MANUAL UPDATE

MANUAL IDENTIFICATION

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Programs Reference Manual

Part Number: 92084-90007

UPDATE IDENTIFICATION

Update Number: 1 (June 1984)

This Packet also Includes:

THIS UPDATE GOES WITH: Second Edition (December 1983)

(An update to a manual not on hand, and not the RTE-IVB O/S)

THE PURPOSE OF THIS MANUAL UPDATE
is to provide new information for your manual to bring it up to date. This is important because it ensures that your manual accurately documents the current version of the product.

THIS UPDATE CONSISTS OF
this cover sheet, a printing history page, all replacement pages, and write-in instructions (if any). Replacement pages are identified by the update number at the bottom of the page. A vertical line (change bar) in the margin indicates new or changed text material. The change bar is not used for typographical or editorial changes that do not affect the text. New pages to be added do not contain change bars.

TO UPDATE YOUR MANUAL
identify the latest Update (if any) already contained in your manual by referring to the Printing History Page (page ii). Incorporate only the Updates from this packet not already included in your manual. Following the instructions on the back of this page, replace existing pages with the Update pages and insert new pages as indicated. If any page is changed in two or more Updates, such as the Printing History Page which is furnished new for each Update, only the latest page will be included in the Update package. Destroy all replaced pages. If "write-in" instructions are included they are listed on the back of this page.

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TECHNICAL MANUAL UPDATE
(92084-90007)

Note that "*" indicates changed page.

UPDATE	DESCRIPTION
1	A. Replace the following pages with the pages attached.

Title*/ii*
iii*/iv
xi/xii*
4-7/4-8*
4-8A/Blank
6-9/6-10*
6-11*/6-12
6-39*/6-40
9-13/9-14*
Index-1* through Index-16*

B. Add the following pages:

11-1* through 11-11*

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RTE-6/VM Utility Programs

Reference Manual

HEWLETT PACKARD

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PRINTING HISTORY

The Printing History below identifies the Edition of this Manual and any Updates that are included. Periodically, Update packages are distributed which contain replacement pages to be merged into the manual, including an updated copy of this Printing History page. Also, the update may contain write-in instructions.

Each reprinting of this manual will incorporate all past Updates, however, no new information will be added. Thus, the reprinted copy will be identical in content to prior printings of the same edition with its user-inserted update information. New editions of this manual will contain new information, as well as all Updates.

To determine what software manual edition and update is compatible with your current software revision code, refer to the appropriate Software Numbering Catalog, Software Product Catalog, or Diagnostic Configurator Manual.

Second Edition	**Dec 1983**	
Update 1	**Jun 1984**	**Correct text, add flag, ext utilities**

PREFACE

This manual describes the use of the interactive utility programs available with the Hewlett-Packard RTE-6/VM Operating System. Before attempting to use the utilities, you should be familiar with the RTE-6/VM operating system. All manuals associated with the operating system are defined in the Index to Operating System Manuals (92084-90001).

File management information in this manual is based on the File Management Package (FMP). Refer to the CI User's Manual for details of the Command Interpreter hierarchical file system.

Chapter 1 provides a general introduction to the operating system utilities and describes the syntax used in the utility runstrings.

Chapter 2 presents the general system utilities that allow you to call for the system status, to manipulate files, to call for help in defining error messages, to compile and load programs and to program the terminal function-key cluster.

Chapter 3 describes the utility provided to translate old-record formats to the formats used by RTE-6/VM.

Chapter 4 describes the utilities used to copy and restore files between tape and disc media.

Chapter 5 describes the utilities used to back up cartridges to tape and to restore the saved cartridges.

Chapter 6 defines the on-line and off-line backup utilities that allow you to selectively back up files, groups of files, or entire logical units (LU).

Chapter 7 describes the utility provided to translate files to and from the Logical Interchange Format (LIF) that is interchangeable with other HP systems.

Chapter 8 describes the file transport utility (FPORT) used for moving files between the HP 1000 and HP 9000 systems. The Application Migration Package (AMP/1000) is required by FPORT in transporting files.

Chapter 9 contains the disc formatting utilities for the HP MAC/ICD and CS/80 discs, and the HP 9895 Flexible Disc.

Chapter 10 defines the on-line driver replacement utilities that allow you to replace device drivers without having to regenerate the system.

Chapter 11 describes the file analysis utilities FLAG and EXT, used to identify external references and specific character patterns in source files.

