UNIVERSITY COMPUTER CENTER

UNIVERSITY COMPUTER CENTER, UNIVERSITY OF MINNESOTA-TWIN CITIES, MINNEAPOLIS, MINNESOTA

CONTENTS

BULLETINS

!!

USER'S MEETING

February 14, 1978
1:00 - 4:00 PM
Social Sciences 850
(West Bank)

This meeting will give you a chance to discuss proposed changes (see page 2 of this newsletter) and let you present your own suggestions.

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A message to PDP11 and PDP8 owners:

The UCC Engineering Services Division will hold a meeting in the near future to consider the possibility of UCC providing maintenance services for these machines. If you are interested, please call Abe Franck at 376-7291 (or send your name, address, and telephone number to indicate your interest).

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UCC newsletter
VOLUME 12 NUMBER 1 JANUARY, 1978

Director: Peter C. Patton
Editor : A. Koepke

Comments about the content of this newsletter, or suggestions for changes may be directed to the editor, 235a Experimental Engineering, 373-7744.

EXPANSION

UCC seeks to expand the CYBER 74 in Spring 1978

"The University of Minnesota is seeking a computer system to expand the CYBER 74 located in the Lauderdale Center. Computing service on that system has been growing at a rate of 20-25% per year. The current system is approaching saturation; to meet the needs for the next four years an additional system will be added which has not less than 75% of the processing capability of the CYBER 74. This system will be located next to the CYBER 74 and must be functionally identical with it."

The preceding paragraph is the first paragraph of a request for bid document that we have submitted to vendors. As many users have noticed, our saturation occurs during the 9:00 AM to 5:30 PM normal working week hours on 5 or 6 days during the month. A large percentage of the computing service growth has been in the on-line MIRJE and SUBMIT from MIRJE areas of interactive graphics and System 2000 data base management. Thus, any expansion computer should have more interactive ability.

In response to the University's request for bid, Control Data Corporation has proposed a dual processor CYBER 172 which has approximately the equivalent central processing power of our CYBER 74 (to do interactive work) and a 131K central memory (CM) which is identical in size to that on the CYBER 74. The CYBER 172 has 10 peripheral processors (PPs) which are twice as fast as those on the CYBER 74 and can be expanded both by additional CM (to a maximum of 262K) and PPs (to a maximum of 20) at much lower cost than for the CYBER 74. Delivery of the CYBER 172 will be by March 31, 1978 if the University can prepare water cooling and electrical power for it at the Lauderdale computer center by that date.

The CYBER 172 will be equipped with:

1) double density disks (235M 6-bit characters each),
2) 9-track tape units (1600 PE, 420K 6-bit characters/second transfer rate),
3) a high speed line printer (1200 lines per minute) with an ASCII print train,
4) communication gear to 110, 300, and 1300 baud asynchronous lines and several synchronous lines.

In addition, the CYBER 172 will share, with the CYBER 74, the 7-track tape units, ECS, and a common disk controller.

COBOL 5, Transaction Processing, and DMS170 are new software products that will be available in addition to the software currently available on the CYBER 74.

Both machines will run with the NOS operating system. The version of NOS that we will install as an upgrade from KRONOS 2.1 has only one or two differences as far as current running programs are concerned. We expect that the CYBER 74 upgrade to NOS will be virtually painless.

User advantages with this new configuration:

1) A CYBER 172 will give user program continuity and compatible software for the next three to five years.

2) The minimum cost for hardware and software combined with only a slight increase in UCC staff will ensure that there will be no increase in user costs.

3) The CYBER 172 strength areas are exactly in those areas (data base management, on-line use, interactive graphics) where we have experienced the largest growth in the past three years. The new software (COBOL 5, DMS170, and Transaction Processing) will give the user additional growth areas in on-line interactive programming.

4) Identical operating systems, common libraries, shared input queues, and common RJE access to either machine ensure that the two machines will appear as one to the user.

5) The extremely stable MERITSS system will still run on KRONOS and be compatible with the MECC system, but will have access to the combined CYBER 74/172.

6) Common account numbers and passwords along with many other user requested accounting features will be jointly available in September, 1978.

