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NOTES AND COMMENTS

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6600 NEWS

SCOPE 3.1

Due to machine unreliability while ECS modifications are being installed, no further SCOPE modifications will be added to the production system until the modifications have been completed. Upon completion (approximately October 15th) the following items will be added to the SCOPE 3.1 system:

1. Updates to RUN, FUN, ALGOL, COBOL, and SIMSCRIPT.
2. Modifications such that the parity error branch of the Fortran IF(UNIT,I) becomes operational. This is effective when used in conjunction with BUFFER IN and BUFFER OUT.
3. Utility Routines
Many utility routines have been altered to allow shortened forms of the name:

COPYBF	=	CBF
COPYBR	=	CBR
COPYCF	=	CCF
COPYCR	=	CCR
COPY	=	C
COPYL	=	CL
COMPARE	=	CP
BKSP	=	B
REWIND	=	R
UNLOAD	=	U

In addition, REWIND and UNLOAD have been modified to allow multiple arguments, e.g. a sequence of control cards

REWIND(A)
REWIND(B)
REWIND(C)
REWIND(D)

may be replaced by the single card

R(A,B,C,D)

A new utility routine RETURNU has been added to the system library. Its purpose is to release files and equipment during a job. RETURNU will detach a file from a job with the following results:

- a) If the file is local and on disk, the tracks will be released and the file name will be disassociated from the job.
- b) If the file is an attached common file, the file will be returned to unassigned common and the file name will be disassociated from the job.
- c) If the file is on magnetic tape, the unit will be unloaded, the equipment released, and the file name will be disassociated from the job.

RETURNU may be called with multiple arguments.

- 4. The console keyboard will recognize the commands
X.DVRT (Allow for 8231 divert option)
X.NODVRT (Dis-allow 8231 divert option)
CHANGE,FILE,Y.
Y = A,B,C,D,L

giving the capability to change the destination of job output from any site to any other site on INPUT or OUTPUT files.

Routines affected: DSD, 1EE, 2IR

- 5. The priority calculation algorithm now depends upon the job card values of field length, time limit priority and number of tape drives being requested. The number of tape drives being requested must appear on the job card as described in the July newsletter. The allowable priorities are 1, 2, and 3. The values 2 and 3 may be used by special permission only. The default value is one if the field is omitted from the job card, or if the requested value is not 1, 2, or 3. (NOTE; this will be effective after ECS modifications are completed.)

Routines affected: 2TJ

Line Limits on the OUTPUT File:

When a Fortran program is compiled by RUN or FUN, a line limit of 10000B lines is automatically set for the OUTPUT file. This line limit may be changed at compilation time by inserting the new line count, in octal, as the seventh parameter on the FUN or RUN card.

Examples:

```
RUN(S, , , , , 100000)  
FUN(S, , , , , 20000)
```

The line limit may also be changed at load time by adding two parameters to the control card that causes the load. The first parameter is the letters LC, signifying a line count. The second parameter is the new line count in octal. After this, any of the usual parameters may be added.

NOTE: The file name LC must not be the first parameter of a loading control card since it would be confused with the use of LC for line count purposes.

Examples:

- 1) To compile a Fortran program, changing the line count to 400B at load time, use the control cards
RUN(S)
LGO(LC,400)
- 2) Assume that an already compiled program is stored on a tape at the computer site. The program has two parameters, the input file from which it reads data and the output file to which results are written. Assume that input will come from the INPUT file and the output will go to the OUTPUT file. The normal control cards will be:

```
JOB CARD.  
REQUEST,TAPE1,HI,DW.  
COPYBF(TAPE1,PROG)  
UNLOAD(TAPE1)  
REWIND(PROG)  
PROG(INPUT,OUTPUT)
```

to execute the program with a new line limit of 22500B, the control cards would be changed to read:

```
JOB CARD.  
REQUEST,TAPE1,HI,DW.  
COPYBF(TAPE1,PROG)  
UNLOAD(TAPE1)  
REWIND(PROG)  
PROG(LC,22500,INPUT,OUTPUT)
```

NOTE: This is the only way to change the line count of this program without re-compiling the program. Using LC is also the only way to change the line count of a compiled program on the library. For example, to change the line limit on UMST530 from the normal 10000B to 32000B the control card used would be:

```
UMST530(LC,32000)
```

6600 REMOTE STATIONS

Two remote stations for the CDC 6600, Medical and West Bank, are presently being readied for use. The telephone lines have been installed and the stations should be ready for operation by October 30th. These stations will be operative during the day only and schedules of operation will be announced in October.

