P D P - 1 1

F I L E   U T I L I T Y   P A C K A G E

(P I P)

FOR THE

DISK OPERATING SYSTEM

DIGITAL   EQUIPMENT   CORPORATION   ●   MAYNARD,   MASSACHUSETTS

Your attention is invited to the last
two pages of this document. The "How
to Obtain Software Information" page
tells you how to keep up-to-date with
DEC's software. The "Reader's Comments"
page, when filled in and mailed, is
beneficial to both you and DEC; all com-
ments received are considered when docu-
menting subsequent manuals.

Associated Documents:

PDP-11 Disk Operating System Monitor,
    Programmer's Handbook, DEC-11-MWDA-D

PDP-11 FORTRAN IV,
    Programmer's Manual, DEC-11-KFDA-D

PDP-11 PAL-11R Assembler,
    Programmer's Manual, DEC-11-ASDB-D

PDP-11 Edit-11 Text Editor,
    Programmer's Manual, DEC-11-EEDA-D

PDP-11 ODT-11R Debugging Program,
    Programmer's Manual, DEC-11-OODA-D

PDP-11 Link-11 Linker and Libr-11 Librarian,
    Programmer's Manual, DEC-11-ZLDA-D

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PREFACE

This manual describes the features and operation of the File Utility Package for the PDP-11 Disk Operating System (DOS). Thus, the manual assumes familiarity with the DOS Monitor (see PDP-11 Disk Operating System Monitor, Programmer's Handbook, DEC-11-MWDA-D).

The File Utility Package is called PIP (Peripheral Interchange Program) for compatibility with similar programs on other DEC systems. Features provided by PIP include file transfers from one device to another, file deletions, file renaming, and directory listings.

Appendix B, Helpful Hints, contains valuable information on possible solutions to various problems which may arise while becoming familiar with PIP.

In addition to the File Utility Package, the PDP-11 Disk Operating System software includes:

    DOS Monitor
    FORTRAN IV
    PAL-11R Assembler
    Edit-11 Text Editor
    ODT-11R Debugging Program
    Link-11 Linker
    Libr-11 Librarian

C O N T E N T S

CHAPTER 1

INTRODUCTION

The File Utility Package performs useful file operations for the
PDP-11 Disk Operating System (DOS). Examples of such operations are
file transfers between devices, directory listings of disk or DEC-
tape, deleting files, and renaming files. This program is named PIP
(Peripheral Interchange Program) to be compatible with similar pro-
grams on other DEC systems.

     The following list summarizes the major features provided by
PIP.

     1.   Allocate a contiguous file on DECtape or disk.
     2.   List the directory of a disk or DECtape, printing only
          file names.
     3.   List the directory of a disk or DECtape, printing file
          names, file size, creation date, and protection code.
     4.   Delete a file or group of files.
     5.   Change the protection on a file.
     6.   Rename (change the name of) a file.
     7.   Zero (initialize) a DECtape directory.
     8.   Transfer a file or group of files from one device to
          another.
     9.   Merge a group of input files into one new output file.

A detailed description of each feature and its operation appears in
either Chapter 3 or Chapter 4.

1.1 CALLING AND EXITING

PIP is called into core, like any other system program under DOS,
using the RUN command. The reader should be familiar with certain
DOS commands before attempting to use PIP; in particular, how the
RUN command relates to the LOGIN, KILL, and FINISH commands. Briefly,
you must be logged in before running PIP, and any previous program
must be KILLed.

     The RUN command to call PIP into core is typed in response to
the Monitor's dot (period) or dollar sign, which denotes DOS Monitor
level.

For example:

```
.LOGIN 1,1
$RUN PIP
```

to which PIP will respond with its version number and a number sign
(#).

NOTE

All command strings are terminated with the
RETURN key.

When PIP prints a number sign, it is ready to receive a command
string. After completing the command, PIP will print another number
sign, allowing another command string to be typed.

To exit from PIP, type CTRL/C (i.e., hold down the CTRL key
while typing the C key). This returns you to the Monitor. At this
point you must type the KILL command before you RUN another program.
For example, the printout might appear as:

```
.LOGIN 1,1          (log in with your UIC)
$RUN PIP            (call PIP into core)
PIP VØØ1A           (PIP identifies itself)
#LP:</DI            (list directory on line printer)
  .
  .                 (directory would appear on the
  .                 line printer)

# ↑C                (CTRL/C to return to Monitor)
.KILL               (clear core for next program)
$RUN EDIT           (call Edit-11 into core)
  .
  .
  .
```


NOTE

In the examples, we have underlined system program
printout to distinguish it from user input which is
not underlined.