Chapter 9
DISC FORMATTING UTILITIES

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Chapter 11
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INITIALIZING/FORMATTING & SPARING ICD/MAC DISCS

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Name Comment File (CF)

The CF command establishes the namr of the optional comment file to be copied from disc to tapes created by subsequent copy commands. When the copy is to mag tape, the file is copied uncoded. Because CTD tapes are formatted in fixed-length blocks, files must be coded for copy to CTD devices. Comment-file records longer than 128 words are truncated. Note that a comment file should not contain zero-length records, or a checksum error could result when the file is listed using the LC command. The CF command takes the form

```
CF,namr
```

Because the comment file is not encoded on mag tapes, the file can be read using the FMGR ST, LI or DU commands.

Scratch Area Definition (SC)

Normally, FC builds each of its internal scratch files on the first cartridge with sufficient space for the initial size of the file. With the SC command, you can specify the cartridge on which the files are to be created. (This command is useful as a means of avoiding Cartridge Full errors in copy operations that require large amounts of scratch-file space.) If used, this command must be given before any CO operation. The command string takes the form shown below.

```
SC,cart
```

where:

cart is the CRN or -LU to be used for the scratch file.

Echo Command (EC)

Initially, command echoing to the list device is OFF. The EC command allows you to specify that each command be echoed to the list device as the command is processed and, subsequently, to suppress echoing if desired. The command takes the form

```
EC,ON
```

or

```
EC,OFF
```

The default parameter is ON.

Copy and Related Commands

The COpy command initiates the copy operation from disc-to-tape, tape-to-disc, or disc-to-disc. Cartridges and tapes can be written and restored by naming the devices as the source and destination parameters. Files being copied can be selected by name, security code, cartridge, etc., as desired. Selection by name can make use of wildcard characters.

WARNING

Do not interrupt the tape copy process. An attempt to take the tape unit off-line, or to dismount the tape, will destroy the tape's contents. Wait until the "Cleaning Up" message and your prompt appears before touching the tape unit.

The COpy command takes the form

```
CO[,srce[,dest[,optns[,file1[,file2[,msc]]]]]]
```

where:

srce selects the file or files to be copied. The srce can be a single namr, a list of namrs enclosed in braces, or a negative tape LU with an optional namr or list of namrs enclosed in braces. Each namr may take the abbreviated form of a CRN or negative disc LU. Wildcard characters are acceptable in srce namrs.

Where used, the braces {} are required as defined. If the srce is a single namr, the braces can be omitted; if, however, the srce is a list of namrs, the list must be enclosed with braces, as

```
namr                        *single-namr srce
{namr,namr...,namr}         *list of srce namrs
```

If the source is a tape LU, the braces can be omitted. If, however, it contains one or more optional namrs, the single namr or list of namrs must be enclosed with braces, as

```
-tlu
-tlu{namr}
-tlu{namr,namr...,namr}
```

dest determines whether the files selected by the source parameter are to be copied to disc or to tape and specifies the name, security code, and cartridge for the destination files. This parameter can be either a namr (for disc destinations) or a negative tape LU with an optional namr enclosed in braces. The namr may take the abbreviated form of a CRN or negative disc LU. The dest parameter takes one of the forms

```
namr            or
-tlu            or
-tlu[{namr}]
```

Only one destination can be specified, and wildcard characters cannot be used in dest namrs. (Refer to the section Grouping CO

On-Line Physical Backup Utilities

The on-line utility programs PSAVE, PRSTR and PCOPY run under control of RTE-6/VM, thus the logical units and disc subchannel definitions are determined by the tables in the current system. Each of the utilities can be run interactively, by using a command runstring, or by means of a command file. When the utilities are invoked using a runstring and you specify an erroneous parameter, the utilities enter interactive mode and prompt for the correct parameter.

To prevent suspending or aborting critical operations that require access to a cartridge, PSAVE does not lock the cartridge during the save operation. It is recommended that you ensure that no other program writes to a disc LU that is in the process of being backed up by PSAVE. In a multi-CPU environment, you should ensure that no other CPU has the disc mounted when you attempt to save or restore it.

PRSTR and PCOPY lock the disc being restored and will not restore to an already mounted FMP cartridge. To restore a disc LU on-line, you must first dismount the cartridge with the FMGR DC command. To restore a disc unit on-line, you must dismount all LUs on that unit. However, PRSTR issues a message listing the mounted LUs and allows you the option of restoring those LUs that are not mounted. If all cartridges are mounted, PRSTR terminates with an error message after listing the LUs that must be dismounted.

Note however, that the system and auxiliary discs, LU 2 and LU 3, cannot be dismounted, and any attempt to do an on-line LU, UNit, or SElective restore to these LUs will result in an error. A UNit or SElective restore will attempt to restore those LUs that were dismounted and lockable, if the user responds with Yes to the OK TO PROCEED (Y or N)? prompts. The tape files containing the PSAVE of LU 2 and LU 3 will be skipped in the restoration process.