6600 UMST MANUALS

The 6600 UMST manual, containing the documentation for the UMST routines, went on sale in the Engineering bookstore on September 19th at a cost of \$2.30 per copy.

Reference copies of the new manual are available at the University Computer Center, the West Bank Computer Center, at the 6600 Lauderdale site, and in the Engineering Library and at the St. Paul Campus computer center.

Please note that there are changes described in the new manual that have not yet been completed on the library programs. These corrections should be completed sometime within the next month and will be announced in this newsletter. Until that time, please see Douglas Anderson, 205 Exp. Eng., ext. 35456, before making any changes in your programs.

The University Computer Center will keep these manuals updated by publishing supplement sheets whenever necessary. The availability of these supplements will be announced through this newsletter.

BMD Manuals

Reference copies of the BMD manual are available in the UCC Library in 227 Exp. Eng. Individual copies may be purchased from:

University of California Press
2223 Fulton
Berkeley, California 94720

at a cost of \$6.00 per copy.

Credits for Computer Time

Please note that the UCC will give credit for bad time only if the credit is requested within two weeks of the original run.

1604 Classroom Usage

As the Fall Quarter begins, we wish to remind instructors that they must re-apply for computer time on the CDC 1604 for classroom computer use. For classes which are large enough, special shelf assignments can be made for keypunching and computer input/output. We can also arrange to put special data processing programs for laboratory experiments or certain data sets on the program library for particular class applications. Apply for computer time at 227 Exp. Eng. and contact Richard Hotchkiss, 217 Exp. Eng., ext. 35756, about any special requirements for your class.

We wish especially to call to the attention of instructors whose classes use time-sharing facilities of the advantages of augmenting such usage with the 1604 batch processing capabilities. The students' backgrounds are enriched by

encountering different systems. The 1604, ancient as it is, still is more powerful in terms of storage, accuracy, and often speed than the time-sharing machines. Where turn-around time is less important, and these other considerations are paramount, we urge the instructor to also use the 1604. Another factor of primary consideration is that of cost. This usage is covered by grants insofar as the computer time is concerned. This may be of major importance when considering your budget. Time-sharing is far from being a novelty now but neither is batch processing outmoded. Both methods of computer usage have to be kept in their proper perspective and utilized for the best man-computer interaction.

Quite frequently, in a course which utilized the digital computer, the instructor finds that some undergraduate student become highly interested in the practical mating of knowledge and machine. These students are often not able to complete their investigations within the confines of the particular course. Hitherto there has been no legal channels through which these "interested" students could pursue their investigations. Since the motivated, interested student is one of the goals of the educational process, the University, through the University Computer Center, is initiating such a channel. Any faculty member may sponsor undergraduate students for such continuing research. Since most classroom computer work involves the 1604, grants for such 1604 use may be applied for in the normal way through the office at 227 Exp. Eng. It is expected that the faculty sponsor will monitor the student's work sufficiently to prevent abuse of these grants.

NEW COURSE

A new course in symbol manipulation will be offered this year, but was unfortunately omitted from the Fall Quarter Class Schedule. The course description is:

MATH 100A-B-C: Mathematics of Symbol Manipulation Systems

(This course will be required of students wishing to take the Computer Science option in mathematics.)

100A: Finite automata theory: switching circuits, Boolean algebra and propositional logic. Kleene's theorem on regular sets. Algebraic aspects of finite automata: minimization, decomposition, synthesis.

100B: The computability of numerical functions: proofs for the basic results connecting abstract models of programmed digital computers, Turing machines, and general recursive functions. Normal form theorem. Universal machines. Unsolvability of halting problem.