Proposed limitations:

The following proposed maximum field lengths will help ensure that most Batch/SUBMIT jobs are done on the CYBER 74 and larger interactive jobs are done on the CYBER 172.

	maximum FL (octal)		
	current CYBER74	proposed CYBER74	proposed CYBER172
INTERACTIVE			
nominal per user	55K	50K	55K
by request per user	71K	55K	101K
total CM available	110K	61K	201K
Batch/SUBMIT			
nominal per user	155K	155K	111K
by request per user	221K	221K	155K
total CM available	170K	221K	110K

DMS170 and Transaction Processing only available on CYBER 172.
Only 110 and 300 baud interactive access available on CYBER 74.

The problem areas we forsee:

1) If growth continues as in the past three years, the CYBER 74 will need to be replaced by 1981-82. Thus the CYBER 172, by doubling processing power, provides only a holding position compared with the CDC 6600/CYBER 74 upgrade of the CDC 1604; that gave us thirteen to twenty times the processing power and a fourteen year life cycle. Note, however, that in three to four years certain emerging patterns such as economical super computers

and distributed computing should allow a clearer decision to be made. This is not possible now.

2) Moving to a CYBER 172 under the CDC network operating system, NOS, means that the user community will again be asked to change at periodic intervals as CDC upgrades their product, rather than using a mature system such as KRONOS 2.1.

3) The new equiment does not include any additional 7-track tape units and thus there is an implicit commitment by UCC to persuade users to convert to 9-track, 1600 PE tapes.

4) Within the next year, we plan to consider moving to a standard ASCII character set, both a 6-bit subset and a full 7-bit set for the upper-lower case printers that will be available. This will probably mean the demise of all of the CDC 501 printers at UCC and the conversion of the 026 scientific extended character set keypunches to a standard 029 set.

DISCLAIMER

This CYBER 74 expansion is only a proposal at this time. Only with official Board of Regents approval will all of this take place. We will not make any firm commitments until such approval has been obtained. (A decision by the board is expected shortly.)

It is also important to note that many of the items presented here are first cut proposals; several task forces are now studying the various aspects of the expansion in order to make firm recommendations in the near future. As always, any suggestions which you, our users, wish to provide would be welcome.

P.C. Patton, 373-4361

FROM THE DESK

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If you have not already seen it, you may want to skim through the CDC manual "NOS Version 1 Timesharing User's Guide." The UCC Reference Room (235A ExpEng) has copies for 1-3 day loan. This is a particularly well-written manual that will lead a new KRONOS (or NOS) user through several terminal sessions, beginning with the most elementary log-in and log-off and proceeding through some file manipulation examples.

Since we will probably be facing an operating system upgrade in the near future, you may well find this to be useful reading.

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We will be posting three positions in User Services: 2 part-time positions for student programmer-consultants (undergraduate or graduate) and one full time position for a writer-programmer-consultant. If you have any qualified applicants, please refer them to me.

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MECC (the Minnesota Educational Computing Consortium) publishes a newsletter called USERS which many of our readers may find interesting. I would like to call a new feature of their newsletter to your attention. Each issue beginning with the second Fall 1977 issue contains an insert devoted to a specific instructional computing area. For example, one insert highlighted the use of computers in athletics; nine programs on the MTS (MECC Timesharing System) computer, a CYBER 73, are being used to keep and to analyze athletic data in many sports and in a variety of conferences.

If you are interested in receivng USERS, call 376-1122 or send your name and address to MECC, 2520 Brodadway Drive, Lauderdale, Minnesota 55113.

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A University of Illinois faculty member is looking for a program that allows for a simulation of a telecommunications network that estimates blocking probabilities. If you know of such a program, please call me.

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Please take special note of the user's meeting on Valentines's Day (see the front page). We should know the status of our proposal (see page 2) by that time. Please urge all your colleagues to attend.

T. Hodge, 373-4599

PASCAL

We would like to urge all users to consider trying the FUTURE version of PASCAL this quarter because it will contain so many new and exciting things. Please do a WRITEUP,PASCAL=FUTURE. In Batch, use this:

```
FUTURE(PASCAL)
PASCAL.
```

When using the PASCAL interactive subsystem, enter:

```
X,FUTURE,PASCAL
```

after every use of NEW or OLD.

