UNIVERSITY COMPUTER CENTER
UNIVERSITY OF MINNESOTA, MINNEAPOLIS, MINN 55455

NOTES AND COMMENTS

VOLUME 7
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Contents:

SHORT NOTES

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A page of this newsletter will now be open to computer-related advertisements. To submit an ad or for information contact Amy Koepke (373-7744).

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Mr. Shih Pau Yen is now senior programmer for statistics at UCC. He is responsible for the SPSS, OMNITAB, UMST packages on the 6600 and the ISIS system on the 6400. Mr. Yen's office is 203 ExpEng (Phone: 373-2522).

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For information and consultation on information retrieval, especially MARS VI, you may now contact Pat Jarvis in the Annex to ExpEng 212 (Phone: 373-4360).

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A new writeup on UTALGOL is available in Room 140 ExpEng. A four page addenda to the ISML Reference Manual is available (contact Amy Koepke, 227 ExpEng, 373-7744). At the Engineering Bookstore, the following manuals are available: UMST: Statistical Computer Progress Manual ($5.00), UCC Users Manual ($4.00), and IMSL Reference Manual ($15.00). The CDC 6600 Reference Manuals and the 6400 KRONOS Reference Manuals should be available this month in the bookstore.

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The MAPS installation at Lauderdale has a Xerox machine which is available to UCC users. The machine can reduce printouts to 8 1/2 x 11 copies, has a continuous feed, and copies may be collated. The price is 2-3¢ per copy with a one dollar minimum. For information call 376-7003.

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According to a Greek myth Sisyphus rolls a stone up a hill only to have it roll back just as he reaches the summit. This seems to be an adequate description of the course of the average University quarter, but perhaps after 2000 years we can at least make the rolling a little easier. As the quarter climbs to an end, computer use climbs right along with it. In regard to classroom assignments which involve computer use, could we suggest that these be distributed throughout the quarter instead of concentrated in the last few weeks or days. This would alleviate end-of-the-quarter congestion and make life a little easier for everyone.

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Anyone with a brilliant idea for a graphic design for the heading of this newsletter may submit their idea to Amy Koepke (227 ExpEng) or Carl Diltz (204 ExpEng). First prize is a year's subscription to Notes and Comments.

PERMANENT FILES AND SUBDIRECTORIES

As announced in the January newsletter a new permanent file system will be installed on April 1. The following discussion indicates the new features of the system relative to permanent files and subdirectories. Comments or problems relative to this discussion should be directed to Kevin Matthews (373-4572).

In the new file scheme, subdirectories will be a special case of permanent files. This will not affect the subdirectory control cards, but the internal system requests and all the PPU dayfile messages will be changed.

A new feature will be the cataloging of permanent files and subdirectories by account number. The account number will now be essentially part of the subdirectory name. This will allow, for example, a user with account number 55550001 to have a subdirectory named LIB on the same disk as a subdirectory LIB belonging to account number 55550002. The different account numbers will identify the two different subdirectories to the system.

The account number of a subdirectory will be the account number of the job which created the subdirectory. This is important if the subdirectory is ever to be referenced by a job with a different account number. For example, suppose the subdirectory FILES is created with the job

```
JOBCARD.55550001
PACK,CREATE,FILES,UCC001.
```

It may be accessed with the cards

```
JOBCARD.55550001
PACK,ATTACH,FILES,UCC001.
```

If, however, a user with account number 55550002 wishes to attach the subdirectory, he will have to specify the account number of the file he wants, since it is different from his own. This will be done using the new AN= option on the pack control cards:

```
JOBCARD.55550002
PACK,ATTACH,FILES,UCC001,AN=55550001.
```

The same account number provisions will be observed in using the ACQUIRE (A) and ATTACH control cards to get permanent files. If the account number of the permanent file is different from the account number of the job, the AN= option must be used to specify the file account number. For example,

```
ATTACH,CLASS,CLASS,AN=55550002.
or  A,CLASS,PN,SN=EXIT,AN=55550002.
```

A special case of the AN= option will occur when the permanent file or subdirectory to be attached belongs to the operating system. In this case, "S" will be used as the account number. For example, to attach the system permanent file STFØPL (which contains the MØMS system common decks) the control card will be:

```
A,STFØPL,AN=S
```

If no AN parameter is specified, the disk directory will be searched for the named file using the account number on the job card. If no file is found, the directory will be searched for a system file of the specified name. For example this will allow the control card A,ISML. to search for the IMSL user library without the indication that it is a system file (AN=S).