The PushButton option does allow the user to restore LU 2 and LU 3 on-line. The following warnings are printed for the user, and the user must answer Yes to all the questions before the restore will take place.

```
*WARNING* SYSTEM LU <n> WILL BE OVERLAYED
OK TO PROCEED (Y or N)?

 ******  W A R N I N G  ******
 ALL ACTIVITY MUST BE TERMINATED BEFORE RESTORE PROCEEDS.
OK TO PROCEED (Y or N)?
```

The first question shown above may be suppressed using the DE option, but the latter must be answered interactively by the user. The user can enter EX or /E to any of these questions and the utility will terminate. After the restoration on the system disc completes, the system will be HALTed to allow the user to reboot. This is because the system on the disc and the system in memory can not be guaranteed to be the same. If PRSTR is executing under Session environment, the user must have a capability level greater than, or equal to 60 to do an on-line PushButton restore to the disc containing LU 2 or LU 3.

A unit restore in CS/80 pushbutton format is not restorable selectively since the pushbutton controls on the drive unit allow only full save or full restore. Therefore, all cartridges on the CS/80 disc must be dismounted before a data restore can be done.

Loading the On-Line Utilities

The loading sequence allows the retrieval of some code space for use as an I/O buffer by loading the routine $BEGGT last. On-line loading includes the relocation of a $ONLIN module that resolves references to special routines needed only in the off-line environment. The on-line utilities PSAVE and PCOPY are loaded interactively as

```
:RU,LOADR
 /LOADR: OP,LB        !load program as large background
 /LOADR: OP,CP        !request current page links
 /LOADR: SZ,27
 /LOADR: RE,%COMM
 /LOADR: RE,%PSAVE    !load PSAVE, or
 /LOADR: RE,%PRSTR    !load PRSTR, or
 /LOADR: RE,%PCOPY    !load PCOPY
 /LOADR: RE,$ONLIN    !load routine to resolve references needed
                      !only in off-line utility
 /LOADR: SE,$BCKUP    !load system-independent physical backup
                      !library relocatable modules
 /LOADR: SE,$DTCLB    !load CS/80 disc library relocatable modules
 /LOADR: SE,$PLIB     !load Pascal library relocatable modules
 /LOADR: SE           !search system libraries to assure that
                      !$BEGGT is relocated last
 /LOADR: RE,$BEGGT    !this set of routines should be relocated
                      !last, as it can be overlaid for use as
                      !an I/O buffer
 /LOADR: SE,%DECAR    !this is only needed if %DECAR
                      !is not generated into your system
 /LOADR: /E
```

The PSPAR utility, scheduled by PRSTR and PCOPY when the VErify option is selected, is loaded as

```
:RU,LOADR
 /LOADR: OP,LB
 /LOADR: OP,CP
 /LOADR: SZ,20
 /LOADR: RE,%COMM
 /LOADR: RE,%PSPAR
 /LOADR: RE,$ONLIN
 /LOADR: SE,$BCKUP
 /LOADR: SE,$DTCLB
 /LOADR: SE,$PLIB
 /LOADR: SE,%DECAR    !this is only needed if %DECAR
                      !is not generated into your system
 /LOADR: /E
```

You can also use the LOADR command files #PSAVE, #PRSTR, #PCOPY, and $PSPAR to load the physical backup utilities into memory and then use the SP command to place them on LU 2.

PSAVE

PSAVE saves one disc LU, a group of disc LUs or an entire disc unit to tape transports or tape cartridges. As an option, you can save an entire disc unit in CS/80 pushbutton-restorable format.

Invoke PSAVE with the runstring

```
[RU,]PSAVE[,input[,srceLU[,destLU[,file#[,opts[,hcpy[,title]]]]]]]
```

where:

input — is the LU (or file) from which the PSAVE parameter inputs are to be read. If input is from a file or or a non-interactive device, no other parameters may be specified. The default is to your log device.

srceLU — is the LU of the disc subchannel to be saved. If the UN (unit save) option is specified, the srce LU parameter is a target to the unit and may be any LU on the disc. If the MU (multiple save) option is specified, this parameter is meaningless and will be ignored. In any other case, this is a required parameter.

destLU — is the LU of the tape transport or tape cartridge to receive the saved data. Under session monitor, the LU specified must be in your Session Switch Table (SST). The default is to LU 8.

file# is the integer number to be assigned to the saved file. This parameter specifies the start location on the tape for the save. Before writing, file# - 1 tape files are skipped from the start of the tape. The default is to the current tape position for tape transports or file #1 for CS/80 cartridges.

opts are any of the following two-character ASCII option codes. The options can be specified in any order, and may not have intervening characters (including blanks) between options. If no options are specified, the default is to LU save without verify.

