Digital Computer Laboratory
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SUBJECT: Modifications to the Utility Control Program

To: Scientific and Engineering Computation Staff and Operators

From: F. C. Helwig

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Abstract: The following memorandum describes a series of modifications made to the utility control program (which is described in DCL-22). The description of the STOP instruction given here superceeds that given in DCL-25 which is obsoleted.

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1. Suppression of Print-out of Flad Table

The recording of the flad table can be suppressed during conversion by placing a 1 in digit 1 of the selector panel and performing a manual read-in. Thus CS. Conversion now has four independent characteristics that can be specified in a manual read-in. These, along with the determining digits in the selector panel are listed below:

(1) digit 1 is 0: record flad table
1: suppress flad table recording

(2) digit 3 is 0: PETR is input device
1: MTR is input device

(3) digit 4 is 0: delayed output
1: direct output

(4) digit 5 is 0: direct read-in
1: direct read-in and conversion to binary

These conditions can be indicated on a performance request by an rm operating instruction.

If a director tape is to be used then flad table suppression can also be accomplished by writing the director word ef, in the performance request.

For example:

e,ef,fc100-0-0,ri,

or

e,ef,fc100-0-0,ric,

result in flad table suppression.

2. Operations from Room 222

The activate buttons and insertion registers in room 222 can now be used to operate the utility control program. The program will perform a manual read-in according to the contents of the selector panel in room 222 if and only if the following conditions hold:

(1) The selector panel in test control contains 1.00000

(2) The insertion panel in test control contains 1.00000

(3) The examine selector panel button in test control has not been pushed.

(4) The examine selector panel button in room 222 has been pushed.

3. Intermediate Titles on fb Tapes

Tape titles can now occur at any point in a binary tape provided that they do not occur in the middle of blocks of binary words. Such titles will be logged in accordance with their form.

4. Logging of Search Time on Unit 0

The time spent by the utility control program in searching unit 0 for a routine utility program will now be recorded in the direct punch log. The symbol, a, followed by the time will be recorded both at the time the search commences and after the program has been brought to the drum.

The following utility programs are considered routine:

(1) The comprehensive system

(2) The generalized post-mortem program

(3) The utility control program

The bi-weekly program will presumably deduct search time from total run time in these cases.

5. f2r Tapes

The symbol, f2r, is used to introduce ERA 1103 flexo tapes. The utility control program reads-in and logs the tape title and then transfers computer control to the WWI-1103 Translation Program which reads-in the flexo-tape and translates it into a binary tape.

The PETR is always used for the input device and the delayed printer and punch are always used for output devices (unless a conversion error is detected).

After a flexo-tape has been read-in the computer is stopped on an si 1 instruction. Further read-in of dependent tapes is accomplished by pressing the sa 40 button. The translation process is completed by pressing the restart button.

Syntatical errors are detected by the translation program during the read-in of the flexo-tape. These are recorded on the direct printer as they occur.

The WWI-1103 Translation Program is a drum utility program which is permanently recorded on magnetic tape unit 2 in blocks 500-507. The parameters for the program are the following:

1.20310	initial drum address
0.27777	final drum address
1.20307	address of check sum
1.20310	initial drum address of first program block
bi 32	initial MCM address of first program block
+2000	length of first program block
sp 34	starting address of first program block
0.00500	initial block number on unit 2

6. Read-in of a Drum Utility Program

The manual mode corresponding to 0.00063 in the selector panel previously brought in the drum utility program only if the computed check sum disagreed with the recorded check sum. The utility control program has been modified so that the drum utility program is read-in in all cases.

7. Standard Date and Time

The log initiation mode (corresponding to 0.00076 in the selector panel has been modified to record a standard date on the buffer drum along with the standard time.

The reference standard time is set-up and recorded as described previously in DCL-22. When this is finished the computer is stopped on an si 0 instruction (previously MCM was restored to its initial contents). The date is then to be placed in the insertion panel according to the following conventions:

(1) The month (a number between 1 and 12) is placed in the sign digit and digit 1 of the insertion panel.

(2) The day (a number between 1 and 31) is placed in digits 2 and 3 of the insertion panel.

(3) The year minus 1950 (temporarily equal to 5) is placed in digits 4 and 5 of the insertion panel.

For example, if the date is 12/31/55 the octal number, 1.43705, is placed in the selector panel.

The standard date (along with a check sum) can be recorded on the buffer drum (group 7 reg. 2039 thru group 7 reg. 2043) by pressing the restart button. This also records the date in the direct printer log and the direct punch log.

Finally, MCM is restored to its contents prior to read-in and the computer stopped.

The log initiation routine is part of that portion of the utility program which operates from group 2 of the buffer drum.

8. Title Logging of fc and fp Tapes

The utility control program records the tape title on the buffer drum (group 2 reg. 0 thru group 2 reg. 310 (octal)) whenever an fc or fp tape is read-in.

The program has been modified so that the date and time of read-in are recorded along with the tape title under certain conditions.

The following rules describe the process:

(1) If the standard time has been disturbed only the title is recorded.

