Technical Report CS74006-T

A DOS-M PRIMER

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I. Bringing up DOS-M.

A. Turn teletype switch to line.
B. Insert the key into the central processor power switch and turn the key to the straight up ("power on") position. This allows the internal registers to be manipulated.
C. Turn the disk power on (the toggle switch is located below the paper tape reader) and the "load-unload" switch on the disk unit to "unload". When the "door unlocked" indicator lights, insert the DOS-M disk pack, close the door, and set the "load-unload" switch to "load". When the "disk-ready" indicator lights, the disk is up to speed and ready.
D. Push the "P" switch on the central processor, displaying the program counter address. Toggle 37750 into the display register. Push any other register switch to load the P-register. Push "S" to display the switch register. Clear the display register and push any other register button to load the S-register with 08. Push the "external preset", "internal preset", "loader enable", and "run" switches. If the loader program ran properly, the display register will display 1020778. If the loading failed, execute this step again. The DOS-M bootstrap loader is in core.
E. Push "S" and load the display register with a 18 to indicate DOS-M is on subchannel one, the cartridge disk. Push any other register switch to load the S-register. Push the "internal preset" external preset", and "run" switches on the central processor. If DOS-M has been loaded properly, the system will ask for the date and time at the system console (teletype).
F. To bring DOS-M down push "halt" on the central processor, turn the power key to locked position, unload the disk, and turn off the teletype.

II. This is a summary of some DOS-M directives (commands). These commands were chosen because they are useful for running FORTRAN programs under DOS-M.

A. :JOB, name
   This directive creates a job. A job must be created before the other directives can be entered.
B. :EJOB
   This directive ends the present job.

C. :STORE,S, file name, 1
   This directive is used to create a source file on disk. The
text is given the file name. The 1 indicates input is from unit 1,
the teletype keyboard. Input is terminated by typing two colons (::)
on the keyboard as the first characters of a new record (i.e. line).

D. :LIST,U, 6
   This directive lists the file names of programs stored on disk
on unit 6, the teletype printer. This directive informs a
user of the file names presently in use.

E. :LIST,S, 6, file name
   The source file stored on disk under the file name is listed on
unit 6, the teletype printer.

F. :EDIT, file name, 1
   This directive allows the file to be edited from the keyboard
(unit 1). Editing must be done in order from top to bottom of
program, i.e. once line 5 has been edited, line 4 cannot be.
Subcommands:
   /DELETE,m
   Line m is deleted.
   /REPLACE,m
   The next line typed replaces line m.
   /INSERT,m
   The next line typed is inserted after line m.
   /END
   Editing is complete. The edited file is saved.

G. :PURGE, file name
   Delete the file from disk.

H. :ABORT
   This directive abnormally terminates the present job. (See
Section III, Part B).

I. :OFF
   This directive stops processing of the running program or
command and returns to command mode. (See Section III, Part B).

J. :PROG, name, options
   This directive is used to run program "name". This command is
used to call FORTRAN and the Loader and will be described in
Section V.

K. :JFILE, file
   Specifies a source file on the disk for the assembler or compiler. A.
disk file must be "JFILEd" before it can be used for input to
a compiler.

L. :RUN, name
   This directive runs user program "name", a program that has
been successfully loaded.

M. :LU,i,j
   Equipment table entry j is given the unit number i for the
duration of the present job.
N. :GO and :UP, eq., num.
These commands are used in loading an object tape. When the
Loader is directed to load an object tape, it will ask for the
tape to be loaded. When the tape is loaded and ready to be read,
:GO should be issued. When the tape is read, the loader waits
for another tape. To indicate the last (or only) tape has been
read, :UP, 3 and :GO, 1 should be issued.

:UP - makes a device ready
:GO - starts a device

III. Communicating with DOS-M

A. When DOS-M is ready for input, it prints an @ and sounds the
teleutype bell.
B. When DOS-M is busy and a character is struck on the keyboard,
an asterisk (*) is typed. The system will then respond to a
limited number of commands. (:OFF and :ABORT are two directives
that will be accepted).
C. After each directive is typed, both the line feed and return
keys must be typed.
D. CTRL/A deletes the previous character.
E. "Rubout", "Line Feed", "Return" deletes an entire input line.

IV. Using the teletype to punch a paper tape

A. Turn the teletype switch to "Local." Push "on" on the paper
tape punch (on the left side of the teletype).
B. Pushing the "Here Is" key produces leader tape.
C. Type data or program with a "line feed", "return" at the end
of each line or record.
D. Push "Here Is" to produce trailer tape. Push "off" on the punch.

