

## **SYSTEM UTILITY PROGRAMS**

**PART 17**

**THE DOS/BATCH ROLLIN UTILITY PROGRAM**

# PART 17

## CHAPTER 1

### ROLLIN COMMANDS

ROLLIN is a stand-alone program, which, when loaded into core, either from its distribution medium or from a ROLLIN formatted DECTape or magtape, overwrites any resident monitor present, and begins execution. The ROLLIN program run is terminated and the Monitor is restored by following the procedure described in Chapter 17-3. ROLLIN is used to transfer data quickly between a disk and either DECTape or magtape or between DECpack disk cartridges or disk packs. Disk devices handled by ROLLIN are the RF11, RC11, RK11 and RP11-C. ROLLIN assumes no file structure on disk or DECTape; transfers are performed in image mode. Magtapes are treated as file-structured devices in that each ROLLIN file is preceded by a DOS/BATCH compatible file label (see Section 17-2.2 for a description of magtape format).

When transferring data onto DECTape or magtape, ROLLIN automatically writes an initial record containing a tape sequence number called reel label. For DECTape transfers, the reel label also contains the number of blocks of data transferred. The reel label guards against mounting tapes out of sequence when returning data to a disk device.

Preceding all data records on each DECTape or the first file on a magtape, ROLLIN copies a core image of itself. This image permits ROLLIN to be bootstrapped from DECTape or magtape to load the remainder of the tape.

#### 1.1 COMMAND FORMAT

ROLLIN prints a # character on the console teleprinter whenever it is ready to accept a command. ROLLIN commands are of the form

```
#dev1:/option 1<dev2:/options
```

or, more simply

```
#/options
```

where

dev1:	is the output device designator.
option 1	can be the formatting switch option.
dev2:	is the input device designator.
/options	indicates one or more legal switch options.

Legal device designators are shown in Table 17-1. The ROLLIN switches are listed for reference in Table 17-2 and explained in Chapter 17-2.

Table 17-1  
Device Designators

Device Designator	Device Medium
DC:	An RC11 disk controller with one RS64 disk unit (one platter) and a capacity of 64K processor words.
DF:	An RF11 disk controller with one RS11 disk unit (one platter) and a capacity of 256K processor words.
DKn: (n = 0 to 7)	An RK11 disk controller with one to eight RK03 or RK05 drive units. One RK03/05 DECpack cartridge has a capacity of 1200K processor words. DK: is equivalent to DK0:
DPn: (n = 0 to 7)	An RP11-C disk controller with one to eight RP03 disk drive units. One RP03 formatted disk pack has a capacity of 20,000K processor words.
DTn: (n = 0 to 7)	One TC11 control unit with up to four TU56 dual transports or eight DECTape drive units. Each drive is designated by a unique number selectable between zero and seven.
MTN:filename (n = 0 to 7)	One TM11 control unit with up to eight TU10 magtape transports. Each transport is designated by a unique unit number selectable between zero and seven. A filename (from one to six alphanumeric characters) must be specified for disk to magtape transfers but not for magtape copy operations.

An example of a ROLLIN transfer command is shown below.

```
#MT0:DAT8<DC:
```

The above command dumps the entire contents of an RS64 disk from an RC11 disk controller onto a magtape file called DAT8 on the magtape reel mounted on unit 0.

