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PUB-429

Volume 22, Number 4
April 1985

For Reference

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L B L
COMPUTING
NEWSLETTER

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PUB-429 4-85/1300

Newsletter Closing Date is Monday, April 15, 1985 . . . and no later.

Address all communications for the Newsletter to Maggie Morley, Editor,
50B/1245 (415) 486-5529; or to login **mam** on UX4

LBL COMPUTING NEWSLETTER

PUB-429

NAMES & NUMBERS TO KNOW

From on-site, dial <xxxx> From off-site, dial (415) 486-<xxxx> From FTS line, dial 451-<xxxx>

COMPUTING DIVISION

Head: Leroy Kerth7474 50B - 2232

OFFICE OF COMPUTING RESOURCES

Head: Ken Wiley7083 50B - 2258

COMPUTING SERVICES

Central Office5871,2 50B - 2239

Guest Cards & Parking Permits5947 50B - 2239

COMPUTING SERVICES

Operating Systems & Product Set

Head: Jerry Borges5568 50F - 144

COMPUTING SERVICES

Applications Group

Head: John Colonias6019 50B - 2262B

COMPUTING SERVICES

User Services

Head: Eric Beals5351 50B - 4224C

Accounting6310 50B - 4224B

Library/Document Sales6094 50B - 1245

Short Courses, UNIX5529 50B - 1245A

GSS Tape Repair Service6094 50B - 1245

Sticky Label Service6094 50B - 1245

DEVELCON IDENTIS

COMPUTER	DEVELCON DIRECTORY NAME
PDP 11/70 (UNIX1).....	UX1
PDP 11/70 (UNIX3).....	UX3
VAX 11/780 (UNIX4).....	UX4
VAX 11/750 (UNIX5).....	UX5
VAX 11/750 (UNIX6).....	UX6
VAX 11/780 (VMS).....	GEN
VAX 11/780 (VMS).....	PDM
VAX 11/780 (VMS).....	NMC
VAX 11/780 (VMS).....	IGM
CDC 6600B,.....	RECC
IBM 3081 (UCB).....	CCDB

LOCAL TYMNET ACCESS NUMBERS

Oakland	430-2900	Vallejo	707-557-0333
Walnut Creek	938-9550	Concord	682-3851
Pleasanton	462-8900	Fremont	490-7366
San Francisco	974-1300	Antioch	778-3420

COMPUTING SERVICES

Computer Operations & Networks

Head: F. Marvin Atchley5455 50B - 2239A

Assistant: Sandy Merola4389 50B - 2239B

Operations Area6211 50B - 1215

Coke Operator5311 50B - 1275

Connecting a Remote Terminal7444 50B - 2249A

PSS (Program Storage System)6219 50B - 2253

Bldg 90 RJE5450 90 - 3136

Terminal or Port Repair5354 50B - 2259

Help Desk5981 50B - 2272

Graphics System Manager5565 50B - 2245

UX4/UX5/UX6 System Manager6720 50B - 1232

UX1/UX3 System Manager7005 50B - 1232

IGM/GEN System Manager5610 50B - 2245

NMC/PDM System Manager5234 50B - 2262A

VMS Cluster Manager6203 50B - 2249C

Network Coordinator4388 50B - 1232

Expediter Services6205 50B - 2253

Magnetic Tape Library6219 50B - 2253

Key Data Entry Service6256 90 - 3145

Operating Hours

All machines are available 24 hours daily.

With these exceptions.

7600.....	M.....	7 AM to 9 AM
	Th.....	7 AM to 9 AM
6600B.....	T.....	7 AM to 9 AM
UX1 - PDP 11/70.....	Thur 3/07.....	12:30 to 6 AM*
UX2 - PDP 11/70.....	Sat 3/16.....	12:30 to 6 AM*
UX3 - PDP 11/70.....	Tue 3/19.....	12:30 to 6 AM*
	Wed 3/20.....	12:30 to 6 AM*

UX4 - VAX 11/780.....	- - - - -	- - - - -
UX5 - VAX 11/750.....	- - - - -	- - - - -
UX6 - VAX 11/750.....	- - - - -	- - - - -
IGM - VAX 11/780.....	Mon 3/04.....	12:30 to 8 AM*
NMC - VAX 11/780.....	Mon 3/18.....	12:30 to 8 AM*
GEN - VAX 11/780.....	Mon 3/11.....	12:30 to 8 AM*
PDM - VAX 11/780.....	Mon 3/25.....	12:30 to 8 AM*
DICOMED - PDP 11/34.....	Sun 3/03.....	8:30 AM to 4 PM

* Subject to Additional Maintenance Periods

Dial-up Access Numbers

All Machines - 300 BPS ... 486-4959

◦ All machines - 1200 BPS .. 486-4979

UX1 Direct Line - 300 BPS 486-7015

UX3 Direct Line - 300 BPS 486-7020

RECC : 110 BPS 486-6351

RECC - 300 BPS 486-5752

RECC - 300 BPS 486-6041

RECC - 300 BPS 486-6661

◦ VA-3400 & 212A are equivalent

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NEWS FROM THE CENTER

Marv Atchley

8600 UP & RUNNING

The first 8600 processor has been installed in the 50B Computer Room. It became operational on March 25. In order to facilitate this early delivery, DEC provided a system consisting of a 12-Mbyte CPU, an HSC-50 Storage Controller, 3 RA81 Disks (1368MB), a TA-78 Tape Drive, and hardware for connecting to 96 Develcon Ports.

DEC architecture allows us to add this hardware to the existing Computer Center VMS cluster. Prior to version 4.0, VMS users were confined to computing on the machine that had both their logon and their data files. As all machines on a cluster share one UAF (User Authorization File) and one user file system, users may now log on to any CPU in that cluster and have access their files. Any user with a valid account on either the PDM, IGM, or GEN may now log onto LBLA and still have access to clustered VMS user files. Note that some software packages will still be available only from a specific CPU. All of the software packages that were on the PDM are now available on the 8600 except BASIC, which has been moved to the IGM. 48 ports of the 8600 have been connected to Develcon under the directory name LBLA. The INTERNET name and the DECNET node name is also LBLA.

PDM GOING AWAY

The PDM will become unavailable to users on April 8th. The Develcon directory will shunt PDM requests to LBLA for the following fortnight.