The account number feature of permanent files and subdirectories will provide an additional security to the user. He need not worry about someone accidentally attaching his file by specifying the wrong name. Any references to a file will be by the account number responsible for the file, or by a definite intentional exception. Users also will need to worry about the uniqueness of subdirectory names on a device since the addition of the account number will differentiate otherwise identical file names.

The messages issued by the operating system for subdirectories will also change. As before, a message will be issued in three cases; (1) when a subdirectory is created; (2) when the number of record blocks in a subdirectory changes, and (3) when a subdirectory is destroyed. An example of each message follows:

```
PFM  UCC001  AN=55550001  NEW SD=SAM
```

This indicates that account number 55550001 created a permanent file of type 71 (i.e., a subdirectory) on the device with VRN UCC001. The subdirectory name is SAM.

```
PFM  UCC001  AN=55550001  LN=0013B SD=SAM
```

This message indicates that the size of a subdirectory has changed. The subdirectory contains 13B record blocks.

```
PFM  UCC001  AN=55550001  PURGE SD=SAM
```

This message indicates that the subdirectory has been purged (destroyed).

Program LISTPAK will no longer be used to list the files in a subdirectory. The program AUDIT will be used to list the permanent files and subdirectories on a device. The basic call to AUDIT will be

```
AUDIT.  or
AUDIT(VR=vrn)
```

where VRN is the visual real number device of the device being audited. The vrn of the system disk will be SYSTEM.

These will list all permanent files and subdirectories associated with the account number of the job running the AUDIT. If the status of a different account number's files is desired, the control card

AUDIT(AN=accnum)
AUDIT(VR=vrn, AN=accnum) is used,

where accnum is the account number of the desired file set.

Several other system components associated with permanent files, will be changed.

A. The PPU program GFM will be rewritten. There should be no changes visible to user programs, but if anyone using GFM suddenly encounters problems they should be reported to Kevin Matthews.

B. The control cards which operate on the file lists (e.g. REWIND,F1,F2,...,FN) will be rewritten.

No changes should be observed for most control cards but two changes will be made to the RENAME control card.

(i) Equivalent files must be separated by an "=" (equal sign) not by a "," (This will make the argument list consistent).

Thus to RENAME file A to B, the control card

RENAME(A,B) will be invalid
RENAME(A=B) must be used.

Also, the RENAME control card will no longer open files. To open file A, the control card

OPEN(A) will be used instead of RENAME(A=A)

C. Presently, there are 5 control cards which call for an identical CLOSE-UNLOAD on files,

RETURN
RETURNU
RU
UNLOAD
U

The control cards RETURNU and RU will be deleted; only RETURN, UNLOAD, or U will be allowed for these functions.

Note on Access Security:

Currently the 6600 batch system does not have password security on computer time and supplies used under a given account number. Password security is now available only with user pack files.

On April 1st, with this permanent file change, we will also install methods for creating password security for the user account number. This proposed security measure will be a password control card. (This control card will not appear in either the system or the user dayfile.) The password will be controlled by the individual user and can be changed by him on a daily basis or by default. Each user will also have the option of requiring no password for his account number.

Since decks are left in open trays and bins with the current operating procedure, it will be the user's responsibility to watch his deck in the input card tray until it is taken to the card reader and then to wait until it has been put into the bin. Alternatively, he may use one of the remote batch medium speed terminals and load and run the card deck himself.

029 KEYPUNCH CARD INPUT

The installation standard for the ExpEng remote station is the 026 keypunch card input. The user may override this standard to select 029 keypunch card input by punching consecutively the characters 2 and 9 into columns 79 and 80 of his JØB card or any 7/8/9 end-of-record card. The newly selected keypunch mode then remains in effect until the end of the job or until it is reset by the characters 2 and 6 consecutively punched into columns 79 and 80 of a 7/8/9 end-of-record card. The user may correctly read an input file of records having consecutive or alternating keypunch modes by punching 26 or 29 on appropriate 7/8/9 cards preceding the corresponding 026 or 029 records. If columns 79 and 80 of a 7/8/9 end-of-record card is blank or does not contain the character pair 26 or 29, the previously selected keypunch mode or the 026 default mode is used.

The particular conversion of 029 card codes to CDC display code that has been implemented on our system is described in the attached table. This mapping was designed to enable FØRTRAN, SNØBØL, and CØBØL users of the IBM/360 to run their card programs on the CDC 6600 without any major repunching of cards. Since many of the 029 keyboard characters are not directly available in the CDC 6600 63 character set (particularly those needed in SNØBØL) the conversion maps 029 card codes into the corresponding display code substitutes which are generally accepted by CDC 6600 compilers.