CHAPTER 2

COMMANDS

All commands in PIP are processed by the DOS Command String Inter-
preter (CSI). This assures a uniform command language between the
various system programs operating under DOS. This section of the
manual will describe briefly the command language. The reader is
referred to the DOS Monitor Handbook for a complete description of
the CSI.

2.1   COMMAND STRINGS

The command string tells PIP which operation or group of operations
to perform. For example, the command to transfer a file named
ARB.PAL from DECtape unit Ø to the line printer would be:

        #LP:<DTØ:ARB.PAL

Commands are always typed in response to the number sign (#).

     Since PIP can perform a large variety of operations, the com-
mands to select the appropriate operation vary. Some operations
require two sets of information: one set to describe the output
and one set to describe the input. As illustrated in the examples,
the input and output are separated from each other by the left angle
bracket (<). For example, the following command will list a DECtape
directory on the line printer.

        #LP:<DTØ:/DI

There are some operations which need only the input information.
For example, to zero (initialize) a new DECtape one need only type:

        #DTØ:/ZERO

As you can see there is no need to specify the < symbol in such a
case.

     Commands can consist of a large number of files, limited only
by the length of a teleprinter line. To transfer files A, B, C, D,

E, and F from disk to DECtape, one could type:

       #DT∅:<A,B,C,D,E,F

    To transfer a file ARB.PAL from user [200,200]'s disk area to DECtape unit ∅ in formatted binary mode, one would type:

       #DT∅:<ARB.PAL[200,200]/FB

    The general format of a command string is:

       dev:filnam.ext[uic]/swl:vl:v2:...vn/sw2:vl:v2:...

Each element of a command string is explained below. In the descriptions that follow, the asterisk (*) character will be mentioned.
Its usage is fully described in Section 3.1.5. For the interim, the asterisk represents "all". For example,

      *.PAL

means all file names with an extension of PAL.

.1.1 <u>Device Specification</u>

The device specification, dev:, consists of two letters (listed below), followed by one or more octal digits when required to specify one of multiple units, followed by a colon. The standard device specifications are listed below, where n represents the unit number.

<u>dev</u>	<u>Device</u>
DF:	Disk, fixed head
DKn:	Disk cartridge (RK11) unit n
DTn:	DECtape unit n
KB:	Keyboard (teleprinter)
LP:	Line printer
MTn:	Magnetic tape unit n
PP:	High-speed paper tape punch
PR:	High-speed paper tape reader
PT:	Low-speed (teleprinter) paper tape reader/punch

The unit designator (n) is required for multiple devices of the same type, e.g., two DECtapes would be DT1: and DT2:.

    When a device is not specified in a command string, the current device is assumed to be the last device specified if there was one,

otherwise, the system disk is assumed. When no unit number is indi-
cated for the device, unit 0 is assumed.

2.1.2 Filename Specification

When required, the filename specification, filnam, consists of from
one to six letters or digits, or an asterisk; all characters in excess
of six are ignored. The asterisk can be used to represent all file-
names.

2.1.3 Filename Extension Specification

When required, the filename extension specification, .ext, consists
of a period followed by from one to three letters or digits, or an
asterisk, which represents all extensions of a named file.

2.1.4 User Identification Code Specification

When required, the user identification code, [uic], consists of a
pair of octal numbers separated by a comma and surrounded by square
brackets. (The left and right square brackets are typed using
SHIFT/K and SHIFT/M respectively.) The left number specifies the
user group and the right number specifies the user within the group.

When a UIC does not appear in a command string, the UIC of the
user specified with the DOS LOGIN command is assumed.

2.1.5 Switch Specification

When required, the switch specification, /swl:..., consists of a
slash followed by one or more letters, and optionally followed by a
value specification of octal or decimal digits separated from the
switch name by a colon. Switch names can be of any length; however,
only the first two characters are ever used. If a switch is unique
with one character, only that character needs to be typed.

2.2 SWITCHES

PIP's non-transfer operations are selected by use of switches, and
are entered into the command string by preceding the switch with a
slash. If more than one switch is used, each is still preceded by
a slash.

A summary of PIP's switch options is listed below:

Switch	Name	Operation
/AL	Allocate	Allocate a contiguous file
/BR	Brief Directory	List only filenames and extensions of a directory
/CO	Contiguous	Treat the file as contiguous
/DE	Delete	Delete the file
/DI	Directory	List the entire directory, i.e., filenames and extensions, file size, creation date, and protection code.
/EN	Enter	Enter the User Identification Code (UIC) in the Master File Directory (MFD)
/FA	Formatted ASCII	Transfer file in formatted ASCII mode
/FB	Formatted Binary	Transfer file in formatted binary mode
/PR	Protect	Change protection on the file
/RE	Rename	Rename the file
/UN	Unlock	Unlock the User File Directory (UFD) to recover the file
/ZE	Zero	Zero the DECtape directory

All switches must be typed as the last part of the file specifier, that is, they cannot appear before the filename on which the switch is to operate. Some options require a numeric value to be associated with the switch. For example:

/PR

is the switch to change the file protection code. The new protection code would follow and be separated from /PR by a colon. For example, a protection change might be written as:

#DTØ:ABC/PR:155

which would change the protection code of file ABC on DECtape unit Ø from whatever it was before to code 155.

