

RTE Utility Programs

Reference Manual



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PREFACE

This manual describes the utility programs available as part of the Real-Time Executive (RTE) operating systems. As new utilities are added to the systems, they will be documented in this manual.

Anyone using these utilities should be familiar with the RTE operating system in which they are to be used. The RTE operating systems are described in the following manuals:

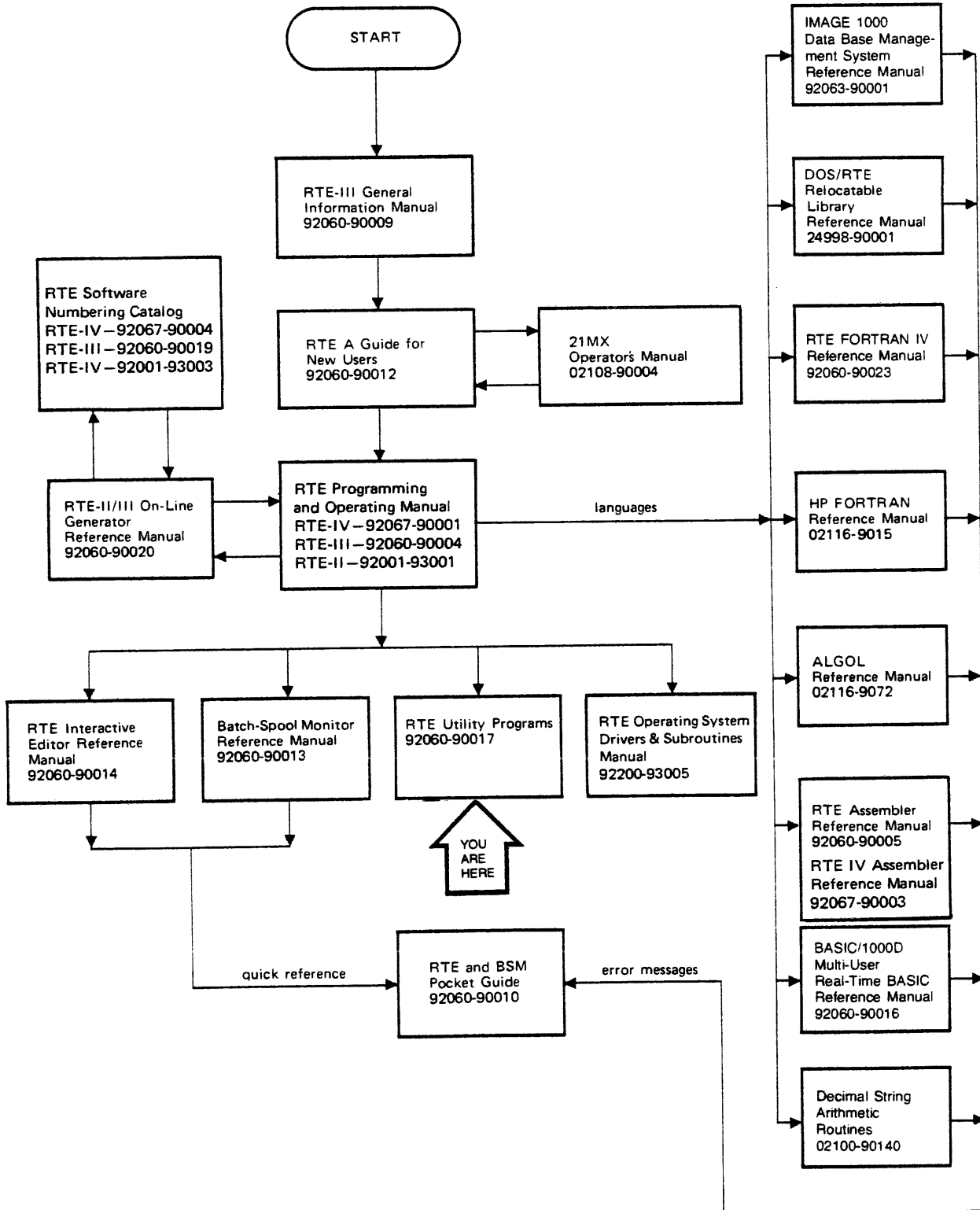
1. Real-Time Executive Memory-based Software System Programmer's Reference Manual (part number 92064-90002),
2. Real-Time Executive II Programming and Operating Manual (part number 92001-93001),
3. Real-Time Executive III Programming and Operating Manual (part number 92060-90004),
4. Real-Time Executive IV Programming and Operating Manual (part number 92067-90001).

Information on RTE operating system software part numbers and file names is contained in:

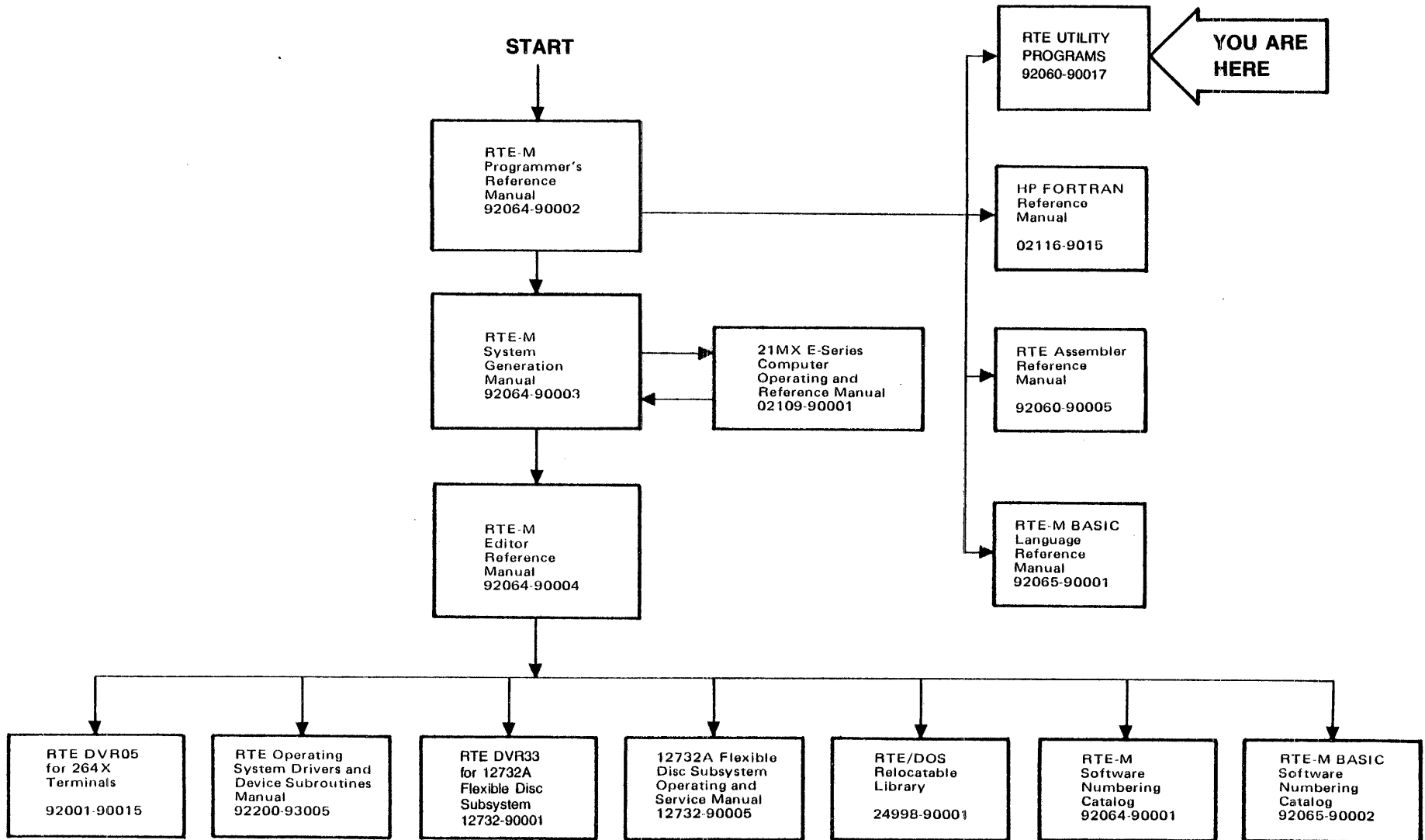
1. 92064A Software Numbering Catalog (part number 92064-90001) for RTE-M,
2. 92001B Software Numbering Catalog (part number 92001-93003) for RTE-II, and
3. 92060B Software Numbering Catalog (part number 92060-90019) for RTE-III.

Other manuals of interest to the RTE user are shown in the Documentation Maps following this preface.

DOCUMENTATION MAP



RTE-M DOCUMENTATION MAP



CONTENTS

Section I	Page	Keys — 2645A Soft Key Programming Utility	4-2
DISC BACKUP PROGRAMS		Initializing Keys	4-3
Introduction	1-1	Creating a Soft Key Command Set	4-4
On-Line Operations	1-4	Modifying a Soft Key Command Set	4-6
Loading the On-Line Utilities	1-4	Outputting a Soft Key Command Set	4-6
Buffer Size	1-5	Listing a Soft Key Command Set	4-7
Bad Tracks	1-5	Keys Program Messages	4-9
Protection Status	1-5	Guidelines	4-9
Format Compatibility	1-5	Soft Key Command Set Examples	4-10
Save	1-6	Soft Key Command Set Worksheet	4-12
Restore	1-8	KYDMP — 2645A Soft Key Command Set	
Copy	1-9	Dump Utility	4-14
On-Line Error Messages	1-10	Running KYDMP	4-14
Off-Line Operations	1-12	KYDMP Program Error Messages	4-15
Buffer Size	1-12		
Bad Tracks	1-12	Section V	Page
Protection Status	1-13	FLEXIBLE DISC BACKUP UTILITY	
Starting the Off-Line Utility	1-13	Description	5-1
Save	1-13	System Requirements	5-1
Restore	1-16	Loading and Initializing SAFD	5-1
Copy	1-17	Initializing SAFD	5-1
Initializing Discs	1-20	Using SAFD	5-2
Off-Line Error Messages	1-20	Saving a Flexible Disc	5-2
		Restoring a Flexible Disc	5-4
		Terminating SAFD	5-5
		Error Messages	5-7
Section II	Page		
DISC UPDATE PROGRAM		Section VI	Page
Required System Setup	2-1	LGTAT-TRACK ASSIGNMENT UTILITY	
Operation	2-1	Description of LGTAT	6-1
Mini Cartridge Tape Format	2-2	Program Requirements	6-1
		Loading LGTAT	6-1
		Running LGTAT	6-1
		Abbreviated LGTAT Output	6-2
		Complete LGTAT Output	6-2
Section III	Page		
THE WHZAT PROGRAM		Appendix A	Page
Description of WHZAT	3-1	DISC UTILITY MAGNETIC TAPE FORMAT	A-1
Running WHZAT	3-1		
WHZAT Output	3-1	Appendix B	Page
		UTILITY PROGRAM TYPES	B-1
Section IV	Page		
2645A SOFT KEY PROGRAMS			
Description	4-1		
Program Requirements	4-1		
Loading the Soft Key Utilities	4-2		

ILLUSTRATIONS

Title	Page	Title	Page
Mini Cartridge Format	2-2	Soft Key Command Set Listing Format	4-8
Directory Format	2-2	SAFD Save Examples	5-3
Program Status Mode (*RU,WHZAT, <i>lu</i>)	3-2	SAFD Restore Examples	5-6
Partition Status Mode (*RU,WHZAT, <i>lu</i> ,1)	3-4	Explanation of Entries in Track Assignment Table ..	6-2
Soft Key Label Display Format	4-3	Complete LGTAT Output	6-3

TABLES

Title	Page	Title	Page
Save-Restore Combinations	1-2	Off-Line Device Transfers	1-12
Utility Applications	1-3	Update Utility Software	2-1
On-Line Data Transfer Programs	1-4	Soft Key Utility Program Types and Priorities	4-2
Disc Configurations	1-6	Utility Program Types	B-1

DISC BACKUP PROGRAMS

SECTION

I

1-1. INTRODUCTION

You can use the disc backup utility programs to:

1. SAVE – transfer information from disc to magnetic tape.
2. RESTORE – transfer information from magnetic tape to disc.
3. COPY – transfer information from one disc to another.
4. VERIFY – check data after a save, restore, or copy operation.
5. INITIALIZE – initialize a disc cartridge.

These utilities are supported in RTE-II, RTE-III, RTE-IV and with the following devices:

- 7900, 7905, 7906 and 7920 disc drives
- 7970 (9 track) magnetic drive
- Consoles using drivers type DVR00 or DVR05

The program types are listed in Appendix B.

These data transfers can be performed in the following ways:

- A. On-line (under control of the RTE system). On-line data transfers occur in logical mode. That is, track addresses are relative to the first logical unit (subchannel) track. During a restore, only logical addresses are used.
- B. Off-line (stand alone). Off-line data transfers occur in physical mode. That is, the actual physical track addresses are used. A restored section on the destination disc will be an image of the saved section on the source disc.