VE Turn on verify option. Track sparing is done only when the verify option is specified.

LU Save is to be an LU save.

UN Save is to be a disc unit save. The source LU parameter can be any LU on the disc unit.

PB Unit save in CS/80 pushbutton-restorable format. The destination LU must be a CS/80 cartridge, and the source LU must be a CS/80 disc. PSPAR must be loaded into memory for this option.

MU Multiple LU saves in one pass. The source LU parameter should be omitted; PSAVE will prompt for the source LUs. All LUs must be from the same class of discs, such as all MAC disc LUs.

hcpy is the LU of the device on which information about the save is to be printed as a record of the save operation. The default is to your log device.

title is the title (to a maximum of 40 ASCII characters) that will be placed in the tape header.

If you enter at least one parameter in the runstring, PSAVE defaults all optional parameters and prompts you for all required parameters not included in the runstring.

Calling PSAVE Interactively

To run PSAVE interactively, just enter the utility call PSAVE or RU,PSAVE. Enter a valid response to each prompt or enter a carriage return to use the default value. If a response is not valid, an appropriate error message is issued and the prompt is repeated. PSAVE prompts for input in the following order. (Note: This is the order that should be used in preparing an input command file.)

If you select the SE option:

ENTER FILE:SUBCHANNEL PAIRS	Enter the file number and target subchannel to which the file is to be restored. If the track map definitions come from tape (TA option), any positive subchannel numbers entered are ignored. If a negative subchannel number is entered. RE responds with the message "ILLEGAL SUBCHANNEL" and again prompts for the file:subchannel pair. (Although these subchannel numbers are ignored they must still be legal.) The subchannel numbers may be given sequentially starting with 0, and the track map may then be defined in the same order. Multiple entries should be separated by commas. To continue on the next line, end the current line with a comma.
ENTER TAPE LU	Enter the LU of the tape unit containing the saved file. The default is to the tape transport, LU 8.

If you select the LU option:

ENTER FILE NUMBER	Enter the tape file number of the file to be restored. The default is file#1 on CS/80 cartridges and the current tape position on tape transports.
ENTER HARD COPY LU	Enter the LU number of the device on which errors will be logged and track map definitions displayed. The default is the system console, LU 1.

If you do not select the DE option:

- tape header - OK TO PROCEED?(YE/NO)	Enter YE if this is the correct tape. If your response is NO, the ENTER FILE NUMBER prompt is repeated.

When restoring to any disc unit, the protect switch must be turned off and the format switch must be turned on. If either condition is not met, an error message is printed and the utility prompts with:

```
TYPE 'GO' WHEN READY ('PA' TO SUSPEND)
```

When the unit switch setting is correct, enter GO and the restore continues. If you enter PA, the utility suspends itself after printing:

```
TYPE GO,PRSTR TO CONTINUE
```

Example

In the following example, note that RE is invoked with the call "PRSTR"; the off-line utility also accepts a call of the form "PR". In this example REstore is called interactively, with the first response a "?" to request a listing of allowable options (either a single "?" or double "??" can be entered as the request). The VE, TA AND SE options then are specified and the file:subchannel pairs are defined for the selective restore operation. The tape header is then displayed, followed by the subchannel definition and the OK TO PROCEED? prompt. The response is YE and the restore operation begins by first verifying the destination disc and sparing tracks if required.

While the restoration is in process, the message RESTORING DISC LU 2 (in this example) is displayed. When the restoration is complete the RESTORED DISC LU 2 message is displayed. Since this example is a selective restore of two discs, the tape header of the second disc is then displayed and the sequence of prompt/verify/restore is repeated, followed by the TASK? prompt.

In the example, the TASK? prompt response is a garble of characters to which REstore responds with the UNRECOGNIZED COMMAND message. Following the available command display (?? response), the EX command is issued and BCKOF terminates. By entering a carriage return (any keyboard character can be used), the system enters non-session mode and returns the * prompt. At this point, any of the system break mode commands that are valid for your configuration can be executed (see the Off-Line System Console Operations section for a list of these commands). To return to the off-line backup utilities, enter a carriage return and enter RU,BCKOF, as shown in the example.

```
TASK?
PRSTR
ENTER OPTIONS
?
ALLOWED OPTIONS (RSTR):
(1) VE => VERIFY
(2) DE => DEPRESS USER QUESTIONS
(3).TA => USE TAPE SUBCHANNEL DEFS
(4) UD => GET USER SUBCHANNEL DEFS
(4).LU => LU SAVE/RSTR/COPY
(4) UN => UNIT (FULL VOL) SAVE/RSTR/COPY
(4) PB => PUSHBUTTON UNIT IMAGE SAVE/RSTR
(4) SE => SELECTIVELY RESTORE LUS

THE NUMBERS IN ()'S REPRESENT CATEGORIES AND
ONLY ONE OUT OF EACH CATEGORY CAN BE USED.
```