PIP's switch options can be grouped into two categories: action switches and qualifying switches, as explained below.

2.2.1 Action Switches

Action switches are generally associated with some recognizable opera-
tion or action. Only one action switch can be used in any one com-
mand string. The action switches are:

ALLOCATE	ENTER
BRIEF	PROTECT
DELETE	RENAME
DIRECTORY	UNLOCK

2.2.2 Qualifying Switches

Qualifying switches are used in conjunction with other switches, and
are generally used to make a distinction which is otherwise not ob-
vious. Any number of qualifying switches can be used in a single
command string. The qualifying switches are:

CONTIGUOUS	FB (Formatted Binary)
ZERO	FA (Formatted ASCII)

CHAPTER 3

FILE HANDLING

3.1 FILE TRANSFERS

The transferring of files between devices is one of PIP's primary
functions. PIP uses the device independent features of DOS, and in
the simplest case transfers files from one peripheral to another.
For example, to list a file you would transfer a copy of the file to
the line printer, as in:

        #LP:<DTØ:FILE1.PAL

or

        #LP:<FILE2.PAL

Note that in the second example above, FILE2.PAL is assumed to be on
the user's area of the disk, since the disk is the device assumed if
none is specified.

    As another example, the following command will transfer the data
on a tape from the paper tape reader and create a file named INPUT.TST.

        #INPUT.TST<PR:

The following command will duplicate a paper tape.

        #PP:<PR:

There can be only one output file but there can be any number of input
files (limited only by the teleprinter line length). For example, to
save three files, ONE.PAL, TWO.PAL, and THREE.PAL, onto DECtape unit
Ø you would type:

        #DTØ:<ONE.PAL,TWO.PAL,THREE.PAL

3.1.1 Combining Files

When there are several input files involved in a transfer the files

may be transferred without combining, as all previous examples illus-
trated, or they may be combined into one new output file.

When no output filename is specified with the output device, the
input files are copied without combining.

When a filename is specified with the output device, all input
files are combined to create the new output file. For example, to
combine the three files, SUB1.FTN, SUB2.FTN, and SUB3.FTN, into one
new file called SUBS.FTN, you would type:

    #SUBS.FTN<SUB1.FTN,SUB2.FTN,SUB3.FTN

As a more complicated example, consider the files above as existing
in a variety of places; then:

    #DT3:SUBS.FTN<DT1:SUB1.FTN,DF:SUB2.FTN[50,50],DT1:SUB3.FTN[1,1]

illustrates the type of syntax one could use.

3.1.2 Modes During Transfers

Files can be created with a variety of modes under DOS. Generally,
files are either formatted or unformatted, either ASCII or binary.
Formatted generally means that control and checksum information is
carried along with the data so the integrity of the file can be as-
sured during usage. Unformatted means that this extra information is
not present. In binary mode a full byte of information is always
transmitted whereas in ASCII mode generally only seven bits of the
byte are passed.

PIP makes no assumptions about the creation mode of any files it
transmits. Consequently, the mode assumed for all transfers is unfor-
matted binary unless specified otherwise. This means that formatted
files will be transmitted with no benefit of the checksum feature that
is available from DOS. It also means, in the case of paper tape, that
blank frames, leader and trailer are all transmitted as data. This
makes files transferred from the paper tape reader to the disk to be
larger than necessary.

3.1.3 Formatted Modes

Switches have been provided to override the assumed unformatted mode.
The /FA (Formatted ASCII) and/FB (Formatted Binary) switches will
cause the mode of the file associated with the switch to be the one
specified. This applies to both input and output files. For example,
to transfer the files ABC.DAT and ABC.TST in formatted binary mode,
you would type:

        #DT∅:<ABC.DAT/FB,ABC.TST/FB

In the case of the paper tape reader, the use of these switches would
guard against the case of putting the tape in the reader backwards,
as in:

        #SPRMAN.OBJ<PR:/FB

Any attempt to transfer in a mode which the device cannot support will
be fatal, as in:

        #LP:/FB<DT∅:ABC

which will cause a Monitor error message to be printed.