UX1 & UX3 DEPARTURE DELAYED

The priority need by a LBL research division for a 11/780 has delayed the availability of another 11/780 for the UNIX project. The move of users from ux1 1 has been delayed until June 28.

ux4 and ux6 have capacity for users who wish to take advantage of the additional features of 4.2 BSD before July.

THE COUNTDOWN REVIEWED . . .

There'll be many major changes & upgrades in our computing hardware & services during the remainder of this fiscal year. Listed below are dates they are expected to take effect. Most of these dates depend upon hardware delivery from various manufacturers and hence may vary from our projected time line. We'll post such schedule modifications as they become known.

DATE	CHANGE
April 8	One VMS 780 system will be dedicated to a research division.
April 15	Ethernet connection to Bldg. 90 completed. Imagen printer installed in Bldg 90.
June 25	Second increment of 7600 replacement system will be installed.
June 28	11/70 UNIX 1 & 3 systems will be removed.
July 1	Entire BKY system turned off & removed. This includes CDC 6600, CDC 7600, Automatic Tape Library, Hyperchannel, PSS, GSS, RECC, COKE, BGATE, DGATE, CYBER18 (Bldg. 90 terminal), ADA1, ADA2, and the Datagraphix 4460 COM. The magnetic tape library will be closed down and the smaller library is made available. Dicomed will be converted to run on-line with a VMS system.
August & September	Hardware in the Bldg. 50B Main Machine Room will be reconfigured and the PDM & GEN moved from Bldg. 50A to Bldg. 50B.
September	Final increment of 7600 replacement system will be installed.

UX4 AUTODIALERS

Bob Rendler

Two Racal-Vadic 3451 auto dialers have been installed on **ux4** and are now available to the user community. The auto dialers accept connections at 300 bps and 1200 bps and operate through the **tip** command on **UNIX**. To connect to a remote system (say, "thatsystem"), type after the **UNIX** prompt . .

UX4 > tip thatsystem < cr >

TIP establishes a full-duplex connection to that remote machine, giving the appearance of being logged in directly on the remote CPU. You must have a login account on the machine (or equivalent) to which you wish to connect.

TIP uses a data base to find out how to reach a particular remote system and to find out how it should operate while talking to that remote system.

See the online manual entries *tip¹(1)* and *remote(5)* for a full description of the **TIP** command and **REMOTE** data base.

If you want to use the **ux4** auto dialers, contact me (**ren@lbl-ux4**, x5629) for more information or to have a system-name added to the data base.

NAG MARK 11 ON VMS AND UNIX VAXES

Bill Hogan

Mark 11 of the **NAG** library of mathematical and statistical subroutines (double precision version) is available both on the **VMS VAX's** (**GEN**, **IGM**, **NMC**, & **PDM**) and **UNIX VAX's** (**ux4**, **ux5**, & **ux6**).

LINKING NAG ON VMS VAX

\$ link main,etc,sys_nagd11/lib

The symbol **sys_nagd11** will become **sys_nagd** after April 30, 1985.

LINKING NAG ON UNIX VAX

% f77 main.f etc.f -lnagd

(that's a lowercase "L" with no spaces after it).

¹Terminal Interface Protocol

CHANGES

Mark 11 contains 35 new subroutines. For details, see the *Fortran Mark 11 News* right behind the Table of Contents in Vol. 1 of the Library Manual (see below).

One subroutine was dropped: **D01FAF**. Its recommended replacement is **D01GBF**.

DOCUMENTATION

- (1) The **NAG Fortran Mini Manual, Mark 11**, explains how the library is organized, and shows decision diagrams that aid in selecting the right subroutine to use. The mini-manual is available in a loose-leaf binder.
- (2) The **NAG Fortran Library Manual, Mark 11**, gives the details about how to use each subroutine in the library. The Library Manual is available in loose-leaf binders and on microfiche.

NAG documentation can be obtained through the Computing Services Library (50B/1245, x5529, x6094).

One set of **NAG** manuals is kept at the **HELP DESK** (50B/1275, x5981).

- (3) The **NAG Fortran Mark 11 Library Concise Summary** is a disk file. To see it, do

\$ type pdm::pdmusr5:[erclib.nag11] summary.doc

Substitute "iprint" for "type" in the preceding command to obtain a printed copy (856 lines).

EXECUTABLE EXAMPLES

Executable examples in the form of simple test programs for 495 (out of 512) **NAG** subroutines are accessible from **GEN**, **IGM**, **PDM**, and (if it has been upgraded to **VMS 4.x**) **NMC**. To get the example for (say) subroutine **G13BDF**, do

\$ @pdm::pdmusr5:[erclib.temp11] getnag11 g13bdf

If you are located on **NMC** and it has not yet been upgraded, you have to do that in two steps:

\$ copy pdm::pdmusr5:[erclib.temp11] getnag11.com *
\$ @getnag11 g13bdf

No test programs were provided for subroutines in chapters X01 or X02 of the library.

Please direct questions about using **NAG** to Bill Hogan, (**hogan@ux4**, x5194) or Elon Close, x6166.

READING GSS TAPES ON VMS VAXES

Marge Hutchinson

The procedures for reading **GSS** tapes on the VMS **VAXes** are now available for testing. These will transfer a subset from the **GSS** tape to a disk file and optionally convert it to a **VAX** readable form. You can use

- **GSSTAPE** to read and optionally translate a subset from the tape to the disk.
- **GSSMAP** to prepare a map of the subsets on the tape.
- **GSSCONVERT** to convert a disk subset that was previously transferred from the tape.

By the time this newsletter appears, you will be able to perform the following conversions with **GSSCONVERT**:

- (1) remove some **GSS**-specific word counts and end marks but leave the data unchanged.
- (2) convert display code to **ascii** and add a line feed after each line.
- (3) move each 60-bit **CDC** word to a 64-bit **VAX** quad-word.
- (4) convert each 60-bit **CDC** word to a 32-bit **VAX** integer.
- (5) convert each 60-bit **CDC** floating word to a 64-bit **VAX** double-precision floating word.

You can invoke each of the procedures by typing its name. You will be prompted for the information required. To get more information, type **GSSNEWS** on **IGM**, **PDM** or **GEN**, or call me (**margeh@IGM**, x4727).