Reformat a Disc (RE)

The FORMT REformat function clears the entire disc area designated by the LU, except for the servo and timing data written to the inter-sector gaps when the disc was preformatted prior to shipment from HP. The directory track is overwritten with zeroes, zeroes are written to all sector preambles, data areas, and postambles, and the spare track pool is cleared. The reformatted disc is not verified, and bad tracks are not spared during the RE operation.

If the PRSTR VErify option is not specified when restoring the disc, or if the disc is restored using READT, the FORMT IN function should be used before restoration, to initialize the disc and to spare tracks according to the system track map. HP-designated bad tracks must be spared using the FORMT SP function even if the tracks are not found to be bad during initialization. Bad tracks defined during disc preformatting are identified in the HP documentation supplied with the disc. (If the records are not available when the disc is to be reformatted, contact your HP customer engineer for assistance.)

CAUTION

> ***If the system disc (LU 2) and auxiliary disc (LU 3) are reformatted, the operating system is lost and the system will go down. This capability should be used only with the full and complete understanding of how to back up the disc using PSAVE and how to restore it using the off-line physical back-up utility RE.***

Any disc can be formatted, including the system disc and auxiliary disc. However, you must have a user capability of 60 (usually reserved for the system manager or other support personnel) before you can reformat the system discs, and the reformatting can only be done interactively. (Refer to the RTE-6/VM Terminal User's Reference Manual for a discussion of user capabilities.)

In reformatting discs other than LU 2 or LU 3, the following steps are recommended:

1. Use the FMGR SL command if needed to be sure that the disc is listed in your SST.

2. Use PSAVE or WRITT to back up all data from the disc to be reformatted.

3. Dismount the disc using the FMGR DC command and make sure no one is using the disc.

4. Reformat the disc using RE.

5. If the data is not to be restored, or if the data is to be restored using READT, use the IN function to spare bad tracks.

6. Use the SP function to individually spare those tracks identified as bad during preformatting prior to shipment from HP.

7. Mount the disc using the FMGR MC command.

8. Restore the data, if desired, using PRSTR or READT. If PRSTR is used with the VErify option, the IN function is not needed: the PRSTR VE option spares the tracks in a prepass before the data is written.

In reformatting LU 2 or LU 3, the following steps are recommended:

CAUTION

Do not use WRITT to back up LU 2 or LU 3. This utility only saves the FMGR area of the disc, not the system area.

1. Log on to an account with a user capability of 60. FORMT will issue the message "UNAUTHORIZED LU 2, 3 ACCESS" if your capability is less than or greater than 60.

2. Use PSAVE to back up all data from LU 2 and LU 3. Note that you should back up both LU 2 and LU 3 even though reformatting is required for only one of the system discs. After reformatting, the system will attempt to come back and the results will be unpredictable.

3. Halt all system activity. Failure to halt all activity when reformatting the system discs could cause FORMT to be swapped out onto the disc between reformats, and the utility would be lost.

4. Reformat LU 2 and LU 3. Note that RE functions only in interactive mode when reformatting the system discs.

5. Use the SP function to individually spare those tracks identified as bad during preformatting prior to shipment from HP.

6. Load the off-line physical back-up utilities as described in Chapter 6.

7. Restore LU 2 and LU 3 using the off-line RE command with the VErify option to spare bad tracks in a prepass over the disc prior to the restoration.

8. Re-boot the system.

Chapter 11
File Analysis Utilities

Introduction

The file analysis utilities FLAG and EXT work together to identify external references and specific character patterns in a source file. FLAG can use the HP-supplied patterns file, SEP.6, that contains a list of all FMP, EXEC, and system library routines that can be called. EXT can be used to customize or create a patterns file for FLAG.

Patterns File

The patterns file SEP.6 can be easily edited to include entry point names from other system libraries and subsystems, or specific declarations and variables occurring in a source file.

You also can create application-specific patterns files. The words in the patterns file may contain any printable characters to a maximum of 16 characters, with one word to a line. Refer to the EXT discussion for the file format. (Note that unsorted patterns files are compared more efficiently than sorted files.) Comments can be included in the patterns file by entering an asterisk (*) in the first column of the line.