Often, minor changes must be made in an 029, IBM/360 program deck in order to be compatible with the CDC 6600 compilers. For example, in a FØRTRAN program, a program card may be a necessary addition in order to declare files used in the program. This additional card must either be punched on an 029 machine or punched by an 026 machine simulating an 029 machine. In the latter

case, the attached table of comparative punch codes may be quite useful. The punches made by both keypunch machines are identical for many of the most common keyboard characters including the alphabetic, the numeric, and the comma, period, minus, asterisk, and slash.

Caution to 029 FØRTRAN users: The use of the apostrophe ' to denote hollerith strings is nonstandard FØRTRAN and is acceptable only to the MNF compiler.

Experimental Engineering Remote Station

Hollerith Card Conventions

	Display	CDC 63-Character Set	Ø29 Keyboard	Hollerith (026)	Hollerith (029)
Identical	01 thru 11	A thru I	A thru I	12-1 thru 12-9	12-1 thru 12-9
Identical	12 thru 22	J thru R	J thru R	11-1 thru 11-9	11-1 thru 11-9
Identical	23 thru 32	S thru Z	S thru Z	0-2 thru 0-9	0-2 thru 0-9
Identical	33 thru 44	0 thru 9	0 thru 9	0 thru 9	0 thru 9
	45	+	+	12	12-8-6
	46	-	-	11	11
Identical	47	*	*	11-8-4	11-8-4
	50	/	/	0-1	0-1
	51	(	(	0-8-4	12-8-5
	52	)	)	12-8-4	11-8-5
Identical	53	$	$	11-8-3	11-8-3
	54	=	=	8-3	8-6
	55	blank	blank	no punch or 6-8	no punch or 0-8-2
Identical	56	, (comma)	, (comma)	0-8-3	0-8-3
	57	. (period)	. (period)	12-8-3	12-8-3
	60	≡	!	0-8-6	11-8-2 or 11-0
	61	[	¢	8-7	12-8-2 or 12-0
	62	]	_ (underline)	0-8-2	0-8-5
Identical	63	: (colon)	: (colon)	8-2	8-2
	64	≠	' (apostrophe)	8-4	8-5
	65	→	?	0-8-5	0-8-7
	66	v	|	11-0 or 11-8-2	12-8-7
	67	∧	&	0-8-7	12
	70	↑	" (quote)	11-8-5	8-7
	71	↓	@	11-8-6	8-4
	72	<	<	12-0 or 12-8-2	12-8-4
	73	>	>	11-8-7	0-8-6
	74	≤	#	8-5	8-3
	75	≥	%	12-8-5	0-8-4
	76	¬	¬	12-8-6	11-8-7
	77	; (semicolon)	; (semicolon)	12-8-7	11-8-6

136 CHARACTER LINE OUTPUT

Users of the Experimental Engineering remote station may now print full 136 character lines if this is allowed by the compiler or system being used. For example, the following program compiled by MNF

```
      DIMENSION I(136)
      DØ 2 J = 1, 136
    2 I(J) = 9
      WRITE (6,1) I
    1 FØRMAT (1X, 136I1)
      STØP
      END
```

will print a full 136 character line of 9's. The leading space resulting from the 1X is discarded after being used for printer line spacing control.

6400/6600 ECS CONNECTION

Work on the software to connect the 6600 and 6400 through ECS is nearing completion. The connection, which will provide file exchange capabilities between the MOMS and KRONOS operating systems, is designed primarily for the time sharing user on the 6400. Use of the connection will be restricted to validated 6400 users. The capability to send two types of files from the 6400 to the 6600 will be provided. Input type files will be put in the **input queue of** the 6600 and run with the other batch jobs in the 6600. The output from the job will be destroyed unless a special control card is included in the input file. The dayfile from the job will be returned to the 6400 automatically and saved as a permanent file. Output type files (print or punch) will be placed in the output queue of the 6600 to be printed or punched. In the other direction, a job running on the 6600 will be able to send files to the 6400 to be saved as a permanent file under the specified user number. With these capabilities the 6600 will supplement the rather restricted 6400 system. Further details will be announced in the next newsletter.

BMD AND UMST CHANGES

During the past month several BMD programs have been transferred from tape to disk due to the frequent utilization of these programs. A number of UMST programs which were infrequently used have been moved from disk to tape. As a result of these transfers, two changes will be apparent to the user. First there will be differences in dayfile messages issued by the operating system and second, the cost will vary according to disk or tape use. UCC will periodically review use of these programs and make appropriate changes in the future.