DICOMED MOVES TO VAX

Marge Hutchinson

As discussed in the September, 1984 newsletter, the **Dicomed** film processing system will be moved from the **PDP 11/34** to the **IGM VAX** by July 1, 1985. Since standard **Dicomed** software will be used to support the **VAX** version, all of the customized **BKY**-style features will disappear. Among the features that will disappear are

- **CDC**-compatible print control characters and character codes.
- Mixing plot formats and character formats in the same file.
- Changing the title on successive fiches.
- Internal control of frame advance, fiche advance, positioning, line spacing, sizes.
- Drawing lines in listings.

See the September newsletter for a complete list of known differences or call me if you have questions. (**margeh@igm**, x4727)

ALLOCATING VIRTUAL MEMORY DYNAMICALLY ON VAX/VMS

Edna Williams

Virtual memory can be allocated dynamically under **VAX/VMS**. Memory obtained as shown below will be contiguous and the size will be rounded to the smallest quad-word (8 bytes), starting on a quad-word boundary; it should be deallocated when it is no longer needed. **A word of caution:** successive requests for virtual memory may not result in contiguous memory with respect to prior requests.

The following short Fortran program demonstrates memory allocation and deallocation. For further information refer to the **VAX/VMS Run-Time Library** manual.

Forward questions and comments to me (**eeew@lbl-gen.arpa**, x5093).

```

        program allocmen
C-----
C
C      THIS IS A SIMPLE EXAMPLE OF ALLOCATING AND DEALLOCATING
C      VIRTUAL MEMORY AT RUN TIME.
C
C-----
C
C      implicit      integer*4 ( a - z )
C
C      include      '($s$def)'          ! SYSTEM STATUS CODES
C
C      parameter    ( array_size = 8 )  ! ARRAY SIZE IN LONGWORDS
C
C -- ALLOCATE ARRAY_SIZE*4 BYTES OF VIRTUAL MEMORY AND STORE
C    THE STARTING ADDRESS IN DYN_ARRAY_ADDR.
C
C      status = lib$get_vm( array_size*4, dyn_array_addr )
C      if ( status .eq. ss$_normal ) then
C
C -- CALL SUBROUTINE AND PASS THE LONGWORD SIZE AND THE ARRAY ADDR.
C    NOTE THAT THE ADDRESS MUST BE PASSED BY VALUE.
C
C          call suba( array_size, %val(dyn_array_addr) )
C
C -- DEALLOCATE VIRTUAL MEMORY
C
C          call lib$free_vm( array_size, dyn_array_addr )
C
C -- ERROR IN ALLOCATING MEMORY, STOP IMAGE
C
C      else
C          call lib$stop( %val(status) )
C      endif
C      end
C      subroutine suba( size, array )
C-----
C
C      UTILIZE ACQUIRED VIRTUAL MEMORY.
C
C-----
C
C      integer*4      size, array(size)
C
C      do i=1, size
C          array(i) = i
C      enddo
C
C      type ' ( " ARRAY = :'( x, 15i4) )', ( array(i), i = 1, size )
C
C      return
C      end

```

WHAT TO DO WHEN RECC GOES AWAY...

Sandy Merola

As you have read in previous Newsletters, the BKY system -- which is being replaced by a more modern VAX 8600-based installation -- is going away on July 1.

RECC,¹ the computer system that connects interactive terminals to the 6000's, will go with it. Those terminals which are directly connected into RECC and not connected to either the Develcon or Gandalf dataswitches, will NOT be connected to any Computing Services equipment, unless other arrangements have been made.

There are a couple of options.

- (1) You can do nothing. Your terminal connection into our facility will simply cease working on July 1.
- (2) You can have your terminal connected to our Develcon dataswitch. This would allow you to connect to any Computing Services mainframe (including the new 8600/VMS service) from your terminal. There is a charge for this connection.

You will be given credit for any of your RECC interfacing hardware which can be directly used in your new connection to Develcon.

In either case, please contact Ann Mills, (ann@lbl-ux4, x7444).

UX4 GOES FORTH

Eddie Rosenthal

FORTH, an extensible stack-oriented low-level language, is now available on UX4. FORTH was originally developed by Charles Moore of Kitt Peak National Observatory to provide a tool for its telescope operation. It has been developed for virtually every CPU on the market today, (including the 8080, 6502, 8086, Motorola 68000 chips, and even the historic CDC 6000's). FORTH is used in a variety of applications, such as expert systems, artificial intelligence, real time systems, robotics, controlling ultrasonic

imaging devices and business applications (such as data base management).

Some features of this FORTH include:

- A means to convert textfile to FORTH blocks, and blocks to ascii text.
- A fortran-from-FORTH linkage
- Support of background execution and foreground re-entry.
- Reading and writing using the standard UNIX file descriptors.
- Batch job execution with standard I/O.
- Editor

Some non-supported facilities currently are

- No magnetic tape access
- Grabber option turned off
- Incomplete terminal access to termcap database

To get started with FORTH, you should have an account on UX4. Log in, and type after the UNIX prompt ("%") -

```
% FORTH <CR>
```

You'll get an asterisk prompt ("*.") from FORTH.

You can then define your own "words" using standard FORTH notation.

To escape the FORTH process temporarily and execute a shell command, type

```
:! 'command'
```

at any time.

You can use the editor that FORTH comes with -- after setting up the correct terminal environment.

DOCUMENTATION

- (1) *Starting FORTH*, by Leo Brodie is an excellent beginner's book.
- (2) *The FORTH Reference Manual* (available from Computing Services Library, (50B/1245, x5529, x6094). gives a full description of the FORTH vocabulary.

The distribution comes from Kitt Peak National Observatory; it's unlicensed and in the public domain. The current support level at LBL is C (little or none).

There are MAN articles for FORTH, text-to-FORTH, and FORTH-to-text.

Forward questions or comments to me (eddier@ux4, x5463).

¹Remote Equipment Control Computer

THE WORKSTATION SCENE

THE MICRO COMPUTER CORNER

QUESTION: In a previous newsletter, you recommended that we include the **DOS "VERIFY ON"** Command in the **autoexec.bat** file. I do a lot of **READS** and **WRITES** to my **AT's** hard disk. How much does all this activity affect performance time?

ANSWER: Hardly at all. For 3-Mbyte transfers on the hard disk, figure about 10 per cent increase in file-transfer time. If you are transferring between a floppy and hard disk, you won't notice ANY difference.