FLAG

The pattern-matching utility FLAG searches one or more source files for words listed in the file SEP.6 (or a custom patterns file) and flags all matches. The matches found are listed to your terminal, or to an output file if the -O option is specified in the command line.

Run FLAG with the command line:

```
[RU,]FLAG,pfile[,-options],sfile[,...]
```

where:

pfile	is the name of the patterns file, either SEP.6 or your custom patterns file.
sfile	is the source file name or names to be searched for matches.

-options can be any combination of the following:

C For each word matched, print the count of lines that contain a match.

K Make case significant in determining a match. By default, case is not significant (i.e., a = A or a).

M Print the source file name at the beginning of each output line. This is the default when more than one source file is specified.

N Print the line number of each matched line at the beginning of the output line.

V Verbose mode. Print all lines in the file with line numbers. Flag matches in lines and print a summary of matches for each pattern. (The summary is identical to that given with the C option.)

PBFA Language options. (Pascal, BASIC, FORTRAN, Assembler.) All source files specified following a language option are assumed to contain code in that language, until the next language option is specified. The purpose of this option is to cause FLAG to ignore all material in the comment fields. FLAG does not verify the actual language of the source; it only checks for the comment character associated with the language specified by the option. If no language option is specified, FLAG searches all material in the source file.

Ofile Specifies file as the output file, instead of your terminal. The file name must immediately follow the O option letter; a space may not be used. If the options are grouped, the O option must be the last member of the group.

All options or option groups must be preceded with a dash. The first argument without a leading dash is interpreted as the patterns file name; all following arguments without a leading dash are interpreted as the source file names. The options are order independent and can be placed anywhere in the command line. However, the language option must precede the associated source file or files. As an example, the command line

```
FLAG,-KV,SEP.6,-OAFLG,-P,&MUTWN::MR,&RUTWN::MR,-F,&STING::JT
```

specifies that FLAG should ignore comments in the Pascal source files &MUTWN::MR and &RUTWN::MR and the FORTRAN source file &STING::JT. Options -KV specify that case is significant in matching a pattern (K), and that the output is to be all lines of the file with matches flagged (V). The -O option names AFLG as the output file. The output file option O could also be grouped with the other named options, as the last member of the group (as -KVOAFLG,).

Examples

In the following example, FLAG is called to run in Verbose mode (-V) and to disregard all comment lines in the FORTRAN file &STING::JT (-F). The Verbose mode output is a listing of all lines of the file to the output file AFLG (-O option) with each matched pattern flagged, as (using the example output):

```
5>>         vvvvv
 >>    LU = LOGLU(Z)
 >>
```

A summary count of the matched patterns follows the program file listing.

```
FLAG,-VFOAFLG,SEP.6,&STING::JT

Flag/1000                8:56 PM MON., 15 AUG., 1983
Version 2.2              &STING::JT
    1            PROGRAM STING
    2            IMPLICIT INTEGER (A-Z)
    3            DIMENSION BUFR1 (40)
    4            DIMENSION BUFR2 (40)
    5>>               vvvvv
     >>          LU = LOGLU(Z)
     >>
    6  C       GET THE RUN STRING
    7>>               vvvvv
     >>          CALL EXEC (14,1,BUFR1,40)
     >>
    8            WRITE (LU,1) BUFR1
    9  100       FORMAT ("EXEC14= ",40A2)
   10  C       GET THE PARAMETER STRING WITH GETST
   11>>               vvvvv
     >>          CALL GETST (BUFR2,40 TLOG)
     >>
   12            WRITE (LU,2) BUFR2
   13>>               vvvvv
     >>200       FORMAT("GETST= ",40A2)
     >>
   14            END

Flag/1000 Summary>>4 words flagged in &STING::JT

     EXEC>>1
     GETST>>2
     LOGLU>>1
```

In the following example, FLAG is called using only the -F language option. The output, defaulted to the terminal, is a summary of the patterns flagged, together with the line of code in which they were found. The comment line reference to GETST is ignored (see the full program listing in the first example).

```
FLAG,SEP.6,-F,&STING::JT
   LOGLU>>          LU = LOGLU(Z)
   EXEC>>           CALL EXEC (14,1,BUFR1,40)
   GETST>>          CALL GETST (BUFR2,40 TLOG)
   GETST>>200       FORMAT("GETST= ",40A2)
```