A. Mickel, 376-7290

J. Strait, 376-7290

SYSTEM 2000

System 2000 consulting hours for Winter Quarter are 10:00-11:00 AM and 1:00-2:00 PM Monday through Friday. Anyone with System 2000 questions or problems may call during these hours to make an office appointment. The number to call is 376-1761.

S I C L

The Special Interactive Computations Laboratory (SICL, pronounced sickle, as in hammer and...) is one of the divisions of UCC. Crowded into a third of the first floor of the Space Science Center, the SICL staff is engaged in development and production work in imaging, interactive graphics, hybrid (analog-digital) computation, and the investigation of applications for microprocessors.

One of the most interesting areas that SICL involves itself in is the the work centered around the Dicomed Image Recorder. In this issue we shall generally discuss the Dicomed system. We will be exploring other SICL projects in other newsletters this year.

The Dicomed system, interfaced with a PDP 11/40, will digitize either color or black-and-white 35mm transparencies, and will produce, from digitized information, color or black-and-white slides or Polaroid prints.

Digitizing is the process of assigning a value to each color or light intensity within a predefined set of grid points in a given area. The Dicomed has a grid resolution on a 35mm x 35mm area ranging from 256 x 256 points (65,636 values) to 2048 x 2048 points (4,194,304 values).

Once a photograph is digitized, any of the values can be manipulated in any number of ways. For example, if you digitize a black and white slide, you can reset all the values to represent various colors and the result, when reproduced on slide or print, will be a "false" colored picture.

After digitizing an original photograph, sections of the photograph may be selected and manipulated separately. Thus, you can "blow-up" part the original, or, if you have a photograph with poor resolution or focus, you can enhance the photograph. If you saw the photographs returned by the Mars and Moon landers, you were viewing photographs enhanced using these same methods and equipment.

The Dicomed system has recently been augmented by a color display. A Ramtek Corporation 256x320 resolution system allows us to view intermediate or final results of digital image processing operations before producing hard copy final finishing. A track-ball allows interactive use of the monitor through a positionable cursor.

The programs designed for manipulating digital image data are contained in a subprogram library called SADIE. SADIE provides routines for a wide variety of commonly used imaging operations. For documentation on the SADIE routines, see WRITEUP,SADIE (many pages; you may want to come to the Reference Room and look at a copy before printing your own). Many of the people using the Dicomed system have been involved with special projects, and have developed their own processing

However, SICL has also developed some general purpose software to aid all graphics users. A conversion program called IMAGPLT has been developed that will convert Varian plot files into image files; these may be displayed on the Ramtek screen or recorded on film via the Dicomed image recorder. Using IMAGPLT together with PLOT31, you can display or record PLOTPAC, PASPLOT, and ARTPLOT files on black-and-white or color slides or prints.

IMAGPLT is callable as a system program. It produces an image file that must be written to magnetic tape for recording. You may use your own tapes or we will supply and transport the tape and the resulting film in the same manner as we do for Calcomp plots. SICL charges only $3.00 for black-and-white and $5.00 for color images, plus the cost of film.

If you wish to see sample images produced by IMAGPLT, come to room 133 Space Science Center where many are on display. Color charts to aid in the selection of colors for your images are also posted. Complete documentation for IMAGPLT is available from 140 ExpEng, the UCC Reference Room, and from SICL.

PDP 11 augmented

The PDP-11/40 which controls the Dicomed and Ramtek image processing equipment, now includes a writable control store. With this writable control store, it is possible to define new assembly language instructions through the microprogramming level, thus allowing the system designer to develop a new or augmented computer architecture suited to a particular application. This capability will be used by students in Computer Science operating system courses, and to augment the image processing and UNIX capabilities of the PDP-11.

Exploring small systems

As computer hardware continues to develop at a gallop, it becomes feasible to incorporate a significant amount of computational power in small systems. To explore some of the features of these small computer systems, we have ordered 7 Terak systems, some of which have already arrived. Each of the Teraks consists of an LSI-11 (the Large Scale Integrated version of the PDP-11/40), one or two floppy disk drives, a bit by bit addressable display screen, and an alphanumeric keyboard. Each of the systems fits easily on a desktop, yet provides PDP-11 architecture with 28K memory. Some of the questions we will be exploring are:

1) Is it economically feasible and desirable to scatter several small scale systems around the campus as an alternative to timesharing or batch processing on the large scale CDC machines? What support from a central system is desirable and/or necessary?