.....[FEB.85 1]

QUESTION: I am interested in buying a modem, specifically the **Anchor Mark XII**, for my **Zenith 151-52**. However, I'm a bit confused about what software is required to go with this modem. Will any terminal emulation and file transfer programs such as *PC-Talk* and *Kermit* work with any modem, or must the software be specifically designed for the modem?

ANSWER: Generally speaking, modems do not need special software. Any terminal emulation and file-transfer program will work with any modem. Different programs make the microcomputer emulate different terminals. For example, **KERMIT** makes an **IBM-PC** or a **Zenith 151** emulate a **Z-19** terminal and **VTERM** makes the same microcomputers emulate a **DEC VT-100**. Both of these programs can talk to a **Hayes** and a **RACAL VADIC** modem. We discussed this with the **Anchor** folks. Indications are that their modem is equally compatible.

We'd like to hear from any of our readers who have an **Anchor Mark XII** modem so that we could verify this. (Call Dan x5589 or Richard LaPierre x4692).

.....[FEB.85 2]

QUESTION: I use **Volkswriter**. Is there a good **Spell** routine I can plug into?

ANSWER: Yes. **WORD PROOF Version II**, has been announced by **IBM** (cost: \$39.95). This package contains 125,000 words

(from "aa" to "zyzzyva") from the **American Heritage Dictionary**. We haven't tested this one yet. However, **Version I** was certainly a **Best Buy** at \$69.95.

.....[FEB.85 3]

QUESTION: Does the Computing Division have any other computers available for loan besides the **HP portable**?

ANSWER: Yes. We have a **DEC PRO 350** with the **VENIX** or **P/OS** operating systems currently available

for short-term trial use and evaluation. The 10-Megabyte hard disk system comes with a **C** compiler. Contact **Dan Van Zile**, (x5589).

.....[FEB.85 4]

QUESTION: I just bought one of the **Zenith 151** computers. Now I need to know about local resources. Is there a user group? What about a network? A Newsletter?

ANSWER: Right-o.. There is a local **Heath User Group**. It meets on the fourth Tuesday of the month at the **Heathkit/ Zenith Computer Store**, 6000 **Potrero Ave.** in **El Cerrito** (236-8870). **BUSS**, the **Independent Newsletter of Heath Co. Computers**, is published by the **Sextant Publishing Co.**, 716 E St., S.E., **Washington, DC 20003**. (Subscription action line: 202/ 544-0900).

TIMELY TIP: **PC Users**. **Daylight Savings Time** is coming. Don't forget to **Spring ahead**. If you have a standard **AST Board**, you run the **AST-supplied** program **SETLOCK.COM** as follows

```
C> SETCLOCK <cr>
```

It will respond

```
resident DATE/TIME processors loaded
```

```
Current date is 4/29/85
```

```
Current time is 08:05:43.07
```

Now, issue the following **DOS "Time"** command

```
C> time <cr>
```

It will respond

```
Current time is 08:06:10.05
```

```
Enter new time: 09:06 <cr>
```

.....[FEB.85 5]

We hope you'll use this Corner to trade useful information, problems, opinions, and horror stories concerning your PC. You can also forward questions and comments to the Workstation Wizards on staff.

If you want feedback on your question or comment, drop a line to

THE MICRO COMPUTER CORNER,
c/o HELP DESK (UX3 or PDM)
50B/1232, or

The Computer Center Library (mam on ux4)
50B/1245.

WORKSTATION NEWS

• HP LASERJET PRINTER

Hewlett Packard has loaned the Workstation Group an HP LaserJet Printer with two font-cartridges. It is available for demonstration and evaluation. Many commercial word-processing programs now support this printer. (We use an updated *Volkswriter Deluxe*, V2.1) We will gladly give you a demonstration and show how to print out your *Volkswriter Deluxe* Word Processing text and *Lotus* worksheets with it. To arrange a demonstration, contact Richard LaPierre, (x4692).

[22.4.1].....

• MORE LOTUS PRINTER UTILITIES

The Workstation group has produced utilities that allow the user to embed printer control codes in LOTUS spreadsheets. You can dress-up the spreadsheet by doing such things as "Enlarged" printing, "Italicized printing" and Underlined printing of worksheet sections.

We now provide support for **Okidata 92/93** printers and the **HP LaserJet** printer (in addition to the **Epson** printer utilities mentioned in March's Newsletter).

Bring your disk for copying to Dan Van Zile, (50B/1245, x5589). It's a good idea to phone him first.

[22.4.2].....

• PC FOCUS UPGRADE INFORMATION

Julie Jones (of Purchasing) forwards the following pretty-good news.

- (1) Version 1.5 is projected to be released in May. We understand that it will run on an unmodified AST Advantage board using up to 640K of Memory and will not require the insertion of a "red dot" disk.
- (2) As of March 16, 1985, Information Builders has no information concerning the availability of a modified Advantage Board.
- (3) Upgrades to Version 1.5 are automatic and at no charge if you have PC Focus maintenance. Without maintenance, you can upgrade for \$550.00. If your maintenance contract has lapsed and you want to renew it, contact Julie Jones x4583.
- (4) All PC Focus users are encouraged to use the newest version available to maintain compatibility with the utilities developed by the Administrative Data Processing sector.
- (5) Programming Resource/Technical Coordinator for maintenance for PC FOCUS is Bert Albrecht, (x6280).

[22.4.3].....

• LOTUS 1-2-3 MACROS CLASS AT UCB

A new course for advanced LOTUS 1-2-3 users is being offered at UCB's Administrative Information Center. This is a half-day course on the use of macros and is being offered to LBL employees at a reduced rate of \$60.45 for the first enrollee and \$42.35 for subsequent enrollees in the same class. For information on class dates and availability, contact Cheryl Bannister (642-8388).

[22.4.4].....

• ZENITH PC LOANER

Zenith Data Systems has loaned the Workstation Group an IBM-compatible PC for test and evaluation by LBL users. The demo unit (MODEL ZF-151-52) has 320-KBytes of RAM memory, two floppy disk drives, and a monochrome monitor.

As mentioned in January's Newsletter, Zenith has a very attractive discount for laboratory employees.

To arrange for a short-term loan of the Zenith PC, contact Workstation member Dan Van Zile (x5589).

