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U N I V E R S I T Y C O M P U T E R C E N T E R

227 EXPERIMENTAL ENGINEERING
UNIVERSITY OF MINNESOTA
MINNEAPOLIS, MINNESOTA 55455

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CONTENTS

Brief Notes	1	6600 Equipment	5
RJE Users	3	August Usage	7
Short Courses	3	Suggestion Box	7
PISCES	5		

BRIEF NOTES

SEMINAR

An Immigration Seminar will be held on Thursday, September 20th from 1:00 - 5:00 PM in Room 120 Blegen Hall (West Bank). This seminar is designed to introduce UCC computing resources to all new faculty members and graduate students and other prospective new users. We will present basic information on available computers, consulting procedures, software, instructional programs, documentation (present and future plans), costs, and scheduling.

For more information call Thea D. Hodge, 373-4599.

SPSS USERS

A listing of additional SPSS error messages has been compiled and is now available from the UCC librarian, Room 229 ExpEng.

PROGRAM TROUBLE REPORTS

A listing of current Program Trouble Reports (PTRs) is now available through the consultants in Room 140 ExpEng and at Lauderdale or from the PTR Coordinator in Room 203 ExpEng. Items on this list may be of an informative nature as well as errors which need attention.

If you wish to report a problem with a program, please fill out the Program Trouble Report form giving a good description and an example. Forms are available at the consultant's desk or in Room 227 ExpEng.

CONSULTING STATISTICS

Users are being asked to fill out a card whenever they ask a UCC consultant for advice in Room 140 ExpEng or at Lauderdale. These cards will help us to decide where and when to strengthen our consulting quantity and quality. The data gathered will also give us a better idea of areas in which to increase our training for our consultants. And finally, it should help us prepare the consulting budget which we submit each spring. We hope that you will find these reasons will justify the few extra moments needed to fill out the top section of the statistics card.

BMD X-SERIES PROGRAMS

All programs except BMDX90 and BMDX93 are now on the 6600 system. Updates to the reference manual and a description of the calling sequences are detailed in a writeup available in Room 140 ExpEng.

STORAGE SPACE AT EXPERIMENTAL ENGINEERING

Beginning October 1, 1973, we will start a new system for assigning storage space in Room 208 ExpEng. A charge of \$1.00 per quarter per shelf and \$1.00 per quarter per four drawers will be made. Each shelf and each set of 4 drawers can hold six boxes of cards (12,000 cards).

This storage charge will be considered a supply cost and will be billed against your supply budget number.

Those persons presently using the storage space will receive a request form by mail. These forms should be returned by October 1 if the storage space is to be reserved.

Approvals for storage expire at the end of each fiscal year (June 30th). New applications should be submitted before that date to continue storage.

Any questions about this policy should be directed to the Key punch Supervisor, Ms. Pat Gerlach, Room 225 ExpEng.

UPDATE USERS

On October 16, 1973 UPDATE will be replaced by UPDATE version 2 (presently known as UPDATE2 on our system). At that time, UPDATE2 will be removed as a separate program. UPDATE version 2 is upward compatible (all present UPDATE OLDPLs can be read by the new version). There are new features in version 2 which are described in the CDC SCOPE 3.3 manual (no. 60305200F) and in the CDC UPDATE manual (no. 60342500C).

CONSULTANTS CORNER

Many readers will be shocked to learn that compilers often err in translating codes. Remember that compilers are simply programs.

If you think that some particular compiler is miscompiling your program, please try all of the following techniques before bringing your grief to the consultant.

1. Isolate that region of code which appears to be executing improperly.
2. Place a statement number on all statements within the suspected area.
3. Break up each complicated statement into several simple statements. Permit no more than four operands on the right hand side of the equal sign.
4. Terminate all DO-loops with a unique CONTINUE statement. Nested DO-loops must end on different CONTINUE statements.

(The above is courtesy of the Lawrence Berkeley Laboratory Computer Center Newsletter, June, 1973.)