2) Where are small systems useful in instructional and research programs in the university setting?

3) What are the interesting and useful properties of small computer networks?

A number of operating systems and language processors (including FORTRAN and PASCAL) are available for use on the LSI 11 system. A version of UNIX is also being prepared for these machines.

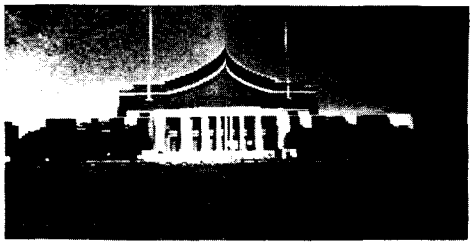
R. Weinberg, 373-7881

A new addition to the system....
This display is was in color....
note the variety of characters.

CHANGING SEASONS

prunes and prisms .....

DISTORTIONS



Recognize this building?
Northrop...photographed, digitized, and then the image was deliberately distorted.

SUGGESTION BOX

COULD YOU PUT A T PARAMETER ON THE TELEX RUN COMMAND? WHEN RUNNING MNF PROGRAMS IT WOULD TURN ON MNF TRACING PROGRAMS, SO THAT

RUN,T

WOULD RESULT IN A

TSF,I=PROG,K,T

OR A

MNF,I=PROG,K,T

CONTROL CARD. THIS WOULD BENEFIT BEGINNING USERS.

M.M.:18NOV77

The RUN and RNH commands are used by all subsystems (BASIC, PASCAL, APLUM, COBOL) in addition to MNF. The parameters allowed on RUN and RNH are:

STANDARD (from page 4-21 of the CDC Timesharing Users Guide)

RUN,B=lfn or C=lfn: binary of source is put on lfn for later use under an EXECUTE subsystem.

RUN,I=lfn: input source is from lfn.

RUN,MA=nnnnn: use octal nnnnn field length.

RUN,MI=nnnnn: increment current field length by octal nnnnn.

RUN,T,q1,q2,...: for FORTRAN Extended, allows user to rename the working files on the PROGRAM statement without recompiling. (We do not have the FTN timesharing version that uses this control character.)

UCC IMPLEMENTED

RUN,E=n: set MNF error levels to n rather than 2.

RUN,X: use Batch character set for SNOBOL compilation.

We think that your idea has merit and actually have had it in our job jar for a while, but since CDC had pre-empted the T, we let it slide. Robert Williams (373-4573) of our MERITSS staff has promised to come up with a reasonable solution and would like to hear from any user now using T for file name changing. We now recommend you put a TRACE statement (the word TRACE alone, starts in column 7) as the first source statement to obtain the effect of your proposed T on the RUN card.

L. Liddiard

NO DIAGNOSTIC IS GIVEN (in MNF), NOT EVEN A WARNING, WHEN YOU TRY TO PRINT OUT AN ARRAY WHICH WAS NOT DIMENSIONED. I SUGGEST THAT THE COMPILER LIST A WARNING WHEN ANY INSTRUCTION USES AN ARRAY WHICH WAS NOT DIMENSIONED.

L.O.:24OCT77

You should get the loader messages

"LOAD ERRORS
UNSATISFIED EXTERNALS
name" (of not dimensioned array)

This is a design error in FORTRAN when compared with ALGOL; ALGOL uses brackets for subscripts and parentheses for procedure arguments. Thus, in ALGOL, name( ) is a procedure whereas name[ ] is an array name. In FORTRAN, name( ) is an array if and only if there exists a dimensioning statement for 'name' within the subprogram, otherwise it is a function evocation. Under E=0 you would have received the message NON-STANDARD OUTPUT LIST and a cross-reference listing would have noted that the name was an EXTERNAL reference.

L. Liddiard

NOW THAT MNF NO LONGER ACCEPTS LITERALS IN THE FORM *...*, PLEASE CHANGE TIDY SO THAT IT WILL CHANGE *...* into '...'. THE CURRENT VERSION CHANGES '...' INTO *...*, WHICH IS NOT VERY USEFUL.

J.C.

