IBM Technical Newsletter

System 7030

Re: Form No. C22-6678

This Newsletter No. N22-0085

Date May 10, 1963

Previous Newsletter Nos. None

ADDITIONS AND CORRECTIONS TO THE MCP REFERENCE MANUAL

Since the MCP Reference Manual (C22-6678) was published, the MCP program has been expanded. It is the purpose of this publication to correct and update the manual. Changes have been made in the following areas:

1. Input
2. Output
3. IPL Options
    a. TIME/DATE
    b. Message Suppression
    c. Rejected Job Count Report
4. Reserve Light Eliminated
5. New Commands
6. New List of Loader Cards
7. Appendix A - Pseudo-Ops
8. Appendix B - Messages
9. Appendix D - MCP Pseudo-Op Codes
10. Errata

INPUT CHANGES

Modifications have been made to both the system input and system output programs to facilitate initializing the system. In previous versions of MCP, the IPL program in the overlapped mode requested two input tapes. If the operator did not ready the second tape, the first tape would never enter the read phase. MCP now allows the input tapes to be made ready in any order and if only one tape is to be run the second tape need not be made ready. The program no longer asks for system input tapes to be made ready but expects a channel signal (caused by ready condition) to begin processing tapes. The normal mount messages are still given and a message, "$CH XX UN X IS THE NEW IP READ TAPE" refers to the tape that has been made ready.

OUTPUT CHANGES

The output program formerly referred to the tape unit assigned to the second output tape IOD. The output program now expects the unit associated with the first output tape IOD to be ready and after an output command, waits for a channel signal to tell it which unit to use next. Therefore, the operator may if he wishes use only a single output unit.

International Business Machines Corp., Advanced Systems Programming Dept., Poughkeepsie, N.Y.

PRINTED IN U.S.A.

IPL OPTIONS

IPL TIME and DATE Options

The time and date may be entered through the binary keys on the console at IPL time. Any valid time and date will be put on the output tape after the job card. The time is entered in the upper row of keys (0-23) and the date in the lower row of keys (32-55). Both entries are in decimal. Keys not to be considered as on should be latched off, not left in the neutral position. The four IPL options are now located in binary keys (28-31). (See Figure 1.)

An invalid time and/or date will cause the console message:

$DATE/TIME INVALID RETRY VIA COMD, CLOCK

The time and date should then be entered through the clock command or no time or date will be put on the output tape. Any command clock entry of time and/or date will replace that previously entered at IPL time.

A zero time and valid or zero date entry will produce the typewriter message:

$TIME AFTER CALIBRATION XX:XX:XX

The present time clock reading will appear in the message and on the output tape. If a valid non-zero time is entered and the date is valid, this time will recalibrate the clock and will appear in the message and on the output tape.

Suppress Messages

If binary key 28 is latched on, all initializing messages will be suppressed except the system tape date message and the invalid time/date message if applicable.

Rejected Job Count Report

Binary key 30 determines if any jobs are to be rejected. The number of jobs to be rejected should be inserted in the numeric switches columns 10 and 11 instead of only column 11.

RESERVE LIGHT ELIMINATED

It should be noted that the conceptor, debugger, and command package no longer turn the reserve light on or off.

NEW COMMANDS

A new command and an addition to a command have been added to the Master Control Program. The commands are the following:

COMD, COMMENT, maximum 40 character message: This command is used to put comments on the output tape. The operator's console and/or system input may be the source of the command. If system input is the source, the comment will appear on the console typewriter as well as on the output tape preceding the job card.

COMD, CLOCK, hours, minutes, seconds, month/day/year: This command has been expanded to allow a date option. If the date field contains a date in the form XX/XX/XX, this date will be put on the output tape with the time and version of the IPL tape. When no date is entered the command will function as before and only the time entered will replace that established at IPL time.

RELOCATABLE LOADER CARDS

The loader handles fourteen classes of cards. Besides the 8 classes given on page 13 of the MCP Reference Manual, the 6 other types are relocatable cards identified by the punches in column 1:

Relocatable Data	(1.8, 1.9, 1.10, 1.11)
Common Definition	(1.7, 1.9, 1.10, 1.11)
FORTRAN Branch	(1.7, 1.8, 1.9, 1.10, 1.11)
FORTRAN Program	(1.7, 1.8, 1.9, 1.11)
Relocatable Binary Instruction	(1.7, 1.9, 1.11)
Special Origin (O punch)	(1.1, 1.8)

These cards and their formats are described in detail in the STRAP II Programming Systems Analysis Guide (C22-6729), pages 187-188.