100C: Symbol manipulation systems: the formal systems of Herbrand-Godel and Post. Post's normal form theorem. Formal grammars: introduction to the theory of Chomsky on context-free and other languages and related automata.

Transduction of languages by automata.
(3 credits per quarter: prereq 15 or 21A and third year standing or #).

The time and place for the course for Fall Quarter are:
VII M W F E 325

Electron Beam Recorder (EBR)

The EBR is a stand-alone, magnetic tape (7 and 9 track IBM compatible) input, high speed (20,000 lines/minute compared to the CDC 501 line printer speed of 1,000 lines/minute) device for putting positive character images on dry silver 16mm microfilm. The CDC 501's 64 different characters are a subset of the 108 characters of the EBR's set which also includes lower case letters, business symbols, and Greek letters; thus the EBR can be made to duplicate the 501 printer output on microfilm. There are two restrictions to the duplication in that the EBR currently has a maximum of 132 characters/line and 64 lines/page (or frame) compared to the 501 which has a maximum of 136 characters/line and 66 lines/page. As an initial software approach to obtaining microfilm output from the EBR, the University Computer Center has written two programs: MF501 is described in this newsletter and MFPRINT will be described next month.

MF501

Control card: MF501(coded file)

- Examples:
- 1) JOBCARD.
RUN(G)
REWIND(OUTPUT)
MF501(OUTPUT)
 - 2) JOBCARD.
RUN(G)
REWIND(OUTPUT)
MF501(OUTPUT)
REWIND(OUTPUT)
COPYCF(NULL,OUTPUT)

This will give all of the output file on both printer paper and microfilm, or only on microfilm if 2) is added to 1).

- 3) If the program used formatted WRITE statements to put out information on TAPE1.

JOBCARD.
RUN(G)
REWIND(TAPE1)
MF501(TAPE1)

would transfer all of the information on the file TAPE1 to microfilm.

General Description

1) MF501 requests special microfilm tape unit, if that is busy, it goes into recall.

2) MF501 puts out tape information that will generate 50 blank frames, and then generates individual characters, each taking up one frame, to put out the 4-digit bin number, single character site letter and 8-digit UCC account number associated with the requesting job.

3) MF501 then translates the coded input file to the external characters in packed binary records required by the EBR unit. Each frame is identical to what would have been printed on the line printer except that any character after position 132 is ignored and a maximum of 64 lines are put on a single frame.

4) MF501 writes an end-of-file on the tape unit, backspaces over the end-of-file, and releases the special microfilm tape unit in order that other MF501 jobs may use the same tape. Accounting information on the total number of frames is given to the DAYFILE and Accounting files.

Operation at the Lauderdale Site

Since the special microfilm tape is released by MF501 only when the job's current file is completely output to tape, the operator may dismount the tape at any time after the equipment is released. This tape is then put on the tape unit of the EBR and the EBR transcribes the tape images to microfilm images at the rate of 5 1/2 frames/second and the microfilm emerges completely developed. The processed film is rewound onto 100 foot plastic reels for each job. This 100 foot size is standard in the microfilm industry and it is best to try to have less than 100 feet (1900 frames) on each file. This 100 foot reel, containing the now correctly oriented frames (since the bin, site and accounting information are the first frames off the reel) is now put into a fiberboard container and the identifying information is written on the container, for distribution to the sites originating the jobs.

Examples of microfilm use:

Example 1: User desires to see larger character images than the .1mm size of the microfilm in the privacy of his office or at a showing to a small group.

Solution: Rent a microfilm viewer from Audio-Visual (373-3761) for \$25/year or purchase a viewer approved by University Microfilm Service.

Example 2: User desires to set up an information retrieval system containing multi-thousands of records that are computer updated periodically.

Solution: University Microfilm Service will duplicate to positive image (for viewing) or negative image (for hard copy) as many copies of the film as are desired, and will mount these into automatic threading cartridges for a motorized viewer.

Example 3: Government requires all computer data for a research project to be saved on permanent microfilm.