3.1.4 Transfers from Teleprinter

Occasionally you may wish to transfer from the teleprinter to another
device, as in:

        #PP:<KB:

The above command is, of course, legal and characters typed will be
output to the high-speed paper tape punch. To indicate end-of-file
with such a command, i.e., to stop transferring to the punch, the DOS
convention is to invoke the END command to signal end-of-file. In
order to execute the command, you must be in Monitor mode. Consequent-
ly, the sequence is:

        ↑C   (CTRL/C was typed)
        .END PT   (RETURN key)
        (LINE FEED key)

The line feed is necessary in order to force control back to PIP after
the END command is executed. PIP will return with a number sign (#)
after the above sequence is completed.

        The same sequence is necessary when transferring from the low-
speed paper tape reader. However, it is necessary to indicate end-of-
file from the user's keyboard. For this purpose, the END PT command
is given. If the user typed:

        #DF:FILEIN.MAC<PT:

3-3

it would be necessary to type:

```
↑C                              (CTRL/C typed)
.END PT                         (RETURN key)
(LINE FEED key)
```

after the tape has been read and the low-speed reader comes to a stop.

3.1.5 Asterisk in Transfers

The asterisk (*), when used in a command string, provides a convenient means of transferring large numbers of related files. For example, to transfer all load modules from a DECtape to the disk, you could type:

#DF:<DTØ:*.LDA

The asterisk is interpreted to mean "all". In the example above, all files with an extension of LDA would be transferred (without combining) onto the disk.

The asterisk can appear in the filename field, the extension field, or both fields. For example, the command:

#DTØ:<FORTN.*

would transfer all FORTN files, regardless of the extension (including the null extension), to DTØ:. The command:

#DF:<DTØ:*.*

would copy all files from DTØ: onto the disk.

There is no need to limit the asterisk to one file specifier. The command:

#DF:<DTØ:*.PAL,DT1:*.PAL,DT2:*.PAL

would transfer all files with extensions of PAL from DTØ:, DT1:, and DT2:.

3.1.6 Contiguous Files

Contiguous files are handled by DOS differently from the regular files, which are called linked files. Blocks of contiguous files are guaranteed by DOS to be physically adjacent, whereas linked files are generally separated by a minimum fixed distance (called the interleave factor) to take advantage of the rotational delay inherent in a disk. Contiguous files are generally used for random accessing of data, a feature which is grossly inefficient with linked files.

Unless specified, file transfers assume linked files and use the corresponding DOS functions to perform the action. When working with contiguous files it is necessary to identify which files are to be treated as contiguous.

When /CO is encountered during output file processing, the file will be written as a contiguous file. If the file specified already exists, a fatal error will occur because DOS does not permit this.

When combining and the named file does not exist, PIP will determine the size of all the input files, allocate the space for the new file, and transfer all input files.

When transferring files without combining, PIP will recognize the /CO switch associated with any input files and create the output file as contiguous. For example, to transfer one contiguous file you would type:

        #DT∅:<ABC.DAT/CO

To merge two contiguous files you would type:

        #DT∅:/CO<ABC.DAT,DEF.DAT

3.2   RENAMING FILES

The RENAME switch is provided to allow the user a means of changing the name of a file. The general form of the command is:

        dev:FILE1/RE <dev:FILE2

which changes the name of FILE2 to FILE1.

As before, if no device is specified, the disk is assumed. For example:

        #MAIN.OBJ/RE <TESTX.OBJ

changes the name of TESTX.OBJ to MAIN.OBJ.

When renaming, it is mandatory that the same device be used on either side of the < symbol. The following is illegal:

#DTØ:FILE1<FILE2

because the device for FILE2 was not specified, thus the disk is
assumed. The operation would not be performed and an error message
would be printed on the user's terminal. The command should be writ-
ten as:

        #DTØ:FILE1<DTØ:FILE2

3.3 DELETING FILES

The DELETE switch is provided to allow the user a means of deleting
one or more files. The simple form of the command is:

        dev:file/DE

For example, the command:

        #DTØ:MAIN.LDA/DE

would delete the file MAIN.LDA from DTØ:.

     A number of files can be deleted by specifying a sequence of
file names before the DELETE switch. For example, the command:

        #MAIN1,DT1:MAIN2.OBJ,DT2:MAIN2.PAL/DE

would delete all three files.

     The DELETE switch supports the asterisk in the filename or ex-
tension fields of file specifications. The asterisk is interpreted
as "all", as in *.PAL meaning all files with an extension of PAL.
To delete all files with an extension of LDA from a DECtape, you
would type:

        #DT1:*.LDA/DE

To delete all files from the disk you would type:

        #*.*/DE

To delete all files from a DECtape, it is recommended that you use the
ZERO switch since that operation is much faster.