[22.4.5].....

• LANDSCAPE PRINTING FOR THE HP THINKJET

Good news for users who were interested in purchasing the ThinkJet printer from HP (but changed their minds when they found that it couldn't print

wide printing jobs)

Landscape printing is now available on the HP.

All they need is a Version 2.11 copy of *Sideways* from Funk Software. (LLNL Stores will stock the correct version of this item in mid-April. Cost: \$45.00).

Users wanting to upgrade their current versions can do so by mailing \$20.00, along with the manual and original diskettes to:

Funk Software
PO Box 1290
Cambridge, Mass. 20223

[22.4.6].....

• HP PLOTTER FOR LOAN/EVALUATION

Hewlett Packard has loaned the Workstation Group a ThinkJet Printer and an eight-pen sheetfeed plotter Model HP 7550A.

The ThinkJet Printer is a low-noise ink-jet dot-matrix printer. It's an LLNL PC Stores item (stock number 6020-68201, approximate cost: \$332.). Contact Dan Van Zile (×5589) to arrange for a short-term loan of the unit to try out on your IBM or compatible PC.

The HP 7550A plotter is a high-resolution plotter (0.001 in.) that has programmable pen-velocity and pen-pressure parameters to accommodate differences in plotting material and plotting pens. HP has provided the Workstation Group with Business Graphics Software to demonstrate the capabilities of the plotter. To arrange for a demonstration of the 7550A, contact Workstation Group member Richard LaPierre (×5692).

[22.4.7].....

• CAI's AVAILABLE

Computer Aided Instruction diskettes for IBM PC/DOS as well as beginning and advanced Lotus 1-2-3 are available for loan. Contact Dan Van Zile (×5589).

These training programs have been favorably reviewed by many users.

[22.4.8].....

• IBM PC/AT SYSTEM INTEGRATION UPDATE

For 25 dollars more than the GSA price for an Enhanced IBM PC/AT from IBM, you can now configure a system with 60% more disk capacity.

As we mentioned in earlier Newsletters, the Workstation Group has been overseeing the integration

of standard PC/AT's into an Enhanced version with 32-Megabyte disk and 512-Kbytes of memory.

Approximately twelve systems have been ordered to date. We now have six up and running. We have not encountered any difficulties other than the start-up problem reported in February's newsletter.

The attractive pricing is a result of the diligent efforts of Mark Vega in Purchasing. We can now get a 32-Mbyte disk for as little as \$1025. (IBM's price for a 20-Mbyte disk of the same manufacturer is \$1116). RTSG is stocking the 128-Kbit memory chips that allow the system to be upgraded to a 512-Kbytes at a charge of approximately \$200 vs. IBM's price of \$346.

A sample requisition is available from Computing Services Library, (50B/1245, ×5529, ×6094).

[22.4.9].....

• CAMPUS IBM PC USER GROUP MEETING

The University campus IBM PC user group meets regularly on the second and fourth Wednesdays of the month at 5:30 PM at 10 Evans Hall. The next meeting is on April 24. The speaker is announced a few days before the meeting. Call Lisa Gertzis (642-1023) for more details.

[22.4.10].....

• MINI-TRADE FAIR

A MINI-TRADE FAIR, designed to promote local opportunities for small, disadvantaged, and women-owned businesses, will be held from 2 to 4 PM on Wednesday, May 1, at the LBL Cafeteria.

A number of Bay Area firms will be displaying their CPU's, peripherals, software, and new products.

This event is sponsored by the Laboratory's Purchasing and Materiel Management Departments.

For more info, contact Eric Sargeson, (×4500), Mark Vega, (×4595), or Richard LaPierre, (×4692).

[22.4.11].....

• 10 MBYTE EXTERNAL HARD DRIVE (DATAMAC)

The Workstation group has been looking into alternatives for users who wish to add a 10-Mbyte hard disk to their PC system equipped with two floppy drives. The normal solution has been to purchase an IBM PC Expansion Unit (IBM part #5161001), which costs approximately \$2000.

However, we are evaluating a \$795 alternative for users who want only a hard disk unit. The system, which measures 4" wide × 7 1/2" high × 16" deep, is external to the PC, has a self-contained

power supply, and initializes like a standard disk system running **DOS 2.0** or **DOS 2.1**.

The **IBM** expansion unit, which is the same size as the **PC**, offers the advantage of providing seven additional expansion card slots plus mounting space for two hard disks.

For further information contact Workstation Members **R. LaPierre** (×4692) or **Dan Van Zile** (×5589).

[22.4.12].....

• **OFFICE WRITER FOR LOAN/EVALUATION**

Word Processing software, Office Writer, is available for loan from the Workstation Group. Like **Volkswriter**, it is simple to use and has a feature that allows you to convert your documents to **Wang** word-processing formats. A tutorial is included, and with the help of the on-line help menu, you can learn to use it in a few hours. For more info, contact Workstation member **Buck Koonce**, (×5739).

[22.4.13].....

• **DOWNLOADING CDC FORTRAN SOURCE FILES TO YOUR PC**

One method for moving **CDC** source files onto a **PC** is to **DISPOSE** them to a **VAX/VMX** machine and then download them to a **PC** via **KERMIT**.

A problem when using **KERMIT** with **VAX/VMS** has been that certain files are not downloaded intact to a personal computer. Column one is stripped off. These files have record attribute **FORTTRAN CARRIAGE CONTROL**. In effect, the system assumes that column one contains fortran carriage control characters when in fact it could contain valuable data.

The **VAX/VMS** utility **CONVERT** can change the record attribute of a file to **CARRIAGE RETURN CARRIAGE CONTROL** so that **VAX/VMS** will handle the file properly. A special file (**st_usr:fixcc.fdl**) has been set up so that this record attribute change can be accomplished with a one line statement.

Under the new **VAX/VMS (4.0)** system the one line command is:

convert/fdl = st_usr:fixcc.fdl <input file> <output file>

where **CONVERT** is a Digital Command Language Utility and accepts as parameters:

<input file> The file with record attribute "FORTRAN CARRIAGE CONTROL"

<output file> The output file produced by the utility which will be identical to the input file but will have record attribute "CARRIAGE RETURN CARRIAGE CONTROL"

Forward questions or problems to Workstation member **Noel Brown** (×4387).

[22.4.14].....