There are three types of data transfers:

1. LU (Logical Unit) transfers: One logical unit (subchannel) is transferred. (Used on-line only.)
2. UNIT transfers: The entire disc drive (all data on the fixed and removable platters) is transferred. (Used off-line and on-line.)
3. FROM-TO transfers: You specify the starting track and the number of tracks to be saved or copied. Whatever was saved on tape is transferred during a restore. (Used off-line only.)

Any kind of an on-line save can be restored off-line. Table 1-1 shows the permitted save-restore combinations. For off-line data transfers, data must not be transferred between a 7900 disc and any other "non-7900" disc. Data saved off-line cannot be restored on-line. If such a restore is attempted, the utility prints OFF-LINE SAVE, CANNOT BE RESTORED ON-LINE and aborts.

Table 1-1. Save-Restore Combinations

RESTORE SAVE	ON-LINE		OFF-LINE
	LU	UNIT	
On-Line LU	X		X
On-Line UNIT		X	X
Off-Line UNIT			X
Off-Line FROM-TO			X

During a save or restore operation, you can specify which file (1 to 8) is to be used on your magnetic tape. The default is file number one. If end-of-tape is detected, the utility prints the message EOT REACHED, MOUNT NEW TAPE. Mount another tape and restart the program. The utility writes a header record on the new tape and continues saving data.

Any of the utilities can be aborted by typing AB in response to a question asked by the program. When a question requires a yes or no response, a reply with YE as the first two characters is interpreted as yes, AB is interpreted as abort, and all other letters are treated as no.

Both the on-line and off-line backup utilities can be used for many purposes; some general, others highly specific to a particular application. Table 1-2 contains a description of some of these functions. Although not comprehensive, it may be helpful in illustrating what to use, and when.

Table 1-2. Utility Applications

FUNCTION	MODE		ON-LINE	OFF-LINE
	TYPE			
SAVE	LU		Saves all tracks on one sub-channel (not just FMGR files). Off-line restore will do track sparing.	NA
SAVE	UNIT		No need for track map table information if track sparing. If you restore off-line you can get track sparing.	Can define track map table with any # of subchannels (like multiple LU saves). Can get track sparing.
SAVE	FR-TO		NA	Saves all tracks within specified bounds. Bounds need not fall at subchannel divisions.
RESTORE	LU		Restore all tracks on one sub-channel without shutting down system.	On-line LU save can be restored off-line. Track sparing is done.
RESTORE	UNIT		For peripheral disc units, you can restore without shutting down system.	Only way to restore a UNIT save containing LU2 or LU3. On-line UNIT save can be restored off-line to get track sparing.
RESTORE	FR-TO		NA	Restore tracks designated by a FR-TO save.
COPY	LU		For fast backup of disc LU's if no magnetic tape unit is available.	NA
COPY	UNIT		Backup with multiple disc drives if no magnetic tape unit is available.	Disc unit backup with multiple disc drives if no magnetic tape unit is available. Also to initialize cartridges with track sparing (disc diagnostics must be performed prior to this utility to insure successful initialization).
COPY	FR-TO		NA	For disc backup (see on-line LU copy).

NA — Not Available

1-2. ON-LINE OPERATIONS

You can perform either UNIT or LU transfers on-line by running SAVE, RSTOR, or COPY. Because the transfer of data is done in a logical mode, the formats of the source and destination discs do not have to be the same. You transfer data between devices using the programs named in Table 1-3.

Table 1-3. On-Line Data Transfer Programs

DESTINATION \ SOURCE	7900	7905/7906/7920	TAPE
7900 Disc	COPY	COPY	SAVE
7905/7906/7920 Disc	COPY	COPY	SAVE
Magnetic Tape	RSTOR	RSTOR	none

CAUTION

If you want an exact duplicate of a disc from an on-line transfer, you must run the utilities while there is no other system activity affecting the disc. The utility programs do not check if anyone else is using the disc concurrently. For example, if an open File Manager file is saved, it will be open when restored.

On-line utilities do not allow logical units 2 or 3 (system discs) to be used as destination subchannels during restore or copy operations. If this is attempted, the utility program prints DEST SUBCHNL IS LU2 OR LU3 and aborts.

You can specify that the transferred data is to be verified after completion of any of the three operations. Verification is done by reading corresponding records from the source and destination devices and making a word by word comparison. The verify program is scheduled by SAVE, RSTOR, or COPY.

When the source data is on logical units 2 and 3, only protected tracks and File Manager tracks are verified.

If data does not verify, the error message VERIFY ERROR AT TRACK *ttt* & LU# *ll* is printed.

1-3. LOADING THE ON-LINE UTILITIES

The on-line utility programs are distributed to you as four relocatable programs and a library of relocatable subroutines. The utilities can be loaded either during system generation or by LOADR.

If you load the disc backup utility programs into an RTE-III or RTE-IV system during generation, you must override the program size and increase the partition size as follows:

Program	2048 word buffer	6144 word buffer
SAVE	7 pages	11 pages
RSTOR	8 pages	12 pages
COPY	7 pages	11 pages
VERFY	7 pages	15 pages

For RTE-II systems, the minimum background area is 5600 words for SAVE and COPY, and 6300 words for RSTOR. Add 4100 words for 6144 word buffer without verify. For 6144 word buffer with verify, the minimum background area is 13400 for all three utilities.

To load the program on-line in an RTE-II or RTE-III system, move the utility program to the LG area and run LOADR. For RTE-III, the program sizes given above must be specified in the *fmt* parameter (parameter 4) of the RU,LOADR command. Satisfy undefined externals by moving the on-line utility library into the LG area and using GO,LOADR with options (GO,LOADR,2,,1 is recommended).

To load the program on-line in an RTE-IV system, perform the following steps:

1. use the LOADR SZ command to specify the program size as per the information above.
2. relocate the program module using the LOADR RE command.
3. search the on-line utility library %DBKLB with the LOADR SE command.

1-4. BUFFER SIZE

If the partition size in which a utility runs is not large enough to hold a 2048 word buffer (1/3 of a track), the program prints PARTITION SIZE TOO SMALL and aborts. If there is enough memory in the utility's partition to hold a 6144 word buffer (a full track) but not enough memory in VERIFY's partition to hold two 6144 word buffers, the program prints WARNING-PARTITION SIZE TOO SMALL FOR VERIFY W/6144 WORD BUF. In either case, you have the option to choose a 6144 word buffer by answering YES to 6144 WORD BUFFER DESIRED? (You should reply NO if the warning was printed and you want the data to be verified.) If VERIFY is not defined or its partition size is not large enough to hold two 2048 word buffers, the message WARNING-VERIFY NOT DEFINED OR PARTITION SIZE TOO SMALL is printed.

For restore, if the save was done with the larger buffer size and the partition cannot hold the 6144 word buffer, the restore utility prints PARTITION SIZE TOO SMALL and aborts. In this case, you can only restore data off-line.

1-5. BAD TRACKS

Each utility attempts up to ten retries when a read or write operation is unsuccessful. If the retries are all unsuccessful, the program prints DISC ERROR AT FOLLOWING TRCK & LU# followed by the track and logical unit numbers. The utility then aborts.

1-6. PROTECTION STATUS

Your system may have disc tracks which have been protected — data cannot be written on them if the write protect switch is on. (These tracks usually contain system information.) During a save, the protection status for each track is recorded. When the information is restored on-line, the protection status of a destination track cannot be modified. (The program prints WARNING-WRITING ON PROTECTED TRCKS if data is written on protected tracks during a restore or copy.) Because of this, on-line restore and copy using the system sub-channel (LU 2) as the source is not recommended. Only during an off-line restore or copy can the protect status bit be set for each track. This insures: 1. the entire system is protected, 2. all system tracks can be verified, and 3. no tracks are wasted.

1-7. FORMAT COMPATIBILITY

If a track map table is not defined for a source or destination disc unit, the utility program prints FOLLOWING TRACK MAP TABLE NOT FOUND followed by \$TB31 for 7900 discs or \$TB32 for discs other than 7900.

LU RESTORE OR COPY. When logical unit 2 is the source LU, the destination LU must have exactly the same number of tracks. For any other source LU's, the number of tracks in the destination subchannel must be greater than or equal to the number of tracks in the source subchannel.

UNIT RESTORE OR COPY. When logical unit 2 is part of the source unit, the destination unit must have a matching track map format. Otherwise, the copy and restore utilities map each source subchannel to a destination subchannel with at least as many tracks. If a destination or source subchannel is not assigned a logical unit number, the utility prints ASSIGN LU# TO FOLLOWING SUBCHNL followed by the subchannel number, then suspends itself. Assign an LU number with the LU command and restart the utility with the GO command.

When disc formats are not compatible, the program prints SOURCE & DEST TRACK MAP INFO NOT COMPATIBLE and aborts.

NOTE

The on-line disc backup utilities require an RTE-II or RTE-III operating system with a date code of 1604 or later when a buffered magnetic tape device is being used. (If you have an earlier system, unbuffer the magnetic tape device when using on-line utility programs.)

Table 1-4. Disc Configurations

DISC TYPE	RANGE OF	NO. TRACKS	PLATTER NO.		
7900		1-203	0-1		
DISC TYPE	RANGE OF	CYLINDER NO.	NO. OF TRACKS	NO OF SURFACES	HEAD NO.
7905		0-410	1-1233	1-3	0-2
7906		0-410	1-1644	1-4	0-3
7920		0-822	1-4115	1-5	0-4

1-8. SAVE

To run the save utility, use the RU or ON command. For example,

RU,SAVE,console,type,source,destination[,disc]

where

console logical unit number (LU) for operator console. Default is 1 or the LU provided by the multi-terminal monitor.

type type of save: 0 for LU save (default), 1 for UNIT save.

source source subchannel LU (LU save, no default) or source disc drive unit (UNIT save, default = 0).

destination destination magnetic tape LU. Default is 8.

disc source disc type (UNIT save only). Refer to Table 1-4.

If a parameter is not acceptable, SAVE prints an appropriate error message (see section 1-10) and asks for a new value. The first question the program asks is whether you want a 6144 word buffer. If there is adequate room, SAVE asks if you want verification. The utility prompts for a file ID (a 72 character string written on the magnetic tape's header record) and the file number where the information is to be stored (a number from 1 to 8). The program then performs the operations you specified, printing a STOP message when done.

Here are sample runs. The first is an LU save, the second a UNIT save.

```
:RU,SAVE,,10,8
WARNING-PARTITION SIZE TOO SMALL FOR VERIFY W/ 6144 WORD BUF
6144 WORD BUFFER DESIRED? (YES/NO)
NO
VERIFY? (YES/NO)
YES
FILE ID?
7900 LU 10 SAVE
FILE#?
2
VERIFYING
  VERIFY : STOP    0000
  SAVE   : STOP    0000
```

```
:RU,SAVE,,1,0,8,7900
WARNING-PARTITION SIZE TOO SMALL FOR VERIFY W/ 6144 WORD BUF
6144 WORD BUFFER DESIRED? (YES/NO)
YES
FILE ID?
7900 UNIT 0 SAVE (LU2, LU10)
FILE#?
1
  SAVE   : STOP    0000
```

1-9. RESTORE

To run the restore utility, use the RU or ON command. For example,

```
RU,RSTOR,console,type,source,destination[,disc]
```

where

console	operator console LU. Default is 1 or the LU provided by the multi-terminal monitor.
type	type of restore: 0 for LU restore (default), 1 for UNIT restore. Must match type of save.
source	source magnetic tape LU. Default is 8.
destination	destination subchannel LU (LU restore, no default) or destination disc drive unit (UNIT restore, default=0).
disc	destination disc type (UNIT restore only). Refer to Table 1-4.

If a parameter is not acceptable, RSTOR prints an appropriate error message (see Section 1-10) and asks for a new value. The first question the restore program asks is the file number (1 to 8) on your magnetic tape. After you enter the number, the program prints the file ID of that file and asks if it is the correct one. If you answer no, RSTOR suspends itself so you can mount another tape. After restarting the program with GO,RSTOR, you are asked for the file number again. Once the correct file is found, you are asked whether you want the data verified. If the type of restore does not match the type of save (recorded in the tape file's header record), RSTOR aborts. Otherwise program restores the data and prints a stop message when it is done.