(2) If the standard time has not been disturbed both the title and time will be recorded. The date will be recorded or not according as the standard date has been disturbed or not.

The recording of the buffer drum title block on the direct and delayed printers is done by the .CS. and PM utility programs.

If the standard time computed by the program exceeds 2400 hours it is recorded modulo 2400 and the date is indexed.

The date and time recording routine is a part of that portion of the utility control program which is located on group 2 of the buffer drum.

9. Title Logging of fb Tapes

Titles of fb tapes are no longer recorded on the buffer drum for tapes having S&EC titles. This change has been made so that S&EC programmers can have almost unrestricted use of the buffer drum provided they are willing to work exclusively with binary tapes.

10. The Log Termination Program

The log termination program (corresponding to 0.00070 in the selector panel) previously recorded the word "stop" followed by the time in the direct punch log. The program has now been modified to record instead the abbreviation "term".

For example: term 1315.2

11. The STOP Instruction

The instruction STOP (or iSTOP) has been considerably modified. The description given below superceeds those given in DCL-22 and DCL-25.

The function of the stop instruction depends on the following independent factors:

(1) Whether or not the stop instruction is:
  (a) Executed as a WWI instruction
  (b) Interpreted

(2) Whether or not a director tape is:
  (a) Not being used
  (b) Being used

In describing the effect of a STOP instruction it is assumed that the instruction being executed is stored in register x.

If a director tape is not being used the STOP instruction does the following:

(1) Stores the WWI instruction sp x+1 or sp 3742 (octal) on group 7 reg.3766 (octal) of the buffer drum according as the STOP instruction is executed as a WWI instruction or an interpreted instruction and displays this instruction in the indicator lights.

(2) Stores the WWI instruction sp 25 in TSS register 2.

(3) Restores MCM and stops the computer on the si 0 instruction in TSS register 0.

It will be seen later that the program can be continued by pressing the restart button twice (provided the stop on si 1 switch is on). The next instruction is then interpreted or not according as the STOP instruction was interpreted or not.

If a director tape is being used the STOP instruction does the following:

(1) Stores the WWI instruction sp x+1 or sp 3742 (octal) in TSS register 2 according as the STOP instruction is executed as a WWI instruction or an interpreted instruction.

(2) Brings the director tape program into MCM.

The director tape program reads-in the next director tape word and acts accordingly.

In particular, if the director word, rs, occurs the instruction in register x+1 is executed as a WWI instruction or as an interpreted instruction according as the STOP instruction was a WWI instruction or interpreted.

In all cases the word "stop" and the time will be recorded in the direct punch log.

For example:

stop 1816.5

12. Logging of Starting Time

When fc or fb tapes having S&EC titles are read-in the starting address (sp y) of the tape is no longer stored in TSS register 2. Instead the sp y instruction will be on group 7 reg. 3766 (octal) of the buffer drum and displayed on the indicator lights. In addition the utility control program will store the instruction, sp 25, in TSS register 2, restore MCM and stop the computer on the si 1 instruction in TSS register 1. (Provided the stop on si 1 switch is on).

A similar situation has been described whenever a STOP instruction is executed.

The utility control program has been modified to detect when it is entered by means of a STOP instruction located on TSS register 2. The following steps then occur:

(1) The word "start" and the time will be recorded in the direct punch log.
For example: start 1816.9

(2) MCM is restored and computer control is transferred to register y, where sp y is the contents of group 7 reg. 3766 (octal) of the buffer drum. (Note that this register must previously have been set up either by a STOP instruction or by reading in an fb or an fc tape with an S&EC title.)

Operating instructions for S&EC tapes are not affected by these changes except that a double restart (or a sa 2) must now be indicated if a programmer desires to continue the execution of a program after stopping on a STOP instruction.

13. A Start Program Manual Mode

A start program manual mode has been defined so that the starting time can be logged in case a program is re-operated. This is obtained by performing a manual read-in with 0.00007 in the selector panel and x in the insertion panel. The following stops occur:

(1) The word "start" and the time are recorded in the direct punch log.

(2) MCM is restored and computor control is transferred to register x.

14. The Director Tape Program

Several modifications have been made to the director tape program. Changes which primarily affect the vocabulary of the performance request are described in a seperate memorandum (DCL-88). Changes which affect operational proceedure are described below.

The use of a director tape is now indicated by placing 1.00000 in both the selector panel and the insertion panel and by pressing both the examine selector panel button and the erase button.

The director tape program now modifies the tape identification section of the utility control program so that the flexo characters, fence, tab and carriage return, are ignored as initial characters. This is done since fc tapes frequently end with extra carriage returns and fp tapes with extra fence characters.

15. The Test Storage Input Program

Register 25 of the test storage input program has been changed from the word ta 2 to the word ta 3. The program now is the following:

Decimal Address	Octal Instruction	
0	+0	
1	+1	
2	Flip Flop 2	
3	Flip Flop 3	
22	mh 36	
25	ta 3	
26	ca 32	Record MCM on group 0
27	si 707	
28	bo 32	
29	ad 26	Read group 11 into MCM
30	si 703	
31	bi 36	