This idea seems reasonable. However, because TIDY is low on our list of priorities, it will be a while before this change is made. Watch the newsletter for an announcement.

M. Frisch

I AM CURRENTLY TAKING TWO COMPUTER SCIENCE COURSES WHICH REQUIRE COMPUTER JOB SUBMITTAL. AS THE QUARTER HAS PROGRESSED I AM FINDING IT INCREASINGLY DIFFICULT TO FIND AN OPEN KEYPUNCH MACHINE IN EXPERIMENTAL ENGINEERING. I WOULD SUGGEST THAT IF THERE ARE X KEYPUNCHES THEN THE NUMBER OF KEYPUNCH USERS Y BE SUCH THAT Y/X NOT EXCEED SOME MAXIMUM VALUE. I HAVE THE IMPRESSION THAT NO SUCH VALUE EXISTS, AND THAT USERS ARE ACCEPTED WITHOUT LIMIT.

M.S.

The number of keypunches available in ExpEng just about doubled in August this year. There are 10 other locations on the Minneapolis campus where jobs can be punched and run. These 10 locations have 18 additional keypunches. It would be to your advantage to use one of these other locations. Since our budget for keypunch machines has been exhausted for this year, we cannot promise any additional punches. Please note that the ExpEng building is open to all users from 7AM until midnight; during early morning and evening hours we frequently see several idle keypunches.

T. Hodge, R. Franta

WHY CAN'T KEYPUNCH MACHINES BE LOCATED FOR USE 24 HOURS PER DAY? I AM AN EXTENSION STUDENT AND CAN ONLY WORK ON WEEKENDS AND THE KEYPUNCH MACHINES ARE NOT AVAILABLE FOR HALF OF THIS TIME.

E.E.:14NOV77

All remote 1004 stations have keypunches. Some of these are open longer hours on weekends. Friday from 0001 through 0400 at Lauderdale keypunch machines are almost always available. There is a total of 24 hours available on Saturday and Sunday at either ExpEng or Lauderdale or both for keypunching. We know of no way either building could be left open any additional hours.

R. Fleagle

WOULD YOU PLEASE CONSIDER CHANGING THE RANDOM I/O ROUTINES SO THAT RECORDS WHICH ARE REWRITTEN WITH NO CHANGE OF LENGTH WOULD BE REWRITTEN IN THE ORIGINAL LOCATION. THE CURRENT METHODS CAN LEAD TO VAST AREAS OF UNUSED DISK SPACE.

J.C.

The current random I/O routines do rewrite in place. We will not consider fixing the PAST versions which do not.

J. Mundstock

PRODUCTION USAGE SUMMARIES

	November, 1977	November, 1976
CDC Cyber 74		
Number of Batch jobs and MIRJE sessions	103,372 (114,547)	85,073 (98,465)
Total Central processor hours inc. DELAY	163 (205)	141 (177)
DELAY queue processor hours	46 (49)	-
MIRJE terminal hours	6,098 (7,837)	-
Mass storage transfers (KPR)	255,167 (325,413)	167,195 (214,957)
Magnetic tape transfers (KPR)	5,123 (7,308)	4,621 (6,517)
Pages printed, charged from UCC	870,451 (961,629)	782,591 (882,714)
Cards punched	375,896 (396,447)	406,640 (442,679)
Microfilm frames produced	7,818 (298,043)	22,539 (259,701)
Statos plotting production (feet)	5,655	5,886
Tapes mounted	9,252	8,793
Average file storage (2210M available)	1,177.2 million char	835.1 million char
Mean time between failures	26.3 hours	16.2 hours
Available during scheduled hours	99.3 percent	98.2 percent
SUPIO uptime during available hours	97.5 percent	-
(totals in parentheses include staff development, accounting, and maintenance runs)		
CDC 6400		
Number of jobs run	176,434	167,358
Central processor hours	120	121
MERITSS terminal hours	23,260	22,846
Number of terminal sessions	47,786	44,555
Maximum number of simultaneous users	119	110
Average file storage	230.7 million char	220.8 million char
Mean time between failures	111.4 hours	24.0 hours
Available during scheduled hours	98.9 percent	98.1 percent