Here are examples of an LU restore and a UNIT restore:

```
:RU,RSTOR,,,8,28
FILE#?
1
FILE ID:
7900 UNIT 0 SAVE (LU2, LU)0)
TAPE#: 01
OK? (YES/NO)
NO
RESTART RSTOR BY ENTERING 'GO,RSTOR'
  RSTOR : PAUSE 0000
*GO,RSTOR
FILE#?
2
FILE ID:
7900 LU 10 SAVE
TAPE#: 01
OK? (YES/NO)
YES
VERIFY? (YES/NO)
YES
VERIFYING
  VERIFY : STOP 0000
  RSTOR : STOP 0000
```

```

:RU,RSTOR,,1,8,1,7900
FILE#?
1
FILE ID:
7900 UNIT 0 SAVE (LU2, LU10)
TAPE#: 01
OK? (YES/NO)
YES
WARNING-PARTITION SIZE TOO SMALL FOR VERIFY W/ 6144 WORD BUF
RSTOR : STOP 0000

```

1-10. COPY

To run the copy utility, use the RU or ON commands. For example,

```
RU,COPY,console,type,source,destination
```

where

console	operator console LU. Default is 1 or the LU provided by the multi-terminal monitor.
type	type of copy: 0 for LU copy (default), 1 for UNIT copy.
source	source subchannel LU (LU copy, no default) or source disc drive unit (UNIT copy, default=0).
destination	destination subchannel LU (LU copy, no default) or destination disc drive unit (UNIT copy, default=0).

If a parameter is not acceptable, COPY prints an appropriate error and asks for a new value. The first question the program asks is whether you want a 6144 word buffer. If there is adequate room, the program asks if you want verification. If you specified an LU copy, you are asked the types (refer to Table 1-4) of the source and destination discs. If the disc track maps are compatible and you are not writing on system discs (LU 2 or 3), the operations are performed and a stop message is printed.

Here are examples of an LU and a UNIT copy:

```

:RU,COPY,,,2,10
WARNING-PARTITION SIZE TOO SMALL FOR VERIFY W/ 6144 WORD BUF
6144 WORD BUFFER DESIRED? (YES/NO)
YES
COPY : STOP 0000

```

```

:RU,COPY,,1,0,0
WARNING-PARTITION SIZE TOO SMALL FOR VERIFY W/ 6144 WORD BUF
6144 WORD BUFFER DESIRED? (YES/NO)
YES
DISC TYPE FOR SOURCE DISC UNIT?
7900
DISC TYPE FOR DEST DISC UNIT?
7905
COPY : STOP 0000

```


1-11. ON-LINE ERROR MESSAGES

Message	Meaning and Action
PARTITION SIZE TOO SMALL	The partition in which the utility program is running cannot hold a 2048 word buffer. The partition size must be 5500 words or more for SAVE and COPY, 6000 words or more for RSTOR. The program is aborted.
WARNING-PARTITION SIZE TOO SMALL FOR VERIFY W/6144 WORD BUF	The partition in which the utility program is running cannot hold two 6144 buffers. If you want to verify your data, do not specify the larger buffer.
FOLLOWING DISC LU# IMPROPER, ENTER AGAIN	The logical unit number specified is invalid — it does not belong to a valid disc type. Enter the correct disc LU#
FOLLOWING DISC DRIVE# IMPROPER, ENTER AGAIN	The disc drive (unit number) is invalid. For 7900 discs, enter a number between 0 and 3. For discs other than 7900 enter a number between 0 and 7.
FOLLOWING DISC TYPE IMPROPER ENTER AGAIN	Invalid disc type specification (refer to Table 1-4). Enter the correct type.
IMPROPER MT LU#, LU#=?	The magnetic tape logical unit number is invalid. Enter a new value.
NO WRITE RING, WRITE ENABLE MT	The write ring is missing from the magnetic tape during a save operation. Put the write ring on and restart the utility with the GO command.
IMPROPER FILE#	The magnetic tape file number is not between 1 and 8. Enter a new value.
FILE NOT FOUND	The file number specified is greater than the number of files on the magnetic tape. Mount another tape, if necessary, and restart the utility with the GO command. Specify the correct file number.
EOT REACHED, MOUNT NEW TAPE	The entire magnetic tape has been read. Mount the next tape and restart the utility with the GO command.
FOLLOWING TRCK MAP TBL NOT FOUND	The entry point for the table describing the track map information (\$TB31 for 7900 and \$TB32 for discs other than 7900) for the source or destination disc unit cannot be found. The utility is aborted.
ASSIGN LU# TO FOLLOWING SUBCHNL	The indicated subchannel is defined in the track map table but is not assigned an LU number. Assign an LU number with the LU command and restart the utility with the GO command.

Message	Meaning and Action
SOURCE & DEST TRACK MAP INFO. NOT COMPATIBLE	One of the conditions described under Format Compatibility (section 1-6) is not satisfied. The program is aborted.
SAVE TYPE NOT SAME AS RESTORE TYPE	The type of restore is not the same as the type of save recorded in the file's header record. RSTOR is aborted.
OFF-LINE SAVE, CANNOT BE RESTORED ON-LINE	The data was saved off-line and cannot be restored on-line. RSTOR is aborted.
DEST SUBCHNL IS LU2 OR LU3	Logical unit 2 or 3 is the destination subchannel for an LU restore or copy operation, or is in the destination unit for a unit copy or restore operation. The utility is aborted.
WARNING-WRITING ON PROTECTED TRCKS	RSTOR or COPY is writing on protected tracks.
DISC ERROR AT FOLLOWING TRCK & LU#	The number of words actually transferred is not equal to the number of words requested to be transferred to or from the disc. The utility is aborted.
SAVE WAITING FOR MT LU LOCK RSTOR WAITING FOR MT LU LOCK	SAVE or RSTOR is waiting to lock the mag tape LU. Operation will continue when the magnetic tape LU is locked.
MISSING REC FOR FOLLOWING TRCK & LU#	During a restore operation a record was missing on magnetic tape. The utility is aborted.
WARNING-VERFY NOT DEFINED OR PARTITION SIZE TOO SMALL	The verify program is not defined or its partition is not large enough. You cannot verify your data.
VERIFY ERROR AT TRCK <i>ttt</i> & LU <i>ll</i>	Data read from or written to the given track location does not verify. The utility continues.
SAVE ABORTED RSTOR ABORTED COPY ABORTED	The utility program has been aborted because of one of the conditions listed above.
??	Carriage return prior to input or input device has timed out waiting for a response. Re-enter input.
IMPROPER TRCK MAP INFO	Subchannels for source or destination disc unit not defined in the track map table. The utility is aborted.

1-12. OFF-LINE OPERATIONS

You can perform UNIT and FROM-TO transfers off-line.

Because data transfer is done in a physical mode, data transfer cannot be done between a 7900 disc and a disc other than 7900. You can use the off-line utility to perform transfers between devices as shown in Table 1-5.

CAUTION

It is your responsibility to insure disc types are the same.

Table 1-5. Off-Line Device Transfers

DESTINATION SOURCE	7900	7905/7906/7920	TAPE
7900 Disc	X		X
7905/7906/7920 Disc		X	X
Magnetic Tape	*	**	

*data must have been saved from 7900

**data must have been saved from a disc other than 7900

The off-line disc backup utility program requires a minimum of 24000 words of memory.

1-13. BUFFER SIZE

During save and copy operations, you have the option to choose either a 2048 or 6144 word buffer size. During a restore operation, the buffer is the same size as that of the saved data.

1-14. BAD TRACKS

Whenever bad tracks are detected the message BAD TRACK AT: is printed, followed by the location of the track. For discs other than 7900, track sparing (spare tracks are used instead of bad tracks) occurs during the following operations: 1) Restore where the save was done on-line. 2) Unit save or copy with an HP DOS* source disc. 3) Unit save or copy with an RTE source disc and the track sparing option is chosen. When tracks are spared, the message SPARED TO: is printed, followed by the location of the spared track. Track sparing is not done for FROM-TO restore or copy operations.

*DOS (Disc Operating System) is another HP operating system for 2100 series computers.

1-15. PROTECTION STATUS

The protection status of each track is recorded as it is saved. When restoring an on-line or off-line save, the protection status of saved tracks is transferred to the corresponding restored tracks.

1-16. STARTING THE OFF-LINE UTILITY

To run the off-line utility, perform the following steps:

1. Load the utility program, !DSKUP, through the input device (paper tape reader, mini cartridge, etc.).
2. The utility is preconfigured for magnetic tape (MT), and consoles using driver DVR00 as follows:

Device	Select Code (Octal)
console	15
MT	23

Set the switch register to 0 if you want this configuration. If you want to reconfigure these I/O channels, set the switch register as follows:

bits 0-5	select code of console
bits 6-15	clear

Disc channels are not preconfigured. Discs (and magnetic tape if the switch register is not zero) are configured through dialogue with the utility program.

3. Set P-register to 2.
4. Press PRESET and RUN.

After you perform these steps, the program uses the system console to send messages and receive replies. Typing ?? in response to any prompt causes the utility to print all the valid responses to the question. (The valid responses will also be printed if you enter an invalid reply.) When the utility starts running, it prints a heading (DISC BACKUP UTILITY) and asks which task you want performed. Type SA (for save), RE (for restore), or CO (for copy).

1-17. SAVE

Refer to the sample below for the questions the utility program asks. The exact questions depend upon the type of save and type of disc. If the switch register is not zero, the program asks for the magnetic tape channel number. Reply with an octal value between 10 and 77. The source disc channel number is also an octal number between 10 and 77. The source disc type is one of those referenced in Table 1-4. The drive number is between 0 and 3 for 7900 discs or between 0 and 7 for discs other than 7900. The type of save is FR for FROM-TO and UN for UNIT.

For FROM-TO saves you must answer the following questions:

RTE OR DOS DISC? (discs other than 7900, discs for other than DOS enter RT)
Enter RT or DO.

FROM TRACK # ? (7900 only)

Enter a number between 0 and 202 specifying where the transfer begins.

FROM CYLINDER # ? (discs other than 7900)

Refer to Table 1-4 for appropriate values which will specify where the transfer is to begin.

OF TRACKS?

Indicate the number of tracks to be saved. For 7900 discs it must be between 1 and 203 minus FROM TRACK #. For DOS 7905 it must be between 1 and 200. Refer to Table 1-4 for information on the other RTE discs.

PLATTER # ? (7900 only)

Indicate which platter is to be saved: 0 for fixed platter or 1 for removable platter.

OF SURFACES? (discs other than 7900)

Type the number of surfaces to be saved (refer to Table 1-4).

STARTING HEAD # ? (discs other than 7900)

Enter the head number where save begins (refer to Table 1-4).

For UNIT saves you must answer these questions:

RTE OR DOS DISC? (discs other than 7900, discs for other than DOS enter RT)

Enter RT or DO.

WANT TRACK SPARING? (RTE discs other than 7900)

Reply YES or NO.

If you reply yes to track sparing, the program needs track map information for each subchannel. (See your system operating manual or generator manual for further information on track maps.) Enter four numbers separated by commas for each subchannel as shown in the second example below. The four values indicate the number of tracks (refer to Table 1-4), the cylinder at which the subchannel begins (refer to Table 1-4), the head number of the first track in the subchannel (refer to Table 1-4), and the number of surfaces the subchannel contains (refer to Table 1-4). Enter /E to terminate the subchannel prompts.

OF SUBCHNLS TO BE COPIED? (7905 DOS discs only)

Indicate the number of subchannels to be saved (1 through 3). The save operation starts with subchannel 0.

You next indicate whether you want a large buffer and if you want the data to be verified. The utility asks for the file number (1 to 8) on the magnetic tape where you want the data to be recorded. The FILE ID is a 72 character field written into the file's header record.

At this point the actual transfer of data begins. The switch register contains the relative track number being saved. When the transfer (and verification) is done, the utility prints TASK COMPLETED.

When the task has been completed or aborted, the program asks for another task. (You cannot reconfigure magnetic tape and console select codes.)

Here is an example of a FROM-TO save with a 7900 disc:

```
DISC BACKUP UTILITY
TASK?
SA
SOURCE DISC CHANNEL#?
21
SOURCE DISC TYPE?
7900
SOURCE DISC DRIVE#?
0
TYPE OF SAVE?
FR
FROM TRACK #?
0
# OF TRACKS?
100
PLATTER #?
1
6144 WORD BUFFER DESIRED?
YES
MT FILE#?
1
FILE ID?
7900 FROM-TO SAVE TRACKS 0-100 REMOVABLE PLATTER
VERIFYING
TASK COMPLETED
```

Here is an example of a UNIT save with a 7905 disc:

```
DISC BACKUP UTILITY
TASK?
SA
SOURCE DISC CHANNEL#?
27
SOURCE DISC TYPE?
7905
SOURCE DISC DRIVE#?
0
TYPE OF SAVE?
UN
RTE OR DOS DISC? (discs for other than DOS enter RT)
RT
WANT TRACK SPARING?
YES
ENTER TRACK MAP INFO FOR SOURCE DISC UNIT AS SHOWN BELOW
# TRKS, FIRST CYL #, HEAD #, # SURFACES
SUBCHNL 00?
203,0,0,2
SUBCHNL 01?
203,103,0,2
SUBCHNL 02?
203,206,0,2
SUBCHNL 03?
```

```
203,309,0,2
SUBCHNL 04?
400,0,2,1
SUBCHNL 05?
/E
6144 WORD BUFFER DESIRED?
YES
VERIFY?
NO
MT FILE#?
1
FILE ID?
7905 UNIT SAVE WITH TRACK SPARING
TASK COMPLETED
```

1-18. RESTORE

Refer to the restore example for the questions the utility program asks. The exact questions depend upon the type of restore and type of disc. If the switch register is not zero, the program asks for the magnetic tape channel number. Reply with an octal value between 10 and 77. For the magnetic tape file number, type a number from 1 to 8 indicating which file contains the data to be restored. The utility prints the identification information and the tape number (which should be 1) from the file's header record. If this is not the tape you want, don't answer YES to the OK? question. Instead, answer NO, mount a new tape, restart the utility by entering GO, and answer the questions again, beginning with MT FILE#?. When you get the right file mounted, the program asks for the destination disc channel number. Input an octal number between 10 and 77. The destination disc drive can be between 0 and 3 for 7900 discs or between 0 and 7 for 7905. (The disc type is read from the header record.)