"Be sincere;
be brief;
be seated."

Franklin D. Roosevelt

DISCOUNT PRICES ON PERSONAL COMPUTERS

A good variety of personal computers is now available to LBL employees at a discount. What follows is a "most current" list of products and prices.

- **ZENITH** - Substantial discounts on Compatible Microputers and Monitors by mail order purchase from Zenith. For information packet, phone Kathleen Handron (x5474) in the mornings. Suzanne Sultan, Zenith Sales Rep, is available for technical questions at 213/540-8362 (call collect). Local Zenith dealer available for support and supplies: **Monarch Computers**, 526-7741.
- **IBM** - Current University Discount now only available through the **UCSF Computer Center**. Phone Diane Steiner, 666-5061. For information packet, phone Kathleen Handron (x5474) in the mornings. ASUC negotiations have not worked out.

Quest Computers - 2180 Franklin St., Oakland (893-7381) is offering a 20 % discount to LBL employees with proper ID on **IBM. Compaq & Apple** hardware and supplies.

- **APPLE** - Substantial discount on Macintosh and Lisa Computers to LBL employees as well as discounts on accessories, software and manuals. "Qualifying" employee must be on laboratory payroll on a regular basis for 50 % time or more. For further information, contact the **ASUC COMPUTER STORE** (642-1968). You must present your LBL Identification Card as proof of employment.
- **RADIO SHACK** - 10 per cent discount card available for the **TRS-80** Microcomputer, along with one each of any compatible peripheral, accessory and/or software package. Contact Kathleen Handron (x5474) in the mornings.
- **HEWLETT PACKARD 150** - 25 per cent discount available through purchase at the Lawrence Livermore Recreation Store. Hardware must be picked up at the store. For further information call 181-29035. Hewlett Packard Consult, Ken Madsen, available at 848-5980.
- **800 SOFTWARE** - 30 to 50 per cent discount on hundreds of software packages. Firm located in Berkeley. For phone orders, call Joseph Peck, 644-1512 and mention that this is a "National Account".

Some vendor information packets are also available at the Computer Services Library (50B, 1245 - x5529, x6094).

"Follow the path of the unsafe, independent thinker.
Expose your ideas to the dangers of controversy.
Speak your mind and fear less the label of "crackpot"
than the stigma of conformity. And on issues that seem
important to you, stand up and be counted at any cost."

... Thomas J. Watson
Founder of IBM

THE PRINTING SCENE

DISTRIBUTED PRINTING, TYPESETTER PREVIEW & GRAPHICS FROM LBL AND MFE SYSTEMS

Bill Johnston

For the past six months, or so, Bill Johnston and Dennis Hall of the Advanced Development Project have been experimenting with various methodologies for providing a distributed hardcopy output facility which would be able to provide connections between most **VMS** and **UNIX** systems at LBL, and a collection of devices which could do line printer, graphics and typesetter previewing output. It was additionally desired that the CPU intensive task of running the text formatting programs like *TeX* and *troff* would not necessarily be done on the system where the job originated, but could be moved to some other, perhaps non-interactive, environment.

The methodology which has evolved uses the (UC) Berkeley 4bsd **UNIX** version of a set of spooling programs known collectively as *lpr*. *lpr* provides the facility to accept files of specified types (printer, graphics, typesetting, etc.), to specify destination devices, and to route the files to whatever system has direct access to the requested device. *lpr* then queues the files for the device. When the queue manager selects a file for processing it uses the information which was passed from the originating system to invoke one or more programs which transform the file into a format suitable for the target device, and then move the file to the device. (This should not be confused with mechanisms to establish queue order based on some priority scheme. This may be inserted, but is done with different software.)

The communication between the originating system, the target system, and, perhaps, the device itself, is largely done using the Berkeley *Inter-Process Communication* mechanism, which is based on the DARPA TCP/IP network protocols running on a lab-wide ethernet.

While the basic mechanisms are from the Berkeley **UNIX** domain, there exists software which runs on **VMS** systems which will provide the essential features described above. This software is currently available on some of the **VMS** systems around LBL, and will probably soon be available on

many more. Output Devices

Coupled with the issues of distributing both the files and their processing is the problem of output devices which can provide the required type and quality of output. In the past the most commonly used devices for the combined line printer, graphics and typesetter previewing output were electrostatic printer/plotters. The most frequent example at LBL being the venerable Versatec, V-80. These devices suffer from a variety of limitations, the most notable of which are inadequate resolution (200 points/inch) and a high CPU cost to drive them.

In recent years a class of devices, commonly called *laser printers*, has matured and become more readily available. Briefly, these devices consist of a Xerographic like marking engine in which the image is placed on a photo-sensitive drum by a scanning laser. The laser must be provided with a bit stream which corresponds to the light and dark portions of the final image. These devices typically have resolutions of 240 to 500 points/inch, and operate at rates of 4 to 140 pages/minute. Laser printers are synchronous devices; once the drum starts turning (and feeding a piece of paper through) it cannot stop or slow down. A little arithmetic will show that the data rates required by the laser are substantial. (For example, 140,000 Bytes/sec, uninterrupted for 8 seconds is required for a 300 point/inch, 8 page a minute device.) The required data rates effectively eliminate the possibility of driving this class of device with general purpose computers.

The severe requirements for driving laser printers has resulted in the development of highly capable controllers which deal with the high data rates of the laser. These controllers now typically contain enough memory to hold a page image as a bit map, and software which permits several types of files to be accepted and converted to bit maps. This software which runs in the controller typically accepts printer like ASCII files, a daisy wheel printer format file, a Tektronix format graphics file and some sort of language which is *native* to the device. In addition to these programs to convert various file formats to bit maps, there will be memory storage for representations of several or more character fonts and programs to provide interfaces to the host computers.

Examples of these devices are Imagen Corp.'s 8/300, 12/240 and 5/480 devices, Quality Micro

Systems (QMS) 800, 1200 and 2400 devices (also marketed by Talaris Systems, Inc.), XEROX IMPRESS engines, the 8700 and 9700, for example, and the new Apple LaserWriter. All of these devices are generically similar, differing in their resolution, speed and supported file formats and languages. The Hewlett-Packard Laser Jet printer is similar to this generic category of devices but it does not have sufficient memory (by far) to address every point on the output paper.