Solution: Rather than printing out the boxes of paper and then microfilming this paper, use the EBR to generate dry silver film output of the data (100 feet = 1900 pages = 1 box of paper). Use University Microfilm Service pickup at all UCC stations to duplicate the dry silver (life expectancy of 5 years) to permanent, negative image silver halide (life expectancy of over 100 years).

Example 4: User wants only a few of the frames of microfilm output on hard copy.

Solution: If the EBR output has been duplicated to negative film, the UCC computer stations will have available reader-printers to make individual positive hard copies. These printers are coin-operated at a cost of 10 cents a frame, or University Microfilm Service will make individual copies at a cost of 25 cents a frame. If EBR output is used to make hard copy, the hard copy will have a dark background and white characters.

Example 5: User wants entire 100 foot of film images on hard copy but does not have 1900 dimes nor can he spare 15,200 seconds to sit in front of a 10 cents/copy, 8-second reader-printer.

Solution: University Microfilm Service will duplicate to negative image silver halide film (\$6.00) and then will use Xerox copyflow to produce hard copy for a \$15 minimum charge, which is enough to print all 1900 pages on the 100 foot standard reel.

Example 6: User wants some standard microfilm output other than roll film in order to distribute several hundred copies of a 75 page computer output.

Solution: University Microfilm Service will cut and insert the EBR or duplicated 16mm microfilm into standard 4x6 Microfiche jackets that can contain 5 rows of 9 frames of EBR output. The jacket can be duplicated in as many copies as desired. (See attached price list.)

Important Considerations

- 1) EBR is not permanent since it uses a heat process that is good for at least 5 years under proper storage. Thus, permanent copies must be made by duplicating to standard silver halide film.
- 2) Positive image microfilm is used for viewing only. If hard copy with positive image is desired then the EBR microfilm must be duplicated to a negative image film.
- 3) Hard copy processes are very expensive for selected frames, and reasonable only when an entire 100 foot roll is transferred to hard copy.
- 4) Microfilm's great advantages are in cost and in storage requirements where 50-100 foot reels or cartridges would take up .5 cubic feet compared to the equivalent 48 boxes of printer output taking up 48 cubic feet of storage space.

COST COMPARISONS

UCC charge per page of printer output	1.0 cents
UCC charge per frame of EBR output (add 20 cents per job for reel, container, and leaders)	.33 cents
UCC charge per frame (Reader-Printer)	10.00 cents

UNIVERSITY MICROFILM SERVICE

charge per frame of duplicated film (for a full 100 foot reel)	.32 cents
charge per frame for hard copy from negative film (for a full 100 foot reel)	.79 cents
Microfiche jacket charge per frame (for a full 45 frame jacket plus cost of film)	1.44 cents
Diazo duplication charge per frame (from Microfiche jacket assuming a full 45-frame jacket)	.30 cents

UNIVERSITY MICROFILM SERVICES

To utilize, duplicate, or store the computer-generated information from silver film, the University Microfilm Service offers the following:

Roll to roll duplication

(output may be specified as positive or negative image)

\$6.00 per one hundred feet

Roll to cartridge duplication (same specifications)

\$6.00 per one hundred feet plus \$1.50 for cartridge and loading

Aperture card (punch card containing 35mm frame)

\$0.10 per card - each card contains 2 to 4 frames

Jackets (acetate sleeve into which strip film is inserted)

\$0.15 for 4 x 6 jacket containing approximately 45 frames plus 0.50 labor charge

\$0.15 for 3 1/4 x 1 1/2 jackets containing approximately 44 frames plus 0.50 labor charge

\$0.15 for Diazo duplication of 4 x 6 jacket, duplication has same image as original

Hard copies - 8 1/2 x 11 paper copy (dry silver)

\$0.25 per copy

Xerox copyflow - 8 1/2 x 11 paper copy

\$0.0082/linear foot (EBR frames=11x11) with a \$15.00 minimum

Pick-up and delivery service will be provided for your convenience at the stations where you pick-up your computer programs.

For further information regarding other types of microfilm, retrieval, duplication and storage of microfilm, please contact:

Dennis D. Johnson
University Microfilm Service
125 North Hall - St. Paul Campus
Telephone: 373-1172