EISPACK DOCUMENTATION

Documentation on EISPACK (see January, 1973 newsletter) is now available by copying relevant portions of the permanent file EISINFO to the OUTPUT file. To copy the whole file (about 240 pages), use the control cards:

```
A,EISINFO.
CBF,EISINFO,OUTPUT.
```

To copy documentation for an individual routine (about 6 pages each), use

```
A,EISINFO.
CØPYS,EISINFO,OUTPUT,name1,name2,...,nameN.
```

Thus, to read about HQR, use:

```
A,EISINFO.
COPYS,EISINFO,OUTPUT,HQR.
```

ØMNITAB

The version of ØMNITAB now available on the CDC 6600 is ØMNITAB II written by the National Bureau of Standards and slightly modified by the University Computer Center staff. The worksheet area is 5000 words, and its default dimensions are 101 by 49. Users requiring a large worksheet should contact John Sneed at 376-7289.

Deck structure for an ØMNITAB run is (use CM 100000):

At Exp. Eng., Laud, or 1004	At West Bank
jobcard.	Jobcard
bin card (not needed on 1004)	BIN.WSBxxx
ØMNITAB	OMNITAB.
(7-8-9 card)	(7-8-9 card)
(ØMNITAB program)	(OMNITAB program)
(6-7-8-9 card)	(6-7-8-9 card) or (7-8,7-8 card)

The following manuals are available at the H. D. Smith bookstore in Blegen Hall:

Introduction to ØMNITAB II Programming, Byers and Schneider,

ØMNITAB II User's Reference Manual, Hogben, Peavy, and Varner, (NBS Technical Note 552), $2.00

The former is recommended for the novice; the latter, as a reference for users with some previous experience with ØMNITAB.

Short courses in ØMNITAB are offered occasionally by UCC - interested users should contact Amy Koepke at 373-7744. Consultation on OMNITAB is available at the WB Computer Center, Blegen Hall. Contact Randy Byers (Hours: 1-3 PM M-F).

NEW OPTION AVAILABLE ON JOB TIME LIMITS

Any user may now set a maximum time limit on jobs run under his account number: Maximum times limits of 1, 2, 4, 5, 10, 20, 50, or 100 seconds may be specified. If a maximum time limit is set for an account number, then any job run under that number will be restricted to either the job card time limit or the maximum time limit, whichever is smaller.

Any user who wants to set up a time limit on his account number should call or write

James Foster
Room 235H ExpEng
373-5757

COMPUTER COST COMPARISON

A former staff member of UCC who is now in a government position recently surveyed computer costs at three computer sites, including UCC. The results were interesting regarding the cost of computing at UCC so we pass them on to you. Two Fortran programs were compiled and run and BMD02R (regression) was executed. The first program involved simple computations, the second read data cards and did more extensive calculation. The computers involved were an IBM 370/165, Univac 1108 and our CDC 6600.

		Execution Step	
Program 1	CP Seconds	Cost	Total Cost
370/165	.61	$ .73	$ 1.88
1108	.68	.05	.67
6600	.99	.15	.24
Program 2			
370/165	2.03	$2.40	$ 3.78
1108	5.56	.37	1.32
6600	2.88	.43	.54
BMD02R			
370/165	7.42	$8.76	$11.22
1108	21.77	1.45	3.92
6600	7.30	1.10	1.61

CPU charge rates were:

370/165	$1.18/sec
1108	.067/sec
6600	.15/sec

CDC 6600 USE FOR JANUARY

Total Jobs: 48,212

From ExpEng	39.9%
Laud	21.9
WB	20.2
Other Remote	12.4
Maintenance	5.6

Average Times

on input queue	10.5 min
control point	6.4
output queue	5.1
Printing	1.7

THE SUGGESTION BOX

Q/S *It would be helpful for debugging purposes if, when an illegal I/O request is encountered, I/O buffers are dumped. Messages used for debugging are not dumped now because they are still in the buffer, making the problem difficult to find since we don't know exactly where the problem is occurring.*

A An illegal I/O request often results from the FET and/or buffer being clobbered. In your case, the I/O error occurred when the attempt was made to dump the buffer. Buffers are dumped whenever reliable FET data is available!

We recommend that when you encounter this problem, you force the dump after each write or print. This can be done by an ENDFILE (which produces no print image).

For example

```
      .
      .
      .
      I = 6LOUTPUT
      PRINT 100
  100 FORMAT(*Program get here*)
      ENDFILE I
```

or

```
      PROGRAM SAM(INPUT, TAPE6=OUTPUT)
      .
      .
      .
      .
      ENDFILE 6
```

Q/S *Several Newsletters have contained important information about BMD programs. Will these be combined into one unified handout?*

A Yes

Q/S *Would it be possible to have FT3 generate an error message indicating that the source input file is empty? Now no error is produced and the job runs to time limit (this can be expensive).*

A This is an error in the compiler; please see the warnings printed in the August newsletter (Volume 6, Number 8, page 3) and also the note FTN version 2 and FTN Version 3 in the December newsletter (Volume 6, number 12, page 13). The error has been reported to CDC, but has not yet been corrected.