INPUT/OUTPUT

USERS: 6400, 6600, CALCOMP, et alia---Phase 1 of the 6400-6600-1700-160 Hybrid Linkage System has now been completed. It is now possible to send CALCOMP plots from the 6400 or 6600 directly to the Hybrid Lab's CDC 160 plotting system, without using transient tapes. For procedures and specifics, call, write or visit the Hybrid Computer Laboratory.

CONTACT: Bill Zech/David L. Messer
Room 132 Space Science Center
Telephone: 373-5768

TO ALL REMOTE TERMINAL USERS

NEW COORDINATOR

We are pleased to announce the appointment of Richard Franta to the position of Coordinator for Remote Job Entry. This new position in UCC is intended to remove the "remote" from remote job entry and provide an interface between the remote user and UCC. Remote users are encouraged to use this interface to make their needs and problems apparent to us so that their voice may be heard in future policy decisions.

Mr. Franta may be contacted with any questions, suggestions, comments, problems, or requests having to do with actual or simulated 1004 or 200 UT terminals. Call 612/376-3963 or write

Richard Franta
217 Experimental Engineering
University Computer Center
University of Minnesota
Minneapolis, Minnesota 55455

IDLE TIME

Starting in October, all remote terminals will disconnect after 4 idle minutes instead of the present 5 minutes. This is planned in an effort to free ports so that gaining access to the machine will be easier.

UNIVAC 1004 LISTING OPTION

It has been proposed that the 1004 use columns 30-109 during the listing of cards. This would not affect normal running of jobs, only the listing of cards. Some of the advantages are that the ribbon wear will be distributed more evenly and that the centering of listings will allow note taking on both margins of the paper.

Since there have been no major objections to this change, it will be implemented in the near future. The remote terminal supervisors will be informed of the change.

SHORT COURSES

The following short courses will be offered by UCC during Fall Quarter. No fees are charged and no registration is required.

Advanced courses on some of these topics will be scheduled Winter Quarter.

We are considering offering these courses upon request at installations outside the Twin Cities. We would be happy to hear from you about any short courses or workshops you would like added to this list.

The suggested references may be purchased at the Engineering Bookstore or you may use the copies in the UCC Users Rooms.

INTRODUCTION TO THE COMPUTER CENTER

A brief introduction to the facilities and resources of the University Computer Center.

Days : Monday, October 1
Hours : 2-4 PM
Room : MechE 212
Instructor : R. Franta
References : UCC Users Reference Manual

BEGINNING FORTRAN

A presentation of the basic features of the Fortran language. Prerequisite is attendance at the Introduction short course.

Days : Wed. Oct. 3; Fri. Oct. 5; Mon. Oct. 8; Wed. Oct. 10; Fri. Oct. 12; Mon. Oct. 15.
Hours : 2-4 PM
Room : MechE 212
Instructor : R. Franta
References : MNF Reference Manual, CDC 6000/7000 Series Fortran 2.3 Reference Manual (#60174900)

CDC 6600 MOMS CONTROL CARDS

An introduction to the MOMS operating system and to the control statements.

Days : Wed. Oct. 17; Fri. Oct. 19; Mon. Oct. 22
 Hours : 2-4 PM
 Room : MechE 212
 Instructor : R. Franta
 References : Materials from instructor.

MODIFY

MODIFY is a program designed to create, maintain, and update library files.

Days : Wed. Oct. 24; Fri. Oct. 26
 Hours : 2-4 PM
 Room : MechE 212
 Instructor : K. Matthews
 References : CDC MODIFY Reference Manual (#60281700)

FILE HANDLING ON MERITSS

An introduction to the use of files on the Time Sharing system, with descriptions of the permanent file commands and the control card utilities.

Days : Mon. Oct. 29; Wed. Oct. 31; Fri. Nov. 2
 Hours : 3-4 PM
 Room : MechE 212
 Instructor : J. Eikum
 References : CDC KRONOS 2.1 Reference Manual (#60407000), CDC KRONOS 2.1 T/S Users Reference Manual (#60407600)

MERITSS CONTROL STATEMENTS

An introduction to the use of control statements on the Time Sharing system.