V. FORTRAN under DOS-M

A. The first line of each FORTRAN program must be as follows:
   FTN, options
   If no options are indicated a source listing is not produced and
   an object tape cannot be punched. It also appears that at least
   one option must be specified in order to have the program compiled.
   FTN,L for listing
   FTN,B for object tape
   FTN,L,B for listing and object tape
B. Line two of a FORTRAN program must begin in column seven and be
   of the following form.
   PROGRAM name
   This statement names the program.
C. After the last subroutine, an END$ is typed to terminate input.
D. Logical unit number.
Logical unit 1 in a FORTRAN READ is used to accept input from the
teletype. Unit 5 can be used to read from the paper tape reader.
A WRITE using unit 6 prints output on the teletype.
E. Double quotes (""") are used in FORTRAN FORMAT statements.
F. Calling the FORTRAN compiler.
1. FORTRAN source program from a disk file.
   :JFILE, file name
   :PROG, FTN4, 2, 6, 6, 15, 99
   The JFILE command specifies a source file for the assembler
or a compiler. The FTN4 specifies that the program to be executed
is the FORTRAN IV compiler. The 2 indicates that the input to
the compiler is from the disk. The two sixes indicate that the
source listing output and object code (if FTN4,B was specified)
are routed to the teletype printer/punch. 15 is the page size,
i.e. the forms, etc.) In order to conserve paper on short programs,
the page size should be approximately 10 larger than the number
of lines in the program. 99 indicates object code is placed in
the job binary area for later loading.
2. FORTRAN source program from a source paper tape.
   :PROG, FTN4, 5, 6, 6, 15, 99
3. FORTRAN source program input from the console (unit 1).
   :PROG, FTN4, 1, 6, 6, 15, 99
   An END$ terminates input. (FTN,L should not be used in this
mode because it will cause a copy of the input record to be
echoed on the line immediately following the record).
G. Punching an object tape.
   If FTN,B is used and unit 6, 1 or 4 is indicated as the punch unit
(third FORTRAN option on :PROG directive), a tape can be punched
after the compiler message "NO ERRORS" is typed. Turn the punch
on. The object tape will be punched. When the system starts
punching trailer tape, punch about 2 inches and turn the punch off.
H. Loading and executing a compiled FORTRAN program.
1. Input from the job binary area.
   :PROG, LOADR, 0, 6, 0, 1, 1
   This directive calls the Loader. The first option is 0 for
input from the job binary area. 6 is the list device
(teletype). The 0, 1, 1 indicates no dynamic debugging or
maps.
   When the Loader completes, the loaded program may be run.
   :RUN, program name
2. Input from the paper tape reader (an object tape).
   :PROG, LOADR, 5, 6, 0, 1, 1
   When the Loader asks for file names, type EE.
   When the Loader asks for the tape, load it into the paper
tape reader and type :GO.
   When the Loader asks for the next tape, type
   :UP, 3
   :GO, 1
   When the Loader completes, the program may be run.
   :RUN, program name
VI. Examples of running FORTRAN under DOS-M.

A. Storing a source file on disk and running it. Input to the program is from the teletype.

```
:JOB,EX1
:STORE,S,SAMPLE,1
:FTN,L

PROGRAM DEMO
INTEGER X
WRITE (6,3)
3 FORMAT("ENTER X")
READ(1,1)X
1 FORMAT(I5)
X=X**2
WRITE(6,2)X
2 FORMAT("X SQUARED=",I5)
END
END$
```

```
:JFIL,SAMPLE
:PROG,FTN4,2,6,6,15,99
:PROG,LOADR,0,6,0,1,1
:RUN,DEMO
ENTER X
5
X SQUARED = 25
```

B. To enter the above program from paper tape, the following directives would be used.

```
:JOB,EX2
:PROG,FTN4,5,6,6,15,99
```

load the tape and push read

```
:PROG,LOADR,0,6,0,1,1
:RUN,DEMO
ENTER X
5
X SQUARED = 25
```

C. Entering data from paper tape.

```
:JOB,EX3
:STORE,S,AProg,1
:FTN,L

PROGRAM DEMOA
INTEGER X
READ(5,1)X
1 FORMAT(I5)
WRITE(6,2)X
2 FORMAT(I5"WAS READ FROM PAPER TAPE.")
END
END$
```
load a paper tape and push "read" on the paper tape reader.

5 WAS READ FROM PAPER TAPE.
D. Entering FORTRAN source from the teletype.
   :JOB,EX4
   :PROG,FTN4,1,6,6,15,99
   FTN
   PROGRAM DEMOB
   WRITE(6,1)
   1 FORMAT("IT WORKED.")
   END
   END$
   :PROG,LOADR,0,6,0,1,1
   :RUN,DEMO
   IT WORKED
E. Loading and running an object tape.
   :JOB,EX5
   :PROG,LOADR,5,6,0,1,1
   /E
load tape and push "read" on the paper tape reader.

   :GO
   :UP,3
   :GO,1
   :RUN,DEMO

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VIII. Reference.

Moving-head Disk Operating System (02116=91779), Hewlett-Packard, 11000 Wolfe Road, Cupertino, California 95014, March, 1971.