If the restore is FROM-TO (the type of restore is read from the header record), the program asks these questions:

TO TRACK #? (7900 only)

Enter a number between 0 and 202 specifying where the transfer begins.

TO CYLINDER #? (discs other than 7900)

Refer to Table 1-4 to specify where the transfer begins.

PLATTER #? (7900 only)

Indicate which platter is to be restored. 0 for fixed platter or 1 for removable platter.

OF SURFACES? (discs other than 7900)

Type the number of surfaces to be restored (refer to Table 1-4).

STARTING HEAD #? (discs other than 7900)

Enter the head number where restore begins (refer to Table 1-4).

You can have the data verified by answering VERIFY? with YES.

After the dialogue is complete, the data transfer operation begins. The switch register contains the relative track number being restored.

If an end-of-tape occurs during the restore, the program prints the message EOT REACHED, MOUNT NEXT TAPE. Mount the next tape (tape number 2) and restart the utility by typing GO followed by a carriage return. (If tape 2 is read to the end, mount tape 3, etc.)

The switch register contains the relative track number being restored. When the transfer (and verification) is done, the program prints TASK COMPLETED.

When the task has been completed or aborted, the program asks for another task. (You cannot reconfigure magnetic tape and console select codes.)

Here is an example of a UNIT restore to a 7900 disc:

```
DISC BACKUP UTILITY
TASK?
RE
MT FILE#?
1
FILE ID:
7900 UNIT 0 SAVE (LU2, LU10)
TAPE#: 01
OK?
YES
DEST DISC CHANNEL#?
21
DEST DISC DRIVE#?
0
VERIFY?
YES
VERIFYING
TASK COMPLETED
```

1-19. COPY

Refer to the copy examples for the questions the utility program asks. The exact questions depend upon the type of copy and the type of disc. The source disc channel number must be an octal number between 10 and 77. Refer to Table 1-4 for a list of source disc types. The source disc drive number is between 0 and 3 for 7900 discs or between 0 and 7 for discs other than 7900. The type of copy is FR for FROM-TO and UN for UNIT.

For a FROM-TO copy you must answer the following questions:

RTE OR DOS DISC (discs other than 7900)
Enter RT or DO.

FROM TRACK #? (7900 only)
Enter a number between 0 and 202 specifying where the transfer begins.

FROM CYLINDER #? (discs other than 7900)
Refer to Table 1-4 for appropriate values which will specify where the transfer is to begin.

OF TRACKS?

Indicate the number of tracks to be copied. For 7900 discs it must be between 1 and 203 minus FROM TRACK #. For DOS 7905 it must be between 1 and 200. Refer to Table 1-4 for information on the other RTE discs.

PLATTER # ? (7900 only)

Indicate which platter is to be copied: 0 for fixed platter or 1 for removable platter.

OF SURFACES? (discs other than 7900)

Type the number of surfaces to be copied (refer to Table 1-4).

STARTING HEAD # ? (discs other than 7900)

Enter the head number where copy begins (refer to Table 1-4).

For a UNIT copy you must answer these questions:

RTE OR DOS DISC? (discs other than 7900)

Enter RT or DO.

WANT TRACK SPARING? (RTE discs other than 7900)

Reply YES or NO.

If you reply yes to track sparing, the program needs track map information for each subchannel. (See your system operating manual or generator manual for further information on track maps.) Enter four numbers separated by commas for each subchannel as shown in the second save example. The four values indicate the number of tracks (refer to Table 1-4), the cylinder at which the subchannel begins (refer to Table 1-4), the head number of the first track in the subchannel (refer to Table 1-4), and the number of surfaces the subchannel contains (refer to Table 1-4). Enter /E to terminate the subchannel prompts.

OF SUBCHNLS TO BE COPIED? (7905 DOS discs only)

Indicate the number of subchannels to be copied (1, 2, or 3). The copy operation starts with subchannel 0.

You next indicate whether you want a large buffer and if you want the data to be verified.

At this point the actual transfer of data begins. The switch register contains the relative track number being copied. When the transfer (and verification) is done, the utility prints TASK COMPLETED.

When the task has been completed or aborted, the program asks for another task. (You cannot reconfigure magnetic tape and console select code.)

Here is an example of a UNIT copy with 7900 discs:

```
DISC BACKUP UTILITY
TASK?
CO
SOURCE DISC CHANNEL#?
21
SOURCE DISC TYPE?
```

7900
SOURCE DISC DRIVE#?
0
TYPE OF COPY?
UN
DEST DISC DRIVE#?
1
6144 WORD BUFFER DESIRED?
YES
VERIFY?
YES
VERIFYING
TASK COMPLETED

Here is an example of a FROM-TO copy with 7905 discs:

DISC BACKUP UTILITY
TASK?
CO
SOURCE DISC CHANNEL#?
27
SOURCE DISC TYPE?
7905
SOURCE DISC DRIVE#?
0
TYPE OF COPY?
FR
RTE OR DOS DISC?
RT
FROM CYLINDER#?
0
OF TRACKS?
100
OF SURFACES?
2
STARTING HEAD#?
0
DEST DISC DRIVE#?
0
TO CYLINDER #?
50
OF SURFACES?
1
STARTING HEAD#?
2
6144 WORD BUFFER DESIRED?
YES
VERIFY?
NO
TASK COMPLETED

1-20. INITIALIZING DISCS

The off-line disc backup utility can be used to initialize discs. To insure successful initialization when using the off-line utilities to initialize, the disc must have been previously formatted and any bad tracks flagged by having run the appropriate disc diagnostic. If the cartridge had been previously formatted using the disc diagnostic, and initialized, it would be sufficient to do a UNIT COPY with track sparing using the same disc drive as source and destination drive to initialize it. In other words, you are reading and writing data onto the same place, however you are sparing according to the new track map (re-initializing). 7900 discs are initialized any time data is written on them. Only the portion of the disc that gets written on gets re-formatted. If a bad track is encountered, it is reported and the utility continues only if the user responds "YES" to the "CONTINUE" question. The off-line utility does not mark the bad track on the 7900 disc defective or take any other action. Discs other than 7900 are initialized doing a UNIT data transfer with track sparing requested. If only some subchannels on a particular disc need to be initialized (bad tracks spared) the track map table that is entered should define only these subchannels. Note: If bad tracks are encountered when reading from an uninitialized cartridge the utility aborts, otherwise bad tracks (if any) will be reported while reading data, continue to save because these bad tracks will be spared when writing.

1-21. OFF-LINE ERROR MESSAGES

Message	Meaning and Action
MT NOT READY	The magnetic tape is either off-line or busy. When it is ready, restart the utility by typing GO.
NO WRITE RING, WRITE ENABLE MT	The write ring is missing from the magnetic tape during a save operation. Put the write ring on and restart the utility by typing GO.
FILE NOT FOUND	The specified file number is greater than the number of files on the magnetic tape. Mount another tape, if necessary, and restart the utility by typing GO. Specify the correct file number.
EOT REACHED. MOUNT NEXT TAPE	The end of the magnetic tape has been detected. Mount the next tape and restart the utility by typing GO.
WARNING-SUBCHNLS ON SOURCE UNIT OVERLAP	discs other than 7900. The subchannels defined in the track map table for the source unit overlap. The utility assumes the number of spare tracks for the subchannel is 0.
IMPROPERLY DEFINED SUBCHNL	discs other than 7900. The specified subchannel is defined such that the starting head number plus the number of surfaces is greater than three. The utility is aborted.
READY DISC	The disc drive is not ready. Restart the utility by typing GO when the disc is ready.

Message	Meaning and Action
TURN OFF DISC PROTECT	The track is protected and the write protect switch is on. Turn off the disc protect switch and restart the utility.
TURN ON FORMAT SWITCH	The utility is formatting the disc, but the format switch is off. Turn it on and restart the utility.
LAST TRACK TOO LARGE	7900 discs only. The number of tracks specified in response to FROM TRACK # for FROM-TO save or copy is greater than 202. Re-enter the number of tracks.
BAD TRACK AT <i>loc</i> *	Ten tries have been made to read or write on the specified track without success. The location, <i>loc</i> , is printed.
SPARED TO <i>loc</i> *	A bad track has been spared to the indicated track location (<i>loc</i>).
CYLINDER COMPARE ERROR AT <i>loc</i> *	discs other than 7900. Ten tries have been made to recalibrate the disc. The program is aborted.
ILLEGAL SPARE AT <i>loc</i> *	discs other than 7900. During a read or a write without track sparing an illegal spare was found at the <i>loc</i> . The utility prints CONTINUE. If you respond YES, the transfer will continue. Otherwise it is aborted.
VERIFY ERROR AT <i>loc</i> *	The verify operation was unsuccessful at the specified track location. The utility continues.
OUT OF SPARE TRACKS FOR SUBCHNL	discs other than 7900. All spare tracks have been used up. The utility is aborted.
UNRECOVERABLE DISC ERROR-EOC OR SEEK CHECK	An end of cylinder or seek check error has occurred because the track map information is incorrect. The utility is aborted.

Message

Meaning and Action

WARNING-TRACK AT
FOLLOWING LOC WAS NOT
SAVED SUCCESSFULLY*

Restore only. The track about to be restored was not saved successfully. The utility continues.

WARNING-MEM SIZE TOO
SMALL FOR VERIFY W/6144
WORD BUF

The memory size is not large enough to hold two 6144 word buffers for a verify. If you want to verify your data, do not request the 6144 word buffer.

I/O ERR PE EQT #2

A parity error occurred on the magnetic tape. The utility must be reloaded.

I/O ERR NR EQT #2

The magnetic tape drive is not ready. The utility must be reloaded.

*The format of the track location (*loc*) depends on the type of disc. For 7900 discs, the location is printed in the form

TRACK# *tttt*, PLATTER# *pp*, UNIT# *u*

For 7905 discs the location is printed in the form

SBCHNL# *ss*, TRACK# *ttt*
CYL# *ccc*, HEAD# *h*, UNIT# *u*

The first line is not printed during UNIT transfers without track sparing or FROM-TO transfers (the track map table has not been defined).

DISC UPDATE PROGRAM

SECTION

II

The disc update utility program replaces files on a disc cartridge with files stored on a mini cartridge tape. You can use this utility to update RTE-II, RTE-III, or RTE-IV master software discs from a mini cartridge distributed by Hewlett-Packard, or you can produce your own mini cartridge to modify your own programs.

The utility consists of the files in table 2-1. Make sure they are loaded on your RTE master software cartridge before you try to run the utility. (Do not relocate the program RDNAM. &UPDAT does this for you.)

Table 2-1. Update Utility Software

NAME	DESCRIPTION
&UPDAT	Transfer File
&PKDIS	Transfer File
%RDNAM	File containing relocatable RDNAM

2-1. REQUIRED SYSTEM SETUP

The master RTE software disc to be updated must be a system or peripheral file manager cartridge with a cartridge reference number of 32767. All files to be updated must carry a security code of RT. The mini cartridge tape unit must be assigned to logical unit 5. There must be at least one blank ID segment in the system (for the program RDNAM).

2-2. OPERATION

Before execution of the update utility, the spool system must be shut down (if one is initialized on the RTE master software disc) and any type 6 files stored on the cartridge which have been restored by the RP command must be OF'ed. This is done so the disc can be packed. Otherwise an FMG-008 error will occur.

You start execution of the utility by entering the RTE command

```
*ON,FMGR,&U,PD,AT,RT,32767
```

(Note that &UPDAT is the transfer file, RT is the security code, and 32767 is the cartridge reference number.)

&UPDAT reads the mini cartridge directory into a file manager file named &DRCTY, then schedules LOADR to temporarily load the program RDNAM from the relocatable file named %RDNAM. RDNAM then reads the mini cartridge directory, purges the file names contained in the directory from the master disc, uses &PKDIS to pack the disc, and moves the files one-by-one from the mini cartridge to the master disc.

CAUTION

Because RDNAM purges old files before creating new files, you should maintain a backup RTE master software cartridge.

2-3. MINI CARTRIDGE TAPE FORMAT

HP mini cartridges (except diagnostics) are recorded in the following format. (If you create mini cartridges which will use this utility, they must follow this format.) Each mini cartridge contains the information shown in figure 2-1.

Directory	File 1	File 2	...	File n
-----------	--------	--------	-----	--------

Figure 2-1. Mini Cartridge Format

The directory is a file consisting of 127-word records whose format is shown in figure 2-2.