Table 17-2  
ROLLIN Option Switch Descriptions

Option Switch	Abbreviation	Meaning										
/BOOT:dev	/BO:dev	<p>This general-purpose bootstrap switch, which loads the first 256 words of core from the device and then branches to location <math>\emptyset</math>, is used to bootstrap DOS/BATCH; for example:</p> <p style="text-align: center;">#/BO:DK</p> <p>loads and starts a DECpack DOS/BATCH system.</p>										
/DATE: dd-mmm-yy	/DA:DD-mmm-yy	<p>Used in writing the FILE LABEL on magtape. /DA causes the specified date to be entered in the FILE LABEL. The format for the day is day-month-year; for example:</p> <p style="text-align: center;">#/DATE:1-FEB-73</p>										
/FIND	/FI	<p>Used with magtape only. When reading from magtape, /FI rewinds the tape and searches for the specified file. When dumping to magtape, /FI causes the tape to skip past all the files previously written on the tape.</p>										
/FORMAT	/FO	<p>Used, on the output side of a transfer command string, to format a DECpack cartridge on an RK<math>\emptyset</math>3/<math>\emptyset</math>5 disk drive or a disk pack on an RP11-C/RP<math>\emptyset</math>3 disk drive before a transfer operation begins.</p>										
/HELP	/HE	<p>Types a brief explanation of ROLLIN options on the console.</p>										
/NOLABEL	/NO	<p>On dumping disk to DECTape, this option inhibits the reel label record from being written (see Sections 17-2.1 and 17-2.2 for a description of the reel label and instances of use of the /NO switch).</p>										
/NUMBER:n	/NU:n	<p>The decimal number specified by n is the total number of units of disk space to transfer. A unit of disk space is 1K processor words, where K=1<math>\emptyset</math>24. The maximum value for n is determined by the type of disk drive as shown below.</p> <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: left;"><u>Drive Type</u></th> <th style="text-align: right;"><u>Maximum n</u> <u>(units of 1K words)</u></th> </tr> </thead> <tbody> <tr> <td>RC11</td> <td style="text-align: right;">64</td> </tr> <tr> <td>RF11</td> <td style="text-align: right;">256</td> </tr> <tr> <td>RK<math>\emptyset</math>3/<math>\emptyset</math>5</td> <td style="text-align: right;">12<math>\emptyset\emptyset</math></td> </tr> <tr> <td>RP<math>\emptyset</math>3</td> <td style="text-align: right;">2<math>\emptyset\emptyset\emptyset\emptyset</math></td> </tr> </tbody> </table> <p>If the /NU switch value is not specified, the entire disk is used.</p>	<u>Drive Type</u>	<u>Maximum n</u> <u>(units of 1K words)</u>	RC11	64	RF11	256	RK $\emptyset$ 3/ $\emptyset$ 5	12 $\emptyset\emptyset$	RP $\emptyset$ 3	2 $\emptyset\emptyset\emptyset\emptyset$
<u>Drive Type</u>	<u>Maximum n</u> <u>(units of 1K words)</u>											
RC11	64											
RF11	256											
RK $\emptyset$ 3/ $\emptyset$ 5	12 $\emptyset\emptyset$											
RP $\emptyset$ 3	2 $\emptyset\emptyset\emptyset\emptyset$											

(continued on next page)

Table 17-2 (cont.)  
 ROLLIN Option Switch Descriptions

Option Switch	Abbreviation	Meaning
/PLATTERS:n	/PL:n	For use with RFl1 or RC11 disks only, n is the number of disk platters to load or dump. /PLATTERS:1 is always assumed if not specified.
/RWIND	/RW	When reading or writing magtape, this switch causes the tape to be rewound before use.
/SKIP:n	/SK:n	When reading or writing magtape, this switch causes the tape to skip past n end-of-file marks before starting a read or write.
/TRACK:n	/TR:n	The decimal number specified by n is the unit of disk space at which the transfer operation begins. A unit of disk space is 1K processor words, as is defined in the description of the /NU:n switch in this table. If the /TR switch value is not specified, the first unit of disk space on the drive is used. The first unit is defined as /TR:0.
/VERIFY	/VE	Used only in image copy operations to ensure that the copy can be read and, when read, is the same as the original.
/WLOCK	/WL	Used with a DECpack device designator to force a write lock on an input drive unit.

# PART 17

## CHAPTER 2

### TRANSFER OPERATIONS

#### 2.1 DISK/DECTAPE OPERATIONS

DECTape is a block-structured device. DECTape reels contain 578 blocks, each 256 words in length. When ROLLIN writes a DECTape, it dumps its own image onto blocks 0 to 19, writes a reel label onto block 20, then dumps data from the disk onto blocks 21 through 532. This means that 128K words of data can be kept on each tape. Hence, an RF11 controller with one RS11 disk requires two DECTapes, while an RK03 or RK05 DECPack cartridge requires ten DECTapes for a complete dump.

When a disk is restored from DECTape, ROLLIN checks the label block on each reel to ensure that the tapes are used in the proper sequence, and that the number of blocks restored does not exceed the number of blocks dumped. If this is not the case, an error message is printed.

