

EMULEX
PATCH MANUAL
FOR PDP-11 OPERATING SYSTEMS



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PREFACE

Emulex supplies patches to RT11, RSX-11M, RSX-11M-Plus and RSTS/E, to support controller hardware running in either extended capacity or reduced capacity mode. The patches are distributed in document form at no charge.

This document represents the accumulation of the latest PDP-11 operating system patches, written by employees of Emulex Corporation for the purpose of altering Digital Equipment Corporation (DEC) software to perform the following functions:

- Use non-standard capacity sizes when accessing disks used with Emulex disk controllers
- Use 22-bit addressing on the PDP-11/23 Plus, Micro-PDP-11, and Micro-PDP-11/73
- Enable increased capabilities found in Emulex peripheral controllers

Although a number of patches were written for older versions of some operating systems, these patches are not included here in order to minimize the size of this document. If you need patches that are not found in this document, contact Emulex at the address listed on the first page, and the appropriate patches (if available) will be forwarded to you.

To apply a patch, follow the installation procedure found at the beginning of each section. These procedures define the patch conditions and give examples of patch installation. These examples should be used for demonstration purposes only; **DO NOT ATTEMPT TO APPLY THEM.**

This manual uses the following conventions:

- All integer values are octal, unless another radix is specified.
- Numbers that include a decimal point represent decimal values.

If you have questions about this document or need additional information, please contact Emulex Technical Support or your Emulex representative.

SOFTWARE WARRANTY

Emulex warrants for a period of ninety (90) days, either from the date of installation or thirty (30) days after shipment, whichever comes first, that each software package supplied shall be free from defects and shall operate according to Emulex specifications under those DEC, IBM, Intel, and UNIX operating system versions supported by Emulex. Emulex does not warrant its software products under any operating system that has not been specifically identified. Any software revisions required hereunder will cover supply of distribution media only and will not cover on-site installation or integration.

During the warranty period Emulex will provide the following:

1. Telephone Support will be provided by our staff of Product Support Specialists anytime during the working day (Pacific Standard Time).
2. Software Product and Documentation updates will be provided if we have received your Warranty Card. Each update provides the latest technical changes required to improve performance or maintainability.
3. Remedial Service: If a problem is encountered with any Emulex Software in its unaltered version and Emulex determines it to be defective, Emulex will provide the following Remedial Services:
 - We will make a temporary correction.
 - We will make a reasonable attempt to develop an emergency bypass until a permanent correction can be made.

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Section 1 INTRODUCTION

This manual is an accumulation of the Emulex patches to the most recent versions of the following DEC PDP-11 operating systems:

- RT11
- RSTS/E
- RSX-11M
- RSX-11M-Plus

There is a separate section for each operating system. The sections are divided into subsections, one for each version of the operating system.

1.1 EMULEX PATCHES

This manual has been written for use by the system manager of a given site, or by an agent of the system manager who has been assigned the task of installing an operating system, performing a system generation, and installing an Emulex software patch.

CAUTION

If you are unsure of the procedure for applying patches to your operating system, read the documentation for your operating system. If you still have questions, contact Emulex Technical Support for assistance in applying a patch from this manual.

1.1.1 WHY EMULEX PATCHES?

Emulex produces hardware device controllers that emulate DEC peripheral devices. This product line presently encompasses disk, tape, and communication controllers and subsystems.

Some options and features have been added to the Emulex controllers which are not found on the DEC controllers they emulate. In most cases, the operating systems do not take advantage of these features, but they can be patched with little trouble. In other cases, the operating system **must** be patched to make use of these controllers.

1.2 TYPES OF EMULEX PATCHES

Three types of Emulex patches are discussed in this manual: disk capacity, 22-bit (LSI-11 bus), and miscellaneous.

Types of Emulex Patches

1.2.1 DISK CAPACITY PATCHES

The configuration of a drive is determined by three factors:

- The number of usable disk surfaces (called tracks or heads)
- The number of usable cylinders (similar to the grooves in a phonograph record)
- The number of sectors (geometrically similar to wedges of a pie)

The Emulex controllers operate on many different sizes of disk drives with various physical configurations. It is therefore necessary for the controller to perform a "remapping" of a logical drive(s) onto the physical drive (see DISK MAPPING). The Emulex controllers do this in one of two ways:

- The first method is to leave the number of heads and sectors the same, in agreement with the DEC standard. When this method is used, the only difference between drives on Emulex controllers and DEC drives is the number of cylinders per drive.
- When the first type of modified capacity does not fit very well, the second method is used. This method modifies the number of tracks and/or sectors, as well as the number of cylinders.

The configuration of the standard DEC disk drives is coded into the operating system in many locations. The purpose of patching is to change those locations so that the operating system can use a disk with a configuration that differs from the DEC standard. This is done by changing the number of cylinders, tracks, and/or sectors. Of course, when the configuration of a drive is changed, many other values defined by the configuration (such as the total number of blocks) are also changed, and these values must also be patched. The locations of these other values are given in the patch procedure.

1.2.1.1 Calculating Patch Values

The patches in this manual are written to apply to many different configurations. This generalization was achieved by using symbols in place of actual values required by the operating system. Because there are too many different possibilities to list here, a procedure for calculating these values is included in Appendix A. A worksheet is included at the end of this document to help you calculate the patch values for your configuration.

1.2.2 TWENTY-TWO-BIT PATCHES

DEC uses two different bus designs in its PDP-11 computer line: the LSI-11 bus and the UNIBUS. These two buses are quite different from each other, and DEC peripheral products cannot be interchanged between the two buses.

With the announcement of the 11/23 Plus processor, which handles 22-bit addressing on the LSI-11 bus, came a number of Emulex products capable of addressing more than 256K bytes of memory. Unfortunately, many of the DEC LSI-11 bus products could not be used on the 22-bit bus. Some Emulex peripherals were given extended addressing bits, not found on the DEC peripherals, to make use of the 22-bit bus, thereby allowing access to more than 256K bytes.

Emulex also puts peripherals on the LSI-11 bus which emulate UNIBUS or MASSBUS hardware. Because the UNIBUS is an 18-bit bus (it uses UNIBUS mapping registers for extended addressing), the Emulex products must add four more addressing bits not found on the actual DEC UNIBUS peripheral controller. However, since the DEC software designers did not anticipate a UNIBUS peripheral on a LSI-11 bus machine, the means for addressing the upper addressing bits was never included in the software. Thus, Emulex offers patches to the DEC PDP-11 operating systems to perform this extended addressing.

1.2.3 MISCELLANEOUS PATCHES

A few miscellaneous patches are included in this manual. These patches make use of some extra features of a particular controller, or take advantage of some slight incompatibilities. Each of these patches is handled separately and is described in the patch description section.

1.3 DISK MAPPING

Disk mapping is the technique of assigning a logical point (or position) to every physical point on a disk drive. Emulex uses a mapping technique in all of its disk controllers. This is usually a one-to-one mapping, in which each logical point matches the physical point on the disk. This technique allows Emulex to offer DEC disk emulators on a wide variety of disk drives.

When DEC wrote its operating systems, it conformed to the exact specifications of the disks that it intended to use. This approach did not allow much of a selection of options. Emulex attempts to match these specifications either by using disk drives that match the configuration of the DEC disk or by using disk mapping techniques.

1.3.1 DIFFERENT PHYSICAL CONFIGURATIONS

Emulex offers a much broader selection of disk options. Some of these options do not match the DEC specifications of disk configurations. Thus, modifications must be made to the operating system to support these non-standard capacities or configurations.

Multiple RH11/RH70 Controllers

1.3.2 TWO LOGICALS ON ONE PHYSICAL

Another advantage of using a mapping technique is that it allows mapping of multiple logical disks onto a single physical disk. This technique is used primarily in the smaller disk emulators (e.g., RK06/7 and RL01/2), but it is also used on some of the larger emulations (RM02/3, RP06) on very large disk drives.

1.3.2.1 Overlapped Seeks

The term "overlapped seek" refers to the ability of the disk controller to accept and execute a seek command for a second disk drive while it is waiting for a seek request on another drive to complete. This ability increases the throughput to the disk subsystem.

When Emulex maps multiple disks onto a single physical disk, a problem results: The controller, because it is emulating two disks, accepts the second disk seek request, but it cannot issue the command to the second logical disk because it is already performing the first seek on the physical disk. Therefore, the controller "throws away" the second seek request by signaling a seek completion on all requests when the first request actually finishes.

Because a DMA request has an implied seek, it does not create any problems, but it can cause unnecessary software overhead. Therefore, Emulex does not advise the selection of overlapped seeks for multiple logical disks onto a single physical disk drive.

1.4 MULTIPLE RH11/RH70 CONTROLLERS

RSTS/E, RSX-11M, and RSX-11M-Plus support multiple RH11/RH70 disk controllers: one at the standard address (176700), the second at the first alternate address (176300), and so on.

1.4.1 RSX-11M AND RSX-11M-PLUS

RSX-11M and RSX-11M-Plus use only one copy of the driver for all RH11/RH70 controllers. A device data base table is generated for each drive at SYSGEN time that contains various information, such as block size and number of cylinders. Thus, modified capacity patches are made for a specific drive type.

NOTE

All drives with the same emulation must be the same size. For example, if you patch for an expanded RM02, all RM02s must be the same expanded size.

1.4.2 RSTS/E (DR VS. DB)

RSTS/E uses multiple copies of the same driver to control all RM02/3/5 and RP04/5/6 disks on the same controller. DRDSK is the driver used with the controller at the standard address, and DBDSK is the driver used with the controller at the alternate address.

The RSTS/E INIT program is built with only the DB driver. INIT includes code that allows it to access both the standard and the alternate address controllers with only the one driver. Therefore, patches to the DR/DB driver for INIT reference only DBDSK. Note that if you attempt to install both normal and modified capacity disks with the same emulation, INIT incorrectly uses one of the disks, even if they are on separate controllers.

The RSTS/E monitor adds support for an RH11/RH70 at the standard address if a RM02/3/5 disk is selected at SYSGEN time; it adds support for a RH11/RH70 at the alternate address if a RP04/5/6 disk is selected at SYSGEN time. Therefore, if you plan to have an RH11/RH70 at the standard address, specify the number of disks on the standard address controller (regardless of whether the disks are RM02/3/5 or RP04/5/6) in response to the SYSGEN question "Number of RM02/3/5s." If you plan to have an RH11/RH70 at the alternate address, specify the number of disks on the alternate address controller (regardless of whether the disks are RM02/3/5 or RP04/5/6) in response to the SYSGEN question "Number of RP04/5/6s."

The patches made to either the DR or DB driver apply to all the drives with the same emulation (RM02/3, RM05, etc.) on the same controller.

NOTE

A modified RM02/03 disk cannot be used with an unmodified RM02/03 disk. (This rule also applies to RM05 and RP04/05/06 disks.)

BLANK

2.1 RT11 PATCH EXPLANATION

2.1.1 SECTION DESCRIPTION

This section explains the general procedure for patching the RT11 operating system for use with Emulex disk and communication controllers. No specific information on any patch or emulation is given in this section; this information is available in later sections.

2.1.2 INTENDED AUDIENCE

This manual is designed for use by the system manager of a given site, or by an agent of the system manager assigned the task of installing an RT11 system or doing a SYSGEN. This manual assumes a fairly high degree of familiarity with RT11 operations, management, and utility procedures.

2.1.3 REQUIRED PATCHES

The only area of the RT11 system that requires patching to reduce or expand the capacity of the disk drive, or to add 22-bit support, is the disk driver.

DP.MAC (SCXX/A) This is the source file of the standard driver for RP02/03 disks.

DM.MAC (SCXX/C) This is the source file of the standard driver for RK06/07 disks.

DL.MAC (SCXX/L) This is the source file of the standard driver for RL01/02 disks.

The source to the driver is edited prior to a SYSGEN. **Be sure to make a backup copy of the original file before making any alterations.**

2.1.4 PATCH PROCEDURE--DISK DISTRIBUTIONS

Systems that have a standard DEC disk (RK05, RK06/7, RL01/2, or RP02/3) can order an RT11 disk distribution from DEC. The SYSGEN procedure executes from the standard DEC disk, and the patches should be installed during the SYSGEN. When the SYSGEN is complete, the modified disk can be formatted and initialized, if a modified capacity patch is installed, or used with 22-bit addressing, if a 22-bit patch is applied.

RT11 Patch Explanation

2.1.5 PATCH PROCEDURE--TAPE DISTRIBUTIONS

Customers who receive a magnetic tape distribution of RT11 must specify the type of disk to which the magtape is to be copied. This disk must be either a DEC disk or an exact emulation of a DEC disk (not a modified-capacity emulation). Customers who have only a tape drive and a modified-capacity Emulex disk on their systems cannot install the patches for the modified capacity. These customers can run at a standard capacity if their controllers and disks support it.

CAUTION

Please note that you cannot choose an RP03 emulation that divides a single physical drive into two logical RP03 drives numbered 0 and 4, 1 and 5, etc. The reason is that RT11 will attempt to subdivide the logical RP03 units into two smaller logical units, also numbered 0 and 4, 1 and 5, etc. This numbering will cause an assignment conflict and an error in your system.

There is also a size limitation: RT11 stores the block size of a disk in a single, unsigned octal word. This means that any logical disk must contain **fewer than 65535 decimal blocks**. If a disk contains more than 65535 blocks, then some wasted space will remain on the disk after initialization. To calculate the number of usable blocks, see Appendix A.

2.2 RT11 V4.0 PATCHES

2.2.1 RT11 V4.0 PATCHES FOR RP02/03

2.2.1.1 Patch Description

This patch modifies RT11 V4.0 to permit the use of non-standard disk drive sizes with the Emulex SCxx/A controllers (RP02/03 emulations).

2.2.1.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

The only area in the RT11 system that requires patching for modified-capacity disks is the disk driver. The driver is edited (using a standard system editor) to reflect the modified values. Then the system is re-SYSGENed (the modified driver reassembled) to incorporate the changes in the disk drive's block size.

The Emulex SCxx/A disk controllers perform a logical mapping of the tracks and sectors onto the drive so that only the number of logical cylinders per drive needs to be changed. This is done in such a way that the number of heads is always 20 and the number of sectors is always 10, in agreement with the DEC standard. Therefore, the only difference between a modified-capacity drive and a standard-size drive is the number of cylinders per drive.

The number of logical cylinders for the SC01/Ax and SC11/Ax controllers can be found in Appendix B of this document. The number of logical cylinders for the SC02/Ax and SC12/Ax disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

2.2.1.3 Patch Notes

Although the RP03 is a supported disk under the RT11 operating system, its size presents a problem: the number of blocks (234200 octal) is too large to fit into 16 bits. The RT11 operating system compensates for this by breaking the physical unit into two logical units (numbers 0 and 4), equivalent in size to a single RP02.

Therefore, when applying this patch, use the integer value of the cylinders **divided by 2** for the number of cylinders in the sections below. (The largest size that can be represented in 16 bits is 65535, so the maximum number of cylinders should never exceed 327 cylinders.)

2.2.1.4 Patch Procedure

1. Make a backup copy of the file DP.MAC and give it the name DP.DEC. This is the standard driver for RP02/03 disks.
2. Calculate the number of cylinders used per logical drive. If you have an SC01/A or SC11/A controller, then the number of cylinders can be found in an appendix of this document. If you have an SC02/A or SC12/A controller, then the number of cylinders can be found in an appendix of the appropriate controller technical manual.
3. Record the number of cylinders on the line labeled CYLINDERS, below. Remember to use **one-half** the number of cylinders for RP03 emulations.

CYLINDERS. _____

Record the number of cylinders minus 1 on the line labeled MAXCYL, below.

MAXCYL. _____

Multiply the number of cylinders by 200 decimal, and record the product on the line labeled BLOCKS, below.

BLOCKS. _____

You will be substituting these values for their variable names in the edit session later.

4. Edit the file DP.MAC, making the following changes. (**Remember to place trailing decimal points on the inserted numbers.**)

Locate the following line:

```
.DRDEF DP,21,FILST$,40000.,176710,254
```

Change it to read:

```
.DRDEF DP,21,FILST$,BLOCKS.,176710,254
```

where BLOCKS. is the value from the drive size table.

5. Next, locate the label L1:. Advance one line. It should read:

```
CMP R3,#202.
```

Change this line to read:

```
CMP R3,#MAXCYL.
```

again substituting the value from the table for MAXCYL.

6. This next location is to be patched only if you are using an RP03 emulation, **not an RP02 emulation**. Skip this step if you are using an RP02 emulation. If you are using an RP03 emulation, move back three lines in the file. This line should read:

```
ADD      #200.,R3
```

Change it to read:

```
ADD      #CYLINDERS.,R3
```

again substituting the value in the table for CYLINDERS.

7. Exit the edit session and proceed with the system generation procedure, through the section where you rename the .SYG files from the SYSGEN to .SYS files.
8. If you have been running from the SCxx/Ax disk, be sure to do a SQUEEZE SY: command now to compress your system disk. This command will modify the stored capacity of your disk to reflect the actual number of blocks on the drive.
9. Your patch is now complete.

2.2.2 RT11 V4.0 PATCHES FOR RK06/07

2.2.2.1 Patch Description

This patch modifies RT11 V4.0 to permit the use of non-standard disk drive sizes with the Emulex SCxx/C controllers (RK06/07 emulations).

2.2.2.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

The only area in the RT11 system that requires patching for modified-capacity disks is the disk driver. The driver is edited (using a standard system editor) to reflect the modified values. Then the system is re-SYSGENed (the modified driver reassembled) to incorporate the changes in the disk drive's block size.

The Emulex SCxx/C disk controllers perform a logical mapping of the tracks and sectors onto the drive so that only the number of logical cylinders per drive needs to be changed. This is done in such a way that the number of heads is always 3 and the number of sectors is always 22, in agreement with the DEC standard. Therefore, the only difference between a modified-capacity drive and a standard-size drive is the number of cylinders per drive.

RT11 V4.0 Patches

The number of logical cylinders for the SCxx/C disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

2.2.2.3 Patch Procedure

1. Make a backup copy of the file DM.MAC and give it the name DM.DEC; this is the standard driver for RK06/07 disks.
2. Calculate the number of cylinders used per logical drive. The number of cylinders can be found in an appendix of the appropriate controller technical manual.
3. Record the number of cylinders on the line labeled CYLINDERS, below.

CYLINDERS. _____

Record the number of cylinders minus 1 on the line labeled MAXCYL, below.

MAXCYL. _____

You will substitute these values for their variable names later in the edit session.

4. Edit the file DM.MAC, making the following changes. (Remember to place trailing decimal points on the inserted numbers.)

Locate the following line:

```
.DRDEF DM,23,FILST$+<SPFUN$*RK6$B>,410.*3.*22.,177440,210
```

Change it to read:

```
.DRDEF DM,23,FILST$+<SPFUN$*RK6$B>,MAXCYL.*3.*22.,177440,-  
210
```

where MAXCYL. is the value from the drive size table.

5. This next location is patched only if you are using an RK07 emulation, not an RK06 emulation. Skip this step if you are using an RK06 emulation; otherwise, locate the following line:

```
DMDSI7 = 814.*3.*22.
```

Change it to read:

```
DMDSI7 = MAXCYL.*3.*22.
```

again substituting the value in the table for MAXCYL.

6. Exit the edit session and proceed with the system generation procedure, through the section in which you rename the .SYG files from the SYSGEN to .SYS files.
7. If you have been running from the SCxx/Cx disk, be sure to do a SQUEEZE SY: command now to compress your system disk. This command will modify the stored capacity of your disk to reflect the actual number of blocks on the drive.
8. Your patch is now complete.

2.2.3 RT11 V4.0 PATCHES FOR RL01/02

2.2.3.1 Patch Description

This patch modifies RT11 V4.0 to permit the use of non-standard disk drive sizes with the Emulex SCxx/L controllers (RL01/02 emulations).

2.2.3.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

The only area in the RT11 system that requires patching for modified-capacity disks is the disk driver. The driver is edited (using a standard system editor) to reflect the modified values. Then the system is re-SYSGENed (the modified driver reassembled) to incorporate the changes in the disk drive's block size.

The Emulex SCxx/L disk controllers perform a logical mapping of the tracks and sectors onto the drive so that only the number of logical cylinders per drive needs to be changed. This is done in such a way that the number of heads is always 2 and the number of sectors is always 40, in agreement with the DEC standard. Therefore, the only difference between a modified-capacity drive and a standard-size drive is the number of cylinders per drive.

The number of logical cylinders for the SCxx/L disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

2.2.3.3 Patch Notes

Although the DEC RL01 and RL02 have 40 sectors, you should assume that they have 20. This is because the number of bytes per sector is 256, whereas a DEC "block" is made up of 512 bytes. Therefore, to fill up a normal block of data, two sequential sectors must be read. This is handled in the DEC disk drivers and should be ignored. When calculating block sizes, use a sector value of 20 instead of the actual 40.

CAUTION

When calculating the patch values for your RL01/02 patch, you must never exceed 512 cylinders. This is a hardware maximum for the controller which cannot be exceeded.

2.2.3.4 Patch Procedure

1. Make a backup copy of the file DL.MAC and give it the name DL.DEC; this is the standard driver for RL01/02 disks.
2. Calculate the number of cylinders used per logical drive. The number of cylinders can be found in the appendix of the appropriate controller technical manual.
3. Record the number of cylinders on the line labeled CYLINDERS, below.

CYLINDERS. _____

You will substitute this value for its variable name later in the edit session.

4. Edit the file DL.MAC, making the following changes. **(Remember to place trailing decimal points on the inserted numbers.)**

(RL01) If you are emulating an RL01, locate the following line:

DLSIZE = <256.*2-1> * DLBPT - DLNBAD

Change it to read:

DLSIZE = <CYLINDERS.*2-1> * DLBPT - DLNBAD

where CYLINDERS. is the value from the drive size table.

(RL02) If you are emulating an RL02, locate the following line:

DLSIZ2 = <512.*2-1> * DLBPT - DLNBAD

Change it to read:

DLSIZ2 = <CYLINDERS.*2-1> * DLBPT - DLNBAD

again substituting the value in the table for CYLINDERS.

5. Exit the edit session and proceed with the system generation procedure, through the section in which you rename the .SYG files from the SYSGEN to .SYS files.
6. If you have been running from the SCxx/Lx disk, be sure to do a SQUEEZE SY: command now to compress your system disk. This command will modify the stored capacity of your disk to reflect the actual number of blocks on the drive.
7. Your patch is now complete.

RT11 V5.0 Patches

2.3 RT11 V5.0 PATCHES

2.3.1 RT11 V5.0 PATCHES FOR RP02/03

2.3.1.1 Patch Description

This patch modifies RT11 V5.0 to permit the use of non-standard disk drive sizes with the Emulex SCxx/A controllers (RP02/03 emulations).

2.3.1.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

The only area in the RT11 system that requires patching for modified capacity disks is the disk driver. The driver is edited (using a standard system editor) to reflect the modified values. Then the system is re-SYSGENed (the modified driver reassembled) to incorporate the changes in the disk drive's block size.

The Emulex SCxx/A disk controllers perform a logical mapping of the tracks and sectors onto the drive so that only the number of logical cylinders per drive needs to be changed. This is done in such a way that the number of heads is always 20 and the number of sectors is always 10, in agreement with the DEC standard. Therefore, the only difference between a modified-capacity drive and a standard-size drive is the number of cylinders per drive.

The number of logical cylinders for the SC01/Ax and SC11/Ax controllers can be found in Appendix B of this document. The number of logical cylinders for the SC02/Ax and SC12/Ax disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

2.3.1.3 Patch Notes

Although the RP03 is a supported disk under the RT11 operating system, its size presents a problem: the number of blocks (234200 octal) is too large to fit into 16 bits. The RT11 operating system compensates for this by breaking the physical unit into two logical units (numbers 0 and 4), equivalent in size to a single RP02.

Therefore, when applying this patch, use the integer value of the cylinders **divided by 2** for the number of cylinders in the following sections. (The largest size that can be represented in 16 bits is 65535, so the maximum number of cylinders should never exceed 327 cylinders.)

2.3.1.4 Patch Procedure

1. Make a backup copy of the file DP.MAC and give it the name DP.DEC; this is the standard driver for RP02/03 disks.

2. Calculate the number of cylinders used per logical drive. If you have an SC01/A or SC11/A controller, then the number of cylinders can be found in an appendix of this document. If you have an SC02/A or SC12/A controller, then the number of cylinders can be found in an appendix of the appropriate controller technical manual.
3. Record the number of cylinders on the line labeled CYLINDERS, below. Remember to use one-half the number of cylinders for RP03 emulations.

CYLINDERS. _____

Record the number of cylinders minus 1 on the line labeled MAXCYL below.

MAXCYL. _____

Multiply the number of cylinders by 200 decimal, and record the product on the line labeled BLOCKS, below.

BLOCKS. _____

You will substitute these values for their variable names later in the edit session.

4. Edit the file DP.MAC, making the following changes. (Remember to place trailing decimal points on the inserted numbers.)

Locate the following line:

```
.DRDEF DP,21,FILST$,40000.,176710,254
```

Change it to read:

```
.DRDEF DP,21,FILST$,BLOCKS.,176710,254
```

where BLOCKS. is the value from the drive size table.

5. Next, locate the label L1:. Advance one line. It should read:

```
CMP R3,#202.
```

Change this line to read:

```
CMP R3,#MAXCYL.
```

again substituting the value from the table for MAXCYL.

RT11 V5.0 Patches

6. This next location is to be patched only if you are using an RP03 emulation, not an RP02 emulation. Skip this step if you are using an RP02 emulation. If you are using an RP03 emulation, move back three lines in the file. This line should read:

```
ADD          #200.,R3
```

Change it to read:

```
ADD          #CYLINDERS.,R3
```

again substituting the value in the table for CYLINDERS.

7. Exit the edit session and proceed with the system generation procedure, through the section in which you rename the .SYG files from the SYSGEN to .SYS files.
8. If you have been running from the SCxx/Ax disk, be sure to do a SQUEEZE SY: command now to compress your system disk. This will modify the stored capacity of your disk to reflect the actual number of blocks on the drive.
9. Your patch is now complete.

2.3.2 RT11 V5.0 PATCHES FOR RK06/07

2.3.2.1 Patch Description

This patch modifies RT11 V5.0 to permit the use of non-standard disk drive sizes with the Emulex SCxx/C controllers (RK06/07 emulations).

2.3.2.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

The only area in the RT11 system that requires patching for modified-capacity disks is the disk driver. The driver is edited (using a standard system editor) to reflect the modified values. Then the system is re-SYSGENed (the modified driver reassembled) to incorporate the changes in the disk drive's block size.

The Emulex SCxx/C disk controllers perform a logical mapping of the tracks and sectors onto the drive so that only the number of logical cylinders per drive needs to be changed. This is done in such a way that the number of heads is always 3 and the number of sectors is always 22, in agreement with the DEC standard. Therefore, the only difference between a modified-capacity drive and a standard-size drive is the number of cylinders per drive.