Days : Mon. Oct. 29; Wed. Oct. 31
 Hours : 2-3 PM
 Room : MechE 212
 Instructor : Bob Williams
 References : CDC KRONOS 2.1 Reference Manual (#60407000), CDC KRONOS 2.1 T/S Users Reference Manual (#60407600)

SPSS

Introduction to the SPSS package of programs. SPSS is an acronym for Statistical Package for the Social Sciences.

Days : Mon. Nov. 5; Wed. Nov. 7; Fri. Nov. 9; Mon. Nov. 12
 Hours : 2-3 PM
 Room : MechE 212
 Instructor : B. Center
 References : SPSS by Nie, Bent, and Hull (McGraw-Hill)

BMD

Introduction to the Biomedical Computer Programs Package.

Days : Mon. Nov. 5; Fri. Nov. 9
 Hours : 3-4 PM
 Room : MechE 212
 Instructor : B. Center
 References : BMD Program Manual (U of California Press)

FILES ON THE CDC 6600

Descriptions of disk pack files and permanent files on the CDC 6600: restrictions, control card commands, utilities.

Days : Mon. Nov. 12; Wed. Nov. 14; Fri. Nov. 16
 Hours : 3-4 PM
 Room : MechE 212
 Instructor : R. Franta
 References : Materials from instructor

PISCES

(See the description of the PISCES System elsewhere in this newsletter.)

Days : Mon. Oct. 15; Wed. Oct. 17; Fri. Oct. 19; Mon. Oct. 22; Wed. Oct. 24; Fri. Oct. 26
 Hours : 2-4 PM
 Room : Ph 157
 Instructor : P. Cundall
 References : PISCES Manuals available from UCC

KEYPUNCH

Basic instructions on using the keypunch.

Days : Oct. 1 thru Oct. 12 (MTWThF)
 Hours : 8:30 - 9:00 AM and 3:30 - 4:00 PM
 Room : 223 ExpEng
 Instructor : P. Gerlach
 References : Materials from instructor

THE PISCES PROGRAMS

In recent years, a great deal of time and money has been expended by organizations connected with the Atomic Energy Commission to develop explicit finite-difference computer programs (the so-called Hydrodynamics codes). These programs have been developed to such a state that their ease of use now rivals the finite element packages apparently preferred by engineers. However, explicit methods have the advantage that arbitrary non-linearity (both in material properties and in the geometry) is taken account of with the expenditure of no more computer time than with linear problems. (The term "explicit" in this context means that time is used as an independent variable.)

The PISCES computer codes are explicit finite-difference programs developed by the Physics International Company to be highly user-oriented. Extensive error-checking is performed on the input data, and powerful graph-plotting routines are included in the package. The programs solve the general dynamic equilibrium equations and equations of state (e.g. stress-strain equations) by making small increments in time and updating all variables at each step. The same program deals with solids, liquids or gasses, or interactions of all three. Provision is made for easy specification of complex geometry and boundary conditions, both of which may be time-dependent. The equations are iterated on a Lagrangian grid, which means that large grid distortions and displacements can occur, and the effects naturally incorporated into subsequent calculation cycles. Other features include: slip-lines, void opening and closing, re-zoning option, re-start option, energy deposition, etc.

The University Computer Center has obtained a license on the PISCES one- and two-dimensional codes for a trial period of one year. If there proves to be sufficient interest, this period will be extended. The one-dimensional program in particular would be ideally suited to inclusion in a course: for example, the teaching and demonstration of stress-wave mechanics. The effects of non-linearity, plasticity, reflection and transmission at material interfaces can all be demonstrated easily, especially since the program contains a printer-plotting routine that will plot any variable against any other, using a simple one-card-per-plot specification.