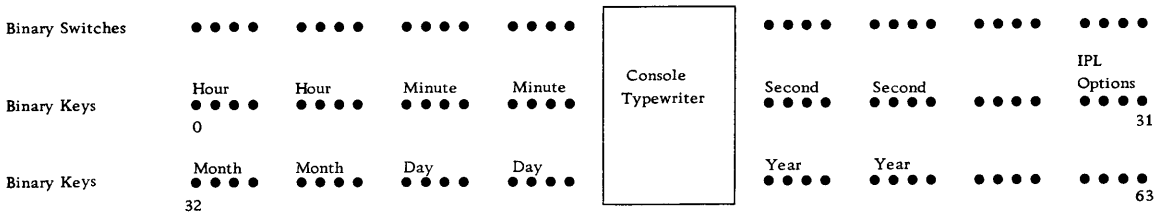

Figure 1. Console Setup for IPL Options, Time, and Date

ADDITIONS TO APPENDIX A - Pseudo-Operations - Page 35

NEW PSEUDO-OPS

A number of new pseudo-ops have been added to MCP. The general calling sequence is as follows:

```
B, $MCP
, PSEUDO-OP CODE
, IODNAME(I)
(Return)
```

The following additional I-O operations should be included in Appendix A:

HIGH DENSITY

```
MHD or MHDS, IODNAME(I)
             B, $MCP
             , $HD or $HDS
             , IODNAME(I)
             (Return)
EPGK (Disk, Console, Reader, Punch, or Printer)
             Invalid operation.
EPGK (TAPE)  Tape is not at load point.
EOP  $HD completed
NONE  $HDS completed
```

LOW DENSITY

```
MLD or MLDS, IODNAME(I)
             B, $MCP
             , $LD or $LDS
             , IODNAME(I)
             (Return)
EPGK (Disk, Console, Reader, Punch, or Printer)
             Invalid operation.
EPGK (TAPE)  Tape is not at load point.
EOP  $LD completed
NONE  $LDS completed
```

EVEN PARITY

```
MEVEN or MEVENS, IODNAME(I)
                 B, $MCP
                 , $EVEN or $EVENS
                 , IODNAME(I)
                 (Return)
```

```
    EPGK (Disk, Console, Reader, Punch, or Printer)
                        Invalid operation.
    EOP  $EVEN completed
    NONE  $EVENS completed
```

ODD PARITY, NO ECC

```
    MODD or MODDS, IODNAME(I)
                    B, $MCP
                    , $ODD or $ODDS
                    , IODNAME(I)
                    (Return)
    EPGK (Disk, Console, Reader, Punch, or Printer)
                    Invalid operation.
    EOP  $ODD completed
    NONE  $ODDS completed
```

ERROR CHECKING AND CORRECTION

```
    MECC or MECCS, IODNAME(I)
                    B, $MCP
                    , $ECC or $ECCS
                    , IODNAME(I)
                    (Return)
    EPGK (Disk, Console, or Printer)
                    Invalid operation.
    EOP  $ECC completed
    NONE  $ECCS completed
```

NO ERROR CHECKING OR CORRECTION

```
    MNOECC or MNOECCS, IODNAME(I)
                        B, $MCP
                        , $NOECC or $NOECCS
                        , IODNAME(I)
                        (Return)
    EPGK  (Disk, Console, Printer, or Tape)
                        Invalid operation.
    EOP  $NOECC completed
    NONE  $NOECCS completed
```

$FELR PSEUDO-OP

FETCH LOWER REGISTERS may be used with its corresponding pseudo-op, STORE LOWER REGISTERS, to allow the user to examine the contents of mainstream lower registers and to alter them if he chooses.

$FELR will fetch the lower registers, describing the status of the last problem program interrupt, into a thirty-one word program buffer.

$FELR uses the following calling sequence:

```
B, $MCP
 , $FELR
 , FWA. (I)
(Return)
```

FWA. (I) specifies the first word (18-bit address) of a thirty-one word buffer into which the contents of the problem program lower registers will be placed.