Words 1-3	4	5	6-127
File 1 Name	Type		Descriptive Title
File 2 Name	Type		Descriptive Title
⋮	⋮		⋮
File n Name	Type		Descriptive Title

Figure 2-2. Directory Format

The left half of the type (word 4) is an ASCII blank. The right half contains one of the following ASCII characters:

Type	Meaning
S	ASCII
R	Relocatable Binary
A	Absolute

Word 5 contains two ASCII blanks.

Because the directory contains all ASCII characters, you can list it on your 264X terminal in local mode.

THE WHZAT PROGRAM

SECTION

III

3-1. DESCRIPTION OF WHZAT

WHZAT is a Hewlett-Packard utility subroutine designed to display information about the current system environment. It operates in one of two modes the user selects when he runs the program. One mode displays all scheduled and suspended programs and their status (RTE-M, RTE-II/III, and RTE-IV). The other mode displays the status of all partitions in numeric sequence (RTE-M-III, RTE-III, and RTE-IV only). WHZAT's type must be one of the types specified for it in Appendix B.

3-2. RUNNING WHZAT

The parameters for running WHZAT are:

**RUN,WHZAT,lu,option*

Where:

lu the logical unit number of the device on which you want the information displayed. The default value is LU 1, the system console.

option indicates what you want displayed.
0 (the default value) will cause the status of scheduled and suspended programs to be displayed.

A non-zero value will cause the status of all partitions being used to be displayed (RTE-III and RTE-IV only).

Both parameters are optional. If you do not supply them, the status of scheduled and suspended programs is displayed on the system console.

In either mode, the information is preceded by a heading which includes the current system time and column headings. Figure 3-1 contains a sample printout of the program status mode and figure 3-2 shows a sample of the partition status mode.

3-3. WHZAT OUTPUT

When you run WHZAT, your program may be listed in one of the following states:

- 0 program is dormant
- 1 program is scheduled
- 2 program is I/O suspended
- 3 program is suspended in general wait list
- 4 program is suspended waiting for system available memory
- 5 program is suspended waiting for disc tracks
- 6 program is either operator or program suspended


```

*****
PT SZ PRGRM,T ,PRIOR*DRMT*SCHD*I/O *WAIT*MEMY*DISC*OPER * NEXT TIME *
*****
0 ** MEM *1 *09000 ***** 1
2 2 R$PN$*1 *00010 ***** 3,CL 032
3 5 PROGA*3 *00097 ***** 6
4 5 PROGB*3 *00097B***** 3,LULK 40,LKPRG=PROGA
5 17 PROGC*3E*00097 ***** 3,RN 031,LKPRG=PROGD
3A27 PROGD*4 *00097 ***** 3,RESOURCE
5 7 PROGE*3 *00097 ***** 3,CLASS #
2 4 QUIKR*3 *00099 0 *****00:00:00:000
6 7 FMGR *3 *00090 ***** 3,EDITR'S QUEUE
3 7 EDITR*3 *00050 ***** 5
6 15 ASMB *3 *00099 ***** 3,LU,EQ DN , 5(0[00000000])
4A 6 TIMEL*4 *00090 ***** 3,LU,EQ DN 6, 5(0[00000000])
4A 6 TIMEL*4 *00090 ***** 3,LU,EQ DN *****90:00:00:000
7 7 FMG07*3 *00050 ***** 3,BL,EQT 7
2 3 WHZAT*4 *00001 ***** 1
0 ** RENSB*1 *00060 ***** 4
3 6 PROGf*4 *00096 ***** 3,RN 031,LKPRG=GLOBL
6 7 ED26 *3 *00050 ***** 2, 16(2[00000010])
*****
DOWN LU'S, 6, 14
*****
DOWN EQT'S, 5, 6
*****
09:51:50:710

```

where:

PT partition number; 0 means memory-resident
SZ page size of program; ** means memory-resident
PRGRM program name
T program type
PRIOR program priority
DRMT dormant (state 0)
SCHD scheduled (state 1)
I/O I/O suspended (state 2)
WAIT general wait state (state 3)
MEMY memory suspended (state 4)
DISC disc suspended (state 5)
OPER operator suspended (state 6)
NEXT TIME time program is listed on time list

RTE-IV ONLY

"A" after the partition number means the program was assigned to the partition.

"E" after the program's type means it is an EMA program

"B" after the program's priority means the program is running under batch.

Figure 3-1. Program Status Mode (*RU,WHZAT,lu)

WHZAT provides further explanatory information when a program is in state 2 or 3, as can be seen in Figure 3-1.

When a program is in state 2 (I/O suspended), the EQT to which the I/O is directed is listed, followed by the availability field (EQT word 5, bits 14 and 15) in octal and the status of the last data transfer (EQT word 5 bits 0 through 7) in binary.

eqt{octal}[binary])

For example, program ED26 in figure 3-1 is I/O suspended, waiting on EQT 16. The status of the last I/O transfer through EQT 16 is octal 2 or binary 0000010.

When a program is in state 3 (general wait state), WHZAT will display one of the following messages giving the reason for the wait. (All examples refer to programs displayed in figure 3-1.)

LULK *lu*.LKPRG=*progx*

e.g., PROGB. The listed program (PROGB) attempted to put a lock on logical unit *lu*. Program *progx* already has a lock on *lu*. The listed program will be rescheduled when *progx* removes its lock

RN *xx*.LKPRG=*progx*

e.g., PROGC. The listed program (PROGC) attempted to set resource number *xx*. Program *progx* already has a lock on the resource number. The listed program will be rescheduled when *progx* removes the lock.

RESOURCE

e.g., PROGD. The listed program attempted to allocate a resource number. The system has no more resource numbers available. The operating system will reschedule the listed program when a resource number is available.

CLASS #

e.g., PROGE. The listed program requested a class number but the system has no more available. The operating system will reschedule the listed program when a class number becomes available.

CL *xx*

e.g., RSPN\$. The listed program is waiting on completion of a class GET to class number *xx*.

progx

e.g., SCHED. The listed program (SCHED) scheduled *progx* with wait. The listed program will be rescheduled when *progx* completes.

progx'S QUEUE

e.g., FMGR. The listed program (FMGR) scheduled *progx* on the queue with wait. *progx* is not dormant so the listed program must wait. The listed program will be rescheduled after its scheduling of *progx* completes.

LU,EQ DN

e.g., ASMB. The listed program is waiting on an EQT that is down. In RTE-IV only, the LU is listed, followed by the EQT number and the status of the last I/O transfer through the EQT in both octal and binary. The LU field is blank if the device went down after the I/O request was entered in the device's queue.

BL,EQT *xx*

e.g., FMG07. Buffer limit exceeded on the controller in EQT entry *xx*.

3-4. ALTERNATE WHZAT OUTPUT

The partition status mode of WHZAT (figure 3-2) provides a dynamic map of the activity in each partition and the partition size. The meaning of the various symbols is explained in Figure 3-2.

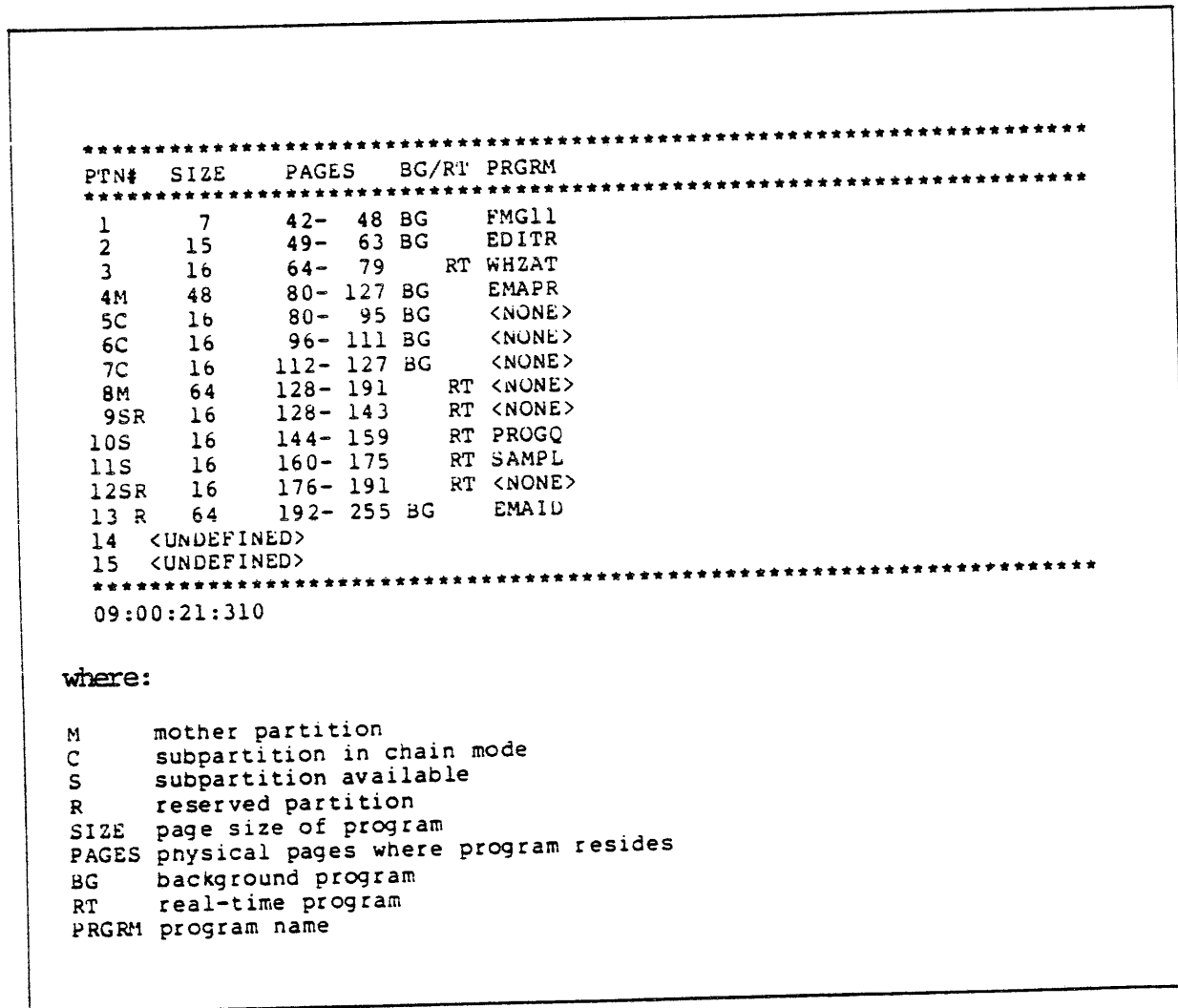


Figure 3-2. Partition Status Mode (*RU,WHZAT,/u.1)

2645A SOFT KEY PROGRAMS

SECTION

IV

4-1. DESCRIPTION

There are two utility programs that are used in conjunction with the 2645A Display Station. They are:

1. KEYS — a program that provides a simple operator interface for generating command sets in a standard format that will program the 2645A soft keys.
2. KYDMP — a program that provides the capability of outputting a soft key command set, created by the KEYS program, from a disc file or a 2645A mini-cartridge file or LU to a 2645A Display Station to program its soft keys.

4-2. PROGRAM REQUIREMENTS

The following information describes the hardware and software requirements for proper operation of these two 2645A Soft Key Utility Programs:

1. Operating Systems — any HP 1000 system with an RTE-M, RTE-II, RTE-III or RTE-IV operating system. Throughout the remainder of this section, the generic term RTE will be used to refer to all of these operating systems.
2. Terminal — any 2645A Display Station configured with DVR05 into one of the above operating systems as a system or auxiliary console.
3. Soft Key Command Sets — both utilities will only operate with a soft key command set created by the KEYS utility in a standard format.
4. Memory Requirements — KEYS requires 5127_{10} (12007_8) words or a 7 page partition. KYDMP requires 1911_{10} (3567_8) words or a 5 page partition.
5. The program type of KEYS and KYDMP must be one of the types specified for them in Appendix B.

4-3. LOADING THE SOFT KEY UTILITIES

The two soft key utilities, KEYS and KYDUMP, are distributed to you as two relocatable files (%KEYS and %KYDMP). These can be loaded either during system generation or on-line by the Loader. Refer to the documentation maps on page iv or v for the appropriate manual containing specific information on using the Loader in your operating system.

The program type and priority for both utilities are listed in Table 4-1.

Table 4-1. Soft Key Utility Program Types and Priorities

UTILITY PROGRAM	PROGRAM TYPE	PROGRAM PRIORITY
KEYS	3 (background)	75
KYDMP	3	10

4-4. KEYS — 2645A SOFT KEY PROGRAMMING UTILITY

The 2645A Data Station has eight programmable soft keys, f1 through f8. The utility KEYS provides a simple operator interface for generating soft key command sets on-line in a standard format. These soft key command sets contain all the information necessary for programming the eight 2645A soft keys when output to the 2645A.