The number of logical cylinders for the SCxx/C disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

2.3.2.3 Patch Procedure

1. Make a backup copy of the file DM.MAC and give it the name DM.DEC; this is the standard driver for RK06/07 disks.
2. Calculate the number of cylinders used per logical drive. The number of cylinders can be found in the appendix of the appropriate controller technical manual.
3. Record the number of cylinders on the line labeled CYLINDERS below.

CYLINDERS. _____

Record the number of cylinders minus 1 on the line labeled MAXCYL below.

MAXCYL. _____

You will substitute these values for their variable names later in the edit session.

4. Edit the file DM.MAC, making the following changes. (Remember to place trailing decimal points on the inserted numbers.)

(RK06) If you are emulating an RK06, locate the following line:

DMDSI6 = 410.*3.*22.

Change it to read:

DMDSI6 = MAXCYL.*3.*22.

where MAXCYL. is the value from the drive size table.

(RK07) If you are emulating an RK07, locate the following line:

DMDSI7 = 814.*3.*22.

Change it to read:

DMDSI7 = MAXCYL.*3.*22.

again substituting the value in the table for MAXCYL.

RT11 V5.0 Patches

5. Exit the edit session and proceed with the system generation procedure, through the section in which you rename the .SYG files from the SYSGEN to .SYS files.
6. If you have been running from the SCxx/Cx disk, be sure to do a SQUEEZE SY: command now to compress your system disk. This command will modify the stored capacity of your disk to reflect the actual number of blocks on the drive.
7. Your patch is now complete.

2.3.3 RT11 V5.0 PATCHES FOR RL01/02

2.3.3.1 Patch Description

This patch modifies RT11 V5.0 to permit the use of non-standard disk drive sizes with the Emulex SCxx/L controllers (RL01/02 emulations).

2.3.3.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

The only area in the RT11 system that requires patching for modified-capacity disks is the disk driver. The driver is edited (using a standard system editor) to reflect the modified values. Then the system is re-SYSGENed (the modified driver reassembled) to incorporate the changes in the disk drive's block size.

The Emulex SCxx/L disk controllers perform a logical mapping of the tracks and sectors onto the drive so that only the number of logical cylinders per drive needs to be changed. This is done in such a way that the number of heads is always 2 and the number of sectors is always 40, in agreement with the DEC standard. Therefore, the only difference between a modified-capacity drive and a standard-size drive is the number of cylinders per drive.

The number of logical cylinders for the SCxx/L disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

2.3.3.3 Patch Notes

Although the DEC RL01 and RL02 have 40 sectors, you should assume that they have 20. This is because the number of bytes per sector is 256, whereas a DEC "block" is made up of 512 bytes. Therefore, to fill up a normal block of data, two sequential sectors must be read. This is handled in the DEC disk drivers and should be ignored. When calculating block sizes, use a sector value of 20 instead of the actual 40.

CAUTION

When calculating the patch values for your RL01/02 patch, you must never exceed 512 cylinders. This is a hardware maximum for the controller which cannot be exceeded.

2.3.3.4 Patch Procedure

1. Make a backup copy of the file DL.MAC and give it the name DL.DEC; this is the standard driver for RL01/02 disks.
2. Calculate the number of cylinders used per logical drive. The number of cylinders can be found in the appendix of the appropriate controller technical manual.
3. Record the number of cylinders on the line labeled CYLINDERS, below.

CYLINDERS. _____

You will be substituting this value for its variable name later in the edit session.

4. Edit the file DL.MAC, making the following changes. (Remember to place trailing decimal points on the inserted numbers.)

(RL01) If you are emulating an RL01, locate the following line:

DLSIZE = <256.*2-1> * DLBPT - DLNBAD

Change it to read:

DLSIZE = <CYLINDERS.*2-1> * DLBPT - DLNBAD

where CYLINDERS. is the value from the drive size table.

(RL02) If you are emulating an RL02, locate the following line:

DLSIZ2 = <512.*2-1> * DLBPT - DLNBAD

Change it to read:

DLSIZ2 = <CYLINDERS.*2-1> * DLBPT - DLNBAD

again substituting the value in the table for CYLINDERS.

5. Exit the edit session and proceed with the system generation procedure, through the section where you rename the .SYG files from the SYSGEN to .SYS files.

RT11 V5.0 Patches

6. If you have been running from the SCxx/Lx disk, be sure to do a SQUEEZE SY: command now to compress your system disk. This command will modify the stored capacity of your disk to reflect the actual number of blocks on the drive.
7. Your patch is now complete.

2.3.4 RT11 V5.0 22-BIT PATCHES FOR SC02/C

2.3.4.1 Patch Description

The DEC RK611 controller is an 18-bit UNIBUS disk controller. That is, it can access a memory address range of only 256K bytes (without memory mapping). The Emulex SC02/C is an LSI-11 bus disk controller that has the hardware capability of addressing a 22-bit memory address range (4M bytes).

RT11 Version 5.0 introduced 22-bit memory addressing to the RT11 system in the Extended Memory Monitor (XM monitor). This patch modifies the RT11 RK06/7 disk driver to pass a 22-bit memory address to the Emulex SC02/C disk controller.

2.3.4.2 Patch Explanation

This patch modifies the RT11 RK06/7 disk driver (DM.SYS) to place the most significant bits of the memory transfer address (bits <21:16>), ORed with the 22-bit address enable command, into the SPARE register of the SC02/C. Bits <21:18> are then masked off in preparation for setting up the CSR (RKCS1).

This patch requires modifications to the standard DEC RK06/7 disk driver (DM.MAC). The patch does not take effect until the system is SYSGENed (to compile the modified driver) and rebooted.

2.3.4.3 Patch Procedure

1. Boot your system, and edit the file DM.MAC.
2. Locate the line:

```
l$:      JSR          PC,@$MPPTR
```

3. Move down two lines. This line should read:

```
ASL     (SP)
```

4. Insert the following text before the above line:

```
.IF NE MMG $T                ; Only include this in DMX.SYS
MOV      (SP),-(SP)           ; Make a copy of the MSB
ASR      (SP)                 ; Shift the data from <9:4>
ASR      (SP)                 ; (left there earlier
ASR      (SP)                 ; assuming RK,RL,etc.)
ASR      (SP)                 ; Right justified to <5:0>
BIC      #177700,(SP)         ; Mask off all but <5:0>
BIS      #22000,(SP)         ; OR in SC02 enable bits
MOV      (SP)+,16(R4)         ; Store in the SPARE register
BIC      #1700,(SP)          ; Force MSB to 18 bits
.ENDC
```

5. Your patch is now complete, so exit the editor. Perform a normal system generation and reboot your system to install the XM monitor and the newly-patched DMX driver.

RT11 V5.1 Patches

2.4 RT11 V5.1 PATCHES

2.4.1 RT11 V5.1 PATCHES FOR RP02/03

2.4.1.1 Patch Description

This patch modifies RT11 V5.1 to permit the use of non-standard disk drive sizes with the Emulex SCxx/A controllers (RP02/03 emulations).

2.4.1.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

The only area in the RT11 system that requires patching for modified-capacity disks is the disk driver. The driver is edited (using a standard system editor) to reflect the modified values. Then the system is re-SYSGENed (the modified driver reassembled) to incorporate the changes in the disk drive's block size.

The Emulex SCxx/A disk controllers perform a logical mapping of the tracks and sectors onto the drive so that only the number of logical cylinders per drive needs to be changed. This is done in such a way that the number of heads is always 20 and the number of sectors is always 10, in agreement with the DEC standard. Therefore, the only difference between a modified-capacity drive and a standard-size drive is the number of cylinders per drive.

The number of logical cylinders for the SC01/Ax and SC11/Ax disk controllers can be found in Appendix B of this document. The number of logical cylinders for the SC02/Ax and SC12/Ax disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

2.4.1.3 Patch Notes

Although the RP03 is a supported disk under the RT11 operating system, its size presents a problem: the number of blocks (234200 octal) is too large to fit into 16 bits. The RT11 operating system compensates for this by breaking the physical unit into two logical units (numbers 0 and 4), equivalent in size to a single RP02.

Therefore, when applying this patch, use the integer value of the cylinders **divided by 2** for the number of cylinders in the sections below. (The largest size that can be represented in 16 bits is 65535, so the maximum number of cylinders should never exceed 327 cylinders.)

2.4.1.4 Patch Procedure

1. Make a backup copy of the file DP.MAC and give it the name DP.DEC; this is the standard driver for RP02/03 disks.

2. Calculate the number of cylinders used per logical drive. If you have an SC01/A or SC11/A controllers, then the number of cylinders can be found in an appendix of this document. If you have an SC02/A or SC12/A controller, then the number of cylinders can be found in an appendix of the appropriate controller technical manual.
3. Record the number of cylinders on the line labeled CYLINDERS below. Remember to use one-half the number of cylinders for RP03 emulations.

CYLINDERS. _____

Record the number of cylinders minus 1 on the line labeled MAXCYL below.

MAXCYL. _____

Multiply the number of cylinders by 200 decimal and record the product on the line labeled BLOCKS below.

BLOCKS. _____

You will substitute these values for their variable names later in the edit session.

4. Edit the file DP.MAC, making the following changes. (Remember to place trailing decimal points on the inserted numbers.)

Locate the following line:

```
.DRDEF DP,21,FILST$,40000.,176710,254
```

Change it to read:

```
.DRDEF DP,21,FILST$,BLOCKS.,176710,254
```

where BLOCKS. is the value from the drive size table.

5. Next, locate the label L1:. Advance one line. It should read:

```
CMP R3,#202.
```

Change this line to read:

```
CMP R3,#MAXCYL.
```

again substituting the value from the table for MAXCYL.

RT11 V5.1 Patches

6. This next location is to be patched only if you are using an RP03 emulation, not an RP02 emulation. Skip this step if you are using an RP02 emulation. If you are using an RP03 emulation, move back three lines in the file. This line should read:

```
ADD      #200.,R3
```

Change it to read:

```
ADD      #CYLINDERS.,R3
```

again substituting the value in the table for CYLINDERS.

7. Exit the edit session and proceed with the system generation procedure, through the section in which you rename the .SYG files from the SYSGEN to .SYS files.
8. If you have been running from the SCxx/Ax disk, be sure to do a SQUEEZE SY: command now to compress your system disk. This command will modify the stored capacity of your disk to reflect the actual number of blocks on the drive.
9. Your patch is now complete.

2.4.2 RT11 V5.1 PATCHES FOR RK06/07

2.4.2.1 Patch Description

This patch modifies RT11 V5.1 to permit the use of non-standard disk drive sizes with the Emulex SCxx/C controllers (RK06/07 emulations).

2.4.2.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

The only area in the RT11 system that requires patching for modified-capacity disks is the disk driver. The driver is edited (using a standard system editor) to reflect the modified values. Then the system is re-SYSGENed (the modified driver reassembled) to incorporate the changes in the disk drive's block size.

The Emulex SCxx/C disk controllers perform a logical mapping of the tracks and sectors onto the drive so that only the number of logical cylinders per drive needs to be changed. This is done in such a way that the number of heads is always 3 and the number of sectors is always 22, in agreement with the DEC standard. Therefore, the only difference between a modified-capacity drive and a standard-size drive is the number of cylinders per drive.

The number of logical cylinders for the SCxx/C disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

2.4.2.3 Patch Procedure

1. Make a backup copy of the file DM.MAC and give it the name DM.DEC; this is the standard driver for RK06/07 disks.
2. Calculate the number of cylinders used per logical drive. The number of cylinders can be found in the appendix of the appropriate controller technical manual.
3. Record the number of cylinders on the line labeled CYLINDERS, below.

CYLINDERS. _____

Record the number of cylinders minus 1 on the line labeled MAXCYL, below.

MAXCYL. _____

You will substitute these values for their variable names later in the edit session.

4. Edit the file DM.MAC, making the following changes. (Remember to place trailing decimal points on the inserted numbers.)

Locate the following line:

```
.DRDEF DM,23,FILST$+<SPFUN$*RK6$B>,410.*3.*22.,1777440,210
```

Change it to read:

```
.DRDEF DM,23,FILST$+<SPFUN$*RK6$B>,MAXCYL.*3.*22.,- 1777440,210
```

where MAXCYL. is the value from the drive size table.

5. This next location is to be patched only if you are using an RK07 emulation, not an RK06 emulation. Skip this step if you are using an RK06 emulation; otherwise, locate the following line:

```
DMDSI7 = 814.*3.*22.
```

Change it to read:

```
DMDSI7 = MAXCYL.*3.*22.
```

again substituting the value in the table for MAXCYL.

RT11 V5.1 Patches

6. Exit the edit session and proceed with the system generation procedure, through the section in which you rename the .SYG files from the SYSGEN to .SYS files.
7. If you have been running from the SCxx/Cx disk, be sure to do a SQUEEZE SY: command now to compress your system disk. This command will modify the stored capacity of your disk to reflect the actual number of blocks on the drive.
8. Your patch is now complete.

2.4.3 RT11 V5.1 PATCHES FOR RL01/02

2.4.3.1 Patch Description

This patch modifies RT11 V5.1 to permit the use of non-standard disk drive sizes with the Emulex SCxx/L controllers (RL01/02 emulations).

2.4.3.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

The only area in the RT11 system that requires patching for modified-capacity disks is the disk driver. The driver is edited (using a standard system editor) to reflect the modified values. Then the system is re-SYSGENed (the modified driver reassembled) to incorporate the changes in the disk drive's block size.

The Emulex SCxx/L disk controllers perform a logical mapping of the tracks and sectors onto the drive so that only the number of logical cylinders per drive needs to be changed. This is done in such a way that the number of heads is always 2 and the number of sectors is always 40, in agreement with the DEC standard. Therefore, the only difference between a modified-capacity drive and a standard-size drive is the number of cylinders per drive.

The number of logical cylinders for the SCxx/L disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

2.4.3.3 Patch Notes

Although the DEC RL01 and RL02 have 40 sectors, you should assume that they have 20. This is because the number of bytes per sector is 256, whereas a DEC "block" is made up of 512 bytes. Therefore, to fill up a normal block of data, two sequential sectors must be read. This is handled in the DEC disk drivers and should be ignored. When calculating block sizes, use 20 for the sector value instead of the actual value of 40.

CAUTION

When calculating the patch values for your RL01/02 patch, you must never exceed 512 cylinders. This is a hardware maximum for the controller which cannot be exceeded.

2.4.3.4 Patch Procedure

1. Make a backup copy of the file DL.MAC and give it the name DL.DEC; this is the standard driver for RL01/02 disks.
2. Calculate the number of cylinders used per logical drive. The number of cylinders can be found in the appendix of the appropriate controller technical manual.
3. Record the number of cylinders on the line labeled CYLINDERS, below.

CYLINDERS. _____

You will substitute this value for its variable name later in the edit session.

4. Edit the file DL.MAC, making the following changes. (Remember to place trailing decimal points on the inserted numbers.)

Locate the following line:

```
DLSIZE = <256.*2-1> * DLBPT - DLNBAD
```

Change it to read:

```
DLSIZE = <CYLINDERS.*2-1> * DLBPT - DLNBAD
```

where CYLINDERS. is the value from the drive size table.

5. This next location is to be patched only if you are using an RL02 emulation, **not** an RL01 emulation. Skip this step if you are using an RL01 emulation; otherwise, locate the following line:

```
DLsiz2 = <512.*2-1> * DLBPT - DLNBAD
```

Change it to read:

```
DLsiz2 = <CYLINDERS.*2-1> * DLBPT - DLNBAD
```

again substituting the value in the table for CYLINDERS.

RT11 V5.1 Patches

6. Exit the edit session and proceed with the system generation procedure, through the section in which you rename the .SYG files from the SYSGEN to .SYS files.
7. If you have been running from the SCxx/Lx disk, be sure to do a SQUEEZE SY: command now to compress your system disk. This command will modify the stored capacity of your disk to reflect the actual number of blocks on the drive.
8. Your patch is now complete.

2.4.4 RT11 V5.1 22-BIT PATCH FOR SC02/C

2.4.4.1 Patch Description

The DEC RK611 controller is an 18-bit UNIBUS disk controller. That is, it can access a memory address range of only 256K bytes (without memory mapping). The Emulex SC02/C is an LSI-11 bus disk controller that has the hardware capability of addressing a 22-bit memory address range (4M bytes).

RT11 Version 5 introduced 22-bit memory addressing to the RT11 system in the Extended Memory Monitor (XM monitor). This patch modifies the RT11 RK06/7 disk driver to pass a 22-bit memory address to the Emulex SC02/C disk controller.

2.4.4.2 Patch Explanation

This patch modifies the RT11 RK06/7 disk driver (DM.SYS) to place the most significant bits of the memory transfer address (bits <21:16>), ORed with the 22-bit address enable command, into the SPARE register of the SC02/C. Bits <21:18> are then masked off in preparation for setting up the CSR (RKCS1).

This patch requires modifications to the standard DEC RK06/7 disk driver (DM.MAC). The patch does not take effect until the system is SYSGENed (to compile the modified driver) and rebooted.

2.4.4.3 Patch Procedure

1. Boot your system, and edit the file DM.MAC.
2. Locate the line:

```
l$:      CALL          @$MPPTR
```

3. Move down two lines. This should read:

```
ASL      (SP)
```

4. Insert the following text before the above line:

```
.IF NE MMG$T ; Only include this in DMX.SYS
MOV (SP),-(SP) ; Make a copy of the MSB
ASR (SP) ; Shift the data from <9:4>
ASR (SP) ; (left there earlier
ASR (SP) ; assuming RK,RL,etc.)
ASR (SP) ; Right justified to <5:0>
BIC #177700,(SP) ; Mask off all but <5:0>
BIS #22000,(SP) ; OR in SC02 enable bits
MOV (SP)+,16(R4) ; Store in the SPARE register
BIC #1700,(SP) ; Force MSB to 18 bits
.ENDC
```

5. Your patch is now complete, so exit the editor. Perform a normal system generation and reboot your system to install the XM monitor and the newly-patched DMX driver.

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3.1 RSX-11M PATCH EXPLANATION

3.1.1 SECTION DESCRIPTION

This section explains the general procedure for patching the RSX-11M operating system for use with disk, tape, and communication controllers available from Emulex Corporation. No specific information on any patch or emulation is given in this section; this information is available in later sections.

3.1.2 INTENDED AUDIENCE

This document is designed for use by the system manager of a given site, or by an agent of the system manager assigned the task of installing an RSX-11M system or doing a system generation. This manual assumes a fairly high degree of familiarity with RSX-11M operations, management, and utility procedures.

3.1.3 REQUIRED PATCHES

There are four basic types of patch methods to RSX-11M:

- SYSGEN command file patch .CMD (Use EDI)
- MACRO source file patch .MAC (Use EDI)
- TASK image file patch .TSK (Use ZAP)
- LIBRARY routine patch (Use EDI, PAT, or ZAP with LBR)

Many different areas of RSX-11M may require patching to fully modify the capacity of a disk drive or add 22-bit support:

SGNPER.CMD This is the SYSGEN command file that builds the file **SYSTB.MAC**. If the patches are made to the SGNPER command file, patches to SYSTB.MAC are not necessary.

SYSTB.MAC This is a source file in the executive that contains a table of the device sizes for each unit on the system. Any emulation that changes the number of logical blocks on a disk type requires a corresponding patch installed in SYSTB.

The source to SYSTB is edited at a breakpoint in the SYSGEN command procedure specifically for executive modifications. This source must be edited every time a SYSGEN is performed.

RSXMC.MAC This is a system conditional file containing some system- and device-specific data.

RSX-11M Patch Explanation

RSXDRVASM.CMD
SGNEXEC.CMD

These are two of the SYSGEN command files.

xxDRV.MAC

This is the driver for device xx. Patches are made to the driver for disk capacity changes or adding 22-bit support.

If the modified size of the disk includes a geometry change (modifying the number of sectors or the number of heads), the corresponding driver must be changed to modify its algorithms for converting a logical block number into a drive location.

SAV,BOO,INI

Privileged tasks. No sources available.

**BAD,FMT,
DSC,BRU**

These utilities are patched either as library modules (before SYSGEN) or after they have been task built (after SYSGEN).

SAVSIZ.MAC
SAVxx.MAC

These routines also contain the block counts for all of the drive types. They are included in some of the privileged tasks that may need to access the drives without going through SYSTB or the driver.

RSX11M.SYS

RSX system image.

BRU64K.SYS

If the size or the geometry of the disks is changed and you wish to use the stand-alone version of BRU, this program must also be patched.

NOTE

If you get a tape distribution from DEC, it must be one that can be copied onto a disk other than the modified-capacity Emulex disk. This is because it is not possible to copy the system onto the disk without patching the stand-alone utilities, and it is not possible to patch the utilities without copying the system onto the disk.

3.1.4 PATCH PROCEDURE (OUTLINE)

The RSX-11M system to be patched must be resident on a disk (other than a modified-capacity disk) while the patches are being installed. The following paragraphs explain how this is done for the various

types of RSX-11M distributions: disk, tape for standard-size disk, and tape for modified-capacity disk.

These patch procedures apply only to modified disk capacity patches. If your patch is not a modified disk capacity patch, skip this section.

- If your RSX-11M distribution is on disk, use the first procedure described in the following text: Disk Distributions.
- If your RSX-11M distribution is on tape, and you have a supported DEC disk or an exact DEC emulation, use the second procedure, Tape Distributions. This procedure includes any of the Emulex standard-capacity DEC emulations.
- If you have only a tape drive and a modified-capacity disk, use the third procedure: Tape Distribution (Emulex Disk).

3.1.5 PATCH PROCEDURE--DISK DISTRIBUTIONS

Systems that have a standard DEC disk (RK06/7, RL01/2) in addition to their modified Emulex disk can order and receive an RSX-11M disk distribution from DEC. The SYSGEN procedure will execute from the standard DEC disk, and the patches for the modified disk will be installed during the SYSGEN. When the SYSGEN is complete, the modified disk can be formatted, BADed, and initialized.

On some disk distributions, the sources are distributed on separate physical disk packs. You should check the SYSGEN manual for a description of which disk contains a specific source module.

3.1.6 PATCH PROCEDURE--TAPE DISTRIBUTIONS

Customers who receive a magtape distribution of RSX-11M must specify the type of disk to which the magtape is to be copied. This disk must be a DEC disk or an exact emulation of a DEC disk (not a modified-capacity emulation). Customers who have only a tape drive and a modified-capacity Emulex disk on their systems will not be able to install the patches for the modified capacity. These customers could run at a standard capacity if their controller and disk will support it.

3.1.7 PATCH PROCEDURE--TAPE DISTRIBUTIONS (EMULEX DISK)

This procedure assumes that you are doing a system generation on a disk other than the modified Emulex disk. If you have only the Emulex disk (and a tape drive) on the system, you must execute the following steps to expand the capacity of your system disk:

RSX-11M Patch Explanation

1. Set up your Emulex controller to run in standard DEC-compatible mode, if possible.
2. Use the standard distribution BRU tape to initialize and copy your baseline tape onto the system disk.
3. Boot the system disk and type <ctrl-z> (the CONTROL and Z keys pressed simultaneously, also symbolized ^Z) to halt the execution of the startup file when you are prompted for the date and time.
4. Set your UIC to [1,51] and use ZAP to modify the file BRU64K.SYS, as shown in the patch procedure section of your patch.
5. Use the VMR SAVE command to make a bootable tape containing the modified stand-alone BRU.
6. Halt the system. (Do not worry about your disk; you are going to scratch the data on it anyway.)
7. Power down the system, and reconfigure the Emulex controller and disk drive to the modified capacity (if necessary). Do a hardware format of the disk, and a diagnostic format if necessary to create a manufacturer's bad block file on the disk.
8. Boot the modified BRU tape, and use it to re-copy the baseline tape onto the system disk. It will write over the old system and re-initialize the disk to the new (expanded) size.
9. Boot the new system disk and proceed with the system generation as usual.

3.1.8 PATCH INSTALLATION INSTRUCTIONS

Emulex patches to RSX-11M are performed in one of three ways:

- Editing a source file or SYSGEN command file using the \$EDI utility
- Creating an edit command file (using \$EDI) for use with the \$SLP utility
- Using the \$ZAP utility to modify task images or object library modules

For a full explanation for the use of \$EDI, \$PAT, or \$ZAP, see the RSX-11M System Manager's Guide.

CAUTION

When patching tasks through the ZAP program, you will be given a base, an offset, a value that should be at that location, and a value to change that location to. If the value at that offset is not what it should be, **do not apply the patch**. Something is wrong, and applying the patch will only worsen the situation. Please call Emulex Software Support for assistance.

3.2 RSX-11M V4.0 PATCHES**3.2.1 RSX-11M V4.0 PATCHES FOR RP02/03****3.2.1.1 Patch Description**

This patch modifies RSX-11M V4.0 to permit the use of non-standard disk drive sizes with the SCxx/A controllers (RP02/03 emulations).

3.2.1.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

There are three areas in the RSX-11M system that may require patching: the system device table SYSTB.MAC, to show the extended or contracted capacity; the appropriate driver; and the various disk utilities that use that driver.

The patches to the device tables and the device driver are applied to the macro source code by means of an editor, and are then installed using the LBR or SLP utility. The patches to the various utilities are made to the task images using the RSX-11M ZAP utility.

The Emulex SCxx/A disk controllers perform a logical mapping of the tracks and sectors onto the drive so that only the number of logical cylinders per drive needs to be changed. This is done in such a way that the number of heads is always 20 and the number of sectors is always 10, in agreement with the DEC standard. Therefore, the only difference between a modified-capacity drive and a standard-size drive is the number of cylinders per drive.

The number of logical cylinders for the SC01/Ax and SC11/Ax controllers can be found in Appendix B of this document. The number of logical cylinders for the SC02/Ax and SC12/Ax disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

RSX-11M V4.0 Patches

Because the disk size is the only area requiring modification for the RP02/03 patch, the RP driver does not require patches. The only areas that require patching are the device table SYSTB.MAC and a few utilities.

3.2.1.3 Patch Procedure

1. Find the number of cylinders used per logical drive for your controller. If you have an SC01/A or SC11/A controller, then the number of cylinders can be found in Appendix A of this document. If you have an SC02/A or SC12/A controller, the number of cylinders can be found in an appendix of the appropriate controller technical manual.
2. Record the number of cylinders on the line labeled CYLINDERS, below.

CYLINDERS. _____

Multiply the number of cylinders by 200 decimal and record the product on the line labeled BLOCKS, below.

BLOCKS. _____

Convert the number of BLOCKS to octal and store the resulting value on the line labeled blocks, below.

blocks _____

Divide the number of blocks into two 16-bit words. Store the most significant 16-bit word on the line labeled msblock, and the least significant 16-bit word on the line labeled lsblock.

msblock _____

lsblock _____

You will substitute these values for their variable names later in the edit session.

3. Perform a normal SYSGEN, as if you were building a system to include an RP02/03 disk subsystem.
4. After the query section has finished, SYSGEN will ask:

>* Do you want to edit any of the query section output files [Y/N]: Y

Answer Y, as shown above. The indirect command processor will pause and print the following message:

AT. -- PAUSING. TO CONTINUE TYPE "RES ...AT."