If, in mainstream the problem program was interrupted during a $WAIT pseudo-op for an interrupt which has not been released, then the associated IOD reference number (which did not cause the current auto-stack mode) is put in the buffer. The base address of the problem program I-O location tables will be placed into the problem program buffer.

The user's buffer will have the following contents after execution of $FELR:

FWA. (I)	IOD Reference Number
FWA. (I) + 1.	Boundary Register
FWA. (I) + 2.	Maintenance Bits
FWA. (I) + 3.	Channel Address
FWA. (I) + 4.	Other CPU Bits
FWA. (I) + 5.	Left Zeros Count
	All Ones Count
FWA. (I) + 6.	Left Half of Accumulator
FWA. (I) + 7.	Right Half of Accumulator
FWA. (I) + 8.	Accumulator Sign Byte
FWA. (I) + 9.	Indicators
FWA. (I) + 10.	Mask
FWA. (I) + 11.	Remainder
FWA. (I) + 12.	Factor
FWA. (I) + 13.	Transit
FWA. (I) + 14. - FWA. (I) + 29.	Index Registers 0-15
FWA. (I) + 30.	Instruction Counter
FWA. (I) + 30.32	Base Address of I-O Location Tables

$STLR PSEUDO-OP

$STLR will allow the user to replace mainstream lower registers with the contents of a thirty-one word problem program buffer.

$STLR may be used only in the auto-stacked mode, i.e., when the problem program is I-O interrupted and control is passed to an I-O table of exits.

$STLR uses the following calling sequence:

```
B, $MCP
 , $STLR
 , FWA. (I)
(Return)
```

FWA. (I) specifies the first word (18-bit address) of the thirty-one word buffer which will be used to replace the lower registers.

The following are restrictions on the use of $STLR:

1. Word 3, boundary control, is not changed by $STLR.
2. TS and EXE indicators are not changed by $STLR.
3. IF bit in the mask register is forced on by $STLR.

The user's lower registers from the Maintenance Bits to the Instruction Counter will be taken from the buffer in the same order as described under $FELR. The IOD Reference Number, Boundary Register and Base Address of I-O Location Tables are not stored.

$FIXUP

The $FIXUP pseudo-op facilitates the handling of maskable interrupts, (20, 22-47), by inserting a single instruction directly into the interrupt table of MCP.

The calling sequence is:

```
B, $MCP
 , $FIXUP
 , A(I)
 , B(J)
(Return)
```

A(I) is the location where the slots to be changed, in the interrupt table, may be saved. If A(I) is zero, nothing will be saved; if non-zero, the Pattern Word from B(J) and the contents of the interrupt table slots to be altered, will be saved at A(I). If the interrupt slot contains the original MCP instruction, then a zero will be saved.

B(J) is the location of a Pattern Word specifying the maskable interrupt entries to be altered, immediately followed by the changes, in ascending order. For each one bit in the Pattern Word, (20, 22-47), there must be a full word instruction following. If the instruction is zero, the original MCP instruction will be restored into the interrupt table; if non-zero, the specified instruction will be stored. The instruction cannot be an I-O instruction, BD or SIC;BD but this is the only restriction.

ADDITIONS TO APPENDIX B - Messages - Page 39

PROGRAMMER MESSAGES

The first message of every job on the system output tape is usually a job card. It is possible that a COMD, COMMENT card may be in the deck and then a comment will appear before the job card. After the job card another message is given with the TIME, RUN DATE, and VERSION of the system tape.

ERRORS DURING EXECUTION

YOUR PROGRAM WAS ENDED BECAUSE OF A TYPE XX ERROR. New error codes:

05 - Problem Program IOD Table of Exits is out of bounds.
19 - Illegal $FIXUP word (i.e., I/O Instruction, BD, SIC;BD).
20 - Attempt has been made to use $STLR when not auto-stacked.

INITIALIZATION MESSAGES - Page 40

The following two messages have been removed because the improved input routine will operate with only one input tape in the overlapped mode.

$FIRST JOB TO BE RUN WILL BE ON CHANNEL XX UNIT X
$OTHER INPUT TAPE WILL BE ON CHANNEL XX UNIT X

NEW MESSAGES

$DATE/TIME INVALID RETRY VIA COMD, CLOCK

An illegal time and/or date has been entered. Unless a time and date is put in by COMD, CLOCK none will appear on the output tape.