The 2645A softkey utilities (KEYS and KYDUMP) can be used for the 2648A Display Station. When run, KEYS can perform the following functions:

1. Create a new soft key command set.
2. Modify a command set that exists in a file or a logical unit number.
3. List the eight soft key labels, types and command strings of the current command set or one that exists in a file or a logical unit number.
4. Output the current soft key command set or one that exists in a file or a logical unit number to a 2645A to program its soft keys.
5. Output a soft key command set to 1) a disc or mini-cartridge file, or 2) a 2645A CTU logical unit number to save it.

A soft key label can be specified by the operator for each of the eight soft keys. These soft key labels are a standard part of each soft key command set created by the KEYS utility. When a soft key command set is output to a 2645A, in addition to programming the soft keys, it displays these labels in the top five lines of the screen according to the format in Figure 4-1. This label field is protected from being written over and is provided as a quick reference to the status of the soft keys.

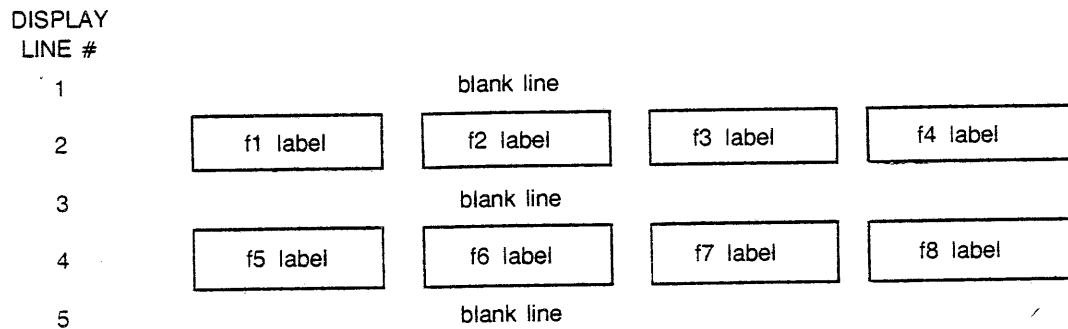


Figure 4-1. Soft Key Label Display Format

There are eight label fields, each sixteen characters long, in which the soft key labels will be written in inverse video (black letters on white background). These labels will be approximately centered in their fields. If no labels are specified when creating a command set, the label fields will be blank. Each time the soft keys are reprogrammed the label field will be updated and protected.

4-5. INITIALIZING KEYS

Once KEYS has been loaded into the system, it can be run from the RTE operating systems with the following command:

```
*RU,KEYS,console,list
```

KEYS can also be run from FMGR in RTE-II, RTE-III and RTE-IV with the following command:

```
:RU,KEYS,console,list
```

In the above commands:

- * the RTE prompt
- : the RTE-II/III/IV FMGR prompt

console — is the logical unit number of the 2645A Display Station from which operator responses are to be made. Default value is LU1 (system console). The default value will occur if no console parameter or an invalid console parameter (1 > LU > 63) is passed.

list — is the logical unit number of the device to which soft key command set listings are to be output. Default value is the 'console' specified previously. Default will occur if no list parameter or an invalid list parameter (1 > LU > 63) is passed.

When KEYS is run with valid parameters, it will print the following request:

ENTER ONE OF THESE FUNCTIONS: [CREATE,MODIFY,OUTPUT,LIST]
OR PRESS [RETURN] TO TERMINATE KEYS:

KEYS can be aborted by typing an A in response to any program request. If an invalid response is made to a program request, the request will be repeated.

Refer to the appropriate paragraph below for operating instructions:

1. Paragraph 4-6 to create a soft key command set,
2. Paragraph 4-7 to modify an existing soft key command set,
3. Paragraph 4-8 to output a soft key command set, or
4. Paragraph 4-9 to list a soft key command set.

4-6. CREATING A SOFT KEY COMMAND SET

If the operator wishes to create a new soft key command set, enter 'C' in response to the program request in paragraph 4-5.

KEYS will request the function key whose assignment is to be made:

ENTER [SOFT KEY NUMBER (1-8)] TO BE PROGRAMMED OR
PRESS [RETURN] IF LAST ASSIGNMENT HAS BEEN MADE:

Enter any soft key number between 1 and 8 or press RETURN if the last soft key has been programmed.

KEYS will print the following heading if a valid soft key number was entered:

SOFT KEY ASSIGNMENT FOR FUNCTION KEY X

Where 'X' is the soft key number entered above.

KEYS will request the soft key label to be assigned to this soft key:

ENTER UP TO [16 CHARACTERS] FOR SOFT KEY LABEL OR
PRESS [RETURN] IF NO LABEL IS TO BE ASSIGNED:

Enter a descriptive label of up to sixteen characters or press RETURN if no label is to be assigned to this soft key.

KEYS will request the soft key command string type:

ENTER: [0] FOR NORMAL OR [2] FOR TRANSMIT ONLY
COMMAND STRING TYPE:

Enter a 0 to create a 'normal' soft key command string. When the soft key containing a type 0 command string is pressed, the command string is output but no CR/LF is generated. This is useful when optional parameters are to be provided by the operator. For example a soft key could contain: RU,FTN4. When depressed this would be transmitted and the operator could add optional parameters such as ,2,1,3,99 CR.

Enter a 2 or press RETURN to create a type 2 command string. When the soft key containing a type 2 command string is pressed, a CR is automatically generated after the last character of the string is output.

KEYS will request a soft key command string to be assigned to this soft key:

ENTER [UP TO 80 CHARACTERS] FOR SOFT KEY COMMAND
STRING TO BE ASSIGNED TO THIS KEY OR PRESS [RETURN]
TO DEFAULT TO STANDARD COMMAND STRING:

Enter a command string of up to eighty characters or press RETURN to assign the appropriate default command string from the following list to the soft key:

Soft Key Number	Default Command String
1	ESCp
2	ESCq
3	ESCr
4	ESCs
5	ESCt
6	ESCu
7	ESCv
8	ESCw

When the last soft key assignment has been made and RETURN is pressed, KEYS will ask the operator what he wants to do next. Typically, after a soft key command set is created it would be checked by LISTING it and then OUTPUT to a file to save it. Also it might be OUTPUT to a 2645A to program its soft keys. Refer to the appropriate paragraph listed at the end of 4-5.

4-7. MODIFYING A SOFT KEY COMMAND SET

If the operator wishes to modify a soft key command set that resides in standard format in a disc file or on mini-cartridge, enter an 'M' in response to the program request in 4-5.

KEYS will request the file name or 2645A CTU logical unit where the command set to be modified resides:

ENTER [FILE NAME,SECURITY CODE,CARTRIDGE] OR [2645A LU]
WHERE SOFT KEY COMMAND SET TO BE MODIFIED IS STORED OR
PRESS [RETURN] TO CONTINUE MODIFYING A COMMAND SET IN THIS
PROGRAM:

If the old soft key command set resides in a disc file, enter the file name and optionally the security code and cartridge separated by commas.

If the command set resides on a mini cartridge with a directory file, enter just the name of the file (this pertains only to RTE-M, be sure that the cartridge directory has been mounted).

If the command set resides on a mini cartridge as an unnamed file, enter the logical unit number of the 2645A CTU where the cartridge is loaded (be sure to position the cartridge at the appropriate file prior to entering the LU number).

Press RETURN to continue modifying a soft key command set that has already been created or loaded previously by KEYS. This feature is convenient in correcting errors in command sets.

KEYS will read the old file (if file name or LU specified) and proceed to request the changes desired as described in 4-6.

4-8. OUTPUTTING A SOFT KEY COMMAND SET

If the operator wishes to output a soft key command set to file or LU, enter the letter 'O' in response to the program request in 4-5.

KEYS will request where the soft key command set to be output is stored:

ENTER [FILE NAME,SECURITY CODE,CARTRIDGE], OR [2645A LU]
WHERE SOFT KEY COMMAND SET TO BE OUTPUT IS STORED OR
PRESS [RETURN] TO OUTPUT DIRECTLY FROM THIS PROGRAM:

If the command set to be output is stored in a disc file, enter the file name and optionally the security code and cartridge separated by commas.

If the command set to be output is stored on a mini-cartridge with a directory file, enter just the name of the file (this pertains only to RTE-M; be sure that the cartridge directory has been mounted).

If the command set to be output is stored on a mini-cartridge as an unnamed file, enter the logical unit number of the 2645A CTU where the cartridge is loaded (be sure to position the cartridge at the appropriate file prior to entering the LU number).

A command set can be output directly from the KEYS program by pressing RETURN.

KEYS will read the file if a file name or LU number is specified. It will then request where this soft key command set is to be output:

ENTER [FILE NAME,SECURITY CODE,CARTRIDGE] OR [2645A LU]
TO WHICH COMMAND SET IS TO BE OUTPUT OR [RETURN] TO
REPLACE ORIGINAL FILE OR LU:

If the command set is to be output to a new disc file, enter the file name and optionally the security code and cartridge separated by commas.

If the command set is to be output to a mini-cartridge with a directory file, enter just the name of the file (this pertains only to RTE-M, be sure that the new file has been added to the cartridge directory and that it has been mounted).

If the command set is to be output to an unnamed mini-cartridge file, enter the LU number of the 2645A CTU where the cartridge is loaded (be sure to position the cartridge at the appropriate file prior to entering the LU number).

Pressing RETURN will only replace the last command set that was previously loaded by KEYS from a file or LU.

KEYS will output the command set as specified and proceed to request the next function to be performed as described in 4-5.

4-9 LISTING A SOFT KEY COMMAND SET

If the operator wishes to list the soft key labels, types and command strings of a command set, enter an 'L' in response to the program request in 4-5.

KEYS will request where the soft key command set to be listed resides:

ENTER [FILE NAME,SECURITY CODE,CARTRIDGE] OR [2645A LU]
WHERE SOFT KEY COMMAND TO BE LISTED IS STORED OR
PRESS [RETURN] TO LIST DIRECTLY FROM THIS PROGRAM:

If the command set to be listed is stored in a disc file, enter the file name and optionally the security code and cartridge separated by commas.

If the command set to be listed is stored on a mini-cartridge with a directory file, enter just the name of the file (this pertains only to RTE-M, be sure that the cartridge directory has been mounted).

If the command set to be listed is stored on a mini-cartridge as an unnamed file, enter the logical unit number of the 2645A CTU where the cartridge is loaded (be sure to position the cartridge at the appropriate file prior to entering the LU number).

If a command set has been previously loaded by KEYS, it can be listed directly from KEYS by pressing RETURN. This feature is useful for checking for errors or recalling the contents of a command set.

KEYS will read the file, if a file name or LU number is specified, and then list the soft key label types and command strings on the list device specified at turn-on.

These will be listed in the format described in Figure 4-2.

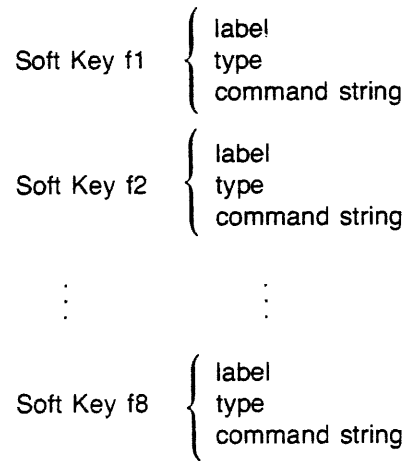


Figure 4-2. Soft Key Command Set Listing Format

4-10. KEYS PROGRAM MESSAGES

The following messages can occur when running the KEYS utility. It is indicated in the meaning of each message whether it is an information only message or an error message.

Message	Meaning
1. KEYS HAS BEEN ABORTED!	Information only; KEYS has been aborted due to operator typing an A in response to program request.
2. FILE MANAGER ERROR - XX HAS OCCURRED	Error message; an error has occurred when trying to create, open, read, write or close a file.
3. ERROR IN READING COMMAND SET FROM LU!	Error message; the number of words read from a command set does not conform to standard format or device error has occurred.
4. NO ORIGINAL FILE OR LU EXISTS	Error message: an attempt has been made to output a command set to an original file or LU that was never read in by KEYS.
5. END KEYS	Information only; normal program completion.

4-11. GUIDELINES

The following are some guidelines for using the KEYS utility and the soft key command sets.

1. When you are storing a soft key command set on a mini-cartridge, store it after the last file; otherwise you may overwrite the succeeding file.
2. To examine the contents of a soft key command set file, it is recommended that you use the listing capability of the KEYS utility rather than the LI command of FMGR.
3. Once the 2645A soft keys have been programmed, use only the standard keyboard keys to get the RTE prompt. Do not use the soft keys as it will hang up the terminal.
4. Pressing RESET once (soft reset) on the 2645A will not affect the soft keys. However, pressing RESET twice (full reset) will reset the soft keys to their default values (ESCp through ESCw).

4-12. SOFT KEY COMMAND SET EXAMPLES

Some soft key command set examples are provided below for RTE-II/RTE-III and RTE-M on worksheet forms. A blank worksheet form and instructions for using it are provided in 4-13.