5. Edit the file SYSTB.MAC as shown in the following example, replacing the variable names with their corresponding values, which you calculated in step 2.

If the drive is configured as an RP02, type:

```
>EDI SYSTB.MAC
[000XX LINES READ IN]
[PAGE 0]
*PL .DP0::
.DP0::
*PL 116100
                .WORD    116100
*C/116100/lsblock/
                .WORD    lsblock
*N-1
                .WORD    0
*C/0/msblock/
                .WORD    msblock
*
```

If the drive is configured as an RP03, type:

```
>EDI SYSTB.MAC
[000XX LINES READ IN]
[PAGE 0]
*PL .DP0::
.DP0::
*PL 034200
                .WORD    034200
*C/034200/lsblock/
                .WORD    lsblock
*N-1
                .WORD    100001
*C/100001/lmsblock/
                .WORD    lmsblock
*
```

Please note that we are changing only the last two digits of the most significant word of the block count, not the entire word. It is important that you do not change the whole word, as the upper bits are used by RSX.

6. If you have SYSGENed more than one RP02/03 drive, repeat step 5 for each drive SYSGENed, substituting the logical drive mnemonic for .DP0:: (.DP1::, .DP2::, etc.).
7. When all drive table entries have been edited, exit from the editor:

```
*ED
[EXIT]
```

RSX-11M V4.0 Patches

8. Resume the SYSGEN command procedure with the command:

```
>RES ...AT.
```

9. The SYSGEN will continue to completion. Next, find the map for the file SAV.TSK. It should be in [1,34]; if it is not there, then you failed to specify SY: as the map device. In this case, you must edit the file [1,24]SAVBLD.COMD, changing the NL: in the map file specification to SY:. Then set your UCI to [1,54] and re-TKB the file by typing:

```
>TKB @SAVBLD
```

This should get you the map file. Once that is done, look up the offset for SAVSIZ. Then patch the file SAV.TSK. Type:

```
SET /UIC=[1,54]  
RUN $ZAP  
ANSWER WITH "SAV.TSK/LI"
```

Locate the section with SAVSIZ in the map of SAV.TSK. Change location <SAVSIZ>+46 to msblock and location <SAVSIZ>+50 to lsblock. Exit from ZAP.

10. Boot in the new RSX-11M system SYSGENed. It should respond with the RSX-11M header and a prompt >. Enter <return> (carriage return), and enter the time in the form:

```
TIM HH:MM DD-MMM-YY
```

If the system does not accept the time, then you made a mistake in your SYSGEN and the system will not boot. Do not save this system! Go back and try to find your mistake.

If the system accepts the time, SAV the system with a /WB to the system disk.

11. Your patch is now complete.

3.2.2 RSX-11M V4.0 PATCHES FOR RM02/03/05

3.2.2.1 Patch Description

This patch modifies RSX-11M V4.0 to permit the use of non-standard disk drive sizes with the Emulex SCxx/B1 and SCxx/B3 controllers (RM02/03/05 emulations).

3.2.2.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

There are three areas in the RSX-11M system that may require patching: the system device table SYSTB.MAC, to show the extended or contracted capacity; the appropriate driver; and the various disk utilities that use that driver.

The patches to the device tables and the device driver are applied to the macro source code by means of an editor, and are then installed using the LBR or the SLP utility. The patches to the various utilities are made to the task images using the RSX-11M ZAP utility.

The Emulex SCxx/B disk controllers perform a logical mapping of the cylinders, tracks, and sectors onto the drive. The number of logical cylinders, tracks, and sectors for the SCxx/B disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

3.2.2.3 Patch Procedure

1. Perform a normal SYSGEN, as if building a system to include an RM02/03/05 disk system. It is recommended that you do a "prep-gen" first to create the SYSSAVED.COMD file. Then execute the SYSGEN procedure, using the saved command file. Answer N (no) to the question:

Skip end of section breakpoints?

2. After the query section has finished, SYSGEN asks:

>* EOS * DO YOU WANT TO: <CR>-CONTINUE R-REPEAT E-EXIT-
P-PAUSE [S]:

Answer P to the SYSGEN question. The indirect command file processor will suspend itself to allow the editing.

AT. -- PAUSING. TO CONTINUE, TYPE "RES ...AT."

3. Refer to the appendices for the entry that matches the configuration of your drive. Substitute the values found in that entry for the variables named in the rest of this patch.
4. Edit the file SYSTB.MAC as shown, substituting the values from the table for their variable names.

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```
>EDI SYSTB.MAC
[00039 LINES READ IN]
[PAGE 0]
*PL .DR0::
.DR0::
*PL 1140
.WORD 001140
*C/001140/lsblock/
.WORD 1sblock
*N-1
*C/000002/msblock/
.WORD msblock
```

5. If you have SYSGENed more than one RM02/03/05 drive, repeat step 4 for each drive SYSGENed, substituting the logical drive mnemonic for .DR0:: (.DR1::, .DR2::, etc.).
6. When all drive table entries have been edited, exit from the editor:

```
*ED
[EXIT]
```

7. Now edit the driver, DRDRV.MAC:

```
>EDI DRDRV.MAC
[00039 LINES READ IN]
[PAGE 0]
*PL PRMTBL:
PRMTBL:
*<return>
DVPRM <2,1140>,5,32.,0
*C/2,1140>,5/msblock,lsblock>,tracks/
DVPRM <msblock,lsblock>,tracks,32.,0
*<return>
DVPRM <2,1140>,5,32.,0
*C/2,1140>,5/msblock,lsblock>,tracks/
DVPRM <msblock,lsblock>,tracks,32.,0
*ED
[EXIT]
```

8. Resume the SYSGEN command procedure with the command:

```
>RES ...AT.<ESC>
```

9. Be certain to obtain the LOAD Maps for SAV.TSK, BOO.TSK, BAD.TSK, and INI.TSK, as these files MUST be patched. The SYSGEN may now continue to completion, but should be stopped before SAVING the new system so that the following patches can be applied:

- a. Patch SAV.TSK as follows:

```
SET /UIC=[1,54]
RUN $ZAP
Answer with SAV.TSK/LI
Locate section <SAVSIZ> on the load map SAV.TSK
Change <SAVSIZ> + 56 from 000002 to msblock
Change <SAVSIZ> + 60 from 001140 to lsblock
Locate section <SAVDR> on the load map of SAV.TSK
Change <SAVDR> + 160 from 000005 to tracks
Exit from ZAP
```

NOTE

SAV.TSK must be patched if the disk is not the system disk. SAV.TSK updates system tables on disk storage sizes, and if not patched, INI.TSK will initialize the disk with the original block count.

- b. Patch BOO.TSK as follows:

```
SET /UIC=[1,54]
RUN $ZAP
Answer with BOO.TSK/LI
Locate section <SAVDR> on the load map of BOO.TSK
Change <SAVDR> + 160 from 000005 to tracks
Exit from ZAP
```

- c. Patch BAD.TSK as follows:

```
SET /UIC=[1,54]
RUN $ZAP
Answer with BAD.TSK/LI
Locate section <BADDAT> on the load map of BAD.TSK
Change <BADDAT> + 2016 from 000002 to msblock
Change <BADDAT> + 2020 from 001140 to lsblock
Change <BADDAT> + 2022 from 000005 to tracks
Change <BADDAT> + 2032 from 000240 to tracks*sectors
Exit from ZAP
```

- d. Patch INI.TSK as follows:

```
SET /UIC=[1,54]
RUN $ZAP
Answer with INI.TSK/LI
Locate section <INIBAD> on the load map of INI.TSK
Change <INIBAD> + 2214 from 000002 to msblock
Change <INIBAD> + 2216 from 001140 to lsblock
Change <INIBAD> + 2220 from 001467 to cylinders
Change <INIBAD> + 2222 from 020005 to
<sectors*256.>+tracks
Change <INIBAD> + 2224 from 020001 to <sectors*256.>+1
Exit from ZAP
```

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e. Patch FMT.TSK as follows:

```
SET /UIC=[1,54]
RUN $ZAP
Answer with FMT.TSK/LI
Locate section <FMTDAT> on the load map of FMT.TSK
Change <FMTDAT> + 44216 from 000002 to msblock
Change <FMTDAT> + 44220 from 001140 to lsblock
Change <FMTDAT> + 44222 from 001467 to cylinders
Change <FMTDAT> + 44224 from 000005 to tracks
Exit from ZAP
```

10. The SYSGEN may now continue to completion. Use the BAD.TSK and INI.TSK utilities to initialize a new system disk, and then transfer all files required for system operation to the new disk. If you use FMT, remember to use the /WLT (write last track) switch to update the manufacturer's bad block file. BOOT the new system just created and SAVE it (/WB) with a bootstrap on the new disk.

3.2.3 RSX-11M V4.0 PATCHES FOR RP06

3.2.3.1 Patch Description

This patch modifies RSX-11M V4.0 to permit the use of non-standard disk drive sizes with the Emulex SCxx/B2 and SCxx/B4 controllers (RP06 emulations).

3.2.3.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

There are three areas in the RSX-11M system that may require patching: the system device table SYSTB.MAC, to show the extended or contracted capacity; the appropriate driver; and the various disk utilities that use that driver.

The patches to the device tables and the device driver are applied to the macro source code by means of an editor, and are then installed using the LBR or the SLP utility. The patches to the various utilities are made to the task images using the RSX-11M ZAP utility.

The Emulex SCxx/B disk controllers perform a logical mapping of the cylinders, tracks, and sectors onto the drive. The number of logical cylinders, tracks, and sectors for the SCxx/B disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

3.2.3.3 Patch Procedure

1. Perform a normal SYSGEN, as if building a system to include an RP06 disk system. It is recommended that you do a "prep-gen" first to create the SYSSAVED.COMD file. Then execute the SYSGEN procedure using the saved command file. Answer Y (yes) to the question:

Skip end of section breakpoints?

2. After the query section has finished, SYSGEN asks:

>* EOS * DO YOU WANT TO: <CR>-CONTINUE R-REPEAT E-EXIT
P-PAUSE [S]:

Answer P. The indirect command file processor will suspend itself to allow the editing.

3. Type the following:

```
>EDI SYSTB.MAC
[00036 LINES READ IN]
[PAGE 0]
*
```

4. The file SYSTB.MAC is now available for editing.
5. Refer to the appendices for the method to calculate the values that match the configuration of your drive. Use the octal values from this table for the variables used in the rest of this patch.

```
*PL .DB0::
.DB0::
*PL 31276
   .WORD      31276
*C/31276/lsblock/
   .WORD      lsblock
*N-1
*C/000005/msblock/
   .WORD      msblock
```

6. If you have SYSGENed more than one RP06 drive, repeat step 5 for each drive SYSGENed, substituting the logical drive mnemonic for .DB0:: (.DB1::, .DB2::, etc.).
7. When all drive table entries have been edited, exit from the editor:

```
*ED
[EXIT]
```

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8. Now edit the driver, DBDRV.MAC:

```
>EDI DBDRV.MAC
[00036 LINES READ IN]
[PAGE 0]
*PL 22.
  DIV      #22.,R0
*C/22./sectors/
  DIV      #sectors,R0
*PL 22.
  CMP      R2,#19.*22.
*C/19.*22./tracks*sectors/
  CMP      R2,#tracks*sectors
*PL 22.
  SUB      #19.*22.,R2
*C/19.*22./tracks*sectors/
  SUB      #tracks*sectors,R2
*PL 22.
  MOV      #22.,R1
*C/22./sectors/
  MOV      #sectors,R1
*PL 22.
460$: CMPB  #22.,R0
*C/22./sectors/
460$: CMPB  #sectors,R0
*PL 22.
  SUB      #22.,R0
*C/22./sectors/
  SUB      #sectors,R0
*ED
[EXIT]
```

9. Resume the SYSGEN command procedure with the command:

```
>RES ...AT.<ESC>
```

10. Be certain to obtain the LOAD Maps for SAV.TSK and BOO.TSK, as these files must be patched. The SYSGEN may now continue to completion, but should be stopped before you save the new system so that the following patches can be applied:

- a. Patch SAV.TSK as follows:

```
SET /UIC=[1,54]
RUN $ZAP
Answer with SAV.TSK/LI
Locate section <SAVSIZ> on the load map SAV.TSK
Change <SAVSIZ> + 752 from 000005 to msblock
Change <SAVSIZ> + 760 from 031276 to lsbblock
Locate section <SAVDB> on the load map of SAV.TSK
Change <SAVDB> + 54 from 000026 to tracks
Exit from ZAP
```

b. Patch BOO.TSK as follows:

```

SET /UIC=[1,54]
RUN $ZAP
Answer with BOO.TSK/LI
Locate section <SAVDB> on the load map of BOO.TSK
Change <SAVDB> + 54 from 000026 to tracks
Exit from ZAP

```

Note that INI.TSK and BAD.TSK do not require patching in Version 4.0 of RSX-11M. Both of these tasks were changed to use the disk size table.

11. The SYGEN may now continue to completion. Use the BAD.TSK and INI.TSK utilities to initialize a new system disk, and then transfer all files required for system operation to the new disk. Now BOOT the new system just created and SAVE it (/WB) with a bootstrap on the new disk.

3.2.4 RSX-11M V4.0 22-BIT PATCHES FOR SC03

3.2.4.1 Patch Description

This patch modifies RSX-11M V4.0 to permit the use of the Emulex SC03 disk controller with 22-bit addressing on the DEC 11/23 Plus processor.

3.2.4.2 Patch Explanation

In order to support the SC03 in 22-bit mode on the 11/23 Plus processor, a SYSGEN command file must be modified. This modification causes the SYSGEN process to create unit control blocks (UCBs) that have the DV.EXT bit set in characteristic word 1 (U.CW1). The DV.EXT bit tells the driver that the controller has a bus address extension register. This file is SGNPER.CMD in UIC [200,200]. It generates the device tables during the SYSGEN process, and must therefore be edited prior to the actual SYSGEN.

3.2.4.3 Patch Procedure

The normal procedure is to load the RSX-11M distribution, apply AUTOPATCH (if available), and then edit the command file, as outlined by the example in Section I of the following procedure. However, an alternate method has been provided in Section II of the procedure which edits the assembled task file.

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I. Follow this method if a SYSGEN has not yet been done.

1. Type the following:

```
>SET/UIC=[200,200]
>INS $EDI
>EDI SGNPER.CMD
[nnnnn lines read in]
[Page 0]
*PL .IF $TME GT 124. .IF $TPR EQ "11/23"
[nnnnn lines read in]
.
.
.
[nnnnn lines read in]
.IF $TME GT 124. .IF $TPR EQ "11/23" .SETS EXT "IDV.EXT"
*I
.IF EXT NE "" .SETS MBC "IDV.MBC"
      (just press RETURN to exit insert mode)
*EX
>
```

2. This completes the modification of the SYSGEN command file. You may now perform a normal SYSGEN, specifying the processor type as an 11/23.

II. If a SYSGEN has already been performed, you can accomplish the same results by patching the system image to set the DV.EXT bit for each unit on the 22-bit controller. The octal value of DV.EXT is 400; therefore, when performing the patch you must "OR in" 400 with whatever value is currently in U.CW1. For example, if the current value of U.CW1 is 140310 octal, you can perform a logical OR with 400 octal by entering 140310+400.

Before you can perform the patch, you must find out what the offsets of the UCBs are. To do this, you must refer to the map of the RSX-11M system image which should reside in UIC [1,34] and have the name RSX11M.MAP. If the map is not available, you can generate one with enough information to perform the patch by using the following command sequence:

1. Type the following:

```
>RUN $TKB
TKB>,RSX11M.MAP/-SP=[1,54]RSX11M.STB
TKB>^Z
>
```

From the map, locate the values of all the symbols that are of the form .DRn:, where n stands for the unit number. This means that if you SYSGEN four units, .DR0:, .DR1:, .DR2:, and .DR3: would exist. These symbols are the UCBs for the four DR units.

Record the associated addresses for each UCB for replacement in the patch. Substitute these values, one at a time, for the symbol <dr-ucb> in the following patch:

1. Type the following:

```
>SET /UIC=[1,54]
>RUN $ZAP
ZAP>RSX11M.SYS/AB
_3:<dr-ucb>+10
003:nnnnnn/ mmmmmmm
_mmmmmmm+400
```

(You must now repeat the above patch for each UCB address that you recorded earlier.)

```
_X
>
```

Either of the above techniques will accomplish the same results. The first method is more desirable because you only need to modify the SYSGEN command file once, while the ZAP patch must be performed each time a new system image is created.

3.2.5 RSX-11M V4.0 22-BIT PATCHES FOR TC02

3.2.5.1 Patch Description

This patch modifies RSX-11M V4.0 to permit the use of the Emulex TC02 tape controller with 22-bit addressing on the DEC 11/23 Plus processor.

3.2.5.2 Patch Explanation

The TC02 emulates a DEC TS11 tape subsystem. When you generate a system on a 11/23 Plus with more than 124K words, you support the extended address bits. The following steps will allow you to use the TC02 on the 11/23 Plus.

3.2.5.3 Patch Procedure

1. Apply autopatch if it is available.
2. Create the following correction file, which will be applied to the TS11 driver:

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```
>SET /UIC=[11,10]
>INS $EDI
>EDI MSDRV.COR
[Creating new file]
Input
MSDRV.MAC/AU:72./-BF=MSDRV.MAC
\
-/M$$EXT&M$$MGE/,/.ENDC/
-/.IF/,/.ENDC/
    MOVB  U.BUF+1(R5),(R2)
    TST   (R2)+
/
<return>
*EX
>
```

3. Now apply the patch to the MS: driver, using the following command sequence:

```
>INS $SLP
>SLP @MSDRV.COR
>
```

4. You may now perform a normal SYSGEN, indicating the processor type as an 11/23 with 128K words of memory or more.

3.2.6 RSX-11M V4.0 22-BIT PATCHES FOR CS01

3.2.6.1 Patch Description

This patch modifies RSX-11M V4.0 to permit the use of the Emulex CS01 communication controller with 22-bit addressing on the DEC 11/23 Plus processor.

3.2.6.2 Patch Explanation

The CS01 emulates a DEC DH11/DM11 terminal multiplexer. When the full-duplex terminal driver is selected, RSX-11M performs DMA transfers on output as opposed to single character interrupts. This technique greatly reduces the software overhead on interrupt processing, but as with all DMA devices on the 11/23 Plus, the problem of extended address support must be taken into consideration.

Fortunately, RSX-11M does not actually perform these DMA transfers from the user's program buffer. It first moves the output message to its own internal message buffer and then performs the DMA transfer from there. DEC chose to do it this way in order to allow the program to be checkpointed while the terminal message is being output. Because the terminal driver is always in the same place in memory, and the SYSVMR command file places it below 256K bytes, it is not

necessary for the terminal controller to support the extended address bits of the 11/23 Plus. Despite this, some minor variations to the SYSGEN procedure are required so that the terminal driver is generated correctly.

3.2.6.3 Patch Procedure

1. Perform a normal SYSGEN, indicating the processor type as an 11/23 with 128K words or more.
2. During the SYSGEN phase 1, answer Y to the following question:

>* 1. DO YOU WISH TO EDIT ANY OF THE EXECUTIVE FILES?

The indirect command file processor will suspend itself to allow the editing.

AT. -- PAUSING. TO CONTINUE, TYPE "RES ...AT."

3. When the SYSGEN command file pauses, use the following command sequence to create a special version of the RSXMC.MAC file:

```
>PIP RSXMCT.MAC=RSXMC.MAC
>EDI RSXMCT.MAC
[nnnnn lines read in]
[Page 0]
*PL M$EXT
[nnnnn lines read in]
.
.
.
[nnnnn lines read in]
M$EXT=0 ;EXTENDED MEMORY SUPPORT
*D
*ED
>
```

4. Now you must edit the driver assembly command file so that certain modules will include the special RSXMCT.MAC file:

```
>SET /UIC=[11,24]
>EDI RSXDRVASM.COM
[nnnnn lines read in]
[Page 0]
*PL TTCAN
[nnnnn lines read in]
.
.
.
[nnnnn lines read in]
[11,24]TTCAN.TTY=LB:[1,1]EXEMC/ML,SY:[11,10]RSXMC,-
SY:TTCAN,TTCAN
```

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```
*C/RSXMC/RSXMCT/  
[11,24]TTCAN.TTY=LB:[1,1]EXEMC/ML,SY:[11,10]RSXMCT,-  
SY:TTCAN,TTMAC,TTCAN  
*PL TTDAT  
[11,24]TTDAT.TTY=LB:[1,1]EXEMC/ML,SY:[11,10]RSXMC,-  
SY:TTCAN,TTDAT  
*C/RSXMC/RSXMCT/  
[11,24]TTDAT.TTY=LB:[1,1]EXEMC/ML,SY:[11,10]RSXMCT,-  
SY:TTCAN,TTDAT  
*PL TTYH  
[11,24]TTYH.TTY=LB:[1,1]EXEMC/ML,SY:[11,10]RSXMC,-  
SY:TTCAN,TTYH  
*C/RSXMC/RSXMCT/  
[11,24]TTYH.TTY=LB:[1,1]EXEMC/ML,SY:[11,10]RSXMCT,-  
SY:TTCAN,TTYH  
*ED  
>
```

5. You may now resume the SYSGEN process by entering the following. (The symbol <esc> signifies the ESCAPE key.)

```
>RES ...AT.<esc>
```

6. Your patch is now complete.

3.3 RSX-11M V4.1 PATCHES

3.3.1 RSX-11M V4.1 PATCHES FOR RP02/03

3.3.1.1 Patch Description

This patch modifies RSX-11M V4.1 to permit the use of non-standard disk drive sizes with the Emulex SCxx/A controllers (RP02/03 emulations).

3.3.1.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

There are three areas in the RSX-11M system that may require patching: the system device table SYSTB.MAC, to show the extended or contracted capacity; the appropriate driver; and the various disk utilities that use that driver.

The patches to the device tables and the device driver are applied to the macro source code by means of an editor, and are then installed using the LBR or SLP utility. The patches to the various utilities are made to the task images using the RSX-11M ZAP utility.

The Emulex SCxx/A disk controllers perform a logical mapping of the tracks and sectors onto the drive so that only the number of logical cylinders per drive needs to be changed. This is done in such a way that the number of heads is always 20 and the number of sectors is always 10, in agreement with the DEC standard. Therefore, the only difference between a modified-capacity drive and a standard-size drive is the number of cylinders per drive.

The number of logical cylinders for the SC01/Ax and SC11/Ax controllers can be found in Appendix B of this document. The number of logical cylinders for the SC02/Ax and SC12/Ax disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

Because the disk size is the only area requiring modification for the RP02/03 patch, the RP driver does not require patches. The only areas that require patching are the device table SYSTB.MAC and a few utilities.

3.3.1.3 Patch Procedure

1. Find the number of cylinders used per logical drive for your controller. If you have an SC01/A or SC11/A controller, then the number of cylinders can be found in Appendix A of this document. If you have an SC02/A or SC12/A controller, then the number of cylinders can be found in Appendix B of the appropriate controller technical manual.
2. Record the number of cylinders on the line labeled CYLINDERS below.

CYLINDERS. _____

Multiply the number of cylinders by 200 decimal and record the product on the line labeled BLOCKS, below.

BLOCKS. _____

Convert the number of BLOCKS to octal, and store the result on the line labeled **blocks**, below.

blocks _____

Divide the octal number of blocks by 2 and store the result on the line labeled **smallsize**, below.

smallsize _____

Divide the octal number of blocks into two 16-bit words. Store the most significant 16-bit word on the line labeled **msblock**, and the least significant 16-bit word on the line labeled **lsblock**.

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msblock _____

lsblock _____

You will substitute these values for their variable names later in the edit session.

3. Apply autopatch if it is available.
4. Install the utilities that you will need during the patch procedure:

```
>INS $EDI
>INS $LBR
>INS $MAC
>INS $PAT
>INS $PIP
>INS $SLP
```

5. Edit the SYSGEN module (which generates the device tables) to reflect the new disk size, by replacing the variable names with their corresponding values as calculated in step 2:

```
>SET /UIC=[200,200]
>EDI SGNPER.COR
[Creating new file]
Input
SGNPER.CMD/-AU=SGNPER.CMD
\
-/.DP30:/
-/TEMPN2/,/TEMPN4/
.SETN TEMPN2 msblock
.SETN TEMPN4 lsblock
-/.DP10:/
-/TEMPN2/,/TEMPN4/
.IF TEMPS2 EQ "RP02" .SETN TEMPN2 msblock
.IF TEMPS2 EQ "RP02" .SETN TEMPN4 lsblock
/
<return>
*EX
[Exit]

>SLP @SGNPER.COR
>
```

6. Patch the DP: driver source so that it will properly calculate the geometry for modified-capacity disks:

```

>SET /UIC=[11,10]
>EDI DPDRV.COR
[Creating new file]
Input
DPDRV.MAC/AU:72./-BF=DPDRV.MAC
\
-/$BLKCK/
-/ASR/,/I.PRM+12/
    MOV     R2,R1
    MOV     R0,R2
    MOV     #200.,R0
    CALL    $DDIV
    MOV     R2,I.PRM+10(R3)
    MOV     R0,R1
    MOV     #10.,R0
    CALL    $DIV
    SWAB    R0
    BIS     R1,R0
    MOV     R0,I.PRM+12(R3)
/
<return>
*EX
[Exit]

>SLP @DPDRV.COR
>

```

7. Patch the FMT utility so it can format non-standard disks:

```

>SET /UIC=[1,20]
>EDI FMTDAT.PAT
[Creating new file]
Input
    .TITLE  FMTDAT
    .IDENT  /01.07A/
; THE CHECKSUM FOR THE INPUT FMTDAT.OBJ IS: 25734
$$$=.
.=$$$+44716
    .WORD  msblock
    .WORD  lsblock
    .WORD  CYLINDERS.
    .END
<return>
*EX
[Exit]

>MAC FMTDAT.POB=FMTDAT.PAT
>LBR FMTDAT=FMT/EX:FMTDAT
>PAT FMTDAT=FMTDAT/CS:25734,FMTDAT.POB
>LBR FMT/RP=FMTDAT
Module "FMTDAT" replaced

>PIP FMTDAT.*;*/DE
>

```

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8. You may now proceed with SYSGEN phase 1. When phase 1 completes, before you begin SYSGEN phase 2, apply the following additional patch.
9. Patch the SAVE module SAVSIZ, which "sizes" the disks at boot time:

```
>SET /UIC=[12,10]
>EDI SAVSIZ.COR
[Creating new file]
Input
SAVSIZ.MAC/AU:72./-BF=SAVSIZ.MAC
\
-/40000./,.
      .WORD  msblock,lsblock
-/DPSET:/
-/U.CW3/,/U.CW2/
      MOV      #msblock,U.CW2(R4)
      MOV      #lsblock,U.CW3(R4)
/
<return>
*EX
[Exit]
```

Now apply the correction file and re-assemble the module:

```
>SLP @SAVSIZ.COR
>SET /UIC=[1,24]
>MAC SAVSIZ=[1,1]EXEMC/ML,[11,10]RSXMC,[12,10]-
      SAVTRC,SAVSIZ
>LBR SAV/RP=SAVSIZ
Module "SAVSIZ" replaced

>PIP SAVSIZ.OBJ;*/DE
>
```

10. You may now continue with a normal SYSGEN process. It will be necessary to rebuild FMT using SYSGEN phase 3 to include the patch. After the SYSGEN, you can boot the new system and it will use the non-standard disks with no further modifications. Your patch is now complete.

3.3.2 RSX-11M V4.1 PATCHES FOR RM02/03/05

3.3.2.1 Patch Description

This patch modifies RSX-11M V4.1 to permit the use of non-standard disk drive sizes with the Emulex SCxx/B1, SCxx/B3, and SCxx/Bx controllers (RM02/03/05 emulations).

3.3.2.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

There are three areas in the RSX-11M system that may require patching: the system device table SYSTB.MAC, to show the extended or contracted capacity; the appropriate driver; and the various disk utilities that use that driver.

The patches to the device tables and the device driver are applied to the macro source code by means of an editor, and are then installed using the LBR or the SLP utility. The patches to the various utilities are made to the task images using the RSX-11M ZAP utility.

The Emulex SCxx/B disk controllers perform a logical mapping of the cylinders, tracks, and sectors onto the drive. The number of logical cylinders, tracks, and sectors for the SCxx/B disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

3.3.2.3 Patch Procedure

1. Apply autopatch if it is available.
2. Install the utilities that you will need during the patch procedure:

```
>INS $EDI
>INS $LBR
>INS $MAC
>INS $PAT
>INS $PIP
>INS $SLP
>
```

3. Edit the SYSGEN module, which generates the device tables, to reflect the new disk size by replacing the variable names with their corresponding values as previously calculated:

RM02: or RM03:

```
>SET /UIC=[200,200]
>EDI SGNPER.COR
[Creating new file]
Input
SGNPER.CMD/-AU=SGNPER.CMD
\
-/.DR30:/
-/TEMPN2//,/TEMPN4/
.SETN TEMPN2 msblock
.SETN TEMPN4 lsblock
```

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```
-/"RP07"/  
-/TEMPN2/,/TEMPN4/  
.SETN TEMPN2 msblock  
.SETN TEMPN4 lsblock  
/  
<return>  
*EX  
[Exit]
```

RM05:

```
>SET /UIC=[200,200]  
>EDI SGNPER.COR  
[Creating new file]  
Input  
SGNPER.CMD/-AU=SGNPER.CMD  
\  
-/.DR10:/  
-/"RM80"/  
-/TEMPN2/,/TEMPN4/  
.SETN TEMPN2 msblock  
.SETN TEMPN4 lsblock  
/  
<return>  
*EX  
[Exit]
```

Now apply the correction file to the SYSGEN command file:

```
>SLP @SGNPER.COR  
>
```

4. Patch the DR: driver module so that it will use the non-standard disk. Note that the symbolics `msblock` and `lsblock` are enclosed in angle brackets (<>). This is the required syntax for a DVPRM command. For a standard disk, the command would be:

```
DVPRM <2,1140>,5.,32.,0 ; RM03
```

RM02: or RM03:

```
>SET /UIC=[11,10]  
>EDI DRDRV.COR  
[Creating new file]  
Input  
DRDRV.MAC/AU:72./-BF=DRDRV.MAC  
\  
-/PRMTBL:/  
-/RM03/,/PHYSICAL/  
DVPRM <msblock,lsblock>,tracks,sectors,0 ; RM03  
DVPRM <msblock,lsblock>,tracks,sectors,0 ; PHYSICAL
```

```

/
<return>
*EX
[Exit]
>

```

RM05:

```

>SET /UIC=[11,10]
>EDI DRDRV.COR
[Creating new file]
Input
DRDRV.MAC/AU:72./-BF=DRDRV.MAC
\
-/PRMTBL:/
-/RM05/,/PHYSICAL/
DVPRM <msblock,lsblock>,tracks,sectors,0 ; RM05
DVPRM <msblock,lsblock>,tracks,sectors,0 ; PHYSICAL
/
<return>
*EX
[Exit]
>

```

Now apply the correction file to the driver module:

```

>SLP @DRDRV.COR
>

```

5. You may now proceed with SYSGEN phase 1. When phase 1 completes, before you begin SYSGEN phase 2, apply these additional patches to the privileged tasks:

RM02: or RM03:

```

>SET /UIC=[12,10]
>EDI SAVDR.COR
[Creating new file]
Input
SAVDR.MAC/AU:72./-BF=SAVDR.MAC
\
-/DRCSR:/
-/RM03/,.
      MOV    #sectors,R3    ;;; RM03
-/#5,R3/,.
      MOV    #tracks,R3    ;;; RM03
/
<return>
*EX
[Exit]
>

```

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RM05:

```
>SET /UIC=[12,10]
>EDI SAVDR.COR
[Creating new file]
Input
SAVDR.MAC/AU:72./-BF=SAVDR.MAC
\
-/DRCSR:/
-/RM05/,,
        MOV    #sectors,R3    ;;; RM05
-/35$/,,
35$:    MOV    #tracks,R3    ;;; RM05
/
<return>
*EX
[Exit]
>
```

Now apply the correction file and re-assemble the module:

```
>SLP @SAVDR.COR
>SET /UIC=[1,24]
>MAC SAVDR=[1,1]EXEMC/ML,[11,10]RSXMC,[12,10]SAVTRC,SAVDR
>LBR SAV/RP=SAVDR
Module "SAVDR" replaced

>PIP SAVDR.OBJ;*/DE
>
```

6. Patch the SAVE module SAVSIZ, which "sizes" the disks at boot time:

RM02: or RM03:

```
>SET /UIC=[12,10]
>EDI SAVSIZ.COR
[Creating new file]
Input
SAVSIZ.MAC/AU:72./-BF=SAVSIZ.MAC
\
-/DEVSIZ:/
-/RM03/,,
        .WORD  msblock,lsblock    ; RM03
/
<return>
*EX
[Exit]
>
```

RM05:

```

>SET /UIC=[12,10]
>EDI INIBAD.COR
[Creating new file]
Input
SAVSIZ.MAC/AU:72./-BF=SAVSIZ.MAC
\
-/DRSET:/
-/40$:/,/121240/
40$:   MOVB   #msblock,U.CW2(R4)           ; SET RM05 SIZE
        MOV    #lsblock,U.CW3(R4)         ; AND LOW LBN
/
<return>
*EX
[Exit]
>

```

Now apply the correction file and re-assemble the module:

```

>SLP @SAVSIZ.COR
>SET /UIC=[1,24]
>MAC SAVSIZ=[1,1]EXEMC/ML,[11,10]RSXMC,-
    [12,10]SAVTRC,SAVSIZ
>LBR SAV/RP=SAVSIZ
Module "SAVSIZ" replaced

>PIP SAVSIZ.OBJ;*/DE
>

```

7. Patch the INIBAD module so that the disk INI utility will support the new disk size. Note that the symbolics `msblock` and `lsblock` are enclosed in angle brackets (<>). This is the required syntax for the LTDV command. For a standard disk, the command would be:

```
LTDV  DR,<2,1140>,823.,5.,32.,1,10.,22. ;RM03
```

RM02: or RM03:

```

>SET /UIC=[12,10]
>EDI INIBAD.COR
[Creating new file]
Input
INIBAD.MAC/AU:72./-BF=INIBAD.MAC
\
-/LTDEVT:/
-/RM03/,.
LTDV DR,<msblock,lsblock>,cylinders,tracks,sectors,1,10.,
    sectors-12. ;RM03
/

```

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```
<return>
*EX
[Exit]
```

```
>
```

RM05:

```
>SET /UIC=[12,10]
>EDI SAVSIZ.COR
[Creating new file]
Input
INIBAD.MAC/AU:72./-BF=INIBAD.MAC
```

```
\
- /LTDEVT:/
- /RM05/,.
```

* LTDV DR, <msblock, lsbblock>, cylinders, tracks, sectors, 1, 10., sectors-12. ;RM05

```
/
<return>
*EX
[Exit]
```

```
>
```

* **NOTE:** This entry is continued to a second line because of space limitations, but in actual use it must be on one line.

Now apply the correction file and re-assemble the module:

```
>SLP @INIBAD.COR
>SET /UIC=[1,24]
>MAC INIBAD=[11,10]RSXMC, [12,10]INIBAD
>LBR INI/RP=INIBAD
Module "INIBAD" replaced
```

```
>PIP INIBAD.OBJ;*/DE
>
```

8. Patch the FMT utility so it can format non-standard disks. Note that FMT has a limitation such that devices with more than 32 (decimal) sectors per track **cannot** be formatted. Therefore, if your disk has more than 32 sectors per track, skip this patch and use either the firmware format or a diagnostic.

RM02: or RM03:

```
>SET /UIC=[1,20]
>EDI FMTDAT.PAT
[Creating new file]
Input
        .TITLE  FMTDAT
        .IDENT  /01.07A/
; THE CHECKSUM FOR THE INPUT FMTDAT.OBJ IS: 25734
```

```

$$$=.
.=$$$+44456                                ; RM02 or RM03
        .WORD    msblock
        .WORD    lsblock
        .WORD    cylinders
        .WORD    tracks
        .WORD    sectors
        .END
<return>
*EX
[Exit]
>

```

RM05:

```

>SET /UIC=[1,20]
>EDI FMTDAT.PAT
[Creating new file]
Input
        .TITLE   FMTDAT
        .IDENT   /01.07A/
; THE CHECKSUM FOR THE INPUT FMTDAT.OBJ IS: 25734
$$$=.
.=$$$+44516                                ; RM05
        .WORD    msblock
        .WORD    lsblock
        .WORD    cylinders
        .WORD    tracks
        .WORD    sectors
        .END
<return>
*EX
[Exit]
>

```

Now assemble the patch file and apply it to the object module:

```

>MAC FMTDAT.POB=FMTDAT.PAT
>LBR FMTDAT=FMT/EX:FMTDAT
>PAT FMTDAT=FMTDAT/CS:25734,FMTDAT.POB
>LBR FMT/RP=FMTDAT
Module "FMTDAT" replaced

>PIP FMTDAT.*;*/DE
>

```

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9. Patch the BAD utility so it can format non-standard disks:

RM02: or RM03:

```
>SET /UIC=[1,20]
>EDI BADDAT.PAT
[Creating new file]
Input
      .TITLE  BADDAT
      .IDENT  /6.01A/
; THE CHECKSUM FOR THE INPUT BADDAT.OBJ IS: 7416
$$$=.
.=$$$+2016                               ; RM02 OR RM03
      .WORD   msblock
      .WORD   lsblock
      .WORD   tracks
      .WORD   sectors
      .WORD   1
      .WORD   sectors
      .WORD   tracks*sectors
      .WORD   10.
      .WORD   sectors-12
      .END
<return>
*EX
[Exit]
>
```

RM05:

```
>SET /UIC=[1,20]
>EDI BADDAT.PAT
[Creating new file]
Input
      .TITLE  BADDAT
      .IDENT  /6.01A/
; THE CHECKSUM FOR THE INPUT BADDAT.OBJ IS: 7416
$$$=.
.=$$$+2042                               ; RM05
      .WORD   msblock
      .WORD   lsblock
      .WORD   tracks
      .WORD   sectors
      .WORD   1
      .WORD   sectors
      .WORD   tracks*sectors
      .WORD   10.
      .WORD   sectors-12
      .END
<return>
*EX
[Exit]
```

>

Now assemble the patch file and apply it to the object module:

```
>MAC BADDAT.POB=BADDAT.PAT
>LBR BADDAT=BAD/EX:BADDAT
>PAT BADDAT=BADDAT/CS:7416,BADDAT.POB
>LBR BAD/RP=BADDAT
Module "BADDAT" replaced
```

```
>PIP BADDAT.*;*/DE
```

>

10. Patch the DSC utility so it can read the bad block definitions from the non-standard disks:

RM02: or RM03:

```
>SET /UIC=[1,20]
>EDI DSCBD.PAT
[Creating new file]
Input
      .TITLE  DSCBD
      .IDENT  /X25.7A/
; THE CHECKSUM FOR THE INPUT DSCBD.OBJ IS: 70375
$$$=.
.=$$$+100                                ; RM02 OR RM03
      .WORD   msblock
      .WORD   lsblock
      .WORD   tracks
      .WORD   sectors
      .WORD   sectors-12
      .END
<return>
*EX
[Exit]
>
```

RM05:

```
>SET /UIC=[1,20]
>EDI DSCBD.PAT
[Creating new file]
Input
      .TITLE  DSCBD
      .IDENT  /X25.7A/
; THE CHECKSUM FOR THE INPUT DSCBD.OBJ IS: 70375
$$$=.
.=$$$+124                                ; RM05
      .WORD   msblock
      .WORD   lsblock
      .WORD   tracks
      .WORD   sectors
```

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```
.WORD    sectors-12
.END
<return>
*EX
[Exit]
>
```

Now assemble the patch file and apply it to the object module:

```
>MAC DSCBD.POB=DSCBD.PAT
>LBR DSCBD=DSC/EX:DSCBD
>PAT DSCBD=DSCBD/CS:70375,DSCBD.POB
>LBR DSC/XP=DSCBD
Module "DSCBD" replaced
>PIP DSCBD.*;*/DE
>
```

11. Patch the BRU utility so it can read the bad block definitions from the non-standard disks:

RM02: or RM03:

```
>SET /UIC=[1,20]
>EDI BRUBAD.PAT
[Creating new file]
Input
    .TITLE    BRUBAD
    .IDENT    /1.07A/
; THE CHECKSUM FOR THE INPUT BRUBAD.OBJ IS: 100303
$$$=.
.=$$$+210                ; RM02 OR RM03
    .WORD    msblock
    .WORD    lsblock
    .WORD    cylinders
    .BYTE    tracks
    .BYTE    sectors
    .BYTE    1
    .BYTE    sectors
    .BYTE    10.
    .BYTE    sectors-12
    .END
<return>
*EX
[Exit]
>
```

RM05:

```
>SET /UIC=[1,20]
>EDI BRUBAD.PAT
[Creating new file]
```

```

Input
      .TITLE  BRUBAD
      .IDENT  /1.07A/
; THE CHECKSUM FOR THE INPUT BRUBAD.OBJ IS: 100303
$$$=.
.=$$$+154                                ; RM05
      .WORD   msblock
      .WORD   lsblock
      .WORD   cylinders
      .BYTE   tracks
      .BYTE   sectors
      .BYTE   1
      .BYTE   sectors
      .BYTE   10.
      .BYTE   sectors-12
      .END
<return>
*EX
[Exit]

>

```

Now assemble the patch file and apply it to the object module:

```

>MAC BRUBAD.POB=BRUBAD.PAT
>LBR BRUBAD=BRU/EX:BRUBAD
>PAT BRUBAD=BRUBAD/CS:100303,BRUBAD.POB
>LBR BRU/RP=BRUBAD
Module "BRUBAD" replaced

>PIP BRUBAD.*;*/DE
>

```

12. Patch the stand-alone BRU64K utility. This utility is a self-contained operating system with several utilities fixed in it, so there are several areas that need to be ZAPed.

RM02: or RM03:

```

>SET /UIC=[1,51]
>RUN $ZAP
ZAP>BRU64K.SYS/AB
_33:32/
033:000032/ 000002
_msblock
_33:34/
033:000034/ 001140
_lsblock
_33:36\
033:000036\ 040
_sectors
_33:37\
033:000037\ 005
_tracks

```

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```
_33:42/  
033:000042/ 000002  
_msblock  
_33:44/  
033:000044/ 001140  
_lsblock  
_33:46\  
033:000046\ 040  
_sectors  
_33:47\  
033:000047\ 005  
_tracks  
_154:634/  
154:000634/ 000002  
_msblock  
_154:642/  
154:000642/ 001140  
_lsblock  
_327:0/  
327:000000/ 000002  
_msblock  
_327:2/  
327:000002/ 001140  
_lsblock  
_327:4/  
327:000004/ 001467  
_cylinders  
_327:6\  
327:000006\ 005  
_tracks  
_327:7\  
327:000007\ 040  
_sectors  
_327:13\  
327:000013\026  
_sectors-12  
_350:772/  
350:000772/ 000002  
_msblock  
_350:774/  
350:000774/ 001140  
_lsblock  
_350:776/  
350:000776/ 000005  
_tracks  
_350:1000/  
350:001000/ 000040  
_sectors  
_350:1004  
350:001004/ 000040  
_sectors  
_350:1006  
350:001006/ 000240  
_tracks*sectors
```

```

_350:1012
350:001012/ 000026
_sectors-12
_X
>

```

RM05:

```

>SET /UIC=[1,51]
>RUN $ZAP
ZAP>BRU64K.SYS/AB
_33:72/
033:000072/ 000007
_msblock
_33:74/
033:000074/ 121240
_lsblock
_33:76\
033:000076\ 040
_sectors
_33:77\
033:000077\ 023
_tracks
_33:102/
033:000102/ 000007
_msblock
_33:104/
033:000104/ 121240
_lsblock
_33:106\
033:000106\ 040
_sectors
_33:107\
033:000107\ 023
_tracks
_154:704/
154:000704/ 000007
_msblock
_154:712/
154:000712/ 121240
_lsblock
_326:744/
326:000744/ 000007
_msblock
_326:746/
326:000746/ 121240
_lsblock
_326:750/
326:000750/ 001467
_cylinders
_326:752\
326:000752\ 023
_tracks
_326:753\

```

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```
326:000753\ 040
  _sectors
  _326:757\
326:000757\ 026
  _sectors-12
  _351:16/
351:000016/ 000007
  _msblock
  _351:20/
351:000020/ 121240
  _lsblock
  _351:22/
351:000022/ 000023
  _tracks
  _351:24/
351:000024/ 000040
  _sectors
  _351:30/
351:000030/ 000040
  _sectors
  _351:32/
351:000032/ 001140
  _tracks*sectors
  _351:000036/ 000026
351:000036/ 000026
  _sectors-12
  _X
>
```

13. You may now continue with SYSGEN phase 2. It will be necessary to run SYSGEN phase 3 and re-build FMT, BAD, DSC, and BRU to include the patches in the task images. After the SYSGEN, you can boot the new system and it will use the non-standard disks with no further modifications.
14. This completes the patch procedure.

3.3.3 RSX-11M V4.1 PATCHES FOR RP06

3.3.3.1 Patch Description

This patch modifies RSX-11M V4.1 to permit the use of non-standard disk drive sizes with the Emulex SCxx/B2 and SCxx/B4 controllers (RP06 emulations).

3.3.3.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

There are three areas in the RSX-11M system that may require patching: the system device table SYSTB.MAC, to show the extended or contracted capacity; the appropriate driver; and the various disk utilities that use that driver.

The patches to the device tables and the device driver are applied to the macro source code by means of an editor, and are then installed using the LBR or the SLP utility. The patches to the various utilities are made to the task images using the RSX-11M ZAP utility.

The Emulex SCxx/B disk controllers perform a logical mapping of the cylinders, tracks, and sectors onto the drive. The number of logical cylinders, tracks, and sectors for the SCxx/B disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

3.3.3.3 Patch Procedure

1. Apply autopatch if it is available.
2. Install the utilities that you will need during the patch procedure:

```
>INS $EDI
>INS $LBR
>INS $MAC
>INS $PAT
>INS $PIP
>INS $SLP
```

3. Patch the SYSGEN module, which generates the device tables, to reflect the new disk size:

```
>SET /UIC=[200,200]
>EDI SGNPER.COR
[Creating new file]
Input
SGNPER.CMD/-AU=SGNPER.CMD
\
-/.DB30:/
-/TEMPN2/,/TEMPN4/
.SETN TEMPN2 msblock
.SETN TEMPN4 lsbblock
/
<return>
*EX
[Exit]
```

Now apply the correction file to the SYSGEN command file:

```
>SLP @SGNPER.COR
>
```

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4. If your emulation has a non-standard number of sectors per track or tracks per cylinder, patch the DB: driver module:

```
>SET /UIC=[11,10]
>EDI DBDRV.COR
[Creating new file]
Input
DBDRV.MAC/AU:72./-BF=DBDRV.MAC
\
-/M$$EIS/
-/#22./,.
        DIV    #sectors,R0
-/#19./,.
        DIV    #tracks,R0
-/#19.*22./,.
        CMP    R2,#tracks*sectors
-/#19.*22./,.
        SUB    #tracks*sectors,R2
-/#22./,.
        MOV    #sectors,R1
-/460$:/,.
460$:  CMPB   #sectors,R0
-/#22./,.
        SUB    #sectors,R0
-/#19./,.
        CMP    #tracks*400,R0
-/#19./,.
        SUB    #tracks*400,R0
/
<return>
*EX
[Exit]

>SLP @DBDRV.COR
>
```

5. Patch the FMT utility so it can format non-standard disks. Note that FMT has a limitation such that devices with more than 32 (decimal) sectors per track **cannot** be formatted. Therefore, if your disk has more than 32 sectors per track, skip this patch and use either the firmware format or a diagnostic.

```
>SET /UIC=[1,20]
>EDI FMTDAT.PAT
[Creating new file]
Input
        .TITLE  FMTDAT
        .IDENT  /01.07A/
; THE CHECKSUM FOR THE INPUT FMTDAT.OBJ IS: 25734
$$$=.
.=$$$+44376                ; RP06
        .WORD  msblock
        .WORD  lsblock
```

```

        .WORD   cylinders
        .WORD   tracks
        .WORD   sectors
        .END
<return>
*EX
[Exit]

>MAC FMTDAT.POB=FMTDAT.PAT
>LBR FMTDAT=FMT/EX:FMTDAT
>PAT FMTDAT=FMTDAT/CS:25734,FMTDAT.POB
>LBR FMT/RP=FMTDAT
Module "FMTDAT" replaced

>PIP FMTDAT.*;*/DE
>

```

6. Patch the stand-alone BRU64K utility. This utility is a self-contained operating system with several utilities fixed in it, so there are several areas that need to be ZAPed:

```

>SET /UIC=[1,51]
>RUN $ZAP
ZAP>BRU64K.SYS/AB
_23:112/
023:000112/ 000642
_tracks*sectors
_23:120
023:000120/ 000642
_tracks*sectors
_23:140
023:000140/ 000026
_sectors
_154:576/
154:000576/ 000005
_msblock
_154:604/
154:000604/ 031276
_lsblock
_X
>

```

7. You may now proceed with SYSGEN phase 1. When phase 1 completes, before you begin SYSGEN phase 2, apply the following additional patches.
8. If your emulation has a non-standard number of sectors per track or tracks per cylinder, patch the SAVE DB: class driver:

```

>SET /UIC=[12,10]
>EDI SAVDB.COR
[Creating new file]
Input

```

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```
SAVDB.MAC/AU:72./-BP=SAVDB.MAC
\  
-/DB CSR:/
-/#22./,..
      MOV      #sectors,R3
-/30$/:/
30$:   MOV      #tracks,R3
/  
<return>
*EX
[Exit]
```

Now apply the correction file and re-assemble the module:

```
>SLP @SAVDB.COR
>SET /UIC=[1,24]
>MAC SAVDB=[1,1]EXEMC/ML,[11,10]RSXMC,[12,10]SAVTRC,SAVDB
>LBR SAV/RP=SAVDB
Module "SAVDB" replaced

>PIP SAVDB.OBJ;*/DE
>
```

9. Patch the SAVE module SAVSIZ, which "sizes" the disks at boot time:

```
>SET /UIC=[12,10]
>EDI SAVSIZ.COR
[Creating new file]
Input
SAVSIZ.MAC/AU:72./-BF=SAVSIZ.MAC
\  
-/DB SET:/
-/U.CW2/,/U.CW3/
      MOV      #msblock,U.CW2(R4)
      MOV      #lsblock,U.CW3(R4)
/  
<return>
*EX
[Exit]
```

Now apply the correction file and re-assemble the module:

```
>SLP @SAVSIZ.COR
>SET /UIC=[1,24]
>MAC SAVSIZ=[1,1]EXEMC/ML,[11,10]RSXMC,-
      [12,10]SAVTRC,SAVSIZ
>LBR SAV/RP=SAVSIZ
Module "SAVSIZ" replaced

>PIP SAVSIZ.OBJ;*/DE
>
```

10. You may now continue with a normal SYSGEN process. It will be necessary to re-build FMT, using SYSGEN phase 3, to include the patch. After the SYSGEN, you can boot the new system and it will use the non-standard disks with no further modifications. Your patch is now complete.

3.3.4 RSX-11M V4.1 22-BIT PATCHES FOR SC02/C

3.3.4.1 Patch Description

This patch modifies RSX-11M V4.1 to permit the use of the Emulex SC02/C disk controller with 22-bit addressing on the DEC 11/23 Plus processor.

3.3.4.2 Patch Explanation

The SC02/C emulates a DEC RK06/07 disk subsystem. DEC does not support this subsystem on a 22-bit backplane, such as the one used on the 11/23 Plus. It is therefore necessary to patch RSX-11M in order for it to work with the extended address range available on the 11/23 Plus. Use the following procedure to make the necessary modifications.

3.3.4.3 Patch Procedure

1. Apply autopatch if it is available.
2. Create the following correction file, which will be applied to the DM driver:

```
>SET /UIC=[11,10]
>INS $EDI
>EDI DMDRV.COR
[Creating new file]
Input
DMDRV.MAC/AU:72./-BF=DMDRV.MAC
\
-/RMDC/
RMB AE= 22
-/M$$EXT/,/.ENDC/
    .IF DF M$$EXT&M$$MGE

    BIT    #DV.EXT,U.CW1(R5)
    BNE    15$
    CALL   $$TMAP

    .ENDC
-/ .ENDC/
15$:
-/M$$EXT/,/.ENDC/
    .IF DF M$$EXT&M$$MGE
```

RSX-11M V4.1 Patches

```

        BIT      #DV.EXT, U. CW1 (R5)
        BNE     75$
        CALL    $MPUBM
75$:

        .ENDC
- /140$: /, /XCUTE/
140$:
        .IF DF  M$$EXT

        BIT      #DV.EXT, U. CW1 (R5)
        BEQ     144$
        MOVB    U.BUF+1 (R5), R0
        BIS     #22000, R0
        MOV     R0, RMBAE (R2)
        BIC     #177774, R0
        SWAB    R0
        BISB    U.BUF (R5), R0
        BR      146$

        .ENDC

144$: MOV     U.BUF (R5), R0
146$: CALLR   XCUTE
- /DMPWF: /
        .IF DF  M$$EXT

        BIC     #DV.EXT, U. CW1 (R5)
        BIT     #HF.QB, $HFMSK
        BEQ     165$
        BIS     #DV.EXT, U. CW1 (R5)
165$:
        .ENDC
- /M$$EXT/, / .ENDC/
        .IF DF  M$$EXT

        BIT     #DV.EXT, U. CW1 (R5)
        BNE     399$
        ADD     #<S.MPR+M.LGTH>, R4
        MOV     -(R4), R1
        MOVB    -(R4), R0
399$: MOV     U.SCB (R5), R4

        .ENDC

- /460$: /
- /M$$MGE/, / .ENDC/
        .IF DF  M$$MGE

        .IF DF  M$$EXT

        BIT     #DV.EXT, U. CW1 (R5)
        BEQ     464$
        MOVB    RMBAE (R2), U.BUF+1 (R5)
        BR      466$

```

```

        .ENDC

464$: MOV    (R2),R1
        SWAB  R1
        BICB  #^C<3>,R1
        MOVB  R1,U.BUF+1(R5)
466$:
        .ENDC
- /M$$EXT/,/.ENDC/
        .IF DF  M$$EXT

        BIT   #DV.EXT,U.CW1(R5)
        BNE   625$
        ADD   #<S.MPR+M.LGTH>,R4
        ADD   R0,-(R4)
        ADCB  -(R4)
625$: MOV   U.SCB(R5),R4

        .ENDC
/
<return>
*EX
>

```

3. Now apply the patch to the DM driver, using the following command sequence:

```

>INS $SLP
>SLP @DMDRV.COR
>

```

4. Next, create a correction file that will be applied to the executive module SYSCM. This patch allows the DM driver to determine on the initial boot that it is a LSI-11 bus system:

```

>EDI SYSCM.COR
[Creating new file]
Input
SYSCM.MAC/AU:72./-BF=SYSCM.MAC
\
-/$HFMSK:./,/.ENDC/

HFMSK =          HF.FPP
        .IF DF  M$$EIS
HFMSK =          HFMSK!HF.EIS
        .ENDC
        .IF EQ  R$$TPR-"23
HFMSK =          HFMSK!HF.QB
        .ENDC

```

RSX-11M V4.1 Patches

```
$HFMSK:..WORD HFMSK
/
<return>
*EX
>
```

5. Now apply the patch to the SYSCM module, using the following command sequence:

```
>SLP @SYSCM.COR
>
```

6. You may now perform a noraml SYSGEN, indicating the processor type as an 11/23 with 128K words or more of memory.
7. When the SYSGEN completes you can perform a normal boot. Your patch is now complete.

3.3.5 RSX-11M V4.1 22-BIT PATCHES FOR CS01

3.3.5.1 Patch Description

This patch modifies RSX-11M V4.1 to permit the use of the Emulex CS01 communication controller with 22-bit addressing on the DEC 11/23 Plus processor.

3.3.5.2 Patch Explanation

The CS01 emulates a DEC DH11/DM11 terminal multiplexer. When the full-duplex terminal driver is selected, RSX-11M performs DMA transfers on output as opposed to single character interrupts. This technique greatly reduces the software overhead on interrupt processing, but as with all DMA devices on the 11/23 Plus, the problem of extended address support must be taken into consideration.

Fortunately, RSX-11M does not actually perform these DMA transfers from the user's program buffer. It first moves the output message to its own internal message buffer and then performs the DMA transfer from there. DEC chose to do it this way in order to allow the program to be checkpointed while the terminal message is being output. Because the terminal driver is always in the same place in memory and the SYSVMR command file places it below 256K bytes, it is not necessary for the terminal controller to support the extended address bits of the 11/23 Plus. Despite this, some minor variations to the SYSGEN procedure are required so that the terminal driver will be generated correctly. Also, a SYSGEN command file must be modified so that it will not assume DEC DHV-11 support on the 11/23 Plus. The following steps will allow you to use the CS01 on the 11/23 Plus.

3.3.5.3 Patch Procedure

1. Before you start the SYSGEN process, you must edit a SYSGEN command file so that DHV-11 support is not generated on LSI-11 bus machines.