In the following example, FLAG is called with the -N option, but without the language option. The output, defaulted to the terminal, is a list of the patterns flagged (including the comment line reference to GETST), the related line of code, and the code line number.

```
FLAG,SEP.6,-N,&STING::JT
   5>LOGLU>>          LU = LOGLU(Z)
   7>EXEC>>           CALL EXCEC (14,1,BUFR1,40)
   10>GETST>>C        GET THE PARAMETER STRING WITH GETST
   11>GETST>>         CALL GETST (BUFR2,40 TLOG)
   13>GETST>>200      FORMAT("GETST= ",40A2)
```

In the following example, FLAG is called with the -F language option to search two source files for matches. Because two source files are specified, the -M (print source file name) is automatically invoked. In this example the file &NULL::JT does not match any entries in the patterns file SEP.6, as noted in the output.

```
FLAG,-F,SEP.6,&STING::JT,&NULL::JT
   &STING::JT>LOGLU>>          LU = LOGLU(Z)
   &STING::JT>EXEC>>           CALL EXEC (14,1,BUFR1,40)
   &STING::JT>GETST>>          CALL GETST (BUFR2,40 TLOG)
   &STING::JT>GETST>>200       FORMAT("GETST= ",40A2)

   Flag>>no words matched in &NULL::JT
```

Loading FLAG

Flag is loaded with the following load command sequence:

```
OP,LB
LI,=PLIB
RE,=FLAG
LI,$VMCLB
EN
```

Because FLAG uses EMA, it must run as large background in a mother partition. If not sized as part of the load command sequence or assigned to a specific partition before running, it will run in the largest available mother partition.

EXT

EXT searches a relocatable input file, finds external references, and lists them to your terminal or to an output file if one is specified in the command line. You can use the BREAK key on your terminal to halt the output listing at any time.

Run EXT with the command line

```
EXT[,-options],srcfile[,outfile]
```

where:

srcfile — is the relocatable (type 5) file to be searched for external references.

outfile — is the file to accept the external references found by EXT. If this file exists, the externals are appended to it unless the replace (-R) option is specified. If the file does not exist, EXT creates it.

-options — can be any of the following:

- C — Condense the output list: separate the pattern words with spaces instead of putting them on separate lines. This option is useful when the output is to your terminal.
- Lnnn — Lengthen the output line to nnn characters. The default and minimum is 80; the maximum is 134. This option is useful when the output is to your terminal, and forces the C option.
- Snn — Scroll the output nn lines at a time. The default is 22. Use -S0 for continuous printing without prompting. This option is useful when the output is to your terminal.
- N — Include the name of the routine (the nam record) in which the externals are found.
- T — Identify entry point and external names.
- V — Verbose mode. Provide all of the informaiton given with the C, N, and T options.

R — Replace (overwrite) the output file if it exists, instead of appending to it.

Efile — Send error messages to the named file. If the file already exists, the error messages are appended to it; if it does not exist, EXT creates it. If this option is omitted, error messages are displayed on your terminal.

Ffile — In searching srcfile, find only the externals in the named patterns file.

Ifile — In searching srcfile, ignore the externals in the named file. This file should have the same structure as the patterns file.

If neither a patterns file nor an ignore file is named, EXT prints all externals in the source file. If both a patterns file and an ignore file are specified, EXT prints all externals in the source file that are named in the patterns file, less the externals in the ignore file.

Options are specified with a leading dash, and can be placed anywhere in the command line. EXT interprets the first argument without a leading dash as the source file name; the second, if specified, is interpreted as the output file name. The options can be specified singly or in a group, except that any option requiring a file name must be specified last in the group. The file name must immediately follow the E, F, or I option letter; a space may not be used. As an example, either of the two following command lines could be used to run EXT in verbose mode on the source file $BHLIB, scrolling the output 11 lines at a time to your terminal screen, and finding patterns from the file IMAGES::JT:

```
EXT,-VS11FIMAGES::JT,$BHLIB

EXT,$BHLIB,-V,-S11,-FIMAGES::JT
```

Output Formats

If you are using EXT to create or modify a patterns file for FLAG, run the utility with no output format options (i.e., do not specify the C, N, T, or V options).

No Options

Running EXT with no format options produces the following output. Note that the output is not sorted; this is the most efficient form for comparing files for matching (using FLAG).

```
EXT,$BHLIB
    .MPY
    .DIV
    .ENTR
    CBYTE
    LBYTE
    MINO
    .ENTR
    .MBT
    .SBT
    CRETS
    CLOSE
      :
    WRITF
    LOCF
    PURGE
    RUN
    .ENTR
    IDRPD
```