SAMPLE RTE-II/III SOFT KEY COMMAND SET WORKSHEET

FILE NAME SECURITY CODE CARTRIDGE

SFTKY1	-2	
--------	----	--

SOFT KEY	LABEL (MAX. OF 16 CHARACTERS)	TYPE (0/2)	COMMAND STRING (MAX. OF 80 CHARACTERS)	SUBSET PAGE
f1	RUN FMGR	2	RU,FMGR	
f2	RUN EDITR	2	RU,EDITR	
f3	LG,5	2	LG,5	
f4	MOVE SOURCE	0	MS,	
f5	RUN FORTRAN IV	0	RU,FTN4,	
f6	RUN LOADR	0	RU,LOADR,	
f7	RUN WHZAT	2	RU,WHZAT	
f8	RUN KEYS	2	RU,KEYS	

SAMPLE RTE-M SOFT KEY COMMAND SET WORKSHEET

FILE NAME	SECURITY CODE	CARTRIDGE
SFTKY2	-2	

SOFT KEY	LABEL (MAX. OF 16 CHARACTERS)	TYPE (0/2)	COMMAND STRING (MAX. OF 80 CHARACTERS)	SUBSET PAGE
f1	RUN RTMLD (PTN)	2	RU,RTMLD , , , , 1	
f2	READ SNAPSHOT	2	TR,SNPSYS	
f3	OUTPUT file	0	OUTPUT ON	
f4	MAP MODULES	0	MAP MODULES ON	
f5	RELOCATE file	0	RELOCATE	
f6	SEARCH file	0	SEARCH	
f7	DISPLAY UNDEFS	2	DISPLAY UNDEFS	
f8	END	2	END	

NOTE: The words in small letters in the labels are to be typed by the operator after the soft key has been pressed.

4-13. SOFT KEY COMMAND SET WORKSHEET

A Soft Key Command Set Worksheet is provided on the following page to facilitate your soft key command set planning. It is recommended that you set up your soft key command set hierarchy on these worksheets prior to creating the command sets.

1. Enter the file name where the command set is to be stored. If it is a disc file enter the security code and cartridge if desired.
2. Enter up to sixteen (16) characters for each soft key label. These labels will be displayed at the top of the 2645A screen when the command set is output to the terminal.
3. Enter the soft key command string type. Enter 0 for Normal or 2 for Transmit Only.
4. Enter up to eighty (80) characters for each soft key command string.
5. Next to each soft key command string that programs another soft key command set, enter the page number that describes this soft key command subset.

SOFT KEY COMMAND SET WORKSHEET

FILE NAME SECURITY CODE CARTRIDGE

SOFT KEY (MAX. OF 16 CHARACTERS)	LABEL	TYPE (0/2)	COMMAND STRING (MAX. OF 80 CHARACTERS)	SUBSET PAGE
f1				
f2				
f3				
f4				
f5				
f6				
f7				
f8				

4-14. KYDMP — 2645A SOFT KEY COMMAND SET DUMP UTILITY

The utility KYDMP outputs a soft key command set, generated by the RTE utility KEYS, from a file or logical unit (LU) to a 2645A Display Station.

Typically, once a soft key command set has been stored in a file or LU, the operator would use either the output capability of the KEYS program or the DU command in FMGR to output the command set to a 2645A. In RTE-M systems with limited memory the FMGR may not be configured or the KEYS utility may not fit. In these cases, the KYDMP utility can be loaded to provide this output capability. It is a smaller program than KEYS, and requires no operator interaction. KYDMP can be run from the operating system or from FMGR (RTE-II, RTE-III, or RTE-IV only).

4-15. RUNNING KYDMP

Once KYDMP has been loaded into the system, it can be run from the RTE operating system or from FMGR (RTE-II, RTE-III, or RTE-IV only). Use one of the following command sequences to run KYDMP from RTE or FMGR:

1. To output a soft key command set stored in a disc or mini-cartridge file to a 2645A Display Station use:

```
RU,KYDMP, [console] ,fi, [ln] , [am] [,security code]
```

2. To output a soft key command set stored in an unnamed mini-cartridge file to a 2645A Display Station use (be sure to position the mini-cartridge at the appropriate file first):

```
RU,KYDMP, [console] ,ctu
```

The parameters in the above command sequences are defined as follows:

- console — the logical unit number of the 2645A to which the soft key command set is to be output. Default value is LU1, the system console. Default value occurs if no parameter or an invalid LU number (1 > LU > 63) is passed.
- fi, [ln] , [am] — three pairs of ASCII characters defining the file name where the command set to be output is stored. The commas must be included even if the second and/or third ASCII pair is not specified. Any valid FMGR file name may be specified.
- security code — optional security code of file.
- ctu — logical unit number of the 2645A Cartridge Tape Unit (CTU) where command set to be output is stored.

When KYDMP is run with valid parameters, it will read the soft key command set from the specified source and output it to the specified 2645A Display Station.

4-16. KYDMP PROGRAM ERROR MESSAGES

The following error messages can occur when running the KYDMP utility. If an error occurs KYDMP aborts and must be rerun.

Message	Meaning
1. NO SECOND PARAMETER SPECIFIED OR NEGATIVE	Second parameter was not specified or was negative.
2. FMGR ERROR -XX WHEN READING FROM FILE	Usually specified file not found (-06) or incorrect security code specified (-07), or incorrect file format.
3. ERROR WHEN READING FROM 2645A CTU	Usually, mini-cartridge not mounted, or positioned at wrong file or 2645A CTU is down.

Note 1: Console is the logical unit (LU) number (1 to 63) of the 26XX Display Station from which operator responses are to be made. If LU=0 or is omitted, it will default to LU=1. An illegal LU parameter aborts the program.

When SAFD is run with valid parameters, it will display the following request on the display station:

FLEXIBLE DISC SAVE OR RESTORE?(SA,RE,NO):

where SA=Save the flexible disc contents on cartridge or magnetic tape.
RE=Restore the flexible disc contents from cartridge or magnetic tape.
NO or any other two-character response terminates the program.

Refer to paragraph 5-7 for information on saving the flexible disc contents, and to paragraph 5-8 for information on restoring the flexible disc contents. Refer to paragraph 5-9 for program termination information.

5-6. USING SAFD

5-7. SAVING A FLEXIBLE DISC

If the operator wishes to save the flexible disc contents, enter SA in response to the program request explained in paragraph 5-5. SAFD will request the flexible disc LU by displaying the following:

ENTER FLEXIBLE DISC LU:

Enter the valid LU for the flexible disc with the contents to be saved.

If a valid LU for the flexible disc is entered, SAFD will request cartridge or magnetic tape LU:

ENTER CARTRIDGE OR MAG TAPE LU:

Enter the valid LU for the cartridge tape unit or magnetic tape unit used for storage of the flexible disc contents.

1. If the valid LU for a magnetic tape unit is entered, SAFD will request the magnetic tape file number:

ENTER MAG TAPE FILE NUMBER:

Enter the file number (1 to 8) to indicate where on magnetic tape the flexible disc contents will be saved. SAFD will then request tape header information:

ENTER TAPE HEADER:

Enter up to 60 alphanumeric characters for tape header information. SAFD will proceed to store files from the flexible disc to the magnetic tape unit.

2. If the valid LU for a cartridge tape unit is entered, SAFD will request tape header information:

ENTER TAPE HEADER:

Enter up to 60 alphanumeric characters for tape header information. SAFD will proceed to store files from the flexible disc to the cartridge tape unit.

If the end of a cartridge tape or magnetic tape is reached, SAFD will display:

```
END OF CARTRIDGE OR MAG TAPE REACHED. INSERT NEW TAPE (#z).  
TO CONTINUE HIT ANY KEY/RETURN
```

z—tape sequence number

Insert another cartridge or magnetic tape and hit any key and carriage return on the display station to continue.

When all of the files have been stored from the flexible disc onto the designated tape, SAFD will display:

```
FILES SAVED ON TAPE
```

SAFD will now go back to the beginning and ask the same questions until an exit is prompted, or SAFD is terminated as explained in paragraph 5-9. Examples of saving flexible disc contents are provided in Figure 5-1.

```
*RU,SAFD,1  
FLEXIBLE DISC SAVE OR RESTORE? (SA,RE,NO): SA  
  
ENTER FLEXIBLE DISC LU: 2  
  
ENTER CARTRIDGE OR MAG TAPE LU: 8  
ENTER MAG TAPE FILE NUMBER: 1  
  
ENTER TAPE HEADER: SAFD MAGNETIC TAPE SAVE AND RESTORE EXAMPLE  
  
FILES SAVED ON TAPE  
FLEXIBLE DISC SAVE OR RESTORE? (SA,RE,NO): NO  
STOP  
  
*RU,SAFD,1  
FLEXIBLE DISC SAVE OR RESTORE? (SA,RE,NO): SA  
  
ENTER FLEXIBLE DISC LU: 2  
  
ENTER CARTRIDGE OR MAG TAPE LU: 4  
  
ENTER TAPE HEADER: SAFD CARTRIDGE TAPE SAVE AND RESTORE  
EXAMPLE  
  
FILES SAVED ON TAPE  
FLEXIBLE DISC SAVE OR RESTORE? (SA,RE,NO): NO  
STOP
```

Figure 5-1. SAFD Save Examples

5-8. RESTORING A FLEXIBLE DISC

If the operator wishes to restore files to a flexible disc from a cartridge or magnetic tape, enter RE in response to the program request in paragraph 5-5.

SAFD will request the flexible disc LU:

ENTER FLEXIBLE DISC LU:

Enter the valid LU for the flexible disc to be restored.

If the valid LU for the flexible disc is entered, SAFD will request the cartridge or the magnetic tape LU:

ENTER CARTRIDGE OR MAG TAPE LU:

Enter the valid LU for the cartridge tape unit or magnetic tape unit used to restore the flexible disc.

1. If a valid LU for a magnetic tape unit is entered, SAFD will request the magnetic tape file number used to restore files to the flexible disc:

ENTER MAG TAPE FILE NUMBER:

Enter the file number (1 to 8) to indicate where on magnetic tape the flexible disc will be restored from. SAFD will then display tape header information on the display terminal:

HEADER IS:

<Tape header will be displayed here>

2. If the valid LU for a cartridge tape unit is input, SAFD will display tape header information on the display terminal:

HEADER IS:

<Tape header will be displayed here>

SAFD will then display the current tape sequence number on the display station:

TAPE #z

z—tape sequence number

At this point, SAFD will allow the operator to verify that the tape header and the tape sequence number are correct. SAFD will then allow the operator to terminate the program by displaying:

TERMINATE(YES/NO):

Enter YE to abort SAFD

Enter NO to continue

If the operator enters YE, SAFD will cease execution at this point. If the operator enters NO, SAFD will proceed to restore the flexible disc from the designated tape unit. Any other two-character input will cause SAFD to repeat the TERMINATE request.

When the end of a cartridge or magnetic tape is reached, SAFD will display:

```
END OF CARTRIDGE OR MAG TAPE REACHED. INSERT NEW TAPE (#z).  
TO CONTINUE HIT ANY KEY/RETURN
```

z—tape sequence number

Insert another cartridge or magnetic tape, and hit any key and carriage return on the display station to continue. When all of the files have been restored to the flexible disc, SAFD will display on the terminal:

```
FILES RESTORED ON FLEXIBLE DISC.
```

SAFD will now go back to the beginning and ask the same questions until an exit is prompted, or SAFD is terminated as explained in paragraph 5-9. Examples of restoring flexible disc contents are provided in Figure 5-2.

Data should only be restored to a flexible disc LU with the same number of good tracks as the original flexible disc LU.

When restoring to a flexible disc with less good tracks than the original disc LU, SAFD reports the following message and ceases execution:

```
ERROR-NOT ENOUGH TRACKS ON FLEXIBLE DISC?
```

If the original flexible disc LU had less good tracks than the destination flexible disc LU, SAFD continues but does not move the file directory. Therefore, the restored flexible disc LU must then be mounted specifying the correct number of tracks saved from the original disc LU. Refer to the File Manager Mount Cartridge (:MC,lu [,last track]) command in the appropriate RTE Programming and Operating System Manual.

A summary of action is as follows:

Restoring Possibilities	Action
# of good tracks saved > # of good tracks from original LU on destination LU	SAFD prints error message and ceases execution.
# of good tracks saved = # of good tracks from original LU on destination LU	SAFD continues.
# of good tracks saved < # of good tracks from original LU on destination LU	SAFD continues but does not move file directory. Mount restored disc LU with correct number of tracks saved from the original disc LU.