3.4   ALLOCATING CONTIGUOUS FILES

The ALLOCATE switch provides a means of allocating space for a con-
tiguous file. This option requires a filename and a value, which is
the number of 64-word decimal blocks to allocate on the specified
device. For example:

        #DF:FILE/AL:1Ø

would allocate 640 (or 10 times 64) contiguous words of file storage
on the disk. The ALLOCATE switch works for both disk and DECtape.

3.5   PROTECTING FILES

The PROTECT switch is provided to allow the user a means of changing
the protection of a file.

The protection code is specified as an octal value argument to
the switch and is treated as three fields corresponding to owner,
user group, and all others. Each field is assigned an octal digit
as described below.

7	6	5	4	3	2	1	Ø

        Owner   User Group   All others
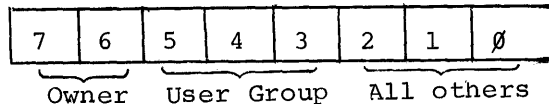
Owner: Bit 6 = 1 = Owner cannot write on or delete the file.
                     This is a safeguard to prevent inadver-
                     tent deletion or over-writing.

         Bit 7 = 1 = Protect the file from automatic deletion
                     on FINISH.

User group and all others:

| | Function | | | |
Code	Delete	Write	Read	Run
Ø	yes	yes	yes	yes
1		yes	yes	yes
2 or 3			yes	yes
4 or 5				yes
6 or 7				

NOTE

Yes indicates that the operation is allowed.
For example, if a file belongs to user [23,10],
a protection code of 3 will allow user [12,4]
to read or run but not delete or write on it.

The general form of this command is:

        dev:fil/PR:value

such as

        #FILE3/PR:355

which changes the protection code of FILE3 to 355. The protection
switch works for DECtape as well as disk, as in:

        #DT∅:FILE4/PR:155

3.6 RECOVERING FILES

There are a number of infrequent ways in which a file can be left in
a state which makes it inaccessible for subsequent processing. For
example, if a file is open and a system crash (hardware or software)
occurs causing the Monitor to be reloaded, the file will likely be
left in an inaccessible state.

    Files which are declared inaccessible by DOS will likely have
up to three things wrong with them:

    1. The LOCK bit in the UFD entry for this file will be set.

    2. The USAGE COUNT in the UFD entry for this file will be
        invalid.

    3. Some blocks allocated for this file may not have been
        marked off in the permanent bit map.

PIP provides a partial solution to this problem with the UNLOCK switch.
The function of this switch is to restore the Lock and Usage Count
fields so that the file can be read. It does not make an attempt to
mark any blocks in the bit map as occupied.

    The sequence for recovery is to use the UNLOCK switch, such as:

        .RUN PIP
        #DF:FILE.OLD/UN

which allows the file to be accessed.

    In order to prevent the blocks from being overwritten, the file

should now be transferred to another file name, such as:

    #DF:FILE.NEW <FILE.OLD

which will copy the old file and guarantee that it is in the proper
state. The old file should then be deleted, such as:

    #DF:FILE.OLD/DE

and the latest file can be renamed, if desired, such as:

    #DF:FILE.NAM/RE <FILE.NEW

Depending upon the state of the file, it may become impossible
to transfer the file onto a backup file because erroneous data in the
link words will make the chain never-ending or will link the file into
unknown portions of the file system. In this case, it is suggested
that you edit the file, searching for the end of the good data. Once
this point has been found, write out the entire last buffer and close
the new output file with the EF command to Edit-11. Since under this
circumstance the file has bad links, any delete operation would almost
surely be disastrous to a portion of the disk. The file containing
erroneous data should be renamed to some uncommon name and left as it
is, until the disk is reinitialized.

CHAPTER 4

DIRECTORY HANDLING

A significant number of PIP's features center around the manipulation
of files within directories and of the directories themselves.

4.1 ENTERING USER IDENTIFICATION INTO DIRECTORY

The User Identification Code (UIC) must appear in the Master File
Directory (MFD) before a user is able to create his own files on the
disk or DECtape. This code is generally entered into the MFD by using
the ENTER option in PIP, although the system building program will
create a few fundamental User File Directories (UFDs).

The UIC of the current user of the system is passed to DOS by the
LOGIN command. For example:

.LOGIN 1Ø,11

will set the current UIC to [10,11].

The UIC of the current user is obtained from DOS and written into
a spare slot in the MFD. If no spare slots exist in the MFD, PIP will
print a fatal error message, and no attempt will be made to extend the
MFD. The recommended sequence is then:

```
.LOGIN uic
$RUN PIP
#DF:/EN
```

This procedure is not always necessary for DECtapes because the ZERO
switch will enter the UIC of the current user when the directory is
initialized.