A Computer Center short course will be offered on the use of the PISCES codes. See the schedule in the newsletter. Further information may be obtained from Peter Cundall of the Civil and Mineral Engineering Department (376-7297). A limited number of manuals are available from the Computer Center.

A REPORT ON BATCH PROCESSING EQUIPMENT AT UCC

February, 1967 to July, 1974

This report shows the growth and changing equipment patterns since the initial installation of the CDC 6600 in 1967.

Initial Installation (February 1967)

Central Processor	CDC 6600 - 65K of 60-bit memory
Mass Storage	2 - CDC 6603 (150M 6-bit chars)
Magnetic tape units	2 - 607 (200/556/800 BPI backward read) 4 - 606 (200/556 BPI)
Printing Equipment	1 - 501 (1000 136 char lines/minute)
Card Equipment	1 - 405 card reader (1200 cards/minute)

Augmentation of the Initial Installation

1967	High Speed Remotes (40.8K baud)	West Bank and ExpEng each having a 405 card reader and 501 printer.
1968	Extended Core Storage	250K - 60 bit words
1968	Card Equipment	415 card punch (250 cards/minute)
	Magnetic tape units	2 - 607 (200/556/800 BPI)
	Microfilm Printing Equipment	3M Electron Beam Recorder
1969	Printing Equipment	501 Printer
1970	Medium Speed Remotes	6671 Data Set Controller (2000 baud 200UT)
1971 - 1973	Mass Storage	841-3 [105M - 6 bit chars] to 841-7 [245M chars]
1971	Medium Speed Remotes	2000 baud (200 UT) PDP-11/20 - 8K
1972	Medium Speed Remotes	2000 baud (UNIVAC 1004)

Current Installation September 1973

Central Processor	CDC 6600 - 65K of 60 bit memory [150K _g maximum job field length]
Extended Core Storage	CDC 6634 - 250K of 60 bit memory [300K _g available to user]
Mass Storage	1 - CDC 6603 [75M chars], 1 - 7054 with 5-844 Drives [585M chars]
Magnetic Tape	4 - CDC 606 and 4 - CDC 607 units with flat heads
Printing	2 - CDC 501 Printer, 1 - 3M Electron Beam Microfilm Recorder.
Card Equipment	1 - 405 Card Reader, 1 - 415 Card Punch
Private High Speed Ports	West Bank, Experimental Engineering, Space Science
Dial up Medium Speed Ports	PDP 11/20 1 - 1200 baud for Data Speed 40's 10 - 2000 baud for UT 200 compatible

Projected Installation by July 1974

Central Processor	CDC CYBER 74 - 98K of 60 bit memory [150K _g maximum job field length]
Extended Core Storage	CDC 6634 - 250K of 60 bit memory [300K _g available to user]
Mass Storage	2 - 7054 controllers with 8 - 844 drives [936M chars]
Magnetic Tape Units	8 - 607 Tape units [200/556/800 BPI, 7 track with wrapped heads]
Printing Equipment	2 - CDC 501 Printers, 1 - CDC 512 Printer [6/8 lines inch, upper lower case, forms], 3M Electron Beam Recorder [20K lines/minute microfilm printer]
Plotting	Varian STATOS 31 - 14 inch width electro- static dot matrix printer/plotter
Card Equipment	1 - 405 Card Reader (1200 cpm) 1 - 415 Card Punch (250 cpm)
Private High Speed Ports	3 - 40.8K baud
Dial up Medium Speed Ports	PDP 11/20 (16K - 16 bit memory) 1-2 1200 baud for Data Speed 40's 16 { 2000 baud rotary } for UT 200 compatible { 4800 baud rotary } and Univac 1004 remote job entry terminals

What does the projected equipment installation mean to UCC Users?