```

>SET /UIC=[200,200]
>INS $EDI
>EDI SGNEXEC.COMD
[nnnnnn lines read in]
[Page      0]
*PL .SETT $QBUS
[nnnnn lines read in]
.
.
.
[nnnnn lines read in]
.IF $TPR EQ "11/03" . OR .IF $TPR EQ "11/23" .SETT $QBUS
*D
*ED
[Exit]
>

```

2. Perform a normal SYSGEN, indicating the processor type as an 11/23 with 128K words or more.
3. During SYSGEN phase 1, answer Y to the following question:

```
>* 1. DO YOU WISH TO EDIT ANY OF THE EXECUTIVE FILES?
```

The indirect command file processor will suspend itself to allow the editing.

```
AT. -- PAUSING. TO CONTINUE, TYPE "RES ...AT."
```

4. When the SYSGEN command file pauses, use the following command sequence to create a special version of the RSXMC.MAC file:

```

>PIP RSXMCT.MAC=RSXMC.MAC
>EDI RSXMCT.MAC
[nnnnn lines read in]
[Page      0]
*PL M$$EXT
[nnnnn lines read in]
.
.
.
[nnnnn lines read in]
M$$EXT=0
*D
*ED
>

```

;EXTENDED MEMORY SUPPORT

RSX-11M V4.1 Patches

5. Now you must edit the driver assembly command file so that certain modules will include the special RSXMCT.MAC file:

```
>SET /UIC=[11,24]
>EDI RSXDRVASM.CMD
[nnnnn lines read in]
[Page 0]
*PL TTCAN
[nnnnn lines read in]
.
.
.
[nnnnn lines read in]
[11,24]TTCAN.TTY=LB:[1,1]EXEMC/ML,SY:[11,10]RSXMC,-
SY:TTMAC,TTCAN
*C/RSXMC/RSXMCT/
[11,24]TTCAN.TTY=LB:[1,1]EXEMC/ML,SY:[11,10]RSXMCT,-
SY:TTMAC,TTCAN
*PL TTDAT
[11,24]TTDAT.TTY=LB:[1,1]EXEMC/ML,SY:[11,10]RSXMC,-
SY:TTMAC,TTDAT
*C/RSXMC/RSXMCT/
[11,24]TTDAT.TTY=LB:[1,1]EXEMC/ML,SY:[11,10]RSXMCT,-
SY:TTMAC,TTDAT
*PL TTYH
[11,24]TTYH.TTY=LB:[1,1]EXEMC/ML,SY:[11,10]RSXMC,-
SY:TTMAC,TTYH
*C/RSXMC/RSXMCT/
[11,24]TTYH.TTY=LB:[1,1]EXEMC/ML,SY:[11,10]RSXMCT,-
SY:TTMAC,TTYH
*ED
>
```

6. You may now resume the SYSGEN process with:

```
>RES ...AT.<esc>
```

7. Your patch is now complete.

3.3.6 RSX-11M V4.1 PATCHES FOR UC01

3.3.6.1 Patch Description

This patch modifies RSX-11M V4.1 to extend the I/O timeout to permit the use of the Emulex UC01 disk controller with the Iomega disk subsystem.

3.3.6.2 Patch Explanation

The UC01/Iomega disk subsystem emulates the DEC RL02 disk subsystem and can therefore be used by the standard software drivers with no modifications. There is, however, one characteristic of the Iomega that can cause the system to crash if not modified: If the Iomega is

not accessed for a specific period of time, it stops spinning to reduce head wear on the media. When the drive is next accessed, it starts spinning and then completes the transfer. Because of this delay during spin-up, the RL02 driver can at times initiate a drive timeout error. This patch allows you to extend the drive timeout so that this error does not occur and the drive spin-up is transparent.

3.3.6.3 Patch Procedure

1. Apply autopatch if it is available.
2. Patch the SYSGEN command file that generates the device tables to use a new timeout value for the RL02 subsystems:

```
>SET /UIC=[200,200]
>INS $EDI
>INS $SLP
>EDI SGNPER.COR
[Creating new file]
Input
SGNPER.CMD/-AU=SGNPER.CMD
\
-/.DL03:/
- /ITOC/,.
      .SETN ITOC 5.
/
<return>
*EX
[Exit]

>SLP @SGNPER.COR
>
```

3. You may now perform a normal SYSGEN. The system that will be generated will use a timeout of 5 seconds for RL02 subsystems rather than 4 seconds, which is enough to prevent the device timeout problem from occurring.
4. Your patch is now complete.

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4.1 RSX-11M-PLUS PATCH EXPLANATION

4.1.1 SECTION DESCRIPTION

This section explains the general procedure for patching the RSX-11M-Plus operating system for use with disk, tape, and communication controllers available from Emulex Corporation. No specific information on any patch or emulation is given in this section; this information is available in later sections.

4.1.2 INTENDED AUDIENCE

This document is designed for use by the system manager of a given site, or by an agent of the system manager assigned the task of installing an RSX-11M-Plus system or doing a system generation. This manual assumes a fairly high degree of familiarity with RSX-11M-Plus operations, management, and utility procedures.

4.1.3 REQUIRED PATCHES

There are four basic types of patch methods to RSX-11M-Plus:

- SYSGEN command file patch - .CMD (Use EDI)
- MACRO source file patch - .MAC (Use EDI)
- TASK image file patch - .TSK (Use ZAP)
- LIBRARY routine patch - (Use EDI, PAT, or ZAP with LBR)

There are many different areas of RSX-11M-Plus that may require patching to fully modify the capacity of a disk drive or to add 22-bit support:

SGNPER.CMD This is the SYSGEN command file that builds the file **SYSTB.MAC**. If the patches are made to the SGNPER command file, patches to SYSTB.MAC are not necessary.

SYSTB.MAC This is a source file in the executive which contains a table of the device sizes for each unit on the system. Any emulation that changes the number of logical blocks on a disk type requires that a corresponding patch be installed in SYSTB.

The source to SYSTB is edited at a breakpoint in the SYSGEN command procedure specifically for executive modifications. This source must be edited every time a SYSGEN is performed.

RSXMC.MAC This is a system conditional file containing some device-specific data.

RSX-11M-Plus Patch Explanation

RSXDRVASM.CMD

SGNEXEC.CMD These are two of the SYSGEN command files.

xxDRV.MAC This is the driver for device xx. Patches are made to the driver for disk capacity changes or for adding 22-bit support.

If the modified size of the disk includes a geometry change (modifying the number of sectors or the number of heads), the corresponding driver must be changed to modify the algorithms it uses to convert a logical block number into a drive location.

SAV,BOO,INI Privileged tasks.

BAD,FMT DSC,BRU

These utilities are patched either as library modules (before SYSGEN) or after they have been task built (after SYSGEN).

INIBAD.MAC SAVSIZ.MAC

These routines also contain the block counts for all the drive types. They are included in privileged tasks that may need to access the drives without going through SYSTB or the driver.

RSX11M.SYS RSX-11M-Plus system image.

BRUSYS.SYS If the size or the geometry of the disks is changed, and you wish to use the stand-alone version of BRU, this program must also be patched.

NOTE

Please note that if you get a tape distribution from DEC, it must be one that can be copied onto a disk other than the modified-capacity Emulex disk. This is because it is not possible to copy the system onto the disk without patching the stand-alone utilities, and it is not possible to patch the utilities without copying the system onto the disk.

4.1.4 PATCH PROCEDURE (OUTLINE)

The RSX-11M-Plus system to be patched must be resident on a disk (other than a modified-capacity disk) while the patches are being installed. The following paragraphs explain how this is done for the various types of RSX-11M-Plus distributions: disk, tape for standard-size disk, and tape for modified-capacity disk. These patch procedures apply only to modified disk capacity patches. If your patch is not a modified disk capacity patch, skip this section.

- If your RSX-11M-Plus distribution is on disk, use the first procedure shown below: Disk Distribution.
- If your RSX-11M-Plus distribution is on tape, and you have a supported DEC disk or an exact DEC emulation, use the second procedure below: Tape Distribution. This would include any of the Emulex standard capacity DEC emulations.
- If you have only a tape drive and a modified-capacity disk, use the third procedure below: Tape Distribution (Emulex Disk).

4.1.5 PATCH PROCEDURE--DISK DISTRIBUTIONS

Systems that have a standard DEC disk (RK06/7, RL01/2) in addition to their modified Emulex disk can order and receive an RSX-11M-Plus disk distribution from DEC. The SYSGEN procedure executes from the standard DEC disk, and the patches for the modified disk are installed during the SYSGEN. When the SYSGEN is complete, the modified disk can be formatted, BADed, and initialized.

On some disk distributions, the sources are distributed on separate physical disk packs. You should check the SYSGEN manual for a description of which disk contains a specific source module.

4.1.6 PATCH PROCEDURE--TAPE DISTRIBUTIONS

Customers who receive a magtape distribution of RSX-11M-Plus must specify the type of disk to which the magtape is to be copied. This disk must be a DEC disk or an exact emulation of a DEC disk (not a modified-capacity emulation). Customers who have only a tape drive and a modified-capacity Emulex disk on their systems cannot install the patches for the modified capacity; these customers can run at a standard capacity if their controller and disk support it.

4.1.7 PATCH PROCEDURE--TAPE DISTRIBUTIONS (EMULEX DISK)

This procedure assumes that you are doing a system generation on a disk other than the modified Emulex disk. If you have only the Emulex disk (and a tape drive) on the system, you must execute the following steps to expand the capacity of your system disk:

1. Set up your Emulex controller to run in "standard" DEC-compatible mode, if possible.
2. Use the standard distribution BRU tape to initialize and copy your baseline tape onto the system disk.
3. Boot the system disk and type <ctrl-z> to halt the execution of the startup file when you are prompted for the date and time.

RSX-11M-Plus Patch Explanation

4. Set your UIC to [6,54] and use ZAP to modify the file BRUSYS.SYS, as shown in the patch procedure section of your patch.
5. Use the VMR SAVE command to make a bootable tape containing the modified stand-alone BRU.
6. Halt the system. Do not worry about your disk; you are going to scratch the data on it anyway.
7. Power down the system, and reconfigure the Emulex controller and disk drive to the modified capacity if it is not already so. Do a hardware format of the disk, and a diagnostic format if it is necessary to create a manufacturer's bad block file on the disk.
8. Boot the modified BRU tape, and use it to re-copy the baseline tape onto the system disk. It will write over the old system and re-initialize the disk to the new (expanded) size.
9. Boot the new system disk and proceed with the system generation as usual.

4.1.8 PATCH INSTALLATION INSTRUCTIONS

Emulex patches to RSX-11M-Plus are done in one of three ways:

- Editing a source file or SYSGEN command file using the \$EDI utility
- Creating an edit command file (using \$EDI) for use with the \$SLP utility
- Using the \$ZAP utility to modify task images or object library modules

For a full explanation for the use of \$EDI or \$ZAP, see the RSX-11M-Plus System Managers Guide.

CAUTION

When patching tasks through the ZAP program, you will be given a base, an offset, a value that should be at that location, and a value to change that location to. If the value at that offset is not what it should be, **do not apply the patch.** Something is wrong, and applying the patch will only worsen the situation. Please call Emulex Software Support for assistance.

4.2 RSX-11M-PLUS V2.0 PATCHES

4.2.1 RSX-11M-PLUS V2.0 PATCHES FOR RM02/03

4.2.1.1 Patch Description

This patch modifies RSX-11M-Plus V2.0 to permit the use of non-standard disk sizes with the Emulex SCxx/B1 and SCxx/B3 controllers (RM02/03 emulations).

4.2.1.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

There are three areas in the RSX-11M-Plus system that may require patching: the system device table SYSTB.MAC, to show the extended or contracted capacity; the appropriate driver; and the various disk utilities that use that driver.

The patches to the device tables and the device driver are applied to the macro source code by means of an editor, and are then installed using the LBR or the SLP utility. The patches to the various utilities are made to the task images using the RSX-11M ZAP utility.

The Emulex SCxx/B disk controllers perform a logical mapping of the cylinders, tracks, and sectors onto the drive. The number of logical cylinders, tracks, and sectors for the SCxx/B disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

4.2.1.3 Patch Procedure

1. Perform a normal SYSGEN, as if building a system to include an RM02/03 disk system. Use BRU to bring the SYSGEN files from tape to disk. Then execute the SYSGEN indirect command file:

```
>@[200,200]SYSGEN
```

2. Do the SYSGEN up to the point just before the SYSGEN does the macro compilation of the files. At this point, the SYSGEN asks:

```
>* DO YOU WISH TO PAUSE TO EDIT ANY FILES BEFORE
ASSEMBLING? [Y/N]:
```

Answer Y as in the example above. The indirect command file processor will suspend itself to allow editing.

```
AT. -- PAUSING. TO CONTINUE TYPE "UNS AT.TO <ESC>"
```

RSX-11M-Plus V2.0 Patches

3. Type the following:

```
>SET /UIC=[11,10]
>EDI DRTAB.MAC
[00060 LINES READ IN]
[PAGE 0]
*PL .DR0::
[60 LINES READ IN]
.DR0::
*P 1140
   .WORD    1140
*C/1140/lsblock/
   .WORD    lsblock
*N-1
*P
   .WORD    2
*C/2/msblock/
   .WORD    msblock
*P 32.,5.
   .BYTE    32.,5.
*C/32.,5./sectors,tracks/
   .BYTE    sectors,tracks
```

4. If you have SYSGENed for more than one RM02/03/05, repeat step 3 for each drive SYSGENed, substituting the logical drive mnemonic for DB0:: (.DB1::, .DB2::, etc.).
5. When all drives table entries have been edited, exit from the editor:

```
*ED
[EXIT]
```

6. Now edit the file SAVCM.MAC:

```
>SET /UIC=[12,10]
>EDI SAVCM.MAC
[00060 LINES READ IN]
[PAGE 0]
*PL RM03
DVTYP DR, 24, 32., 5.      ;;; RM03
*C/5./tracks/
DVTYP DR, 24, 32., tracks ;;; RM03
*PL RM02
DVTYP DR, 24, 32., 5.      ;;; RM02
*C/5./tracks/
DVTYP DR, 24, 32., tracks ;;; RM02
*ED
[EXIT]
```

7. Assemble the file SAVCM.MAC:

```
>MAC [12,10]SAVCM=[1,1]EXEMC/ML,[11,10]RSXMC/PA:1,-
[12,10]SAVCM
```

8. Put the object file into its object library:

```
>SET /UIC=[1,24]
>LBR [1,24]SAV/RP=[12,10]SAVCM
```

9. Now set up an object file for patching using the ZAP utility:

```
>LBR HRSIZ=SAV/EX:HRSIZ
>RUN $ZAP
ZAP>HRSIZ.OBJ
_2674/
0:002674/ 000002
_msblock
_2720/
0:002720/ 001140
_lsblock
_2770/
0:002770/ 002440
_hedsec
_3172/
0:003172/ 000002
_msblock
_3216/
0:003216/ 001140
_lsblock
_3266/
0:003266/ 002440
_hedsec
_X
```

```
>LBR SAV/RP=HRSIZ
>LBR HRSIZ=OLR/EX:HRSIZ
>RUN $ZAP
ZAP>HRSIZ.OBJ
_3530/
0:003530/ 000002
_msblock
_3554/
0:003554/ 001140
_lsblock
_3624/
0:003624/ 002440
_hedsec
_4026/
0:004026/ 000002
_msblock
_4052/
0:004052/ 001140
_lsblock
_4122/
0:004122/ 002440
_hedsec
```

RSX-11M-Plus V2.0 Patches

_X

```
>LBR [1,24]OLR/CO::128.=[1,24]OLR
>LBR OLR/RP=HRISZ
```

10. Resume the SYSGEN command procedure with the command:

```
>UNS AT.T0 <esc>
```

11. Be certain to obtain the LOAD maps for BAD.TSK and FMT.TSK, as these files must be patched. The SYSGEN may now continue to completion, but should be stopped before SAVING the new system so that the following patches can be applied:

- a. Patch BAD.TSK as follows:

```
SET /UIC=[1,54]
RUN $ZAP
Answer with "BAD.TSK/LI"
Locate section <BADDAT> on the load map BAD.TSK
Change <BADDAT> + 2016 from 000002 to msblock
Change <BADDAT> + 2020 from 001140 to lsbblock
Change <BADDAT> + 2022 from 000005 to tracks
Change <BADDAT> + 2032 from 000240 to tracks*sectors
Exit from ZAP
```

- b. Patch FMT.TSK as follows:

```
SET /UIC=[1,54]
RUN $ZAP
Answer with "FMT.TSK/LI"
Locate section <FMTDAT> on the load map FMT.TSK
Change <FMTDAT> + 44216 from 000002 to msblock
Change <FMTDAT> + 44220 from 001140 to lsbblock
Change <FMTDAT> + 44222 from 001467 to cylinders
Change <FMTDAT> + 44224 from 000005 to tracks
Exit from ZAP
```

12. The SYSGEN may now continue to completion. Remember to save the system with a SAV /WB.

4.2.2 RSX-11M-PLUS V2.0 PATCHES FOR RP06

4.2.2.1 Patch Description

This patch modifies RSX-11M-Plus V2.0 to permit the use of non-standard disk sizes with the Emulex SCxx/B1 and SCxx/B3 controllers (RP06 emulations).

4.2.2.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

There are three areas in the RSX-11M-Plus system that may require patching: the system device table SYSTB.MAC, to show the extended or contracted capacity; the appropriate driver; and the various disk utilities that use that driver.

The patches to the device tables and the device driver are applied to the macro source code by means of an editor, and are then installed using the LBR or the SLP utility. The patches to the various utilities are made to the task images using the RSX-11M ZAP utility.

The Emulex SCxx/B disk controllers perform a logical mapping of the cylinders, tracks, and sectors onto the drive. The number of logical cylinders, tracks, and sectors for the SCxx/B disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

4.2.2.3 Patch Procedure

1. Perform a normal SYSGEN, as if building a system to include a RP06 disk system. Use BRU to bring the SYSGEN files from tape to disk. Then execute the SYSGEN indirect command file:

```
>@[200,200]SYSGEN
```

2. Do the SYSGEN up to the point just before it performs the macro compilation of the files. At that point, the SYSGEN asks:

```
>* DO YOU WISH TO PAUSE TO EDIT ANY FILES BEFORE
ASSEMBLING? [Y,N]: Y
```

Answer Y as in the example above. The indirect command file processor will suspend itself to allow the editing.

```
AT. -- PAUSING. TO CONTINUE TYPE "UNS AT.TO <ESC>"
```

3. Type the following:

```
>SET /UIC=[11,10]
>INS $EDI
>EDI DBTAB.MAC
[00060 LINES READ IN]
[PAGE 0]
*
```

4. The file DBTAB.MAC is now available for editing.
5. Refer to Appendix B for the table of values that match the configuration of your drive. Use the octal values from this table for the variables used in the rest of this patch.

RSX-11M-Plus V2.0 Patches

```
*PL .DB0::
[00060 LINES READ IN]
.DB0::
*PL 5
    .WORD    5
*C/5/msblock/
    .WORD    msblock
*<RETURN>
    .WORD    31276
*C/31276/lsblock/
    .WORD    lsblock
*PL 22.
    .BYTE    22.,19.
*C/22.,19./sectors,tracks/
    .BYTE    sectors,tracks
*PL 815.
    .WORD    815.
*C/815./cylinders/
    .WORD    cylinders
```

6. If you have SYSGENed more than one RP06 drive, repeat step 5 for each drive SYSGENed, substituting the logical drive mnemonic for .DB0:: (.DB1::, .DB2::, etc.).
7. When all drive table entries have been edited, exit from the editor:

```
*ED
[EXIT]
```

8. Now edit the file SAVCM.MAC:

```
>SET /UIC=[12,10]
>EDI SAVCM.MAC
[00060 LINES READ IN]
[PAGE 0]
*PL RP06
[00060 LINES READ IN]
[00060 LINES READ IN]
[00060 LINES READ IN]
    DEVICE DB,DB,RP06,DISK,<22,00>
*<RETURN>
    SIZE    5.,31276,22.,19.,815.
*C/5.,31276,22.,19.,815./msblock,lsblock,sectors,-
tracks,cylinders/
    SIZE    msblock,lsblock,sectors,tracks,cylinders
*ED
```

9. Assemble the file SAVCM.MAC:

```
>MAC [12,10]SAVCM=[1,1]EXEMC/ML,[11,10]RSXMC/PA:1,-
[12,10]SAVCM
```

10. Put the new object file into its object library:

```
>SET /UIC=[1,24]
>LBR [1,24]SAV/RP=[12,10]SAVCM
```

11. Now set up an object file for patching, using the ZAP utility:

```
>LBR HRSIZ=SAV/EX:HRSIZ
>RUN $ZAP
ZAP>HRSIZ.OBJ
_2100/
0:002100/ 000005
_msblock
_2124/
0:002124/ 031276
_lsblock
_2150/
0:002150/ 001457
_cylinders
_2174/
0:002174/ 011426
_hedsec
_X
```

```
>LBR SAV/RP=HRSIZ
>LBR HRSIZ=OLR/EX:HRSIZ
>RUN $ZAP
ZAP>HRSIZ.OBJ
_2124/
0:002124/ 000005
_msblock
_2150/
0:002150/ 031276
_lsblock
_2174/
0:002174/ 001457
_cylinders
_2220/
0:002220/ 011426
_hedsec
_X
```

```
>LBR [1,24]OLR/CO::128.:128.=[1,24]OLR
>LBR [1,24]OLR/RP=[12,10]HRSIZ
```

12. Resume the SYSGEN command procedure with the command:

```
>UNS AT.T0 <esc>
```

13. The SYSGEN should now run to normal completion.

RSX-11M-Plus V2.0 Patches

4.2.3 RSX-11M-PLUS V2.0 22-BIT PATCHES FOR SC03

4.2.3.1 Patch Description

This patch modifies RSX-11M-Plus V2.0 to permit the use of the Emulex SC03 disk controller with 22-bit addressing on the DEC 11/23 Plus, Micro-PDP-11, or Micro-PDP-11/73 processors.

4.2.3.2 Patch Explanation

The SC03 emulates a DEC RH70 disk subsystem. The characteristic that is unique to the RH70 is the existence of a bus address extension register that allows direct support of the 22-bit address space. Although RSX-11M-Plus has the ability to dynamically configure peripherals, it makes the assumption that RH70-type peripherals are supported only on the 11/70. This assumption by the software prevents the operating system from functioning on the 11/23 Plus without a patch. Unfortunately, the operating system will not boot until this patch has been applied.

There is a procedure, however, by which you can load the boot blocks into memory and apply the patch. After this initial boot, you can apply the patch permanently to the baseline system image. Use the following procedure to perform this initial boot and apply the patch.

4.2.3.3 Patch Procedure

1. Enter console ODT on your 11/23 Plus.
2. Enter the following ODT dialog, in which the following conventions are observed: **bold** text represents user input; **<return>** indicates the RETURN key; **<lf>** is the LINE FEED key; and **<unit #>** means that you enter the unit number of the disk you are booting.

