call 625-7397.
Some classes have size limitations: Register early.

Introductory Courses

Introduction to Computing	Jan 16-25	TTh	2:15-4:00 pm
UNIX Overview Section 2	Jan 30	T	2:15-5:00 pm
Overview of the NOS 2 Operating System	Jan 17	W	2:15-5:00 pm
Introduction to VAX/VMS Operating System	Jan 22-31	MW	2:15-4:00 pm
Overview of the NOS/VE Operating System	Feb 6	T	2:15-5:00 pm

Elective Courses

vi: UNIX Editor Section 2	Feb 1	Th	2:15-5:00 pm
Using SPSS* (Statistics Package)	Feb 5-9	MWF	2:15-4:00 pm
Electronic Mail and Networks	Feb 12-14	MW	2:15-4:00 pm
Using SAS (Statistical Analysis System)	Feb 19-23	MWF	2:15-4:00 pm
INGRES (Data Base Package)	Feb 13-22	TTh	2:15-4:00 pm
Introduction to Lisp	Feb 26-Mar 2	MWF	2:15-4:00 pm

Registration Information

Prerequisites: Please note any prerequisites for the class you are interested in. Instructors will not be able to review any prerequisite information. For more information on prerequisites, call the Computing Information Center at 625-7397.

Limits: Some central systems classes have limits to class size. Please try to register early to be sure of getting a place. If you decide to cancel from a class, please do so as soon as possible, so that we can make the space available to others.

Registration: Registration is located at ACS's Computing Information Center, 128A Lind Hall. (Hours: 8:00 am to noon and 1:00 to 4:30 pm, Monday through Friday.) To register call 625-7397. You can also register by electronic mail—write to MAD@UMNACVX or MAD@VX.ACS.UMN.EDU. Please call to cancel if you later decide not to attend, so we know how many to expect. Deadline for registering is 4:00 pm on the last working day before the class begins. For registration information, call 625-7397.

Note: Monday, January 15, is a University holiday. No classes will be held.

Course Descriptions

INTRODUCTION TO COMPUTING. An introduction to basic terms and concepts in computing. Students receive free computer time to practice basic procedures like logging in, creating and editing a text file, etc. Four meetings.

OVERVIEW OF THE UNIX OPERATING SYSTEM. An overview of the UNIX operating system, running on the ENCORE UMAX. Logging on and off; Simple utilities; Files and directory structure; Access permissions; The Shell, redirection, pipes and filters; Metacharacters; Editors- ed, vi; Mail, write, talk, mesg; Compilation and execution, (Fortran, C, Pascal); Background and foreground; Processors, Shells and subshells. One meeting.

OVERVIEW OF THE NOS 2 OPERATING SYSTEM. Hardware, software, commands, and conceptual background of the CDC Network Operating System, Version 2.5 running on the CYBER CA. Topics include: File concepts; XEDIT basics; Command syntax; Temporary, permanent, and local files; Subsystems. One meeting.

INTRODUCTION TO VMS OPERATING SYSTEM. Overview of the VMS 5.1 operating system running on the DEC VAX 8650. Hardware and software; Logging on and off; Utilities; Files and directory structure; Commands and syntax.; the EDT editor; Symbols and logical names; Procedure files; Batch jobs. Four meetings.

OVERVIEW OF THE NOS/VE OPERATING SYSTEM. An overview of the NOS/VE operating system used on the CYBER NV. Topics will include: Command syntax; File and catalog concepts; On-line documentation; File attributes and manipulations, Compilation and execution of programs; Procedures and programs as commands; Batch jobs. This is *not* a class for computing beginners. One meeting.

VI: UNIX EDITOR. Editing files on UNIX systems with ex (line editing) and vi (full screen editing). All the commands will be covered. Additional topics include

terminal definitions, '.exrc', view, and examples of where an ex command is superior to a vi command in ease of use. One meeting.

USING SPSS* (Statistical Package). Basic structure, job setup, and required statements; data manipulation and selection, commands that control internal and external files. Familiarity with CYBER NOS 2 and XEDIT, or VAX/VMS operating system and EDT editor, or equivalent knowledge, is required. The first session will be a brief review of NOS 2 and XEDIT for beginners. Three meetings.

ELECTRONIC MAIL AND NETWORKS. Introduction to electronic mail and networks. Mail on the VAX 8650; sending, receiving, and managing mail, commands. BITNET addressing and uses. Other networks. Prerequisites: *Introduction to VMS Operating System* or experience using VMS. Two meetings.

USING SAS (Statistical Analysis System). Basic structure, job setup, and required statements, data manipulation and selection, commands that control internal and external files. Prerequisites: Familiarity with VAX/VMS operating system and EDT editor is required. Three meetings.

INGRES (DATA BASE Package). Learn to use INGRES on the VAX 8650 computer. Topics include creating data bases, retrieving information using the English-like language QUEL, creating "ad hoc" reports, and using Application-By-Forms to develop data entry, data manipulation, and report generation. Five meetings.