$SERVICE RD/FD CHECK ON CARD READER

If the reader's FEED CHECK light is off it is a read check. The procedure then is to push the STOP button on the reader and remove the remaining cards from the hopper. Then unload the reader and take the last 4 cards which have unloaded and put them in the hopper before loading the remaining cards and starting the reader.

For a feed check the procedure may vary. It is possible that a serious card jam may have occurred, and it is best to let the engineers remove the cards to avoid damage to the brushes. If it is only a minor feed check usually feeding through the last two cards that were inside the reader will correct the situation.

$CH XX UN X UNLOADING, REUSE TAPE.

This message indicates that an uncorrectible card reader error has occurred. The bad card has been written on the tape. When this error is detected the tape is unloaded but may be reused because the tape was not at fault.

$STRIP CH XX UN X BEFORE REUSING.

An uncorrectible tape error has occurred on the designated tape.

$CH XX UN X IS UNLOADING, INPUT FOUND END OF TAPE.

The End of Tape reflective spot has been sensed while writing tape.

$INPUT SKIPPED A JOB BECAUSE OF UK DIFFICULTY.

This message will be given via the typewriter if the UK occurred at the beginning of the first record of a file. If the UK occurs during the execution phase, a similar message will be put only on the output tape.

ERROR MESSAGES - Page 42

$TYPE XX ERROR

XX = 82 Special Assignment Error

An attempt has been made to assign or unassign the same MCP unit a second time.

COMMAND RESPONSES - Page 42

$TIME AFTER CALIBRATION XX:XX:XX

The new time constant has already been used to calibrate the time shown. This message is issued in response to COMD, CLOCK or a valid IPL time and date setting.

ADDITIONS TO APPENDIX D - MCP Pseudo-Operation Codes

The following additional mnemonic and absolute codes should be included in Appendix D as they are now available for use by the problem program:

$HD	14.00
$HDS	14.01
$LD	14.32
$LDS	14.33
$EVEN	15.00
$EVENS	15.01
$ODD	15.32
$ODDS	15.33
$ECC	16.00
$ECCS	16.01
$NOECC	16.32
$NOECCS	16.33
$FIXUP	36.32
$STLR	37.00
$FELR	37.32

ERRATA

Page 9 - column 1 - line 14: The word immediately should be stricken from the following sentence as the tables are not always immediately above the problem program. "The tables that the problem program requires will be immediately above n_2 in protected storage."

Page 10 - column 2 - line 19: Strike out the sentence: "The same unit symbol on several tape IOD's unconditionally associates them with the same tape unit."

Page 13 - column 1 - line 7b:
not "The loader handles eight classes of cards."
but "The loader handles fourteen classes of cards."

Page 18 - column 1 - line 5b: The dump format for octal hex without panel:
not 4.32
but 0.32

Page 20 - column 2 - 3rd line, under Error Interrupts:
not "For interrupts 0.3 and 5,"
but "For interrupts 0-3 and 5,"

Page 25 - column 2 - line 5: The option for binary key 30 should read: REJECTED JOB COUNT REPORT

Page 25 - column 2 - line 34: The following two messages and the paragraph following them are no longer valid. These messages are not given as the system now can run with one input tape in the overlapped mode.
$FIRST JOB TO BE RUN WILL BE ON CHANNEL XX UNIT X.
$OTHER INPUT TAPE WILL BE ON CHANNEL XX UNIT X.

Page 26 - column 1 - line 9 after Rejected Job Count Report:
not "The number of jobs to be rejected (1-9) is inserted in numeric switch column 11."
but "The number of jobs to be rejected is inserted in numeric switches columns 10 and 11."

Page 28 - column 1 - line 34: Delete the paragraph referring to the reserve light being used to indicate that the console input has been processed. The reserve light is no longer turned on.

Page 33 and 34 - may be entirely deleted: A complete writeup of the 7030 update program may be found in the MCP Programming Systems Analysis Guide (C22-6678) starting on page 215. A bulletin has also been published explaining the Update 30 program. (C22-6718)

Page 45 - column 2 - line 1: A comment mark is inserted before the EOP comment:
not EOP
but 'EOP

Page 48 - column 1 - second and third line from bottom:
BCD code for Y is 30 not 34
BCD code for Z is 31 not 35