```
@776710/xxxxxx 40 <return>  
@776710/000100 <unit #> <return>  
@776700/004200 21 <return>  
@776732/000000 10000 <return>  
@776702/000000 177400 <return>  
@776700/004220 71 <return>  
@456/005007 0 <return>  
@R0/xxxxxx <unit #> <return>  
@R1/xxxxxx 176700 <return>  
@R7/xxxxxx 0 <return>  
@P  
003460  
@274/005737 240 <return>  
@276/177764 240 <return>  
@334/005037 240 <return>  
@336/177766 240 <return>  
@R7/003460 0 <return>  
@P
```

3. The system should now come up normally.
4. After the startup procedure has been completed, use the following commands to permanently patch the baseline system image:

```

>SET /UIC=[2,54]
>RUN $ZAP
ZAP>RSX11M.SYS/AB
_3:274/
003:000274/ 005737
_240
_3:276/
003:000276/ 177764
_240
_3:334/
003:000334/ 005037
_240
_3:336/
003:000336/ 177766
_240
_X
>

```

After these procedures have been followed, you will be able to boot the baseline system normally.

5. You may now proceed with a normal autopatch and SYSGEN process. Before you can boot and save your new system image, you must patch the SAV task to accomplish the same results as the patches in the previous section. To do this, you will need the map of the SAV task image, which is one of the privileged tasks. From [1,34]SAV.MAP you must find the starting block of the segment containing the symbol \$VBNI and also its address. As distributed, these values are block 75 and address 145654 respectively. If the values obtained from your map are different, substitute them in the following example of the command procedure.

```

>SET /UIC=[1,54]
>RUN $ZAP
ZAP>SAV.TSK
_75:145654+274/
075:146150/ 005737
_240
_75:145654+276/
075:146152/ 177764
_240
_75:145654+334/
075:146210/ 005037
_240
_75:145654+336/

```

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075:146212/ 177766

_240

_X

>

6. Now boot the system image and save it. Your patch is now complete. Please note that the SAV patch must be applied each time a SYSGEN is performed.

4.2.4 RSX-11M-PLUS V2.0 22-BIT PATCHES FOR TC02

4.2.4.1 PATCH DESCRIPTION

This patch modifies RSX-11M-Plus V2.0 to permit the use of the Emulex TC02 tape controller with 22-bit addressing on the DEC 11/23 Plus, Micro-PDP-11, or Micro-PDP-11/73 processors.

4.2.4.2 Patch Explanation

The TC02 emulates a DEC TS11 tape subsystem. When you generate a system on a 11/23 Plus, you must modify the MS: driver so that it will properly support the extended address bits. The following steps will allow you to use the TC02 on the 11/23 Plus, Micro-PDP-11, or Micro-PDP-11/73.

4.2.4.3 Patch Procedure

1. Apply autopatch if it is available.
2. Create the following correction file, which will be applied to the TS11 driver:

```
>SET /UIC=[11,10]
>INS $EDI
>EDI MSDRV.COR
[Creating new file]
Input
MSDRV.MAC/AU:72./-BF=MSDRV.MAC
\
-/M$$EXT/,/.ENDC/
-/U.BUF(R5)/,/(R2)+/
    MOVB    U.BUF+1(R5),(R2)
    TST     (R2)+
/
<return>
*EX
>
```

3. Now apply the patch to the MS: driver, using the following command sequence:

```
>INS $SLP
>SLP @MSDRV.COR
>
```

4. You may now perform a normal SYSGEN, indicating the processor type as an 11/23 Plus.

4.2.5 RSX-11M-PLUS V2.0 22-BIT PATCHES FOR CS01

4.2.5.1 Patch Description

This patch modifies RSX-11M-Plus V2.0 to permit the use of the Emulex CS01 communication controller with 22-bit addressing on the DEC 11/23 Plus, Micro-PDP-11, or Micro-PDP-11/73 processors.

4.2.5.2 Patch Explanation

The CS01 emulates a DEC DH11/DM11 terminal multiplexer. When the full-duplex terminal driver is selected, RSX-11M-Plus performs DMA transfers on output as opposed to single character interrupts. This technique greatly reduces the software overhead on interrupt processing, but as with all DMA devices on the 11/23 Plus, the problem of extended address support must be taken into consideration.

Fortunately, RSX-11M-Plus does not actually perform these DMA transfers from the user's program buffer. It first moves the output message to its own internal message buffer and then performs the DMA transfer from there. DEC chose to do it this way in order to allow the program to be checkpointed while the terminal message is being output. Because the terminal driver is always in the same place in memory and the SYSVMR command file places it below 256K bytes, it is not necessary for the terminal controller to support the extended address bits of the 11/23 Plus. Despite this, some minor variations to the SYSGEN procedure are required so that the terminal driver will be generated correctly.

4.2.5.3 Patch Procedure

1. Perform a normal SYSGEN, indicating the processor type as an 11/23 Plus.
2. When the SYSGEN asks you the following question, answer Y:


```
>* AE030 Do you wish to pause to edit any files before
>*          assembling? [Y/N D:N]:
```

The indirect command file processor will suspend itself to allow the editing.

3. When the SYSGEN command file pauses, use the following command sequence to create a special version of the RSXMC.MAC file:

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```
>PIP RSXMCT.MAC=RSXMC.MAC
>EDI RSXMCT.MAC
[nnnnn lines read in]
[Page 0]
*PL M$$EXT
[nnnnn lines read in]
.
.
.
[nnnnn lines read in]
M$$EXT=0 ;EXTENDED MEMORY SUPPORT
*D
*ED
>
```

4. Now you must edit the driver assembly command file so that certain modules will include the special RSXMCT.MAC file:

```
>SET /UIC=[200,200]
>EDI TTDRVASM.CMD
[nnnnn lines read in]
[Page 0]
*PL ,TTCAN
IN:[1,1]EXEMC/ML,SY:[11,10]RSXMC/PA:1,TTMAC,TTCAN
*C/RSXMC/RSXMCT/
IN:[1,1]EXEMC/ML,SY:[11,10]RSXMCT/PA:1,TTMAC,TTCAN
*PL ,TTDAT
IN:[1,1]EXEMC/ML,SY:[11,10]RSXMC/PA:1,TTMAC,TTDAT
*C/RSXMC/RSXMCT/
IN:[1,1]EXEMC/ML,SY:[11,10]RSXMCT/PA:1,TTMAC,TTDAT
*PL ,TTYH
IN:[1,1]EXEMC/ML,SY:[11,10]RSXMC/PA:1,TTMAC,TTYH
*C/RSXMC/RSXMCT/
IN:[1,1]EXEMC/ML,SY:[11,10]RSXMCT/PA:1,TTMAC,TTYH
*ED
>
```

5. You may now resume the SYSGEN process. Your patch is now complete.

4.3 RSX-11M-PLUS V2.1 PATCHES

4.3.1 RSX-11M-PLUS V2.1 PATCHES FOR RM02/03/05

4.3.1.1 Patch Description

This patch modifies RSX-11M-Plus V2.1 to permit the use of non-standard disk sizes with the Emulex SCxx/B1 and SCxx/B3 controllers (RM02/03/05 emulations).

4.3.1.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

There are three areas in the RSX-11M-Plus system that may require patching: the system device table SYSTB.MAC, to show the extended or contracted capacity; the appropriate driver; and the various disk utilities that use that driver.

The patches to the device tables and the device driver are applied to the macro source code by means of an editor, and are then installed using the LBR or the SLP utility. The patches to the various utilities are made to the task images using the RSX-11M ZAP utility.

The Emulex SCxx/B disk controllers perform a logical mapping of the cylinders, tracks, and sectors onto the drive. The number of logical cylinders, tracks, and sectors for the SCxx/B disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

4.3.1.3 Patch Procedure

1. Apply autopatch if it is available.
2. Install the utilities that you will need during the patch procedure:

```
>INS $EDI
>INS $LBR
>INS $MAC
>INS $PAT
>INS $PIP
>INS $SLP
>
```

3. If your emulation has a non-standard number of sectors per track or tracks per cylinder, patch the SAVE common driver as follows:

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RM02:

```
>SET /UIC=[12,10]
>EDI SAVCM.COR
[Creating new file]
Input
SAVCM.MAC/AU:72./-BF=SAVCM.MAC
\
-/CMTYP:/
-/RM02/,.
    DVTYP    DR, 25, sectors, tracks   ;; RM02
/
<return>
*EX
[Exit]
```

RM03:

```
>SET /UIC=[12,10]
>EDI SAVCM.COR
[Creating new file]
Input
SAVCM.MAC/AU:72./-BF=SAVCM.MAC
\
-/CMTYP:/
-/RM03/,.
    DVTYP    DR, 24, sectors, tracks   ;; RM03
/
<return>
*EX
[Exit]
```

RM05:

```
>SET /UIC=[12,10]
>EDI SAVCM.COR
[Creating new file]
Input
SAVCM.MAC/AU:72./-BF=SAVCM.MAC
\
-/CMTYP:/
-/RM05/,.
    DVTYP    DR, 27, sectors, tracks   ;; RM05
/
<return>
*EX
[Exit]
```

Now apply the correction file and re-assemble the module:

```
>SLP @SAVCM.COR
>SET /UIC=[1,24]
>MAC SAVCM=[1,1]EXEMC/ML,[2,54]RSXMC,[12,10]SAVCM
>LBR SAV/RP=SAVCM
Module "SAVCM" replaced
```

```
>PIP SAVCM.OBJ;*/DE
>
```

4. If your emulation has a non-standard number of sectors per track or tracks per cylinder, patch the SAVE boot block routine as follows:

RM02:

```
>SET /UIC=[12,10]
>EDI SAVBOT.COR
[Creating new file]
Input
SAVBOT.MAC/AU:72./-BF=SAVBOT.MAC
\
-/RHTYP:/
-/RM02/,.
      DVTYP    25, sectors, tracks ; RM02
/
<return>
*EX
[Exit]
```

RM03:

```
>SET /UIC=[12,10]
>EDI SAVBOT.COR
[Creating new file]
Input
SAVBOT.MAC/AU:72./-BF=SAVBOT.MAC
\
-/RHTYP:/
-/RM03/,.
      DVTYP    24, sectors, tracks ; RM03
/
<return>
*EX
[Exit]
```

RM05:

```
>SET /UIC=[12,10]
>EDI SAVBOT.COR
[Creating new file]
Input
SAVBOT.MAC/AU:72./-BF=SAVBOT.MAC
\
-/RHTYP:/
-/RM05/,.
      DVTYP    27, sectors, tracks ; RM05
/
<return>
*EX
[Exit]
```

RSX-11M-Plus V2.1 Patches

Now apply the correction file and re-assemble the module:

```
>SLP @SAVBOT.COR
>SET /UIC=[1,24]
>MAC SAVBOT=[1,1]EXEMC/ML,[2,54]RSXMC,[12,10]SAVBOT
>LBR SAV/RP=SAVBOT
Module "SAVBOT" replaced

>PIP SAVBOT.OBJ;*/DE
>
```

5. Patch the HRSIZ module, which is responsible for "sizing" disk drives when they are brought online.

RM02:

```
>SET /UIC=[27,10]
>EDI HRSIZ.COR
[Creating new file]
Input
HRSIZ.MAC/AU:72./-BF=HRSIZ.MAC
\
-;/ RM02/,.
    SIZE msblock,lsblock,sectors,tracks,cylinders ; RM02
/
<return>
*EX
[Exit]
```

RM03:

```
>SET /UIC=[27,10]
>EDI HRSIZ.COR
[Creating new file]
Input
HRSIZ.MAC/AU:72./-BF=HRSIZ.MAC
\
-;/ RM03/,.
    SIZE msblock,lsblock,sectors,tracks,cylinders ; RM03
/
<return>
*EX
[Exit]
```

RM05:

```
>SET /UIC=[27,10]
>EDI HRSIZ.COR
[Creating new file]
Input
HRSIZ.MAC/AU:72./-BF=HRSIZ.MAC
\
-;/ RM05/,.
```

```

        SIZE  msblock,lsblock,sectors,tracks,cylinders ; RM05
/
<return>
*EX
[Exit]

```

Now apply the correction file and re-assemble the module:

```

>SLP @HRSIZ.COR
>SET /UIC=[1,24]
>MAC
MAC>H1=[1,1]EXEMC/ML,[2,54]RSXMC,-
MAC>[12,10]SAVHRC,[27,10]HRPRE,HRSIZ
MAC>H2=[1,1]EXEMC/ML,[2,54]RSXMC,-
MAC>[27,10]HRPRE,HRSIZ
MAC>^Z                                     (enter <ctrl-z>)
>LBR SAV/RP=H1
Module "HRSIZ " replaced

>LBR OLR/RP/NOEP=H2
Module "HRSIZ " replaced

>PIP H1.OBJ;*,H2.OBJ;*/DE
>

```

6. Patch the INIBAD module so that the disk INI utility will support the new disk size. Note that the symbolics **msblock** and **lsblock** are enclosed in angle brackets, <>. This is the required syntax for the LTDV command. For a standard disk, the command would be:

```
LTDV  DR,<2,1140>,823.,5.,32.,1,10.,22. ;RM03
```

RM02: or RM03:

```

>SET /UIC=[12,10]
>EDI INIBAD.COR
[Creating new file]
Input
INIBAD.MAC/AU:72./-BF=INIBAD.MAC
\
-/LTDEVT:/
-/RM03/,.
LTDV  DR,<msblock,lsblock>,cylinders,tracks,
sectors,1,10.,sectors-12 ;RM03
/
<return>
*EX
[Exit]

>

```

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RM05:

```
>SET /UIC=[12,10]
>EDI INIBAD.COR
[Creating new file]
Input
INIBAD.MAC/AU:72./-BF=INIBAD.MAC
\
-/LTDEVT:/
-/RM05/,.
*
LTDV DR,<msblock,lsblock>,cylinders,tracks,
sectors,1,10.,sectors-12 ;RM05
/
<return>
*EX
[Exit]

>
```

NOTE

Lines marked with an asterisk (*) are continued on the following line because of space limitations. In actual use, however, a command must be on a single line, not as shown.

Now apply the correction file and re-assemble the module:

```
>SLP @INIBAD.COR
>SET /UIC=[1,24]
>MAC INIBAD=[2,54]RSXMC,[12,10]INIBAD
>LBR INI/RP=INIBAD
Module "INIBAD" replaced

>PIP INIBAD.OBJ;*/DE
>
```

7. Patch the SYSGEN module that generates the device tables to reflect the new disk size:

RM02: or RM03:

```
>SET /UIC=[200,200]
>EDI SGNMAS.COR
[Creating new file]
Input
SGNMAS.CMD/-AU=SGNMAS.CMD
\
-!/ RM02/,/CYL/
      .SETN ZN1 msblock           ! RM02 OR RM03
      .SETN ZN2 lsblock
      .SETN SEC SECTORS.
      .SETN TRK TRACKS.
      .SETN CYL CYLINDERS.
```

```

/
<return>
*EX
[Exit]

>

```

RM05:

```

>SET /UIC=[200,200]
>EDI SGNMAS.COR
[Creating new file]
Input
SGNMAS.CMD/-AU=SGNMAS.CMD
\
-!/ RM05/,/TRK/
    .SETN ZN1 msblock      ! RM05
    .SETN ZN2 lsblock
    .SETN SEC SECTORS.
    .SETN TRK TRACKS.
    .SETN CYL CYLINDERS.
/
<return>
*EX
[Exit]

>

```

Now apply the correction file to the SYSGEN command file:

```

>LBR SGNMAS.CMD=SYSGEN.CLB/EX:SGNMAS
>SLP @SGNMAS.COR
>LBR SYSGEN.CLB/RP=SGNMAS.CMD
Module "SGNMAS" replaced

>PIP SGNMAS.CMD;*/DE
>

```

8. Patch the FMT utility so it can format non-standard disks.

NOTE

FMT has a limitation such that devices with more than 32 (decimal) sectors per track **cannot** be formatted. Therefore, if your disk has more than 32 sectors per track, skip this patch and use either the firmware format or a diagnostic.

RM02: or RM03:

```

>SET /UIC=[1,24]
>EDI FMTDAT.PAT
[Creating new file]
Input
    .TITLE FMTDAT

```

RSX-11M-Plus V2.1 Patches

```
.IDENT /01.07A/  
; THE CHECKSUM FOR THE INPUT FMTDAT.OBJ IS: 25734  
$$$=  
.=$$$+44456 ; RM02 or RM03  
.WORD msblock  
.WORD lsblock  
.WORD cylinders  
.WORD tracks  
.WORD sectors  
.END  
<return>  
*EX  
[Exit]  
>
```

RM05:

```
>SET /UIC=[1,24]  
>EDI FMTDAT.PAT  
[Creating new file]  
Input  
.TITLE FMTDAT  
.IDENT /01.07A/  
; THE CHECKSUM FOR THE INPUT FMTDAT.OBJ IS: 25734  
$$$=  
.=$$$+44516 ; RM05  
.WORD msblock  
.WORD lsblock  
.WORD cylinders  
.WORD tracks  
.WORD sectors  
.END  
<return>  
*EX  
[Exit]  
>
```

Now assemble the patch file and apply it to the object module:

```
>MAC FMTDAT.POB=FMTDAT.PAT  
>LBR FMTDAT=FMT/EX:FMTDAT  
>PAT FMTDAT=FMTDAT/CS:25734,FMTDAT.POB  
>LBR FMT/RP=FMTDAT  
Module "FMTDAT" replaced  
  
>PIP FMTDAT.*;*/DE  
>
```

9. Patch the BAD utility so it can format non-standard disks:

RM02: or RM03:

```

>SET /UIC=[1,24]
>EDI BADDAT.PAT
[Creating new file]
Input
  .TITLE  BADDAT
  .IDENT  /6.01A/
; THE CHECKSUM FOR THE INPUT BADDAT.OBJ IS: 7416
$$$=.
.=$$$+2016                ; RM02 OR RM03
  .WORD   msblock
  .WORD   lsblock
  .WORD   tracks
  .WORD   sectors
  .WORD   1
  .WORD   sectors
  .WORD   tracks*sectors
  .WORD   10.
  .WORD   sectors-12
  .END
<return>
*EX
[Exit]

>

```

RM05:

```

>SET /UIC=[1,24]
>EDI BADDAT.PAT
[Creating new file]
Input
  .TITLE  BADDAT
  .IDENT  /6.01A/
; THE CHECKSUM FOR THE INPUT BADDAT.OBJ IS: 7416
$$$=.
.=$$$+2042                ; RM05
  .WORD   msblock
  .WORD   lsblock
  .WORD   tracks
  .WORD   sectors
  .WORD   1
  .WORD   sectors
  .WORD   tracks*sectors
  .WORD   10.
  .WORD   sectors-12
  .END
<return>
*EX
[Exit]

>

```

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Now assemble the patch file and apply it to the object module:

```
>MAC BADDAT.POB=BADDAT.PAT
>LBR BADDAT=BAD/EX:BADDAT
>PAT BADDAT=BADDAT/CS:7416,BADDAT.POB
>LBR BAD/RP=BADDAT
Module "BADDAT" replaced

>PIP BADDAT.*;*/DE
>
```

10. Patch the DSC utility so it can read the bad block definitions from the non-standard disks:

RM02: or RM03:

```
>SET /UIC=[1,24]
>EDI DSCBD.PAT
[Creating new file]
Input
    .TITLE   DSCBD
    .IDENT   /X25.7A/
; THE CHECKSUM FOR THE INPUT DSCBD.OBJ IS: 70375
$$$=.
.=$$$+100                ; RM02 OR RM03
    .WORD    msblock
    .WORD    lsblock
    .BYTE    tracks
    .BYTE    sectors
    .BYTE    sectors-12
    .END
<return>
*EX
[Exit]
>
```

RM05:

```
>SET /UIC=[1,24]
>EDI DSCBD.PAT
[Creating new file]
Input
    .TITLE   DSCBD
    .IDENT   /X25.7A/
; THE CHECKSUM FOR THE INPUT DSCBD.OBJ IS: 70375
$$$=.
.=$$$+124                ; RM05
    .WORD    msblock
    .WORD    lsblock
    .BYTE    tracks
    .BYTE    sectors
    .BYTE    sectors-12
```

```

        .END
    <return>
    *EX
    [Exit]

>

```

Now assemble the patch file and apply it to the object module:

```

>MAC DSCBD.POB=DSCBD.PAT
>LBR DSCBD=DSC/EX:DSCBD
>PAT DSCBD=DSCBD/CS:70375,DSCBD.POB
>LBR DSC/RP=DSCBD
Module "DSCBD" replaced

>PIP DSCBD.*;*/DE
>

```

11. Patch the BRU utility so it can read the bad block definitions from the non-standard disks:

RM02: or RM03:

```

>SET /UIC=[1,24]
>EDI BRUBAD.PAT
[Creating new file]
Input
    .TITLE BRUBAD
    .IDENT /1.07A/
; THE CHECKSUM FOR THE INPUT BRUBAD.OBJ IS: 100303
$$$=.
.=$$$+210 ; RM02 OR RM03
    .WORD msblock
    .WORD lsbblock
    .WORD cylinders
    .BYTE tracks
    .BYTE sectors
    .BYTE 1
    .BYTE sectors
    .BYTE 10.
    .BYTE sectors-12
    .END
<return>
*EX
[Exit]

>

```

RM05:

```

>SET /UIC=[1,24]
>EDI BRUBAD.PAT
[Creating new file]

```

RSX-11M-Plus V2.1 Patches

```
Input
  .TITLE BRUB AD
  .IDENT /1.07A/
; THE CHECKSUM FOR THE INPUT BRUBAD.OBJ IS: 100303
$$$=.
.=$$$+154 ; RM05
  .WORD msblock
  .WORD lsblock
  .WORD cylinders
  .BYTE tracks
  .BYTE sectors
  .BYTE 1
  .BYTE sectors
  .BYTE 10.
  .BYTE sectors-12
  .END
<return>
*EX
[Exit]
>
```

Now assemble the patch file and apply it to the object module:

```
>MAC BRUBAD.POB=BRUBAD.PAT
>LBR BRUBAD=BRU/EX:BRUBAD
>PAT BRUBAD=BRUBAD/CS:100303,BRUBAD.POB
>LBR BRU/RP=BRUBAD
Module "BRUBAD" replaced

>PIP BRUBAD.*;*/DE
>
```

12. Patch the stand-alone BRUSYS utility. This utility is a self-contained operating system with several utilities fixed in it, so there are several areas that need to be ZAPed:

RM02: or RM03:

```
>SET /UIC=[6,54]
>RUN $ZAP
ZAP>BRUSYS.SYS/AB
_33:32/
033:000032/ 000002
_msblock
_33:34/
033:000034/ 001140
_lsblock
_33:36\
033:000036\ 040
_sectors
_33:37\
033:000037\ 005
```

```

_tracks
_33:42/
033:000042/ 000002
_msblock
_33:44/
033:000044/ 001140
_lsblock
_33:46\
033:000046\ 040
_sectors
_33:47\
033:000047\ 005
_tracks
_155:734/
155:000734/ 000002
_msblock
_155:742/
155:000742/ 001140
_lsblock
_244:174/
244:000174/ 000002
_msblock
_244:176/
244:000176/ 001140
_lsblock
_244:200/
244:000200/ 001467
_cylinders
_244:202/
244:000202/ 000005
_tracks
_244:204/
244:000204/ 000040
_sectors
_307:112/
307:000112/ 000002
_msblock
_307:114/
307:000114/ 001140
_lsblock
_307:116\
307:000116\ 005
_tracks
_307:117\
307:000117\ 040
_sectors
_307:120\
307:000120\ 026
_sectors-12
_535:0/
535:000000/ 000002
_msblock
_535:2/
535:000002/ 001140

```

RSX-11M-Plus V2.1 Patches

```
_lsblock
_535:4/
535:000004/ 001467
_cylinders
_535:6\
535:000006\ 005
_tracks
_535:7\
535:000007\ 040
_sectors
_535:13\
535:000013\ 026
_sectors-12
_556:772/
556:000772/ 000002
_msblock
_556:774/
556:000774/ 001140
_lsblock
_556:776/
556:000776/ 000005
_tracks
_556:1000/
556:001000/ 000040
_sectors
_556:1004/
556:001004/ 000040
_sectors
_556:1006/
556:001006/ 000240
_tracks*sectors
_556:1012/
556:001012/
_sectors-12
_x
>
```

RM05:

```
>SET /UIC=[6,54]
>RUN $ZAP
ZAP>BRUSYS.SYS/AB
_33:72/
033:000072/ 000007
_msblock
_33:74/
033:000074/ 121240
_lsblock
_33:76\
033:000076\ 040
_sectors
_33:77\
033:000077\ 023
_tracks
```

```
_33:102/  
033:000102/ 000007  
_msblock  
_33:104/  
033:000104/ 121240  
_lsblock  
_33:106\  
033:000106\ 040  
_sectors  
_33:107\  
033:000107\ 023  
_tracks  
_156:4/  
156:000004/ 000007  
_msblock  
_156:12/  
156:000012/ 121240  
_lsblock  
_244:234/  
244:000234/ 000007  
_msblock  
_244:236/  
244:000236/ 121240  
_lsblock  
_244:240/  
244:000240/ 001467  
_cylinders  
_244:242/  
244:000242/ 000023  
_tracks  
_244:244/  
244:000244/ 000040  
_sectors  
_307:136/  
307:000136/ 000007  
_msblock  
_307:140/  
307:000140/ 121240  
_lsblock  
_307:142\  
307:000142\ 023  
_tracks  
_307:143\  
307:000143\ 040  
_sectors  
_307:144\  
307:000144\ 026  
_sectors-12  
_534:744/  
534:000744/ 000007  
_msblock  
_534:746/  
534:000746/ 121240  
_lsblock
```

RSX-11M-Plus V2.1 Patches

```
_534:750/  
534:000750/ 001467  
_cylinders  
_534:752\  
534:000752\ 023  
_tracks  
_534:753\  
534:000753\ 040  
_sectors  
_534:757\  
534:000757\ 026  
_sectors-12  
_557:16/  
557:000016/ 000007  
_msblock  
_557:20/  
557:000020/ 121240  
_lsblock  
_557:22/  
557:000022/ 000023  
_tracks  
_557:24/  
557:000024/ 000040  
_sectors  
_557:30/  
557:000030/ 000040  
_sectors  
_557:32/  
557:000032/ 001140  
_tracks*sectors  
_557:36  
557:000036/ 000026  
_sectors-12  
_X  
>
```

13. You may now continue with the normal SYSGEN process. It will be necessary to re-build FMT, BAD, DSC, and BRU during SYSGEN to include the patches. After the SYSGEN you can boot the new system and it will use the non-standard disks with no further modifications.
14. This completes the patch procedure.

4.3.2 RSX-11M-PLUS V2.1 PATCHES FOR RP06

4.3.2.1 Patch Description

This patch modifies RSX-11M-Plus V2.1 to permit the use of non-standard disk sizes with the Emulex SCxx/B1 and SCxx/B3 controllers (RP06 emulations).

4.3.2.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

There are three areas in the RSX-11M-Plus system that may require patching: the system device table SYSTB.MAC, to show the extended or contracted capacity; the appropriate driver; and the various disk utilities that use that driver.

The patches to the device tables and the device driver are applied to the macro source code by means of an editor, and are then installed using the LBR or the SLP utility. The patches to the various utilities are made to the task images using the RSX-11M ZAP utility.