The Spring Quarter Break 1974 installation of a 98K CYBER 74 [CDC's new version of the 6600] will give us three advantages. First, it is 10-to-20% faster than the 6600 and this will be reflected in lower job costs [i.e. lower CP times for identical jobs]. Second, the 98K of storage represents 66% more actual storage to multiprogram user jobs. Simulation studies by UCC show that the current work load will be processed at a faster rate [i.e. faster turnaround time] or that an increased work load [up to 50% more jobs] will complete in the same time required for the current work load. Third, it has a higher reliability margin than our current CDC 6600 which means less down time for the user.

The Christmas 1973 installation of a second 844 controller and the elimination of the last 6603 will give two advantages. First, the 844 drive has 3.3 times the capacity of an 841 unit and 1.5 times the capacity of a 6603 unit combined with a throughput rate that is approximately 2.5 times that of a 841 or 6603. This will be reflected in lower job costs for the user, since there will be less PP time charged for identical mass storage transfers. Second, the 844 drive with its large capacity/low cost per storage unit allows the UCC user to consider online data bases or mountable data bases with 117M characters in a single data base.

The November 1973 uniform installation of 607 tape units with wrapped heads as opposed to the flat headed 606 and 607 units that are currently owned means that better tape driver routines with increased error checking ability can be used. The wrapped heads enable the tape units to read and write slightly damaged tapes better but to do so with a slight degradation in the life expectancy of the magnetic tape.

The Christmas 1973 512 printer installation will give the user upper and lower case line printing that is a marked improvement over the 501 printer output. In addition to optional 6 or 8 lines to the inch the user will be given the ability to print forms, a feature UCC has discouraged with the hard-to-change 501 printer.

The Varian STATOS 31 printer/plotter will give UCC a high speed plotting device that has an output capacity of 2.2 inches/second of 14" wide paper which is close in speed to high speed printer output. This electrostatic printer/plotter energizes styli that are placed 100 to the inch across the width of the paper. Then the paper is moved through a toner bath (ink particles) and these inked points are then dried by air. The simplicity and speed of the operation will give UCC a much needed plotting capability.

The November 1973 installation of 6 more 2000 baud medium speed ports will ensure that the dial up rotary will not saturate during the fiscal year 1973. In addition, over the next several months, all Univac 1004 terminals with 400 lpm printers will be upgraded to 600 lpm. An experimental 4800 baud dial up system will be installed this fall and if successful many of the remote job entry stations will be converted to this higher speed modem which should double the throughput of the terminal.

UCC realizes that this projected installation does not cover the problems of 9-track magnetic tape and paper tape I/O, but those problems will be investigated over the next several months.

CDC 6600 USE FOR AUGUST

Total Jobs: 40,594 jobs

From ExpEng	27.6%
From Lauderdale	20.5%
From West Bank	10.8%
From Other Remote Terminals	33.2%
For Maintenance	7.9%

Average Times:

On Input Queue	21.5 minutes
At Control Point	6.3 minutes
On Output Queue	3.9 minutes
Printing	1.7 minutes

THE SUGGESTION BOX

[Suggestions may be edited for clarity. Unsigned suggestions are ignored.]

Q/S. Make binary decks available under MNF. As a special option this would not slow down most jobs.

A. We had planned to offer "relocatable binary" on MNF this summer but other projects plus bug correction (our first priority) plus resequencing the MNF compiler have pushed this date up to early 1974. Currently MNF does allow an OVERLAY (filename,0,0) statement as the first card of the source deck and the binary overlay

created can then be loaded fairly quickly by the loader. In terms of reduced time: the fact that MNF compiles to core and then does its own loading of system routines means that the time required to process the LOAD or EXECUTE card for those compilers with relocatable binary can be exchanged for 300 to 1000 additional Fortran source statements.