If a user other than the one originally zeroing the DECtape wishes
to access files on the tape, he must enter his UIC on the DECtape or
explicitly reference the UIC field during each reference.

4.2 DIRECTORY LISTINGS

The directory of a file-structured device may be output to any device.
The information listed for a directory is some subset of all the in-
formation contained within the UFD entry for each file.

The directory switch prints a title line and then lists the file-
name, the extension, the number of blocks (decimal), the creation date,
and the protection code. It also summarizes some figures concerning
the files in the directory.

The directory switch can assume either the multiple-file or single
file syntax. For examples:

    #LP:/DI<DTØ:,DT1:

outputs the directories for DTØ: and DT1: onto the line printer.

    #KB:/DI<DTØ
or
    #DTØ:/DI

outputs the directory of DTØ: onto the user's terminal.

    #KB:<DI
or
    #/DI

outputs the directory of DF: onto the user's terminal.

Notice that in the last few examples a convenient notation was
allowed which assumed the user's teleprinter, if no output device was
specified. This form is legal only if " < " is not present in the
command.

Sample disk and DECtape directories are shown below. Notice that
the summaries are different, depending upon whether disk or DECtape is
used.

```
DIRECTORY DFØ:  [1,1]              ——file size (decimal blocks)
                                   ——— protection code
MONLIB          956  Øl-JAN-7Ø  <377>  ←——— 
PIP              61  Øl-JAN-7Ø  <233>
PIPX             73  Øl-JAN-7Ø  <233>
EDIT             61  Øl-JAN-7Ø  <233>
PAL             114  Øl-JAN-7Ø  <233>
ODT    .OBJ      53  Øl-JAN-7Ø  <233>
LINK             77  Øl-JAN-7Ø  <233>
LIBRA            37  Øl-JAN-7Ø  <233>
COPY             13  Øl-JAN-7Ø  <233>
DOS    .S1       17  Øl-JAN-7Ø  <233>
R                 1  Øl-JAN-7Ø  <233>
DOS    .S2       14  Øl-JAN-7Ø  <233>
DOS    .O2        9  Øl-JAN-7Ø  <233>
DOS    .S3       14  Øl-JAN-7Ø  <233>
DOS    .OR        9  Øl-JAN-7Ø  <233>
DOS    .S4       14  Øl-JAN-7Ø  <233>
DOS    .O4        9  Øl-JAN-7Ø  <233>
PAL1             13  Øl-JAN-7Ø  <233>
PAL2            336  Øl-JAN-7Ø  <233>
PAL3            454  Øl-JAN-7Ø  <233>
PAL4            45Ø  Øl-JAN-7Ø  <233>
PAL5            199  Øl-JAN-7Ø  <233>
EDITA           397  Øl-JAN-7Ø  <233>
EDIT1           138  Øl-JAN-7Ø  <233>
EDIT2            9Ø  Øl-JAN-7Ø  <233>
EDIT3           1Ø6  Øl-JAN-7Ø  <233>
EDIT4            85  Øl-JAN-7Ø  <233>
EDIT5            13  Øl-JAN-7Ø  <233>
                               ↑
TOTL BLKS:     3813      creation date
TOTL FILES:      28
```

```
DIRECTORY DT0:   [1,1]

SYSLOD.SYS    31   23-MAR-71  <377>
MONLIB.SYS    80   01-APR-71  <333>
PIP           15   01-APR-71  <233>
PIPX   .LDA   18   01-APR-71  <233>
EDIT   .LDA   15   01-APR-71  <233>
PAL.   .LDA   28   01-APR-71  <233>
ODT.   .OBJ   13   01-APR-71  <233>
LINK   .LDA   19   01-APR-71  <233>
LIBRA  .LDA    9   01-APR-71  <233>
COPY12.LDA     3   26-MAR-71  <233>

FREE BLKS:   329
FREE FILES:   46
```

A subset of the directory listing is available with the BRIEF switch. This switch prints the title line, then lists only the file-name and extension followed by the summary data. For example,

        #DT0:/BR

will give a brief directory listing for DT0:, while

        #/BR

will give a brief directory listing for the user's disk area.