5-9. TERMINATING SAFD

If the operator wishes to terminate SAFD, any two-character input other than SA or RE can be entered in response to the program request in paragraph 5-5. SAFD will cease execution and the following will be displayed:

```
STOP
```

```
*RU,SAFD,1
FLEXIBLE DISC SAVE OR RESTORE? (SA,RE,NO): RE

ENTER FLEXIBLE DISC LU: 2

ENTER CARTRIDGE OR MAG TAPE LU: 8
ENTER MAG TAPE FILE NUMBER: 1

HEADER IS:
SAFD MAGNETIC TAPE SAVE AND RESTORE EXAMPLE

TAPE #(1)

TERMINATE(YES/NO): NO

FILES RESTORED ON FLEXIBLE DISC.
FLEXIBLE DISC SAVE OR RESTORE?(SA,RE,NO): NO
STOP

*RU,SAFD,1
FLEXIBLE DISC SAVE OR RESTORE? (SA,RE,NO): RE

ENTER FLEXIBLE DISC LU: 2

ENTER CARTRIDGE OR MAG TAPE LU: 4

HEADER IS:
SAFD CARTRIDGE TAPE SAVE AND RESTORE EXAMPLE

TAPE #(1)

TERMINATE(YES/NO): NO

FILES RESTORED ON FLEXIBLE DISC.
FLEXIBLE DISC SAVE OR RESTORE?(SA,RE,NO): NO
STOP
```

Figure 5-2. SAFD Restore Examples

5-10. ERROR MESSAGES

The following error messages may appear on the console during execution.

ERROR-NOT A FLEXIBLE DISC LU?
TERMINATE(YES/NO):

The LU entered is not the LU for a flexible disc or the subchannel was not ready (the flexible disc was not in place). The operator should respond with YE to cause SAFD to cease execution or NO to continue.

ERROR-NOT A CARTRIDGE OR MAG TAPE LU?
TERMINATE(YES/NO):

The LU entered is not the LU for a flexible disc or the subchannel was not ready (the flexible disc was not in place). The operator should respond with YE to cause SAFD to cease execution or NO to continue.

ERROR-WRONG TAPE. INSERT NEW TAPE (#z)

The tape just inserted is the wrong tape (wrong tape sequence number). This error occurs only when restoring the flexible disc. Insert correct tape with tape sequence number z. Hit any key and carriage return to continue.

ERROR-NOT ENOUGH TRACKS ON FLEXIBLE DISC?

The number of tracks saved on the tape(s) is too large to fit on the destination flexible disc LU. SAFD ceases execution.

ERROR-EOT-FILE NOT FOUND?
ENTER MAG TAPE FILE NUMBER:

The specified file number is greater than the number of files on the magnetic tape. Enter the correct magnetic tape file number.

ERROR-NOT A POSITIVE #?
ENTER MAG TAPE FILE NUMBER:

The number entered for the file number was not positive. Re-enter the magnetic tape file number.

6-1 DESCRIPTION OF LGTAT

LGTAT is a Hewlett-Packard utility subroutine designed to display information about the system and auxiliary disc subchannel tracks. The user specifies the logical unit (*lu*) to which the output will be directed, and whether an abbreviated or complete form of the output should be displayed.

The abbreviated LGTAT output displays the total number of available tracks on the system and auxiliary disc subchannels, and the number of tracks in the largest contiguous track block.

The complete LGTAT output displays the Track Assignment Table for the system and auxiliary disc subchannels, the location of the start of the logical source tracks, plus the abbreviated information described above.

6-2. PROGRAM REQUIREMENTS

The following information describes the hardware and software requirements for proper operation of LGTAT:

1. Operating systems—any HP 1000 system with an RTE-IV operating system.
2. Memory requirements—LGTAT requires a three page partition.

See Appendix B for information on LGTAT's program type.

6-3. LOADING LGTAT

The LGTAT utility is distributed as a relocatable module in an FMP file called %LGTAT. It can be loaded either during system generation or on-line by the Loader. Refer to the documentation map at the beginning of this manual for information on using the Loader in your operating system.

6-4. RUNNING LGTAT

LGTAT is run using a command of the following format:

```
RU,LGTAT[,lu [,form ]]
```

where:

lu is the logical unit to which LGTAT will direct its output

form =0 to specify the abbreviated form
=1 to specify the complete form

COMMENTS

If the output *lu* is unspecified, it defaults to the *lu* from which LGTAT was scheduled.

If the *form* is unspecified, it defaults to 0, specifying the abbreviated form.

6-5. ABBREVIATED LGTAT OUTPUT

If the abbreviated form is specified, LGTAT will output the following information:

```
TOTAL AVAILABLE TRACKS= xxx  
LARGEST CONTIGUOUS TRACK BLOCK= yyy
```

where the italicized letters will be filled in with the appropriate numbers.

6-6. COMPLETE LGTAT OUTPUT

If the complete form is specified, LGTAT will output a complete listing of the track assignment table for the system disc subchannel and, if present, the auxiliary disc subchannel; the information output in the abbreviated form; plus the location of the start of the Logical Source (LS) tracks. If the LS tracks are currently undefined then LGTAT's output will so inform the user.

The Track Assignment Table will be listed as an $n \times 10$ array, where n will be automatically adjusted by LGTAT to print out all the tracks on the associated disc subchannel (see Figure 6-2). Each entry in the array corresponds to one track. The meanings of the various entries are explained in Figure 6-1.

LGTAT dynamically reports swapped tracks. Large EMA programs that are swapped may not always appear to be contiguous as is normally expected. This is caused by the slow I/O processing relative to the speed of track allocation and deallocation. While LGTAT is reporting the contents of a particular track, the contents of other tracks may have changed.

A track is identified by the first program contained in that track, and LGTAT will label the track as belonging to that program even if other programs also reside on it. The first program identifies the track by one of the ways specified earlier (e.g., PROGX).

LGTAT will report a system track following the system entry points tracks. Currently, this track is reserved for system use.

ENTRY	MEANING
<i>progx</i>	track belongs to program <i>progx</i>
<i>progx&</i>	track holds memory-image form of program <i>progx</i>
<i>progx^</i>	track holds program <i>progx</i> that has been swapped from memory to the disc
--	free track
ENTS	track holds system entry points
LS	track holds logical source tracks
SYSTEM	track is a system track
GLOBAL	track is a global track
FMP	track belongs to the file manager (FMGR)
LIBRY	track is a library track

Figure 6-1. Explanation of Entries in Track Assignment Table

TRACK ASSIGNMENT TABLE

& =PROG ^ =SWAP

TRACK	0	1	2	3	4	5	6	7	8	9
0	SYSTEM	SYSTEM	SYSTEM	SYSTEM	\$\$CMD&	AUTOR&	FMGR0&	FMGR1&	FMGR4&	FMGR5&
10	FMGR7&	FMGR9&	XXADR&	LIBRY	LIBRY	LIBRY	LIBRY	LIBRY	LIBRY	LIBRY
20	LIBRY	LIBRY	LIBRY	LIBRY	LIBRY	LIBRY	LIBRY	ENTS	EDI24	EDI24
30	FMGR &	GASP &	SYSTEM	EDI24	EDI24	EDI24	---	---	---	COMPL&
40	COMPL&	---	---	---	---	EDI24	---	---	---	---
50	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP
60	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP
70	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP
80	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP
90	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP
100	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP
110	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP
120	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP
130	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP
140	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP
150	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP
160	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP
170	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP
180	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP
190	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP
200	FMP	FMP	D. RTR							

AUXILIARY DISC

0	LG^TAT&	---	---	---	DBSPA&	DBSPA&	---	---	---	---
10	SPOUT&	---	---	---	---	---	---	---	---	---
20	---	---	---	---	---	---	---	---	---	---
30	PRMPT&	---	R\$PN\$&	---	---	---	---	---	---	---
40	---	---	---	---	---	---	---	---	---	---
50	---	---	---	---	---	---	---	---	---	---
60	---	---	---	---	---	---	---	---	---	---
70	---	---	---	---	---	---	---	---	---	---
80	---	---	---	---	---	---	---	---	---	---
90	---	---	---	---	---	---	---	---	---	---
100	---	---	---	---	---	---	---	---	---	---
110	---	---	---	---	---	---	---	---	---	---
120	FMG18^	FMG18^	FMG26^	FMG26^	FMG24^	FMG24^	---	COMPL^	COMPL^	FMG29^
130	LG	LG	LG	LG	LG	---	PRMPT^	CNSLM^	RPCNV^	FMG29^
140	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP
150	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP
160	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP
170	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP
180	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP
190	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP	FMP
200	FMP	FMP	D. RTR ^							

THE LS TRACK(S) START AT TRACK 29 OF LU 2

TOTAL AVAILABLE TRACKS = 125
 LARGEST CONTIGUOUS TRACK BLOCK = 85

Figure 6-2. Complete LGTAT Output

DISC UTILITY MAGNETIC TAPE FORMAT

APPENDIX

A

A 140 word long header record is written out on mag tape at the beginning of every mag tape file to be created by either the on-line or the off-line utility. If end of tape is reached before a file is completely written out by the on-line or off-line utility, it is continued at the beginning of another tape with the header record written out first. This header record contains the same information as the one written on Tape 1 except that tape # information is changed. The information contained in the header record is as follows:

WORDS	INFORMATION																		
1-36	FILE ID (title)																		
37	TAPE #																		
38	Disc Type																		
39	<table style="display: inline-table; vertical-align: middle;"> <tr> <td style="padding-right: 10px;">On-line:</td> <td style="font-size: 3em; vertical-align: middle;">{</td> <td style="padding-right: 20px;">1 = LU save</td> <td style="padding-right: 20px;">Off-line:</td> <td style="font-size: 3em; vertical-align: middle;">{</td> <td style="padding-right: 20px;">- 1 = not used</td> </tr> <tr> <td></td> <td></td> <td style="padding-right: 20px;">2 = UNIT save</td> <td></td> <td></td> <td style="padding-right: 20px;">- 2 = UNIT save</td> </tr> <tr> <td></td> <td></td> <td style="padding-right: 20px;">3 = not used</td> <td></td> <td></td> <td style="padding-right: 20px;">- 3 = FROM-TO save</td> </tr> </table>	On-line:	{	1 = LU save	Off-line:	{	- 1 = not used			2 = UNIT save			- 2 = UNIT save			3 = not used			- 3 = FROM-TO save
On-line:	{	1 = LU save	Off-line:	{	- 1 = not used														
		2 = UNIT save			- 2 = UNIT save														
		3 = not used			- 3 = FROM-TO save														
40	<table style="display: inline-table; vertical-align: middle;"> <tr> <td style="font-size: 3em; vertical-align: middle;">{</td> <td style="padding-right: 20px;">0 = LU2 not included</td> </tr> <tr> <td style="font-size: 3em; vertical-align: middle;">}</td> <td style="padding-right: 20px;">1 = LU2 included</td> </tr> </table>	{	0 = LU2 not included	}	1 = LU2 included														
{	0 = LU2 not included																		
}	1 = LU2 included																		
41	<table style="display: inline-table; vertical-align: middle;"> <tr> <td style="font-size: 3em; vertical-align: middle;">{</td> <td style="padding-right: 20px;">0 = RTE Disc</td> </tr> <tr> <td style="font-size: 3em; vertical-align: middle;">}</td> <td style="padding-right: 20px;">1 = DOS Disc</td> </tr> <tr> <td style="font-size: 3em; vertical-align: middle;">}</td> <td style="padding-right: 20px;">2 = neither</td> </tr> </table>	{	0 = RTE Disc	}	1 = DOS Disc	}	2 = neither												
{	0 = RTE Disc																		
}	1 = DOS Disc																		
}	2 = neither																		
42	0 = 2048 word record size; 1 = 6144 word record size																		
43-140	Track map information																		

Each data record has the following format:

W0	W1	2048 or 6144 words - DATA
----	----	---------------------------

- W0 - bits 0-14 = subchannel #
- bit 15 = 0 if source track not write protected
- = 1 if source track is write protected

- W1 - bits 0-14 = logical track # (relative to first track in subchannel)
- bit 15 = 0 if successful write
- = 1 if data could not be written out successfully

UTILITY PROGRAM TYPES

APPENDIX

B

The utility programs described in this manual should be one of the types listed in Table B-1 to assure proper operation. Refer to the reference manual for the particular operating system for an explanation of program types.

Table B-1. Utility Program Types

PROGRAM	RTE-II	RTE-III	RTE-IV
SAVE	2,3	2,3	2,3
RESTOR	2,3	2,3	2,3
COPY	2,3	2,3	2,3
VERFY	2,3	2,3	2,3
WHZAT	1,2,3,4	1,2,3	1*,2,3,4
KEYS	2,3	2,3	2,3
KYDMP	2,3	2,3	2,3
SAFD	2,3	2,3	2,3
LGTAT	—	—	1*,2,3,4

*Either with or without TABLE AREA II.

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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 software.

THIS UPDATE CONSISTS OF

this cover sheet, a printing history page or a revised "List of Effective Pages," 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 outside margin indicates new or changed text material. The change bar is not used for typographical or editorial changes that do not affect the text.

TO UPDATE YOUR MANUAL

identify the latest Update (if any) already contained in your manual by referring to the Printing History Page or List of Effective Pages (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
(92060-90017)**

UPDATE 1

Reason for Update 1: Manual enhancement.

A. Replace following pages. Changed pages are marked by “*”.

Title page*/ii*
1-13*/1-14
2-1*/2-2
3-3*/3-4

READER COMMENT SHEET

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