Q/S *Please repair the ExpEng I/O keypunches. They frequently jam.*

A These machines were recently overhauled and never seem to jam when the keypunch supervisor checks them.

Q/S *How about providing hot water and packets of sanka (or tea) at Lauderdale?*

A We've tried this in the past (without success) and hesitate to get into it again. The coffee operation is costly as is. Why not bring a thermos?

Q/S *Please use the same paper at ExpEng as you use at Lauderdale. It's more pleasing to the eye.*

A We use the same paper; perhaps the lights make a difference.

Q/S *Supply more card punches at Lauderdale and keep them in repair!*

A Sorry, but we'll be getting no more punches for a while. As for repairs, the keypunches are under a maintenance service contract and are serviced monthly. The keypunch supervisor checks every machine weekly and the Lauderdale machines are checked daily by one of the operations staff. Any complaints about the Lauderdale machines should be immediately reported to the shift supervisor. Make your complaints as specific as possible----the supervisor needs more information than "the machine's out of order."

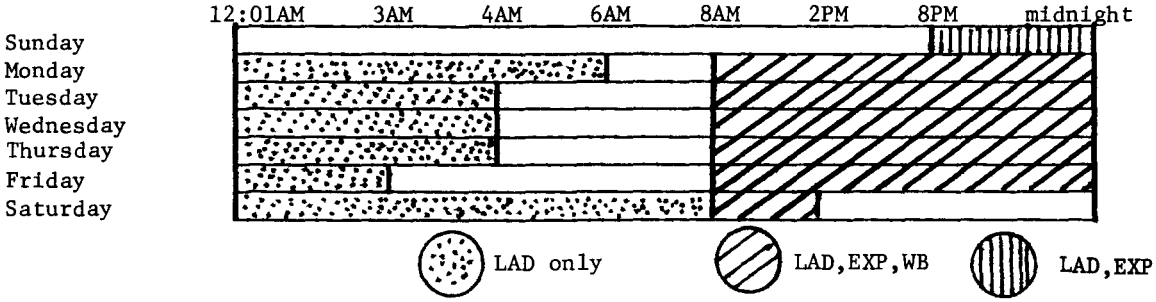
Q/S *Get a dollar changer at Lauderdale.*

A We've answered this before and the situation is still the same. We don't qualify for a dollar changer since our sales volume is <u>not</u> high enough <u>and</u> we cannot provide adequate security for the machine.

Q/S *Why not have EOF's punched in all four corners?*

A See this newsletter, Vol. 6 #12 (December, 1972)

6600 OPERATING HOURS



Medium Speed Remote Terminals		Local Supervisor(s)	telephone
Room N640 ElthH	(Mpls)	J. DeWitt	376-7377
		R. Swisher	376-3156
Room S191 KolthH	(Mpls)	T. Faulkner	376-7024
		J. Abdullah	373-2348
Room 321 MinMet	(Mpls)	C. Swanson	373-5475
		R. Lewis	373-2300
Room 38 ElectE	(Mpls)	C. Berg	373-5404
		M. Cook	373-3895
Room 384 HortS	(St P)	J. Heinen	373-1086
		M. Brenner	373-0949
Room 17 AgEng	(St P)	R. Vance Morey	373-0763
		N. Valentine	373-1059
Room 54 BA	(WB)	H. Smith	373-3608
Room 69 Physics	(Mpls)	J. Blair	373-3340
		B. Eaton	373-0242

Useful Telephone Numbers

373-4876	Manager, Operations (R. Folden)
373-4599	Manager, User Services (T. Hodge)
373-4548	Account Clerk, 6600
373-7753	Account Clerk, 6400
373-4995	EBR Operator
373-4596	ExpEng I/O
373-2521	Keypunch Supervisor
373-4940	Lauderdale Shift Supervisor
373-4994	Recorded Message
373-7744	Reference Librarian
373-4995	Tape Librarian (leave a message)
373-4360	UCC Office
373-4921	Users' Room (Lauderdale)
373-3608	West Bank I/O

Locations of UCC Keypunches

Mpls				StP	WB	Lauderdale
N640 ElthH	130	ExpEng		17 Ag Eng	90 Bleg H	Users' Room
12A Smith H	321	MinMet		302 CofH		
38 ElectE	69	Phys		384 HortS		
208 ExpEng	125	SpaSci				
131 ExpEng						