-C Option

The -C option output is the unsorted listing in condensed form, where information is separated with spaces rather than appearing on separate lines.

```
EXT,-C,$BHLIB
 .MPY     .DIV     .ENTR    CBYTE    LBYTE    MINO
 .ENTR    .MBT     .SBT     CRETS    CLOSE    WRITF    LOCF     PURGE    RUN
 .ENTR    IDRPD    RP       NAMR     EXEC     IDGET    RMPAR
 .DIV     .ENTR    .GOTO    BLT      FSTAT    RDDIR    LBYTE
 .MPY     .ENTR    EXEC     ISHFT    CLUCR    NAMRT
 .DIV     .ENTR    SBYTE    WTREC
   :
 LOGLU
 .ENTR    EXEC     OPEN     CREAT    CLOSE    WRITF    LOCF     FMGR     .MVW
 LOGLU
 EXEC     .LBT     .SBT
 NAMR     .ENTR    .MVW
 .ENTR    .LBT
 .ENTR    .SBT
```

-T Option

The -T option output is the unsorted listing with each external and entry point identified.

```
ext,$bhlib,-t
  ent: KYWDS
  ent: .MPY
  ext: .DIV
  ext: .ENTR
  ext: CBYTE
  ext: LBYTE
  ext: MINO
  ext: FMGR
  ext: .ENTR
  ext: .MBT
  ext: .SBT
       .
       .
       .
  ext: LUTRU
  ext: RDACT
  ext: MOD
  ext: ISHFT
  ext: MBYTE
  ext: SBYTE
```

-N Option

The -N option identifies the routine in which each external/entry point is found. The heading is the nam record, which gives the routine type and priority (n,nn), its size, and other information that can vary from routine to routine.

```
EXT,-N,$BHLIB
    KYWDS (7,99) 2024 WHH Keyword table searcher
     149 words
     .MPY
     .DIV
     .ENTR
     CBYTE
     LBYTE
     MINO
```

```
FMGR (7,99) 2023 WHH FMGR runner
 346 words
 .ENTR
 .MBT
 .SBT
 CRETS
 CLOSE
 WRITF
 LOCF
 PURGE
 RUN

WILD (7,99) 2023 WHH Wildcard evaluator)
 913 words
 .DIV
 .ENTR
 .GOTO
 BLT
 FSTAT
 RDDIR
 LBYTE
 .
 .
 .
GETGU (7,99) 2023 WHH Get group and user ID
 26 words
 $ESTB
 .ENTR

TYPER (7,99) 2017 WHH Text typer
 235 words
 EXEC
 .ENTR
 REIO
```

-V Option

The -V option provides all of the information included in the -N option and the -T option for each routine, using the -C option format.

```
EXT,$BHLIB,-V
    KYWDS (7,99) 2024 WHH Keyword table searcher
       149 words
       ent: KYWDS
       ext: .MPY    .DIV    .ENTR     CBYTE      LBYTE      MIN0

    RUN (7,99) 2023 WHH RUN command processor
       170 words
       ent: RUN
       ext: .ENTR   IDRPD   RP        NAMR       EXEC       IDGET     RMPAR
```

```
WILD (7,99) 2023 WHH Wildcard evaluator
   913 words
   ent: WILD
   ext: .DIV    .ENTR   .GOTO     BLT        FSTAT      RDDIR     LBYTE

STDIO (7,99) 2023 WHH Standard I/O initialization
   81 words
   ent: STDIO   EXIT
   ext: .ENTR   EXEC    STDIN     STDOU      NAMRN      PRTN

      .
      .
      .

RDACT (7,99) 2023 WHH Account file reader
   370 words
   ent: RDACT
   ext: .ENTR   OPEN    READF

NAMRT (7,99) 2023 WHH NAMR typing routine
   20 words
   ent: NAMRT
   ext: .ENTR

NAMRN (7,99) 2023 WHH Get next NAMR parameter
   105 words
   ent: NAMRN
   ext: .ENTR   BLT     NXPAR     SBYTE      NAMRU
```

Loading EXT

Load EXT with the following load command sequence:

```
OP,LB
SZ,28
LI,=PLIB
LI,$VMCLB
RE,=EXT
RE,=AVL2
EN
```

If the SZ,28 command will not load EXT, try again with a smaller size.

Error Handling

EXT normally returns the value 0 in the FMGR 1P global. If an error occurs, EXT reports the non-zero value returned in 1P with an error message. A negative value indicates the corresponding FMP error A positive value is returned with one of the following error messages:

Ext: (1) Didn't recognize X,X options.

Ext: (2) Wrong file type for input <output><error><find><ignore>file NNN.

Ext: (3) Size EXT up, or use fewer entries in your find or ignore files.

The last message will appear only if EXT was loaded incorrectly, and indicates an internal table overflow. In all cases, EXT exits after issuing the message.

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M

N

O

P - Q

R

S

T

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X

Y - Z