Q/S. *I feel it unfair that I must pay for 2 pages of ugly front graffiti, 2 pages of error flag 10 (and dump) plus an aborted dayfile telling me to look at the nonexistent pages 3-11 to 3-13 of the 6000 series reference manual.*

A. You have 3 problems.

- 1) The nonexistent pages 3-11 to 3-13 are in the 6000 Series Computer Systems Reference Manual, not the Fortran Reference Manual. These pages explain the reasons for MODE exits on CDC 6000 machines and thus are valuable if you want to understand the particular mode exit. In order to analyze the mode exit, a dump of the operating registers and the program area where the MODE exit occurred are put into the output file. Consultants can help explain these dumps.
- 2) We also wish to save paper. The new JANUS package to be installed this fall will accurately count pages, allow 029 punched cards to be read and will print just one output banner page. To keep people informed of system changes we will continue to put out SYSNOTES (graffiti) on this single banner page.
- 3) ERROR FLAG 10 (job rerun) does not put out any dumps but does indeed put out 3 extra pages. Currently there are two reasons that a job is RERUN:
 - a) A deadstart of the system while that job was at a control point.
 - b) Operator intervention in cases of unmounted disk pack or missing magnetic tape. From July 1 to August 22, we had only 3 844 disk drives for UCC101, UCC102, UCC103 as well as transitory packs. Thus, at times a requested pack was not on-line and an operator would rerun a job. We now have enough drives to ensure that all on-line packs are physically mounted.

Q/S. *When running a job from a 1004 terminal, I would find it useful to be able to use a control card to hold a job in the output queue and then use another control card to call the job when I want it to print.*

A. Holding an output file in the system is not a desirable feature since the file name table could very easily fill up and thus clog the entire system. Everyone would suffer instead of just those at a particular site.

If necessary, you can dump your output to a disk pack and have it held there at a minimal cost. In addition, any 1004 user can SUSPEND the printing of undesired output.

Because of the disadvantage mentioned above and because of these alternatives, we feel that a hold output feature is not needed at this time.

Q/S. *What happened to the display at Lauderdale? It was very useful for checking up on operators.*

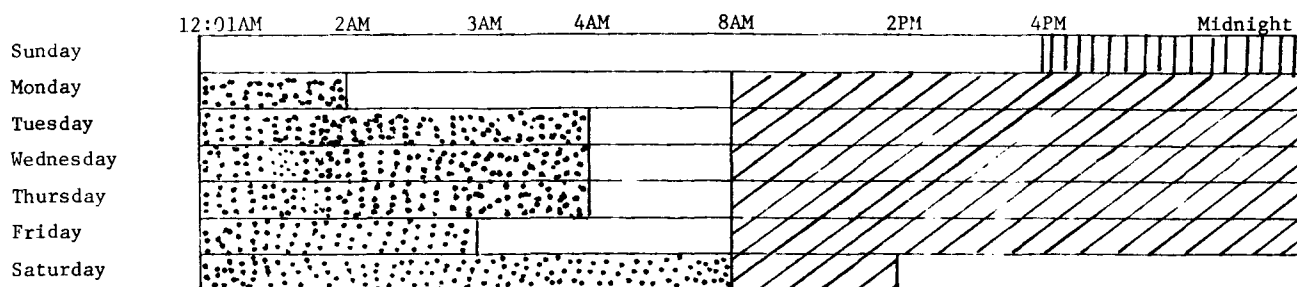
A. The display was not cost effective. It was removed permanently. Since the 1004 is a "multipurpose" device, it should fit into your specific needs. [Instructions are posted on site.]

Q/S. *I appreciate the need for room for the MECC meeting which you held at Lauderdale; however you should also appreciate our need to use the facilities; the unexpected "power down" of all facilities caused a significant inconvenience and waste of time for many of us.*

A. We agree and apologize; however, our solution was the best compromise we could come up with under the circumstances.

NOTE: *There have been a number of questions about the Lauderdale area. We have taken note of all suggestions and complaints and can answer them all in this way: The Lauderdale facility, including staff area, users area, parking lot, equipment placement, supplies, telephones, storage area, table placement, etc., etc., are all under study; we have made no final decisions on how this area is to be used. We will be making changes; keep in mind that most changes will be experimental to help us find the best way to manage the facility.*

6600 OPERATING HOURS



LAD only



LAD, EXP, WB



LAD, EXP

Medium Speed Remote Terminals

Local Supervisor(s)