The Imagen 8/300 and the LBL Distributed Printing System

The device which is our first example of the highly capable laser printers, and which is currently integrated into the distributed printing scheme described above, is an Imagen 8/300. This device prints 8 pages/minute at a resolution of 300 points/inch on ordinary office copy machine paper. The Imagen will interpret printer files, Diablo 1640 format files, Tektronix 4012 - Plot 10/TCS files and imPRESS (the native language) files. The controller contains >1.5 MByte of RAM and a Motorola 68000 processor. The Imagen uses an ethernet interface to communicate with a host computer using the TCP/IP protocol.

As currently configured, the distributed printing system has lbl-csam, -ux4, -ux5, -ux6 and lbl-adv2 as machines which are sources of the files to be printed (user nodes) and uses lbl-adv1 as the server node. The server node is the (one in this case, but more are possible) computer which actually sends data to the output device. In the current configuration the server node also has the task of doing all of the text formatting and file translation, as well as the device communication. The purpose of this latter situation is to off load the text formatting process (currently only *troff*) from the user nodes. The current server node (lbl-adv1) is an Integrated Solutions Inc., Optimum 5/10, a Motorola 68010 system which runs a port of Berkeley 4.2 UNIX.

Plans for the Future

In the near future we will be getting several more laser printer output devices and server node systems to drive them. We will soon be able to support *TeX* output processing (*dvi* files, not *TeX* itself) and have a wide variety of fonts available. Hopefully most of the graphics software systems will eventually be able to drive the 8/300. (Some do now, see below.) We are acquiring an Apple LaserWriter to experiment with integrating it into the distributed printing scenario as a lower cost, serial

line driven device.

Access to the Imagen from LBL Systems

From the LBL UNIX systems which are part of the distributed printing system, access to the Imagen is via several commands, depending on the file format.

For *troff* output, the *itroff* command is used. *itroff* accepts arguments specifying the target device (*ip1* for the Imagen in Bld. 50B, second floor) and the macro package to be used (e.g. *-me*). *itroff* first runs your *troff* input file through *soelim* on the local machine to expand included files, then sends the file to lbl-adv1. On adv1 the *troff* input file is run through *tbl* and *eqn*. (This is always done, so you cannot run *tbl* on your local machine as *tbl* output is again transformed (and incorrectly this second time) by *tbl*.) See the manual page for *itroff*.

For graphics output the *ipr* command is used. The Imagen accepts graphics instructions in Tektronix Plot 10-TCS and Imagen imPRESS formats. Plot 10-TCS commands are generated by a wide variety of software at LBL including drivers in Grafpac, Tektronix, ISSCO, Precision Visuals, and Dynamic Graphics software. imPRESS is the *native* language of the Imagen, and these commands are generated by Visual Engineering graphics packages (including GKS) on UX4, as well as a few others. Work is in progress on an imPRESS driver for Tektronix GKS.

All files presented to the Imagen must contain, as the first line of the file, a specification of the translator to be invoked by the Imagen controller resident software on the remainder of the file. This document control specification has the form *@document(language XX)*, where, for graphics files, XX is *tektronix* or *imPRESS*. Most software which generates imPRESS files puts in this specification, while most software which generates Tektronix code does not. *ipr* prepends the document control line to graphics files destined for the Imagen, and invokes LPR to send the file to the device. On the UNIX systems there is a man page for *ipr*, and a summary follows:

```
ipr <graphics_file -Llanguage -Pdevice
language is imPRESS or tektronix
device is ip1
```

In the event that your file already contains a language specification, the *-L* switch may be omitted. *-P* identifies the desired output device.

For files in Diablo 1640 format *ipr* is also used, the only difference being that *daisy* is given for the language specification.

To print ASCII files, *imprint* is used. The default is to put a header line on the output pages (page number, file name and date). This may be suppressed by the *-n* flag. See the *imprint* manual page for more details.

Graphics on the Imagen from MFE:

Assuming that you have generated Tektronix files on the MFE Cray, getting graphics output from the Cray on the Imagen involves two steps.

The first step is to get the file to an LBL machine that has access to the Imagen. There are two ways to do this.

- (1) One way is to send the Cray graphics file to the MFE PDP10 and then use *ft* to get it to an LBL UNIX machine.
- (2) The second way is to dispose the Cray graphics file to a NAP connected machine like *lbl-gen*.

Now that the file is resident on an LBL machine, a second step is necessary because the Tektronix files generated by the MFE Orderlib driver are not of a standard format. There is a program called *tekedit* which modifies the format to one acceptable by the Imagen. Again, there are two cases. From a UNIX system *tekedit* reads from standard input and writes on standard output. The most straightforward thing to do is to combine *tekedit* and *ipr* into a single step. This is done by defining the shell script *tekimagen* which contains:

```
tekedit <$1 | ipr -Pip1 -Ltektronix
```

Now, the command *tekimagen mfe_file* will take the MFE graphics file resident on UX4, UX5, UX6 or CSAM and display it on Imagen *ip1*. This shell script is on most machines so that you do not have to define it.

From LBL-GEN you may invoke a command which sends the MFE graphics file to a UNIX system to be translated and forwarded to the Imagen. The command

```
@etc:tekimagen unix_system_name mfe_graphics_file_name
```

will accomplish this. The first argument to this command is the name of a UNIX system where the processing is to be done. Several things are necessary on that system. First, you must have an account on that system with the same user name as your LBL-GEN account. Second, in your home

directory on the UNIX system you must have a file named *.rhosts* which contains a line for the form *lbl-gen*. Third, you must have an entry in your UNIX *.login* file which specifies which Imagen device you are going to use. This entry is of the form *setenv IP ip1*, assuming that you want to use *ip1*. The second argument is the local file name for the graphics file.

You may check the location of your job in the Imagen queue by issuing the command

```
rsh unix_system_name ipq
```

For example, assuming your UNIX account is on UX4, and your graphics file name is *mfe.plt* you could say

```
@etc:tekimagen ux4 mfe.plt
```

Followed by

```
rsh ux4 ipq
```

There will probably be further refinements in this process in the future.

For further information contact Bill Johnston, Advanced Development (x5014), or Bob Rendler, Computing Services (x5629) Dennis Hall is on sabbatical leave at Cray Research.