INTRODUCTION TO LISP. This introduction is designed to teach people who may not have used a programming language before, how to write programs in LISP. LISP primitives. Programming techniques for developing recursive solutions to problems, and setting up complex solutions from previously defined simpler ones. Class will use VAX 8600 Common LISP to practice what they learn in class. Prerequisites: *Introduction to VMS Operating System*, or equivalent knowledge. Three meetings.

Conventions

Throughout this and other ACS publications, we have adopted these conventions:

- Messages and prompts from the ACS computers appear in plain type, like *this*.
- Words that the computer systems replace with a specific name, value, or other information appear in *italic type, like this*.
- Commands you type at your terminal keyboard appear in **bold face type, like this**.
- Words that must be replaced by a specific name, value, or command that you type in appear in ***bold italic type, like this***.
- Comments to interactive sessions and program files are enclosed in { curly braces, like this }.

Here's an example:

SAVE, *filename*

is a command you type in. You type **SAVE** and replace *filename* with the name of your file. The system may respond with the message

filename ALREADY PERMANENT { An example of a system message. }

where *filename* will be replaced by the name of the file you attempted to save.

- The symbol <CR> refers to the carriage return (or RETURN) key on the terminal. The <CR> serves as a terminator for commands you type at your terminal. In most cases we do not show <CR>; we assume you know to type it after every command.

Phones/Hours/Labs

ACS PHONE NUMBERS

Administrative Office: 626-1600
HELP-Line 626-5592

Access:

ACS systems (UX, VX, NV, CA)
3/12/2400 bps + 7/Even/1 626-1630
12/2400 bps + 8/None/1 626-1631
LUMINA 626-2206

Accounts:

ENCORE , VAX, CYBER CA, CYBER NV, 625-1511
Computer Hours (recorded message) 626-1819
Computing Information Center, 128A Lind 625-7397
Contract Services 625-2303
East Bank I/O, 128B Lind Hall 625-5082
Engineering Services 625-1595
Equipment Maintenance/Repair 625-1595
FAX 626-7440
Graphics Software 626-5592
Information, Lauderdale 626-1600
Lauderdale Computer Room/Services 626-0550
LUMINA 626-2206
LUMINA Consultant 626-2272
Magnetic Tape Librarian 626-1838
Math and Engineering Software 625-5830
Newsletter Subscription 625-7397
Permanent File Restoration 626-0595
Public Labs (with ACSnet)
140 Blegen Hall 624-5278
B40 Central Library no phone
207, 270 Diehl Hall 624-3128
4-204/4-250 EE/CSci 625-9081
121 Elliott Hall 624-0866
14 Folwell Hall 625-4896
1 Lind Hall 625-0801
128B Lind 625-5082
308 Mechanical Engineering 625-7352
9 Walter Library 626-1899
MWNC Lab Manager (14 Folwell Hall) 625-7850
Publications Information 626-1093
Short Course Registration 625-7397
Shuttle Bus Service 625-9525
System Status (recorded message) 626-1819
West Bank Computing Services 624-0877

For the phone numbers of consulting services, see the Help Page.

PUBLIC LABS TWIN CITIES CAMPUS

Central System Interactive Micro
 Printing

East Bank

ApH 117			X
Arch 148			X
CenH		X	
ComH		X	
DiehlH 207, 270	L	X	X
EddyH Annex 54			X
EE/CSci 4-204/250	I, L	X	X
EltH 121	I, L	X	X
FolH 14, 14a	L	X	X
FronH		X	
LindH1	I	X	
LindH 26			X
LindH 128B	L	X	
LindH 306B			X
MasCanCtr M39		X	
MechE 308	I	X	
MoosT 8-425			X
Phys 130	L	X	X
PioH		X	
SanH		X	
TerrH		X	
VinH 203			X
WaLib 9	L	X	X

West Bank

AndH 170	L		X
BlegH 140	I	X	
MdbH		X	
OMWL B2			X

St. Paul

BaH		X	
CentLib B40	I	X	
CentLib B50			X
ClaOff 135	L		X
McNH 69			X
Vet 436			X

I - Impact line printers.
L - Laser printers.

SYSTEM OPERATING HOURS

The ENCORE UX, VAX VX, CYBER NV, and CYBER CA systems run continuously from 6 pm Sunday until 6 am the following Sunday. The systems are in unattended production mode each night from midnight until 6 am. It is unlikely that any tape requests or printing will be processed during these hours. Normal operations resume at 6 am each day except Sunday.

On the first and third Fridays of each month from 5 am to 7 am the CYBER CA and NV systems are unavailable. Low-rate hours are from 8 pm to 8 am Monday through Friday, and all operating hours on Saturday and Sunday.

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Send to ACS Computing Information Center, 128A Lind Hall, 207 Church St. SE, Minneapolis, MN 55455

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