Reference Manuals

Room 38 ElectE (Mpls)	C. Berg/373-5404 M. Cook/373-3895	CDC 6010000W 60281700B 60189400L 86615300B 60306100D 60253000E 60279900D 60176600K 60329400B 60174900F 44610400E 60207000B 60133600C 60178300C 60234800E 60252600D	6000/7000 Computer Systems Ref. Man. KRONOS MODIFY Ref. Man. SCOPE Ref. Man. Ver. 3.2 APEX Ref. Man. ALGOL Ref. Man. Ver. 2 COBOL Ref. Man. Ver. 3 COMPASS Ref. Man. Ver. 2 FORTRAN EXTENDED Ref. Man. Ver. 3 FTN DEBUG Users Guide FORTRAN (RUN/FUN) Ref. Man. Ver. 2.3 MINIC Simulation Language Ref. Man. OPTIMA Ref. Man. Ver. 3 PERT/TIME Ref. Man. SIMSCRIPT Ref. Man. SIMULA Ref. Man. SORT/MERGE Ref. Man. Ver. 3
Room N640 EltH (Mpls)	J. DeWitt/376-7377		
Room S191 KoltH (Mpls)	T. Faulkner/376-7024 J. Abdullah/373-2348		
Room 321 MinMet (Mpls)	C. Swanson/373-5475 R. Olfke/373-5680		
Room 69 Physics (Mpls)	Bob Scarlett/373-0243 Dave Olson/373-0044		
Room 415 CofH (St. P)	D. Nelson/376-7003 T. Ehlen/376-7003		
Room 24 No Hall (St. P)	J. Colton/373-0990 D. Rignell/373-0990		
Room 257 BioSci (St. P)	R. Comstock/373-0928 L. Hulbert/376-3067	<u>Other</u> BMD BMDX IMSL OMNITAB II SPSS	Biomedical Computer Programs Ref. Man. Biomedical Computer Programs Ref. Man. Library Catalog Programmers Ref. Man. Statistical Package for the Social Sci.
Room 384 HortS (St. P)	J. Heinen/373-1086 M. Brenner/373-0949		
Room 125G COB (St. P)	C. Bingham/373-0988		
Room 54 BA (WB)	G. Lutgen/373-3608	<u>UCC</u> MNF Ref. Man. OMNITAB II, An Introduction to SPSS Supplement (Ver. 5.0) UMST: Statistical Programs Ref. Man. UCC Users Ref. Man.	
User Room (Lauderdale)	Shift Supervisor/373-4940		

Useful Telephone Numbers

373-4876	Operations (R. Folden)
373-4599	User Services (T. Hodge)
373-4548	Account Clerk, 6600
373-7753	Account Clerk, 6400
373-4596	ExpEng I/O
376-7584	Field Engineering
373-2521	Keypunch Supervisor
373-4940	Lauderdale Shift Supervisor
373-4995	Microfilm Operator (leave a message)
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 (Number in Parenthesis After Site)

<u>East Bank</u>		<u>St. Paul</u>		<u>West Bank</u>		<u>Lauderdale</u>
38	ElectE (2)	223	ExpEng (4)	257	BioSci (1)	90 BlegH (2)
N640	EltH (1)	S191	KoltH (1)	125G	COB (1)	Users Room (4)*
130	ExpEng (2)	321	MinMet (1)	415	CofH (1)	
131	ExpEng (1)	69	Physics (1)	384	HortS (1)	
208	ExpEng (8)*					

*includes 1 interpreting card punch

INPUT / OUTPUT

Users who wish to exchange information on programs, equipment, etc. with other UCC users may use this form to submit the information.

To: Editor, N & C
University Computer Center
Room 227 Experimental Engineering
University of Minnesota
Minneapolis, Minnesota 55455

Please publish the following message in the INPUT/OUTPUT section of the next UCC Newsletter:

Message: _____

Contact:
Name _____
Address _____

Telephone _____