##### 2.1.1 Disk to DECTape Dump

To dump a disk to DECTape, simply type DT: as the output device and the disk device designator as the input device. For example,

```
#DT:<DK0:
```

dumps an RK03 or RK05 disk cartridge 0 onto ten DECTapes (unit 0 would be used first, then units 1,2,3,4,5,6 and 7, the ninth tape would then go back to unit 0 and the tenth to unit 1). This is the normal order for using tapes, the user could override this by typing the actual units to use. For example,

```
#DT2:,DT0:<DF:
```

would dump the RF11 disk onto two tapes, using unit 2 first, and then unit 0.

The /NOLABEL switch option is used when writing over the first part of a DECTape previously written by ROLLIN. For example, suppose we have just patched the DOS/BATCH Monitor. This monitor normally resides on the first 28K of the RF11 disk. Now suppose we want to dump this patched monitor on the first 28K of an earlier disk dump. This can be done by mounting the first dump tape on unit 0, loading ROLLIN, and typing the following command.

```
#DT0:<DF:/NUMBER:28/NOLABEL
```

This will write out the first 28K of the disk without rewriting the DECTape label. Now, when we restore from this tape, ROLLIN will read the entire tape, and not just the first 28K.

### 2.1.2 Restoring Disk from DECTape

This is simply the reverse of the dump operation and takes a similar command. For example,

```
#DF:<DT:
```

would restore the RFl1 from two reels of DECTape on units 0 and 1.

As before, reel numbers can be given explicitly, if desired. For example,

```
#DF:<DT1:,DT2:,DT3:,DT4:/PLATTERS:2
```

would load a 2-platter RFl1 disk (512K) from four DECTapes, mounted on units 1, 2, 3, and 4, in that order.

## 2.2 DISK/MAGTAPE OPERATIONS

Magtapes are written by ROLLIN with 800 BPI density and odd parity. On 9-channel drives each 16-bit word takes two frames of tape. On 7-channel drives core-dump mode is used, so each 16-bit word takes four frames of tape.

Each dump operation writes one file on the tape. This file normally consists of a 7-word file label record containing the filename (always with the .ROL extension), UIC (always [1,1]), protection code (always 155 decimal), and date. This is followed by a 256-word reel label record that contains the reel sequence number for this file. Following this are the actual data records. Each data record, except possibly for the final one, contains 4K words (8K bytes) of data. ROLLIN closes the file by writing three end-of-file (EOF) records, one to end the file and two more to indicate the end-of-data (EOD) on the magtape. ROLLIN then backspaces over two of the EOF records to leave the tape correctly positioned for performing another dump. There is one exception to this file format. If, before writing the file label, the tape is positioned at the load point (beginning-of-tape), two records are written immediately following the file label.

The file label is DOS/BATCH compatible, permitting mixing of ROLLIN files and DOS/BATCH files on a single tape and cataloging of the tape via the /DI option of DOS/BATCH PIP. However, DOS/BATCH records are required to be 256 words in length, while ROLLIN makes more efficient use of the tape by writing 4K words in each record. This means that ROLLIN files cannot be read in file structured mode by



DOS/BATCH (READ/WRITE). TRAN can, of course, be used with ROLLIN files. (See Part 3, DOS/BATCH Monitor.)

### 2.2.1 Disk to Magtape Dumps

To illustrate dumping from disk to magtape, suppose a system had one RFl1 disk and two RK05 drives. These could be dumped as three files by the following commands.

```
#MT0:DFDMP<DF:/RWIND/DATE:1-FEB-73  
#MT0:DK0DMP<DK0:/DATE:1-FEB-73  
#MT0:DK1DMP<DK1:/DATE:1-FEB-73
```

The filename must be specified with magtape; the date is optional but should be specified. The magtape now has three files on it: DFDMP.ROL, DK0DMP.ROL, DK1DMP.ROL. Note that the file extension is never specified by the user; the extension is always ROL.