Sample disk and DECtape directories are shown below:

```
DIRECTORY DF0:  [1,1]

MONLIB
PIP
PIPX
EDIT
PAL
ODT    .OBJ
LINK
LIBRA
COPY
DOS    .S1
R
DOS    .S2
DOS    .O3
DOS    .S3
DOS    .OR
DOS    .S4
DOS    .O4
PAL1
PAL2
PAL3
PAL4
PAL5
EDITA
EDIT1
EDIT2
EDIT3
EDIT4
EDIT5

TOTL BLKS:  3813
TOTL FILES:   28
```

```
DIRECTORY DTØ:  [1,1]

SYSLOD.SYS
MONLIB.SYS
PIP    .LDA
PIPX   .LDA
EDIT   .LDA
PAL    .LDA
ODT    .OBJ
LINK   .LDA
LIBRA  .LDA
COPY12.LDA

FREE BLKS:   329
FREE FILES:   46
```

4.3 ASTERISK IN DIRECTORY LISTINGS

The asterisk (*) feature for filenames and extensions works for
directory listings, both normal and brief form. For example, the
command

<u>#</u>*.PAL/BR

gives a brief directory listing for all files on the user's disk area
with an extension of PAL. The asterisk can appear in the filename
field, the extension field, or both. In addition, groups of file
specifiers can be arranged to provide sequential listings, as in

<u>#</u>DTØ:*.MAC,DF:FORTN.*/DI

4.4 DECTAPE ZEROING

In order to initialize a new DECtape with the basic file structure
information required by the DOS Monitor, the ZERO switch is provided.

This switch works only on DECtape and performs no action for other
devices.

The function creates the permanent bit maps, the file bit maps,
the MFD, and a UFD for the user currently running this program.

This switch may be used either by itself, as in:

<u>#</u>DTØ:/ZE

or in combination with other switches, as in:

<u>#</u>DTØ:ONE/ZE<DT1:A,B,C

which zeroes DTØ: first, then creates file ONE on DTØ: by concatenating
files A, B, and C from DT1:. When used in combination with other
switches, ZERO is performed before any other implied actions.

CHAPTER 5

ERROR MESSAGES

Error messages conform to the standard for error handling as defined
in the DOS Monitor handbook. Errors will be of the form

        Sxxx

where the S indicates a system program error.

        Error messages unique to PIP are listed below. Consult the DOS
Monitor handbook for a complete description of all error messages.

Error Message	Reason
S203	Too many switches or an illegal switch
S204	Too many output specifiers.
S205	Too many input files
S231	Illegal command; file-structured device required.
S232	More than one action switch specified.
S233	UIC not in MFD.
S234	No file name where one is required.
S235	No files exist in UFD.
S236	Operation applicable to DECtape only.
S237	File not found.
S240	Insufficient space for file.
S241	MFD is full.
S242	Meaningless command; no action taken.

)P-11 PIP ALL VERSIONS THRU 5A

:oblem with files inadvertently named ᵁAB

IP will not allow the use of an '*' on the output side of a
ommand in TRANSFER or RENAME. Attempts to use the '*' will
esult in a file called ᵁAB in the field corresponding to the
*' in the command.

⊃ get rid of ᵁAB file names, do the following:

    Rename the file using '*' in the field(s) corresponding
    to the ᵁAB

       eg.
      ᵁAB . ᵁAB
      #FOO < *.* /RE (the file will then be renamed FOO.)

SUMMARIES

Switch	Name	Example	Operation
/AL	Allocate	#DF:FILE/AL:1Ø	640 (10 x 64) contiguous words of file storage is allocated on disk.
/BR	Brief Directory	#DTØ:/BR	List all filenames and extensions of directory for DECtape Ø onto the user Teletype.
/CO	Contiguous	#DTØ:<ABC/CO	Transfer file ABC as contiguous file from disk to DECtape Ø.
		#DTØ:/CO<ABC,DEF	Merge files ABC and DEF as two contiguous files.
/DE	Delete	#MAIN/DE	Delete file MAIN from disk.
		#DTØ:ABC,DT1:DEF/DE	Delete files ABC and DEF from DECtapes Ø and 1 respectively.
/DI	Directory	#DTØ:/DI	List all filenames, extensions, size, creation date, and protection codes of directory for DECtape Ø onto the user's Teletype.
/EN	Enter	#DF:/EN	Enter current user's UIC in MFD on disk.
/FA	Formatted ASCII	#LP:/FA<DTØ:ABC	Copy file ABC from DECtape Ø to line printer in formatted ASCII mode.
/FB	Formatted Binary	#DTØ:<ABC/FB	Copy file ABC from disk to DECtape Ø in formatted binary mode.
/PR	Protect	#ABC/PR:355	Change protection code of disk file ABC to 355.
/RE	Rename	#ABC/RE<DEF	Rename disk file DEF to ABC.
		#DTØ:GHI/RE<DTØ:JKL	Rename DECtape Ø file JKL to GHI.
/UN	Unlock	#DF:FILE.OLD/UN	Unlock FILE.OLD after a system failure so that FILE.OLD can be accessed.
/ZE	Zero	#DTØ:/ZE	Erase all files from directory of DECtape Ø.
/FR	Free Blocks	#DK/FR	# of free blocks on disk Ø.