CYBER 74 DOWNTIME SUMMARY : December, 1977

	Monday-Friday 0800-1800	other	total
Total possible scheduled uptime hours	210.	283.	493.
Total downtime hours (see Schedule A)	8.3	8.0	16.3
Total uptime hours	201.7	275.0	476.7
Uptime percentage	96.0 percent	97.2 percent	96.7 percent
Average downtime per occurrence	17.1 minutes	20.0 minutes	18.4 minutes
Mean time between failures	7.5 hours	11.5 hours	9.3 hours
Subsystem failures			
SUPIO	5	3	8
TELEX	0	0	0
EXPORT	10	2	12

schedule A: downtime hours

	Number	Total hours	Average minutes
(1) Preventive maintenance over-runs	0	0.0	0.0
(2) Software related problems	0	0.0	0.0
(3) Hardware related problems	3	3.6	72.0
(4) Indeterminate software/hardware problems*	47	12.4	15.9
(5) External Problems	3	0.2	4.3

* An intermittent hardware problem is believed responsible, but has not yet been isolated.

WINTER QUARTER 1978 SHORT COURSE SCHEDULE

FORM IS: COURSE, DAYS, TIME, DATES, LOCATION, INSTRUCTOR.

INTRODUCTION TO UCC	: T,	2:15-4PM, 10 JAN, MECH E 221, RTF
INTERMEDIATE COMPASS	: TTH,	2:15-4PM, 10-26 JAN, FORD H 40, KCM
INTERMEDIATE FORTRAN	: MWF,	2:15-4PM, 11-27 JAN, VINCENT H 2, RTF
INTRODUCTION TO SYSTEM 2000	: MWF,	2:15-4PM, 16-27 JAN, FORD H 40, JC
APL	: MWF,	3:15-5PM. 16 JAN - 3 FEB, AERO 21, JH
KRONOS CONTROL STATMENTS	: TTH,	2:15-4PM, 17 JAN - 9 FEB, VINCENT H 2, RTF
DUMP, LOAD MAP READING	: TH,	2:15-4PM, 9 FEB, VINCENT H 2, RTF
SPSS (COMPUTER NEOPHYTES)	: M,	2:15-3:30, 30 JAN, VINCENT H 1, SPY
SPSS (SPSS NEOPHYTES)	: T,	2:15-3:30, 31 JAN, VINCENT H 1, SPY
SPSS (SPSS INTERMEDIATES)	: WTH,	2:15-3:30, 1-2 FEB, VINCENT H 1, SPY
SPSS ON LINE	: F,	2:15-3:30, 3 FEB, VINCENT H 1, SPY
COBOL	: MWF,	2:15-4PM, 30 JAN - 17 FEB, FORD H 40, JC
BEGINNING FORTRAN (NIGHT)	: MWF,	6:15-8PM, 6-24 FEB, AERO 21, RTF
PASCAL	: MWF,	3:15-5PM, 6-24 FEB, AERO 21, ABM
PLOTPAC	: TWTH,	7:30-9:30, 7-9 FEB, LAUDERDALE CONF RM, KM
WINTER QUARTER USER MEETING	: T,	1:00-4PM, 14 FEB, SOC. SCI. 850 *
INTRODUCTION TO TIMESHARING	: TTH,	2:15-4PM, 14-16 FEB, FORD H 40, RTF
SYSTEM 2000/REPORT WRITER	: MWF,	2:15-4PM, 20-24 FEB, FORD H 40, JC
ADVANCED SYSTEM 2000	: MWF,	2:15-4PM, 27 FEB - 3 MAR, FORD H 40, SPN
RECORD MANAGER	: MWF,	2:15-4PM, 27 FEB - 3 MAR, MINMET 120, JC
PROGRAMMING STYLE	: MWF,	2:15-4PM, 27 FEB - 3 MAR, VINCENT H 2, RTF
SORT/MERGE	: MWF,	2:15-4PM, 6-10 MAR, MINMET 120, JC
SYSTEM 2000/PLI	: MWF,	2:15-4PM, 6-10 MAR, FORD H 40, SPN

RETURN TO:
UNIVERSITY COMPUTER CENTER
227 EXPERIMENTAL ENGINEERING
UNIVERSITY OF MINNESOTA - TWIN CITIES
208 UNION STREET SE
MINNEAPOLIS, MINNESOTA 55455