A large 2400-foot reel can easily hold this much data; however, a small 600-foot reel would not have enough room for a complete dump of the second RK05. When ROLLIN detects the end-of-tape, it backspaces over the last data record, writes three end-of-file records, and prints the following message.

```
TAPE FULL, TYPE M TO MOUNT ANOTHER REEL AND CONTINUE, ANYTHING  
ELSE TO ABORT REQUEST:
```

If another tape is available, type M followed by the RETURN key. ROLLIN now prints the following message.

```
TYPE RETURN TO CONTINUE WHEN READY.
```

Now mount the new tape (it must be on the same unit number). Press the RETURN key and ROLLIN will finish the dump. After a tape has been dumped it is recommended that the WRITE ENABLE ring be removed.

Figure 17-1 illustrates the format of a tape with two files on it, the first of which is a dump of an RS11 disk, and the second is a dump of an RK05 disk cartridge.

LOAD POINT

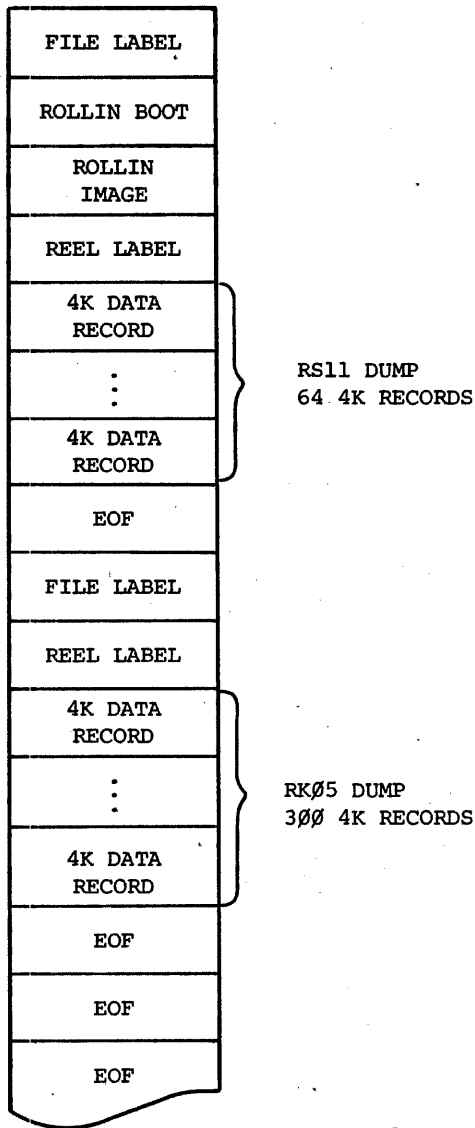


Figure 17-1  
ROLLIN Magtape Format

If a magtape reel contains data files (either ROLLIN core-image files or DOS/BATCH files) and the user desires to add more data files, the /SKIP:n switch can be used to read over n files on the reel and dump the data in the proper position. For example, the command string shown below

```
#MT0:DCDMP<DC:/RWIND/DATE:27-DEC-73/SK:3
```

causes the reel of magtape on unit 0 to be rewound first. A search is performed for the end of the third file on the reel. The contents of the RS64 disk are dumped to a fourth file on the reel which is named DCDMP.ROL. The data 27-DEC-73 is placed in the file label record.

### 2.2.2 Restoring Disk from Magtape

Returning to our illustrative case, the three files mentioned above could be restored from magtape by the following commands.

```
#DF:<MT0:DFDMP/FIND  
#DK0:<MT0:DK0DMP  
#DK1:<MT0:DK1DMP
```

Here, the /FIND switch rewinds the tape and searches for the file DFDMP.ROL, which would in this example be the first file on the tape. While /FIND may always be used, if you are certain that the tape is correctly positioned, omitting /FIND will greatly speed the restoring process since the tape is not rewound. ROLLIN will, in any case, verify that the filename is the same as the specified name, and the extension is ROL, and indicate the error if it is not.

This again assumes that the tape dumped by the commands given in Section 17-2.2.1 has been mounted on unit 0. If an end-of-file is encountered during the read, as would be the case with a 600-foot reel, then ROLLIN will ask for another reel by printing

```
END-OF-FILE DURING READ, TYPE  
M TO MOUNT ANOTHER REEL, OR K TO KILL REQUEST:
```

If the second reel is available, respond M followed by the RETURN key. ROLLIN now prints the following message.

```
TYPE RETURN TO CONTINUE WHEN READY.
```

Now dismount the current tape and mount the continuation tape on the same unit as before. Press the RETURN key and ROLLIN will finish the read.