A-1

Device Specifications

dev	Device
DF:	Disk, fixed head
DKn:	Disk cartridge (RK11)
DTn:	DECtape unit n
KB:	Keyboard (teleprinter)
LP:	Line printer
MTn:	Magnetic tape unit n
PP:	High-speed paper tape punch
PR:	High-speed paper tape reader
PT:	Low-speed (teleprinter) paper tape reader/punch

APPENDIX B

HELPFUL   HINTS

There   are a few things which are obvious to experienced DOS users,
but the beginner often has to learn them empirically. This section
is meant to help the beginner avoid some common pitfalls.

1. If you are having difficulty running PIP, make sure
    that:

    a. you are logged in,

    b. you did a KILL command after running a pre-
        vious program,

    c. the load module (PIP.LDA) is on the disk, or,

    d. you are accessing the proper UIC field on the
        DECtape, if attempting to run from DECtape,
        i.e., you should be logged in under the same
        UIC as shown on the directory of the DECtape.

2. If you are having difficulty accessing a DECtape file
    which you are positive is there, you are probably logged
    in under a different UIC than appears on the DECtape.
    In this case, either:

    a. Explicitly specify the UIC in the command,
    b. FINISH and LOGIN under the proper number, or,
    c. ENTER your UIC on the DECtape (see Section 4.1).

3. If you are having difficulty transferring to the line
    printer, make sure the printer is on-line; set the
    switch to ON LINE.

4. If you are having difficulty reading a file and there
    has recently been a software or hardware crash, read
    Section 3.6, Recovering Files.

5. If you continue to get file structure errors on output
    files, you are probably trying to create a file which
    already exists. DOS does not allow this, so delete
    the file first.

6. If you are logged in for the very first time and
    cannot create any files, it is because you have no
    User File Directory (UFD) in the Master File Direc-
    tory (MFD). To create one, Log in, call PIP and
    type:

            #DF:/EN

    and you are all set.

7. If you cannot write anything on a DECtape even
    though the write switch is on, it is likely that:

    a. the DECtape belongs to someone else and he
        does not want you to write on it accidentally,
        or,

    b. the tape has not been certified.

    If the DECtape does belong to someone else, you may
    still write on it by using the ENTER switch to put
    your directory on the DECtape, as in:

            #DT∅:/EN

    Uncertified DECtapes can be certified using a di-
    agnostic program supplied with the maintenance pro-
    gram.

MAGTAPE OPERATIONS

This appendix describes those changes made to VØØ4A PIP to incorporate
several industry compatible magtape operations. The version of PIP
described is distributed as VØØ5A PIP.

C.1 GENERAL MAGTAPE INFORMATION

Industry compatible magnetic tape is supported by PIP for the following
operations:

    a. Directory listings

        #MT1:/DI
        #MTØ:/BR

    b. File transfer operations

        #MT1:FILE<DT2:ABC
        #MT:MERGE<ABC,DTØ:FACT,MT1:DATA

    c. Directory initialization

        #MT1:/ZE

    d. Rewind, and Rewind and Unload (see sections C.2 and C.3).

    Transfer and directory operations include all asterisk features
used for other file-structured devices. In addition, on magtape it is
possible to say:

        #MT1:[*,*]/DI
or
        #MT1:[*,*]/BR

This allows the user to obtain a complete listing of all files on the
specified magtape(s). When this option is used, the UIC specification
is printed as part of the file information. For example:

DIRECTORY MTØ: [*,*]

13-SEP-71

| DDT | .PAL | 59 | 11-SEP-71 | <233> | [2ØØ,2ØØ] |
| EDIT | | 14 | I3-SEP-71 | <233> | [1,1] |

TOTL BLKS: 73
TOTL FILES: 2

DIRECTORY MT2: [*,*]

13-SEP-71

| ODT | .OBJ | 13 | 13-SEP-71 | <233> | [1,1] |

TOTL BLKS: 13
TOTL FILES: 1

2 REWIND

 Rewind switch is applicable only to magtape units. This switch
uses the tape to be wound back on its original reel. Following this
...ion the magtape unit(s) can still be addressed. For example:

    #MT1:/RW

    #MT1:,MT2:/RW

 acceptable commands.

 REWIND and UNLOAD

 Rewind and Unload switch is applicable only to magtape units. This
...tch causes the tape to be wound back on its original reel and the
...tape unit to be switched off-line. Following this option the MAG-
...e unit(s) cannot be addressed for further processing. For example:

    #MT:/RU

    #MT2:,MT3:/RU

4 ZERO

    It is mandatory that a magtape be zeroed before use. The /ZE
...itch writes two end-of-file marks on the tape so that it can be
...ndled correctly by DOS.

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