ABOUT THE HP LASERJET

Bill Benson

Laser printers have come down dramatically in price this year, making them first choice for production of general office correspondence, as well as reports, papers, and proposals, etc., (documents requiring equations, figures, illustrations of "professional" quality).

Up until last December, the Versatec had been, for the last few years, our output device of choice. This device prints at 200 dots per inch on specially-treated paper. Resolution is barely adequate, and characters usually look a little ragged. The paper is limp, slightly off color, and has a chemical odor.

Laser printers, such as the Imagen and HP Laserjet, are a big improvement. At 300 dots per inch the characters are almost indistinguishable from the fully-formed characters produced from daisy wheels on "letter quality" printers. No special paper is needed, operation is quiet, and printing is fast -- up to 8 pages per minute.

The Imagen has access to a potentially large number of fonts, enough memory to generate full page bitmaps at full resolution, and is supported by a microcomputer running troff under UNIX.

The HP Laserjet is less capable, but at \$3500 is much less expensive than other laser printers. At this price, it is not unreasonable to use it as a standalone printer for a microcomputer.

Although we intended to evaluate it for this purpose, we have explored the Laserjet's capabilities and limitations mainly through VAX/VMS. The first step is to interface the printer to the computer. The printer interface is simple, but the communication settings are rigidly specified. The interface accepts only full eight bit data, over a serial line, at 9600 baud, with XON/XOFF flow control.

This simplicity makes for easy connection to most micros, which provide direct access to the printer port. On mini-computers, it is more convenient to receive output from the terminal drivers. No special drivers need to be written, and print queue management is supported. The difficulty is that since such use of terminal drivers is unusual, operating system bugs and other obstacles get in the way of a straight-forward connection.

With UNIX, it has been discovered (by Bill Johnston) that an extra 'stty litout' must be given before the 'stty litout -raw' that presumably should set full eight bit output with XON/XOFF. Since UNIX text lines are terminated with line-feeds, the Laserjet should be set to append a carriage return in this case. Command sequences are defined for the Laserjet to handle several different end of line and end of page conventions.

We have installed a terminal queue in VMS, so that the printer is accessible to all users of lblh. The terminal characteristics have been set to pass through eight bit data with flow control. This is sufficient to print text files, but graphics files suffer because we have not been able to locate and disable extra characters sent by the terminal driver. A subroutine is available (from Grafpac), however, which can send both text and graphics.

We have written a short program using this subroutine to write both text and graphics directly to the terminal port. This circumvents the difficulties, but gives up the easiest way to perform spooling. The program can be used to handle the simple but common case of printing a letterhead, logo, or small graphic image on only the initial page of a document.

The Laserjet has a more limited selection of fonts than the Imagen, although both support the 10 pitch/12 point Courier established as a business standard by the IBM Selectric typewriter. Additional fonts come in cartridge form for the Laserjet, including sizes of proportionally spaced Times Roman and Helvetica. These fonts can be used to give documents a typeset appearance, since character strings can be placed arbitrarily on the page.

Most CSR text formatting and typesetting work uses the UNIX eqn, tbl, troff pipeline, which give high quality results on the Imagen. At least one troff driver is reportedly available for the Laserjet, although we have not had any experience with it. Since we have installed the Laserjet on a VMS machine, we have instead adapted a page composition program previously written to format and typeset Census data reports on the high-speed Xerox 9700 laser printer. We have successfully produced tabular layouts, with multiple fonts, rules, and graphics.

This has been a viable approach for several reasons.

- (1) The Laserjet hardware is directly accessible, and easy to program directly. Second,

- (2) There are many documents for which the full functionality of troff is not needed. For example, using ragged right margins avoids problems with hyphenation and excessive or erratic word space separations.
- (3) The user interface can be made simpler and program execution much quicker than with troff. It is convenient to design tabular layouts, for example, directly at the terminal using fixed width characters to indicate alignment, with the program rendering text and numbers in proportionally spaced fonts on the printed page.

A major limitation, in comparison with the Imagen, is the very limited graphic memory of 59 kilobytes. This will hold nearly a full page at the lowest resolution of 75 dots per inch, but only slightly more than 2 square inches at the highest resolution of 300 dots per inch. Two intermediate resolutions of 100 and 150 can also be used. There is no limitation on the number of separate graphics, page positions, or use of different resolutions, other than the memory limit. A Grafpac driver has been written which can produce multiple bitmaps for the Laserjet.

As another consideration, printing will be slower when a large bitmap must be sent to the Laserjet. In one case, a tabular report was designed with an overlaid form of horizontal and vertical rules. A page printed in 70 seconds with full page graphics, but only 20 seconds when the rules were composed from characters.

Please contact me (x5703) if you would like to see documentation or sample output, or share experiences.

"A man's character is his destiny."

Heraclitus

LISTING FILES ON THE LASERJET PRINTER

Eric Van Vliet

Users with printer ports attached to a Hewlett Packard LaserJet printer can list files thereon, using, **hpr**, a locally-developed facility. Call it as follows:

- a. `% hpr yourfile`
- b. `yourfile 2 : 00`
- c. `output is on hp.out`
- d. `% cat hp.out`

- a. `yourfile` is listed
- b. `hpr` echoes the name of the file & tells the number of pages in it. Then a colon, followed by a "O" for each page as it's processed.
- d. "`cat hp.out`" sends the output to the Laser Jet.

The operation is equivalent to "`lpr`" on the line printer, "`qprint`" on the versatec, "`imprint`" on the Imagen.

Some features:

- (1) `hpr` reverses output page order; last page on the bottom, first page on top.
- (2) It uses proportional-spaced times Roman bold face font.
- (3) It replaces tabs with suitable escape sequences.
- (4) It also inserts escape sequences to turn the printer port on and off.

Users will probably want to copy the `hpr` shell script (`/ux4a/etsd/ecvv/bin/hpr`) and edit it to suit their needs. (N.B. because it has escape sequences in it; they should use `cat -v` or `vi` to inspect it without messing up the terminal).

- a. The shell script uses a small program (`/ux4a/etsd/ecvv/bin/hptab`). written in **C** to handle tabs.
- b. The `source` is in (`/ux4a/etsd/ecvv/bin/hptab.c`).

Forward comments and questions to Eric Van Vliet (`ecvv@ux4`, x7068).

The Computing Newsletter, published monthly, provides much useful current information to our users and is mailed to them free, upon request.

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