### 2.3 COPY AND VERIFYING OPERATION

The ROLLIN program allows the user to perform a copy operation and, optionally, to specify a verify action in conjunction with the copy operation. The verify action is specified by use of the /VERIFY switch in the copy command string. Devices upon which a copy is performed are magtape drives, the RK03 or RK05 disk drives, and RP11-C/RP03 disk drives.

In the execution of the copy operation, no header or label information is automatically written. An exact image of the medium on the input device is transferred to the same type medium on the output device. The verify action, if specified, is performed as a second pass of the copy operation. The following three sections describe procedures to perform copy operations for magtape and disk pack devices.

### 2.3.1 Magtape Procedures

To copy a magtape, mount the input reel with the write ring removed, and mount the reel on which the copy is to be written with the write ring inserted on another unit.

A copy operation with a verify action is accomplished as follows.

```
#MT1:<MT0:/VE
```

When the copy operation is completed, ROLLIN prints the following message.

```
STARTING VERIFICATION PASS
```

The verification action ensures that the copy can be read, and that, when read, it is identical to the input. If multiple copies are to be made of the same input reel, it is suggested that the copy be used as input to the subsequent copy operation. Such a course of action lessens wear on the original master reel. The unit number of the previous copy is then used for input, the original reel is taken down and a new reel mounted in its place, and the drive unit number of the new reel is used for output.

Completion of the verification action is signalled by a pound sign (#) being printed at the terminal. If any other messages are printed before the pound sign (#) is printed, the copy operation was not successful. The unit number of the device causing the fatal error is printed in the error message.

### 2.3.2 DECpack Procedures

Copies of DECpack cartridges can be made by using either RK03 or RK05 disk drives. To safeguard the input cartridge, the drive on which it is mounted can be write locked by using the /WL switch, either in a single action or in combination with the copy command string. Either of the following two commands is acceptable.

```
#DK1:/WL  
#DK0:<DK1:/WL
```

To format a cartridge prior to writing a copy to it, the user specifies the /FORMAT switch on the output side of the command string. Verification can be specified also by using the /VE switch. The following command string demonstrates the use of the /FORMAT and /VE switches with write lock.

```
#DK1:/FO<DK0:/WL/VE
```

Upon initialization of execution of the above command string, the following message is printed.

STARTING RK FORMAT PASS

When formatting is completed and copying begins, the following message is printed.

END RK FORMAT PASS

When copying is complete, the following message is printed.

STARTING VERIFICATION PASS

If any other messages are printed prior to the pound sign (#), the copy operation was not successful. The error message indicates the drive unit number on which the error occurred.

### 2.3.3 RP11-C Disk Procedures

The user copies a disk pack mounted on an RP11-C/RP03 drive in the same manner as he copies DECpack cartridges. He may use the /FORMAT and /VERIFY switches similarly, with one variation. Formatting a disk pack on an RP03 drive requires enabling of the format toggle switch on the RP11-C controller. The ROLLIN program prints messages which instruct the user to set and disable the format switch. The following command string causes the disk pack mounted on RP03 drive unit 1 to be formatted and an image copy to be transferred to it and verified from RP03 drive unit 0.

```
#DP1:/FO<DP0:/VE
```

The messages informing the user of the actions taken are the same as those occurring when a DECpack cartridge is formatted, copied and verified. The only exception is that the messages to set and disable the format toggle switch on the RP11-C controller replace the messages STARTING RK FORMAT PASS and END RK FORMAT PASS.

PART 17  
CHAPTER 3  
RESTORING THE MONITOR

The ROLLIN program runs in a stand-alone state in the memory of a PDP-11 computer. When the ROLLIN program run is completed, the user may restore the DOS/BATCH Monitor by using the /BO switch and indicating the device that contains the Monitor, as in the following example.

```
#/BO:DK  
DOS/BATCH Vxxxx (where xxxx is the version number)  
$
```

The above command string causes the DOS/BATCH Monitor to be read from RK03 or RK05 drive unit 0 and loaded into core. The identification message indicates the Monitor is successfully bootstrapped and the user can follow the proper login procedures. The /BO switch is described in Table 17-2.