The Emulex SCxx/B disk controllers perform a logical mapping of the cylinders, tracks, and sectors onto the drive. The number of logical cylinders, tracks, and sectors for the SCxx/B disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

4.3.2.3 Patch Procedure

1. Apply autopatch if it is available.
2. Install the utilities that you will need during the patch procedure:

```
>INS $EDI
>INS $LBR
>INS $MAC
>INS $PAT
>INS $PIP
>INS $SLP
```

3. If your emulation has a non-standard number of sectors per track or tracks per cylinder, patch the SAVE common driver as follows:

```
>SET /UIC=[12,10]
>EDI SAVCM.COR
[Creating new file]
Input
SAVCM.MAC/AU:72./-BF=SAVCM.MAC
\
-/CMTYP:/
-/RP06/,.
    DVTYP    DB, 22, sectors, tracks    ;;; RP06
/
<return>
*EX
[Exit]
```

RSX-11M-Plus V2.1 Patches

Now apply the correction file and re-assemble the module:

```
>SLP @SAVCM.COR
>SET /UIC=[1,24]
>MAC SAVCM=[1,1]EXEMC/ML,[2,54]RSXMC,[12,10]SAVCM
>LBR SAV/RP=SAVCM
Module "SAVCM" replaced

>PIP SAVCM.OBJ;*/DE
>
```

4. If your emulation has a non-standard number of sectors per track or tracks per cylinder, patch the SAVE boot block routine as follows:

```
>SET /UIC=[12,10]
>EDI SAVBOT.COR
[Creating new file]
Input
SAVBOT.MAC/AU:72./-BF=SAVBOT.MAC
\
-/RHTYP:/
-/RP06/,.
    DVTYP    DB, 22, sectors, tracks ; RP06
/
<return>
*EX
[Exit]
```

Now apply the correction file and re-assemble the module:

```
>SLP @SAVBOT.COR
>SET /UIC=[1,24]
>MAC SAVBOT=[1,1]EXEMC/ML,[2,54]RSXMC,[12,10]SAVBOT
>LBR SAV/RP=SAVBOT
Module "SAVBOT" replaced

>PIP SAVBOT.OBJ;*/DE
>
```

5. Patch the HRSIZ module, which is responsible for "sizing" disk drives when they are brought online:

```
>SET /UIC=[27,10]
>EDI HRSIZ.COR
[Creating new file]
Input
HRSIZ.MAC/AU:72./-BF=HRSIZ.MAC
\
-/; RP06/,.
    SIZE  msblock,lsblock,sectors,tracks,cylinders ; RP06
```

```

/
<return>
*EX
[Exit]

```

Now apply the correction file and re-assemble the module:

```

>SLP @HRSIZ.COR
>SET /UIC=[1,24]
>MAC
MAC>H1=[1,1]EXEMC/ML,[2,54]RSXMC,-
MAC>[12,10]SAVHRC,[27,10]HRPRE,HRSIZ
MAC>H2=[1,1]EXEMC/ML,[2,54]RSXMC,-
MAC>[27,10]HRPRE,HRSIZ
MAC>^Z                                     (enter <ctrl-z>)
>LBR SAV/RP=H1
Module "HRSIZ " replaced

>LBR OLR/RP/NOEP=H2
Module "HRSIZ " replaced

>PIP H1.OBJ;*,H2.OBJ;*/DE
>

```

6. Patch the SYSGEN module which generates the device tables to reflect the new disk size:

```

>SET /UIC=[200,200]
>EDI SGNMAS.COR
[Creating new file]
Input
SGNMAS.CMD/-AU=SGNMAS.CMD
\
-/.DB34:/,/CYL/
.DB34: .SETN ZN1 msblock          ! RP06
      .SETN ZN2 lsblock
      .SETN CYL cylinders
-/.22.,19./,.
      .DATA #1          .BYTE sectors,tracks
/
<return>
*EX
[Exit]
>

```

Now apply the correction file to the SYSGEN command file:

```

>LBR SGNMAS.CMD=SYSGEN.CLB/EX:SGNMAS
>SLP @SGNMAS.COR
>LBR SYSGEN.CLB/RP=SGNMAS.CMD
Module "SGNMAS" replaced

```

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```
>PIP SGNMAS.COMD;*/DE
>
```

7. Patch the FMT utility so it can format non-standard disks.

NOTE

FMT has a limitation such that devices with more than 32 (decimal) sectors per track **cannot** be formatted. Therefore, if your disk has more than 32 sectors per track, skip this patch and use either the firmware format or a diagnostic.

```
>SET /UIC=[1,24]
>EDI FMTDAT.PAT
[Creating new file]
Input
    .TITLE    FMTDAT
    .IDENT    /01.07A/
; THE CHECKSUM FOR THE INPUT FMTDAT.OBJ IS: 25734
$$$=.
.=$$$+44376                ; RP06
    .WORD    msblock
    .WORD    lsblock
    .WORD    cylinders
    .WORD    tracks
    .WORD    sectors
    .END
<return>
*EX
[Exit]
>
```

Now assemble the patch file and apply it to the object module:

```
>MAC FMTDAT.POB=FMTDAT.PAT
>LBR FMTDAT=FMT/EX:FMTDAT
>PAT FMTDAT=FMTDAT/CS:25734,FMTDAT.POB
>LBR FMT/RP=FMTDAT
Module "FMTDAT" replaced

>PIP FMTDAT.*;*/DE
>
```

8. Patch the stand-alone BRUSYS utility. This utility is a self-contained operating system with several utilities fixed in it, so there are several areas that need to be ZAPed:

```
>SET /UIC=[1,51]
>RUN $ZAP
ZAP>BRUSYS.SYS/AB
_23:112/
```

```

023:000112/ 000642
_tracks*sectors
_23:120
023:000120/ 000642
_tracks*sectors
_23:140
023:000140/ 000026
_sectors
_155:676/
155:000676/ 000005
_msblock
_155:704/
155:000704/ 031276
_lsblock
_244:114/
244:000114/ 000005
_msblock
_244:116/
244:000116/ 031276
_lsblock
_244:120/
244:000120/ 001457
_cylinders
_244:122/
244:000122/ 000023
_tracks
_244:124/
244:000124/ 000026
_sectors
_X
>

```

9. You may now continue with a normal SYSGEN process. It will be necessary to re-build FMT during SYSGEN to include the patch. After the SYSGEN, you can boot the new system and it will use the non-standard disks with no further modifications. Your patch is now complete.

4.3.3 RSX-11M-PLUS V2.1 22-BIT PATCHES FOR SC02/C

4.3.3.1 Patch Description

This patch modifies RSX-11M-Plus V2.1 to permit the use of the Emulex SC02/C disk controller with 22-bit addressing on the DEC 11/23 Plus, Micro-PDP-11, or Micro-PDP-11/73 processors.

4.3.3.2 Patch Explanation

The SC02/C emulates a DEC RK06/07 disk subsystem. DEC does not support this subsystem on a 22-bit backplane, such as the one used on the 11/23 Plus. It is therefore necessary to patch RSX-11M-Plus in order for it to work with the extended address range available on the 11/23 Plus. Use the following procedure to make the necessary modifications.

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4.3.3.3 Patch Procedure

1. Apply autopatch if it is available.
2. Create the following correction file, which will be applied to the DM driver:

```
>SET /UIC=[11,10]
>INS $EDI
>EDI DMDRV.COR
[Creating new file]
Input
DMDRV.MAC/AU:72./-BF=DMDRV.MAC
\
-/RKDC/
RKBAE= 22
-/$STMAP/,.
        BIT      #DV.EXT,U.CW1(R5)
        BNE      20$
        CALL     $STMAP
-/DMPWF1/,/DMPWF0/
        BEQ      42$
        JMP      DMPWF0
42$:    JMP      DMPWF1
-/DMXCT/,.
        BIT      #DV.EXT,U.CW1(R5)
        BEQ      10$
        MOV      R0,-(SP)
        MOVB     U.BUF+1(R5),R0
        BIS      #22000,R0
        MOV      R0,RKBAE(R2)
        BIC      #177774,R0
        SWAB     R0
        BIC      #177400,(SP)
        BIS      R0,(SP)
        MOV      (SP)+,R0
10$:    CALL     DMXCT
-/DMPWF:/, .
DMPWF: MOV      S.KRB(R4),R2
        BIC      #KS.EXT,K.STS(R2)
        BIC      #DV.EXT,U.CW1(R5)
        BIT      #HF.QB,$HFMSK
        BEQ      10$
        BIS      #KS.EXT,K.STS(R2)
        BIS      #DV.EXT,U.CW1(R5)
10$:    MOV      @S.KRB(R4),R2
-/DMCALC:/
-/5$/
        BIT      #DV.EXT,U.CW1(R5)
        BNE      5$
/
<return>
*EX
>
```

3. Now apply the patch to the DM driver, using the following command sequence:

```
>INS $SLP
>SLP @DMDRV.COR
>
```

4. Next, create a correction file that will be applied to the executive module LOWCR. This patch allows the DM driver to determine on the initial boot that it is an LSI-11 bus system:

```
>EDI LOWCR.COR
[Creating new file]
Input
LOWCR.MAC/AU:72./-BF=LOWCR.MAC
\
-/$HFMSK:;/,.
$HFMSK:;
    .IF EQ  R$TPR-"23
    .WORD  HF.QB!HF.EIS
    .IFF
    .WORD  HF.EIS
    .ENDC
/
<return>
*EX
>
```

5. Now apply the patch to the LOWCR module, using the following command sequence:

```
>SLP @LOWCR.COR
>
```

6. Finally, create a correction file that will be applied to a module of SAVE named SAVCM. This patch allows you to save systems on the SC02/C subsystem which are larger than 124K words in size.

```
>SET /UIC=[12,10]
>EDI SAVCM.COR
[Creating new file]
Input
SAVCM.MAC/AU:72./-BF=SAVCM.MAC
\
-/$SETUP:/
-/$#5,R4/
    BIS      #22000,22(R5)
```

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```
/  
<return>  
*EX  
>
```

7. Now apply the patch to the SAVCM module, re-assemble it, and replace it in the SAVE object library, using the following command sequence:

```
>SLP @SAVCM.COR  
>SET /UIC=[1,24]  
>INS $MAC  
>MAC SAVCM=[1,1]EXEMC/ML,[2,54]RSXMC/PA:1,[12,10]SAVCM  
>INS $LBR  
>LBR SAV/RP=SAVCM  
Module "SAVCM " replaced  
  
>PIP SAVCM.OBJ;*/DE  
>
```

8. You may now perform a normal SYSGEN, indicating the processor type as an 11/23 Plus.
9. When the SYSGEN completes, you can perform a normal boot. Your patch is now complete.

4.3.4 RSX-11M-PLUS V2.1 22-BIT PATCHES FOR CS01

4.3.4.1 Patch Description

This patch modifies RSX-11M-Plus V2.1 to permit the use of the Emulex CS01 communication controller with 22-bit addressing on the DEC 11/23 Plus, Micro-PDP-11, or Micro-PDP-11/73 processors.

4.3.4.2 Patch Explanation

The CS01 emulates a DEC DH11/DM11 terminal multiplexer. When the full-duplex terminal driver is selected, RSX-11M-Plus performs DMA transfers on output as opposed to single character interrupts. This technique greatly reduces the software overhead on interrupt processing, but as with all DMA devices on the 11/23 Plus, the problem of extended address support must be taken into consideration.

Fortunately, RSX-11M-Plus does not actually perform these DMA transfers from the user's program buffer. It first moves the output message to its own internal message buffer and then performs the DMA transfer from there. DEC chose to do it this way in order to allow the program to be checkpointed while the terminal message is being output. Because the terminal driver is always in the same place in memory and the SYSVMR command file places it below 256K bytes, it is not necessary for the terminal controller to support the extended address bits of the 11/23 Plus. Despite this, some minor variations to the SYSGEN procedure are required so that the terminal driver will

be generated correctly. Also, a SYSGEN command file must be modified so that it will not assume DEC DHV-11 support on the 11/23 Plus. The following steps will allow you to use the CS01 on the 11/32 Plus.

4.3.4.3 Patch Procedure

1. Before you start the SYSGEN process, you must edit a SYSGEN command file so that the DHV-11 support will not be generated on LSI-11 bus machines.

```
>SET /UIC=[200,200]
>INS $LBR
>LBR SG NEXC.COMD=SYSGEN.CLB/EX:SG NEXC
>INS $EDI
>EDI SG NEXC.COMD
[nnnnn lines read in]
[Page 0]
*PL .SETT $QBUS
[nnnnn lines read in]
.
.
[nnnnn lines read in]
.IF <STRLEN> NE 0 .SETT $QBUS
*D
*ED
[Exit]
>LBR SYSGEN.CLB/RP=SG NEXC.COMD
>PIP SG NEXC.COMD;*/DE
>
```

2. Perform a normal SYSGEN, indicating the processor type as an 11/23 Plus.
3. When the SYSGEN asks the following question, answer Y.

```
>* AE030 Do you wish to pause to edit any files before
>* assembling? [Y/N D:N]:
```

The indirect command file processor will suspend itself to allow the editing.

4. When the SYSGEN command file pauses, use the following command sequence to create a special version of the RSXMC.MAC file:

```
>SET /UIC=[11,10]
>PIP RSXMCT.MAC=RSXMC.MAC
>EDI RSXMCT.MAC
[nnnnn lines read in]
[Page 0]
*PL M$$EXT=0
[nnnnn lines read in]
```

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```
.  
. .  
[nnnnn lines read in]  
M$$EXT=0 ;EXTENDED MEMORY SUPPORT  
*D  
*ED  
>
```

5. Now you must edit the driver assembly command file so that certain modules will include the special RSXMCT.MAC file:

```
>SET /UIC=[200,200]  
>EDI TTDRVASM.COM  
[nnnnn lines read in]  
[Page 0]  
*PL ,TTCAN  
IN:[1,1]EXEMC/ML, [11,10]RSXMC/PA:1,TTMAC,TTCAN  
*C/RSXMC/RSXMCT/  
IN:[1,1]EXEMC/ML, [11,10]RSXMCT/PA:1,TTMAC,TTCAN  
*PL ,TTDAT  
IN:[1,1]EXEMC/ML, [11,10]RSXMC/PA:1,TTMAC,TTDAT  
*C/RSXMC/RSXMCT/  
IN:[1,1]EXEMC/ML, [11,10]RSXMCT/PA:1,TTMAC,TTDAT  
*PL ,TTYH  
IN:[1,1]EXEMC/ML, [11,10]RSXMC/PA:1,TTMAC,TTYH  
*C/RSXMC/RSXMCT/  
IN:[1,1]EXEMC/ML, [11,10]RSXMCT/PA:1,TTMAC,TTYH  
*ED  
>
```

6. You may now resume the SYSGEN process. Your patch is now complete.

4.3.5 RSX-11M-PLUS V2.1 PATCHES FOR UC01

4.3.5.1 Patch Description

This patch modifies RSX-11M-Plus V2.1 to extend the I/O timeout to permit the use of the Emulex UC01 disk controller with the Iomega disk subsystem.

4.3.5.2 Patch Explanation

The UC01/Iomega disk subsystem emulates the DEC RL02 disk subsystem, and can therefore be used by the standard software drivers with no modifications. There is, however, one characteristic of the Iomega that can cause the system to crash if not modified: If the Iomega is not accessed for a specific period of time, it stops spinning to reduce head wear on the media. When the drive is next accessed, it starts spinning and then completes the transfer. Because of this

delay during spin-up, the RL02 driver can at times initiate a drive timeout error. This patch will allow you to extend the drive timeout so that this error will not occur and the drive spin-up will be transparent.

4.3.5.3 Patch Procedure

1. Apply autopatch if it is available.
2. Patch the SYSGEN command file that generates the device tables to use a new timeout value for the RL02 subsystems:

```

>SET /UIC=[200,200]
>INS $EDI
>INS $LBR
>INS $SLP
>EDI SGNMAS.COR
[Creating new file]
Input
SGNMAS.CMD/-AU=SGNMAS.CMD
\
-/.DL10S://
-/ITOC/,.
        .SETN ITOC 5
/
<return>
*EX
[Exit]

>LBR SGNMAS.CMD=SYSGEN.CLB/EX:SGNMAS
>SLP @SGNMAS.COR
>LBR SYSGEN.CLB/RP=SGNMAS.CMD
Module "SGNMAS" replaced

>PIP SGNMAS.CMD;*/DE
>

```

3. You may now perform a normal SYSGEN. The system that will be generated will use a timeout of 5 seconds for RL02 subsystems rather than 4 seconds, which is enough to prevent the device timeout problem from occurring.
4. Your patch is now complete.

BLANK

5.1 RSTS/E PATCH EXPLANATION

5.1.1 SECTION DESCRIPTION

This section explains the general procedure for patching the RSTS/E operating system for use with disk, tape, and communication controllers available from Emulex Corporation. No specific information on any patch or emulation is given in this section; this information is available in later sections.

5.1.2 INTENDED AUDIENCE

This manual is designed for use by the system manager of a given site, or by an agent of the system manager assigned the task of installing a RSTS system or performing a system generation. This manual assumes a fairly high degree of familiarity with RSTS operations, management, and utility procedures.

5.1.3 REQUIRED PATCHES

There are five areas of RSTS that may require patching to fully modify the capacity of a type of disk drive:

INIT.SYS This is the program that, when booted, sizes the system and maps out the devices on the bus. Options to INIT allow disks to be formatted and initialized and the monitor to be installed and configured.

Because INIT passes the device size (in blocks) to the monitor, any emulation that changes the size of the device needs a corresponding patch installed in INIT.SYS.

INIT also determines the bus type of the booted system. Twenty-two bit patches are applied to INIT.

SYSGEN.SIL This is the default monitor that is sent with the system to allow the user to do a system generation. Any emulation that modifies the disk geometry (number of sectors or number of heads) from the default needs a patch installed in the driver in SYSGEN.SIL to make the disk usable. These emulations include most expanded RP06 and RM02/3/5 emulations, but not the RP02/03, RK06/07, or RL01/02 emulations.

RSTS.SIL This monitor, or any monitor that is generated, also needs a driver patch if the disk geometry has been changed.

RSTS/E Patch Explanation

HOOK.SAV This program is used to make media bootable, and must be patched if the device cluster size of a device has been modified by expanding the size of the device.

SAVRES.SAV This program is used for backups, and must also be patched if the device cluster size is modified.

A patch consists of the following:

- A file to patch
- A module in the file (if the file is a monitor SIL)
- A base address
- An offset from the base
- A value that defines what is currently at the offset (defined by the base and offset)
- A variable or expression designating what value is to be placed at that address

5.1.4 PATCH PROCEDURE (OUTLINE)

The RSTS system to be patched must be resident on a disk (other than a modified-capacity disk) while the patch is being installed. The following paragraphs explain how this is done for the various types of RSTS distributions: disk, tape for standard-size disk, and tape for modified-capacity disk. These patch procedures apply only to modified disk capacity patches. If your patch is not a modified disk capacity patch, skip down to the section entitled Sample Patch Installation.

- If your RSTS distribution is on disk, use the first procedure shown below: Disk Distribution.
- If your RSTS distribution is on tape, and you have a supported DEC disk or an exact DEC emulation, use the second procedure below: Tape to DEC-standard Disk. This would include any of the Emulex standard capacity DEC emulations.
- If you have only a tape drive and a modified-capacity disk, use the third procedure below: Tape to Emulex Disk.

5.1.5 PATCH PROCEDURE--DISK DISTRIBUTION

1. Make a copy of the SYSGEN disk. No modifications should ever be made to the original of this disk, including the DEC autopatch. This disk contains all of the files needed to do a system generation, and all of the files that will need to be patched by Emulex.

2. Perform a normal system generation while running from the standard DEC disk.
3. Install the patches to INIT and (if required) to the SYSGEN.SIL monitor, the RSTS.SIL target monitor, and the optional files.
4. Reboot your DEC-standard disk, and initialize your Emulex disk to its modified capacity. Copy over to the Emulex disk any files that you will need.

5.1.6 PATCH PROCEDURE--TAPE TO DEC-STANDARD DISK

1. Boot the SYSGEN tape. Use the DSKINT and COPY options to initialize your standard size disk and copy the [0,1] files down to it.
2. Perform a normal system generation while running from the standard-size disk.
3. Install the patches to INIT and (if required) to the SYSGEN.SIL monitor, the RSTS.SIL target monitor, and the optional files.
4. Reboot your DEC-standard disk, and initialize your Emulex disk to its modified capacity. Copy over to the Emulex disk any files you will need.

5.1.7 PATCH PROCEDURE--TAPE TO EMULEX DISK

1. Set up your Emulex controller to run in "standard" DEC-compatible mode, if possible.
2. Boot the SYSGEN tape. Use the DSKINT and COPY options to initialize your DEC disk and copy the [0,1] files down to it.
3. Perform a normal system generation while running from the DEC-standard disk.
4. While running from the target monitor, use ONLPAT to install the patches to INIT and (if required) to the SYSGEN.SIL monitor, the RSTS.SIL target monitor, and the optional files.
5. Mount a scratch tape on the tape transport. Use [1,2]HOOK.SAV to generate a bootable patched system generation volume:

```

RUN $HOOK.SAV
*MT0:[0,1]INIT.SYS,SY:[0,1]INIT.SYS
Hook complete.
*^z
    
```

RSTS/E Patch Explanation

6. Use PIP to copy all files from [0,1] on the disk to [0,1] on the tape, **except** the files that have the extension .SYS. Also copy all the files from [1,2] on the disk to [1,2] on the tape:

```
RUN $PIP.SAV
*MT0:[0,1]=SY:[0,1]*.* /IN
SATT .SYS ? <return>
BADB .SYS ? <return>
INIT .SYS ? <return>
SYSGEN.SIL ? Y
RT11 .RTS ? Y
ERR .ERR ? Y
SWAP .SYS ? <return>
RSTS .SIL ? Y
BASIC .RTS ? Y
*MT0:[1,2]=SY:[1,2]*.*
*^Z
```

7. Halt the system. You need not use SHUTUP or UTILTY to bring down the system, as the patches that are installed in INIT will cause it to crash anyway. Do not worry about your disk; you are going to scratch the data on it in any case.
8. Power down the system, and reconfigure the Emulex controller and disk drive to the modified capacity, if they are not already so. Do a hardware format of the disk, and a diagnostic format if it is necessary to create a manufacturer's bad block file on the disk.
9. Boot the patched magtape created in the preceding steps. Use the DSKINT option to initialize and pattern your Emulex disk at the modified capacity.
10. Use the COPY option of INIT to copy all of the [0,1] files from the magtape to the target disk. When the COPY option asks "Disk?," respond **ddu:/A**. This will copy all of the files from [0,1] on the tape to the system disk instead of the minimal system files. Substitute your disk mnemonic for ddu:. The COPY option will boot the target disk.
11. **INSTALL** the target monitor, set the **DEFAULTs**, **REFRESH** the disk to set up the system files, and **START** up timesharing. **Be sure to use the RT11 run-time system as your default for this step.** You can set your desired run-time system later.
12. Use PIP to copy the [1,2] files back to the disk from the magtape. Continue with the system generation and create the system library, optional libraries, RSX, and so on.

```
RUN $PIP
*SY:[1,2]=Mx0:[1,2]*.*
*^Z
```

5.1.8 SAMPLE PATCH

The following is a sample patch document, and the listing of what the user might see as he installs the patch.

NOTE

This is not an actual patch. It is a simplified example for illustration purposes only.

In some patches, the user may have to install parts of the patch conditionally, based on such factors as the driver used (overlapped or non-overlapped seeks), some system generation option specified (e.g., Disk Driver Phase), or the drive type specified for the controller (24=RM03, 25=RM02, 27=RM05).

5.1.8.1 Sample INIT.SYS Patches

BASE	OFFSET	IS	CHANGE TO
SATBUF	14332	2	4
SATBUF	14344	10646	17440
ROOT	5546	2440	6440

5.1.8.2 Example SYSGEN.SIL Patches

BASE	MODULE	OFFSET	IS	CHANGE TO
DBDSK	DSK	72	26	40
DBDSK	DSK	1370	2440	6440

5.1.9 SAMPLE INSTALLATION

<Customer Boot>

INIT Vnnnnn RSTS Vnnnnn <system name>

Option: PATCH

File to patch? INIT.SYS

Base address? SATBUF

Offset address? 14332

Base	Offset	Old	New?
------	--------	-----	------

057000	014332	000002	? 4
--------	--------	--------	-----

057000	014334	067324	? ^Z
--------	--------	--------	------

(<ctrl-z> for new offset)

Offset address? 14344

Base	Offset	Old	New?
------	--------	-----	------

057000	014344	010646	? 17440
--------	--------	--------	---------

057000	014346	012737	? ^Z
--------	--------	--------	------

(<ctrl-z> for new offset)

Offset address? ^Z

(<ctrl-z> for new base)

Base address? ROOT

Offset address? 5546

Base	Offset	Old	New?
------	--------	-----	------

RSTS/E Patch Explanation

013560 005546 002440 ? 6440
013562 005550 105737 ? ^Z (**<ctrl-z>** for new offset)
Offset address? ^Z (**<ctrl-z>** for new base)
Base address? ^Z (**<ctrl-z>** for new file)

File to patch? SYSGEN.SIL (or **<lf>** for installed SIL)
Module name? DSK
Base address? DBDSK
Offset address? 72
Base Offset Old New?
041440 000072 000026 ? 40
041440 000074 012767 ? ^Z (**<ctrl-z>** for new offset)
Offset address? 1370
Base Offset Old New?
041440 001370 002440 ? 6440
041440 001372 104040 ? ^Z (**<ctrl-z>** for new offset)
Offset address? ^Z (**<ctrl-z>** for new base)
Base address? ^Z (**<ctrl-z>** for new module)
Module name? ^Z (**<ctrl-z>** for new file)
File to patch? ^Z (**<ctrl-z>** to exit).

Option: BOOT SY: (Reboot disk to load INIT)

Your patch should now be applied. You should continue by initializing the Emulex disk.

CAUTION

If the values in the "old" column do not match what the old values should be (as per the patch), something is wrong, and you must discontinue any patching. You are applying either the wrong patch or the wrong version of the ONLPAT program. Continuing to apply the patch will only make matters worse. Call Emulex Technical Support for assistance.

5.2 RSTS/E V7.2 PATCHES

5.2.1 RSTS/E V7.2 PATCHES FOR RP02/03

5.2.1.1 Patch Description

This patch modifies RSTS V7.2 to permit the use of non-standard disk drive sizes with the Emulex SCxx/A controllers (RP02/03 emulations).

5.2.1.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

Only one location in the INIT.SYS system program will be patched. This location contains the block count for an RP02, which is one-half of the block count for an RP03. The DEC standard RP02 is 40000 decimal blocks, and the standard RP03 is 80000 decimal blocks; thus, the normal value at this location is 116100 octal (= 40000 decimal). You will replace this value with the octal disk block count if you have an RP02 emulation, or with one-half of the block count if you have an RP03 emulation (in which case RSTS will double it to get the real block count). The octal disk block count is computed by taking the number of logical cylinders mapped by the controller, multiplying by 200, and converting to octal.

The Emulex SCxx/A disk controllers perform a logical mapping of the tracks and sectors onto the drive so that only the number of logical cylinders per drive needs to be changed. This is done in such a way that the number of heads is always 20 and the number of sectors is always 10, in agreement with the DEC standard. Therefore, the only difference between a modified-capacity drive and a standard-size drive is the number of cylinders per drive.

The number of logical cylinders for the SC01/Ax and SC11/Ax controllers can be found in Appendix B of this document. The number of logical cylinders for the SC02/Ax and SC12/Ax disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

5.2.1.3 Patch Notes

Although the RP03 is a supported disk under the RSTS operating system, its size presents a problem: the number of blocks (234200 octal) is too large to fit into 16 bits. The RSTS operating system compensates for this by breaking the physical unit into two logical units (numbers 0 and 4), equivalent in size to a single RP02.

Therefore, use the integer value of the cylinders **divided by 2** for the number of cylinders when calculating the patch values. (The largest size that can be represented in 16 bits is 65535, so the maximum number of cylinders should never exceed 327 cylinders.)

5.2.1.4 Patch Procedure

1. Boot your system, and from the INIT "Option:" prompt, execute the following commands:

```
Option: PATCH
File to patch? INIT.SYS
Base address? SATBUF
Offset address? 15146
  Base   Offset  Old      New?
060000  015146  116100  ? smallsize      (See table)
060000  015150  016100  ? ^Z              <ctrl-z>
Offset address? ^Z
Base address? ^Z
File to patch? ^Z
```

Option: BOOT SY:

The BOOT SY: command is used to reboot the system to bring the patched version into memory. The PATCH command only changes the disk file INIT.SYS.

2. Your patch is now complete.

5.2.2 RSTS/E V7.2 PATCHES FOR RM02/03/05

5.2.2.1 Patch Description

This patch modifies RSTS/E V7.2 to permit the use of non-standard disk drive sizes with the Emulex SCxx/B1 and SCxx/B3 controllers (RM02/03/05 emulations).

5.2.2.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

There are many locations in INIT.SYS and the RSTS/E monitor SIL that will be patched. These locations contain the number of cylinders, tracks, sectors, blocks, and so on. You will replace these values with the logical sizes for your disk.

The Emulex SCxx/B disk controllers perform a logical mapping of the cylinders, tracks, and sectors onto the drive. The number of logical cylinders, tracks, and sectors for the SCxx/B disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

5.2.2.3 Patch Procedure

File to Patch: INIT.SYS

<u>BASE</u>	<u>OFFSET</u>	<u>IS</u>	<u>CHANGE TO</u>	<u>FOR</u>
SATBUF	015446	001454	000240	RM02/03/05 Only if msblock=0
SATBUF	015616	000002	msblock	RM03
SATBUF	015620	000002	msblock	RM02
SATBUF	015624	000007	msblock	RM05
SATBUF	015676	001100	lsblock	RM03
SATBUF	015700	001100	lsblock	RM02
SATBUF	015704	121200	lsblock	RM05
SATBUF	015756	000004	devclus	RM03
SATBUF	015760	000004	devclus	RM02
SATBUF	015764	000010	devclus	RM05
DBDSK	000046	000240	tracks*sectors	RM02
DBDSK	000050	000040	sectors	RM02
DBDSK	000052	000240	tracks*sectors	RM03
DBDSK	000054	000040	sectors	RM03
DBDSK	000062	001140	tracks*sectors	RM05
DBDSK	000064	000040	sectors	RM05
DBDSK	001260	177440	sectors-400	RM02/03
DBDSK	001262	002400	tracks*400	RM02/03
DBDSK	001310	177440	sectors-400	RM05
DBDSK	001312	011400	tracks*400	RM05
DSIDAT	000112	151466	150000!cylinders-1	RM03
DSIDAT	000120	151466	150000!cylinders-1	RM02
DSIDAT	000134	151466	150000!cylinders-1	RM05
DSIDAT	000114	002037	hedsec-401	RM03
DSIDAT	000122	002037	hedsec-401	RM02
DSIDAT	000136	011037	hedsec-401	RM05
COPY	002426	000240	tracks*sectors	RM03
COPY	002430	000040	sectors	RM03
COPY	002434	000240	tracks*sectors	RM02
COPY	002436	000040	sectors	RM02
COPY	002450	001140	tracks*sectors	RM05
COPY	002452	000040	sectors	RM05
ROOT	006204	002440	hedsec	RM03
ROOT	006206	002440	hedsec	RM02
ROOT	006212	011440	hedsec	RM05

RSTS/E V7.2 Patches

File to Patch: SYSGEN.SIL and RSTS.SIL:

Module to Patch: DSK

For non-overlapped seek driver:

DxDSK	000046	000240	tracks*sectors	RM02
DxDSK	000050	000040	sectors	RM02
DxDSK	000052	000240	tracks*sectors	RM03
DxDSK	000054	000040	sectors	RM03
DxDSK	000062	001140	tracks*sectors	RM05
DxDSK	000064	000040	sectors	RM05
DxDSK	001260	177440	sectors-400	RM02/03
DxDSK	001262	002400	tracks*400	RM02/03
DxDSK	001310	177440	sectors-400	RM05
DxDSK	001312	011400	tracks*400	RM05

For overlapped seek driver:

DxSEEK	000046	000240	tracks*sectors	RM02
DxSEEK	000050	000040	sectors	RM02
DxSEEK	000052	000240	tracks*sectors	RM03
DxSEEK	000054	000040	sectors	RM03
DxSEEK	000062	001140	tracks*sectors	RM05
DxSEEK	000064	000040	sectors	RM05
DxSEEK	001374	177440	sectors-400	RM02/03
DxSEEK	001376	002400	tracks*400	RM02/03
DxSEEK	001424	177440	sectors-400	RM05
DxSEEK	001426	011400	tracks*400	RM05

Where "x" is:

"R" for standard address (DRDSK, DRSEEK)
"B" for alternate address (DBDSK, DBSEEK)

File to Patch: HOOK.SAV

2714	000000	000240	tracks*sectors	RM03
2714	000002	000040	sectors	RM03
2714	000010	000240	tracks*sectors	RM02
2714	000012	000040	sectors	RM02
2714	000030	001140	tracks*sectors	RM05
2714	000032	000040	sectors	RM05

File to Patch: SAVRES.SAV

GGB	001324	000240	tracks*sectors	RM03
GGB	001326	000040	sectors	RM03
GGB	001334	000240	tracks*sectors	RM02
GGB	001336	000040	sectors	RM02
GGB	001354	001140	tracks*sectors	RM05
GGB	001356	000040	sectors	RM05

5.2.3 RSTS/E V7.2 PATCHES FOR RP06

5.2.3.1 Patch Description

This patch modifies RSTS/E V7.2 to permit the use of non-standard disk drive sizes with the Emulex SCxx/B2 and SCxx/B4 controllers (RP06 emulations).

5.2.3.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

The Emulex SCxx/B disk controllers perform a logical mapping of the cylinders, tracks, and sectors onto the drive. The number of logical cylinders, tracks, and sectors for the SCxx/B disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

5.2.3.3 Patch Procedure

File to Patch: INIT.SYS

<u>BASE</u>	<u>OFFSET</u>	<u>IS</u>	<u>CHANGE TO</u>
SATBUF	015612	000005	msblock
SATBUF	015672	015100	lsblock
SATBUF	015752	000010	devclus
DBDSK	000042	000642	tracks*sectors
DBDSK	000044	000026	sectors
DBDSK	001244	177426	177400!sectors
DBDSK	001246	011400	tracks*400
DSIDAT	000076	011456	010000!cylinders-1
DSIDAT	000100	011025	hedsec-401
COPY	011472	000642	tracks*sectors
COPY	011504	000026	sectors
ROOT	006200	011426	hedsec

File to Patch: SYSGEN.SIL and RSTS.SIL:

Module to Patch: DSK

For non-overlapped seek driver:

DxDSK	000042	000642	tracks*sectors
DxDSK	000044	000026	sectors
DxDSK	001244	177426	177400!sectors
DxDSK	001246	011400	tracks*400

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For overlapped seek driver:

DxSEEK	000042	000642	tracks*sectors
DxSEEK	000044	000026	sectors
DxSEEK	001360	177426	177400!sectors
DxSEEK	001362	011400	tracks*400

Where "x" is: "B" for standard address (DBDSK,DBSEEK)
"R" for alternate address (DRDSK,DRSEEK)

File to Patch: HOOK.SAV

002704	000000	000642	tracks*sectors
002704	000002	000026	sectors

File to Patch: SAVRES.SAV

GGB	001314	000642	tracks*sectors
GGB	001316	000026	sectors

5.2.4 RSTS/E V7.2 PATCHES FOR RK06/07

5.2.4.1 Patch Description

This patch modifies RSTS V7.2 to permit the use of non-standard disk drive sizes with the Emulex SCxx/C controllers (RK06/07 emulations).

5.2.4.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

Only two locations in the INIT.SYS system program will be patched. These locations contain the block and cylinder count for an RK06 or an RK07. The DEC standard RK06 is 27126 decimal blocks, and the standard RK07 is 53790 decimal blocks; thus, the normal value at the first location is 64740 octal (27104 decimal) for RK06, or 151010 octal (53768 decimal) for RK07. You will replace this value with the octal disk block count. The octal disk block count is computed by taking the number of logical cylinders mapped by the controller, multiplying by 66 (decimal), subtracting 22 (decimal), and converting to octal. The second location requires the number of logical cylinders minus 1.

The Emulex SCxx/C disk controllers perform a logical mapping of the tracks and sectors onto the drive so that only the number of logical cylinders per drive needs to be changed. This is done in such a way that the number of heads is always 3 and the number of sectors is always 22, in agreement with the DEC standard. Therefore, the only difference between a modified-capacity drive and a standard-size drive is the number of cylinders per drive.

The number of logical cylinders for the SCxx/C disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

5.2.4.3 Patch Procedure

1. Boot your system, and from the INIT "Option:" prompt, execute the following commands:

For RK06:

```
Option: PATCH
File to patch? INIT.SYS
Base address? SATBUF
Offset address? 15044
  Base   Offset  Old      New?
060000  015044  064740  ? blocks
060000  015046  010362  ? ^Z                                     <ctrl-z>
Offset address? ^Z
Base address? DSI
Offset address? 6720
  Base   Offset  Old      New?
116002  006720  000632  ? cylinders-1
116002  006722  005767  ? ^Z
Offset address? ^Z
Base address? ^Z
File to patch? ^Z
```

Option: BOOT SY:

For RK07:

```
Option: PATCH
File to patch? INIT.SYS
Base address? SATBUF
Offset address? 15056
  Base   Offset  Old      New?
060000  015056  151010  ? blocks
060000  015060  005304  ? ^Z                                     <ctrl-z>
Offset address? ^Z
Base address? DSI
Offset address? 6732
  Base   Offset  Old      New?
116002  006732  001456  ? cylinders-1
116002  006734  020200  ? ^Z
Offset address? ^Z
Base address? ^Z
File to patch? ^Z
```

Option: BOOT SY:

RSTS/E V7.2 Patches

The BOOT SY: command is used to reboot the system to bring the patched version into memory. The PATCH command only changes the disk file INIT.SYS.

2. Your patch is now complete.

5.2.5 RSTS/E V7.2 22-BIT PATCHES FOR SC02/C

5.2.5.1 Patch Description

This patch modifies RSTS V7.2 (SYSGEN level J) to permit the Emulex SC02/C disk to use 22-bit addressing on the DEC 11/23 Plus, Micro-PDP-11, or Micro-PDP-11/73 processors.

5.2.5.2 Patch Explanation

The DEC RK611 controller is an 18-bit disk controller; that is, it can access a memory address range of only 256K bytes without special mapping hardware. The Emulex SC02/C controller has the hardware capability of addressing a 22-bit memory address range (4M bytes).

This patch modifies the RSTS/E RK06/07 disk driver to place the most significant bits of the memory transfer address (bits <21:16>), ORed with the 22-bit address enable command, into the SPARE register of the SC02/C. Bits <21:18> are then masked off in preparation for setting up the CSR (RKCS1).

5.2.5.3 Patch Procedure

1. Boot your system, and from the INIT "Option:" prompt, execute the following commands:

```
Option: PATCH
File to patch? <lf>          (patch INSTALLED monitor SIL)
Module name? DSK
Base address? DMDSK         (use DMSEEK if overlapped seeks
                             used)
Offset address? 252        (use 462 if overlapped seeks used)
  Base  Offset  Old      New?
  ????? 000252 072127 ? 4537
  ????? 000254 000004 ? DSKPAT+150
  ????? 000256 ?????? ? ^Z
Offset address? ^Z
Base address? DSKPAT+150
Offset address? 0
  Base  Offset  Old      New?
  ????? 000000 000000 ? 52701
  ????? 000002 000000 ? 22000
  ????? 000004 000000 ? 10163
  ????? 000006 000000 ? 22
  ????? 000010 000000 ? 42701
  ????? 000012 000000 ? 177774
  ????? 000014 000000 ? 72127
```

```

?????? 000016 000000 ? 4
?????? 000020 000000 ? 205
?????? 000022 000000 ? ^Z
Offset address? ^Z
Base address? ^Z
Module name? ^Z
File to patch? ^Z

```

Option:

2. Your patch is now complete; bring up your system normally.

CAUTION

This patch was written to fit into the reserved PATCH area for the disk drivers (for DEC patches). If any of the values in the DSKPAT area under the "old" column are non-zero, **do not** continue applying this patch. If you continue, you will be writing over a DEC patch that will cause unpredictable results.

This patch must be applied to all user generated monitors.

5.2.6 RSTS/E V7.2 22-BIT PATCHES FOR SC03

5.2.6.1 Patch Description

This patch modifies RSTS V7.2 (SYSGEN level J) to permit the Emulex SC03 disk to use 22-bit addressing on the DEC 11/23 Plus, Micro-PDP-11, or Micro-PDP-11/73 processors.

5.2.6.2 Patch Explanation

The SC03 emulates a DEC RH70 disk subsystem. The characteristic that is unique to the RH70 is the existence of a Bus Address Extension (BAE) register that allows direct support of the 22-bit address space. Because RH70 type peripherals normally are found only on an 11/70, RSTS/E does not know how to address this device correctly. This confusion prevents the operating system from correctly transferring data between the SC03 and high memory (greater than 256K bytes). RSTS boots and runs normally without this patch until enough jobs are added to force memory usage past 256K bytes; then it crashes.

This patch forces the RSTS monitor to recognize the BAE register of the SC03 disk controller and address it as a 22-bit device.

5.2.6.3 Patch Procedure

1. Boot your system, and from the INIT "Option:" prompt, execute the following commands:

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```
Option: PATCH
File to patch? INIT.SYS
Base address? START
Offset address? 11206
  Base   Offset   Old      New?
116002  011206  001025  ? 425
116002  011210  004767  ? ^Z
Offset address? 11344
  Base   Offset   Old      New?
116002  011344  012704  ? 721
116002  011346  170234  ? ^Z
Base address? ^Z
File to patch? ^Z
```

<ctrl-z>

Option: BOOT SY:

The BOOT SY: command is used to reboot the system, to bring the patched version into memory. The PATCH command only changes the disk file INIT.SYS.

2. Your patch is now complete.

5.3 RSTS/E V8.0 PATCHES

There have been two releases of RSTS/E V8.0. The first release was SYSGEN version K (SYSGNK, edit level 06). Patch kit C included a new copy of the SYSGEN tape, version L (SYSGNL, edit level 07). Before applying any RSTS/E V8.0 patches, determine the edit level of your system. This can be done either by examining your SYSGEN distribution tape or by booting your system; the boot identification line contains the edit level.

5.4 RSTS/E V8.0-06 SYSGNK PATCHES

5.4.1 RSTS/E V8.0-06 PATCHES FOR RP02/03

5.4.1.1 Patch Description

This patch modifies RSTS V8.0-06 (SYSGEN level K) to permit the use of non-standard disk drive sizes with the Emulex SCxx/A controllers (RP02/03 emulations).

5.4.1.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

Only one location in the INIT.SYS system program will be patched. This location contains the block count for an RP02, which is one-half of the block count for an RP03. The DEC standard RP02 is 40000

decimal blocks, and the standard RP03 is 80000 decimal blocks; thus, the normal value at this location is 116100 octal (40000 decimal). You will replace this value with the octal disk block count if you have an RP02 emulation, or one-half of the block count if you have an RP03 emulation (in which case RSTS will double it to get the real block count). The octal disk block count is computed by taking the number of logical cylinders mapped by the controller, multiplying by 200 (decimal), and converting to octal.

The Emulex SCxx/A disk controllers perform a logical mapping of the tracks and sectors onto the drive so that only the number of logical cylinders per drive needs to be changed. This is done in such a way that the number of heads is always 20 and the number of sectors is always 10, in agreement with the DEC standard. Therefore, the only difference between a modified-capacity drive and a standard-size drive is the number of cylinders per drive.

The number of logical cylinders for the SC01/Ax and SC11/Ax controllers can be found in Appendix B of this document. The number of logical cylinders for the SC02/Ax and SC12/Ax disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

5.4.1.3 Patch Notes

Although the RP03 is a supported disk under the RSTS operating system, its size presents a problem: the number of blocks (234200 octal) is too large to fit into 16 bits. The RSTS operating system compensates for this by breaking the physical unit into two logical units (numbers 0 and 4), equivalent in size to a single RP02.

Therefore, use the integer value of the cylinders **divided by 2** for the number of cylinders when calculating the patch values. (The largest size that can be represented in 16 bits is 65535, so the maximum number of cylinders should never exceed 327 cylinders.)

5.4.1.4 Patch Procedure

1. Boot your system, and from the INIT "Option:" prompt, execute the following commands:

```
Option: PATCH
File to patch? INIT.SYS
Base address? ONE
Offset address? 10230
  Base   Offset  Old      New?
105002  010230  116100  ? smallsize      (See table)
105002  010232  016100  ? ^Z                <ctrl-z>
Offset address? ^Z
Base address? ^Z
File to patch? ^Z
```

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Option: BOOT SY:

The BOOT SY: command is used to reboot the system, to bring the patched version into memory. The PATCH command only changes the disk file INIT.SYS.

2. Your patch is now complete.

5.4.2 RSTS/E V8.0-06 PATCHES FOR RM02/03/05

5.4.2.1 Patch Description

This patch modifies RSTS/E V8.0-06 (SYSGEN level K) to permit the use of non-standard disk drive sizes with the Emulex SCxx/B1 and SCxx/B3 controllers (RM02/03 emulations).

5.4.2.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

There are many locations in INIT.SYS and the RSTS/E monitor SIL that will be patched. These locations contain the number of cylinders, tracks, sectors, blocks, and so on. You will replace these values with the logical sizes for your disk.

The Emulex SCxx/B disk controllers perform a logical mapping of the cylinders, tracks, and sectors onto the drive. The number of logical cylinders, tracks, and sectors for the SCxx/B disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

5.4.2.3 Patch Procedure

File to Patch: INIT.SYS

<u>BASE</u>	<u>OFFSET</u>	<u>IS</u>	<u>CHANGE TO</u>	<u>FOR</u>
ONE	010550	001454	000240	RM02/03/05 Only if msblock=0
ONE	010724	000002	msblock	RM03
ONE	010726	000002	msblock	RM02
ONE	010732	000007	msblock	RM05
ONE	011004	001100	lsblock	RM03
ONE	011006	001100	lsblock	RM02
ONE	011012	121200	lsblock	RM05

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ONE	011064	000004	devclus	RM03
ONE	011066	000004	devclus	RM02
ONE	011072	000010	devclus	RM05
DBDSK	000046	000240	tracks*sectors	RM02
DBDSK	000050	000040	sectors	RM02
DBDSK	000052	000240	tracks*sectors	RM03
DBDSK	000054	000040	sectors	RM03
DBDSK	000062	001140	tracks*sectors	RM05
DBDSK	000064	000040	sectors	RM05
DBDSK	001260	177440	sectors-400	RM02/03
DBDSK	001262	002400	tracks*400	RM02/03
DBDSK	001310	177440	sectors-400	RM05
DBDSK	001312	011400	tracks*400	RM05
DSIDAT	000112	151466	150000!cylinders-1	RM03
DSIDAT	000120	151466	150000!cylinders-1	RM02
DSIDAT	000134	151466	150000!cylinders-1	RM05
DSIDAT	000114	002037	hedsec-401	RM03
DSIDAT	000122	002037	hedsec-401	RM02
DSIDAT	000136	011037	hedsec-401	RM05
BLDBOT	000522	000240	tracks*sectors	RM02
BLDBOT	000524	000040	sectors	RM02
BLDBOT	000526	000240	tracks*sectors	RM03
BLDBOT	000530	000040	sectors	RM03
BLDBOT	000532	001140	tracks*sectors	RM05
BLDBOT	000534	000040	sectors	RM05
ROOT	006150	002440	hedsec	RM03
ROOT	006152	002440	hedsec	RM02
ROOT	006156	011440	hedsec	RM05

File to Patch: SYSGEN.SIL and RSTS.SIL:

Module to Patch: DSK

For non-overlapped seek driver:

DxDISK	000046	000240	tracks*sectors	RM02
DxDISK	000050	000040	sectors	RM02
DxDISK	000052	000240	tracks*sectors	RM03
DxDISK	000054	000040	sectors	RM03
DxDISK	000062	001140	tracks*sectors	RM05
DxDISK	000064	000040	sectors	RM05
DxDISK	001260	177440	sectors-400	RM02/03
DxDISK	001262	002400	tracks*400	RM02/03
DxDISK	001310	177440	sectors-400	RM05
DxDISK	001312	011400	tracks*400	RM05

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For overlapped seek driver:

DxSEEK	000046	000240	tracks*sectors	RM02
DxSEEK	000050	000040	sectors	RM02
DxSEEK	000052	000240	tracks*sectors	RM03
DxSEEK	000054	000040	sectors	RM03
DxSEEK	000062	001140	tracks*sectors	RM05
DxSEEK	000064	000040	sectors	RM05
DxSEEK	001436	177440	sectors-400	RM02/03
DxSEEK	001440	002400	tracks*400	RM02/03
DxSEEK	001466	177440	sectors-400	RM05
DxSEEK	001470	011400	tracks*400	RM05

Where "x" is: "R" for standard address (DRDSK, DRSEEK)
"B" for alternate address (DBDSK, DBSEEK)

File to Patch: HOOK.SAV

BLDBOT	000522	000240	tracks*sectors	RM02
BLDBOT	000524	000040	sectors	RM02
BLDBOT	000526	000240	tracks*sectors	RM03
BLDBOT	000530	000040	sectors	RM03
BLDBOT	000532	001140	tracks*sectors	RM05
BLDBOT	000534	000040	sectors	RM05

File to Patch: SAVRES.SAV

BLDBOT	000522	000240	tracks*sectors	RM02
BLDBOT	000524	000040	sectors	RM02
BLDBOT	000526	000240	tracks*sectors	RM03
BLDBOT	000530	000040	sectors	RM03
BLDBOT	000532	001140	tracks*sectors	RM05
BLDBOT	000534	000040	sectors	RM05

5.4.3 RSTS/E V8.0-06 PATCHES FOR RP06

5.4.3.1 Patch Description

This patch modifies RSTS/E V8.0-06 (SYSGEN level K) to permit the use of non-standard disk drive sizes with the Emulex SCxx/B2 and SCxx/B4 controllers (RP06 emulations).

5.4.3.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

The Emulex SCxx/B disk controllers perform a logical mapping of the cylinders, tracks, and sectors onto the drive. The number of logical cylinders, tracks, and sectors for the SCxx/B disk controllers can be

found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

5.4.3.3 Patch Notes

RSTS/E Version 8.0 incorporated a major change to the disk directory structure (RDS1). The RSTS Version 8.0 Release Notes, which describe this change, should be read thoroughly before you attempt to apply this patch.

RSTS/E Version 8.0 takes advantage of the full size of the RP06, whereas earlier versions used only 800 of the 815 cylinders (for "historical purposes"). If you attempt to REFRESH a Version 7 (RDS0 format) disk under Version 8.0, INIT.SYS automatically adds the 15 extra cylinders to your disk. If you have a modified-capacity Version 7 disk, you should not attempt to use it under RSTS/E Version 8.0.

5.4.3.4 Patch Procedure

File to Patch: INIT.SYS

<u>BASE</u>	<u>OFFSET</u>	<u>IS</u>	<u>CHANGE TO</u>
ONE	010550	001454	240 (Only if msblock = 0)
ONE	010720	000005	msblock
ONE	011000	031270	lsblock
ONE	011060	000010	devclus
DBDSK	000042	000642	tracks*sectors
DBDSK	000044	000026	sectors
DBDSK	001244	177426	177400!sectors
DBDSK	001246	011400	tracks*400
DSIDAT	000076	011456	010000!cylinders-1
DSIDAT	000100	011025	hedsec-401
BLDBOT	000516	000642	tracks*sectors
BLDBOT	000520	000026	sectors
ROOT	006144	011426	hedsec
CLN	000166	000005	msblock
CLN	000174	031270	lsblock

File to Patch: SYSGEN.SIL and RSTS.SIL:

Module to Patch: DSK

For non-overlapped seek driver:

DxDISK	000042	000642	tracks*sectors
DxDISK	000044	000026	sectors
DxDISK	001244	177426	177400!sectors
DxDISK	001246	011400	tracks*400

For overlapped seek driver:

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DxSEEK	000042	000642	tracks*sectors
DxSEEK	000044	000026	sectors
DxSEEK	001422	177426	177400!sectors
DxSEEK	001424	011400	tracks*400

Where "x" is: "B" for standard address (DBDSK, DBSEEK)
"R" for alternate address (DRDSK, DRSEEK)

File to Patch: HOOK.SAV

BLDBOT	000516	000642	tracks*sectors
BLDBOT	000520	000026	sectors

File to Patch: SAVRES.SAV

BLDBOT	000516	000642	tracks*sectors
BLDBOT	000520	000026	sectors

5.4.4 RSTS/E V8.0-06 PATCHES FOR RK06/07

5.4.4.1 Patch Description

This patch modifies RSTS V8.0-06 (SYSGEN level K) to permit the use of non-standard disk drive sizes with the Emulex SCxx/C controllers (RK06/07 emulations).

5.4.4.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

Only two locations in the INIT.SYS system program will be patched. These locations contain the block and cylinder count for an RK06 or an RK07. The DEC standard RK06 is 27126 decimal blocks, and the standard RK07 is 53790 decimal blocks; thus, the normal value at the first location is 64740 octal (27104 decimal) for the RK06, or 151010 octal (53768 decimal) for the RK07. You will replace this value with the octal disk block count, which is computed by taking the number of logical cylinders mapped by the controller, multiplying by 66 (decimal), subtracting 22 (decimal), and converting to octal. The second location requires the number of logical cylinders minus 1.

The Emulex SCxx/C disk controllers perform a logical mapping of the tracks and sectors onto the drive so that only the number of logical cylinders per drive needs to be changed. This is done in such a way that the number of heads is always 3 and the number of sectors is always 22, in agreement with the DEC standard. Therefore, the only difference between a modified-capacity drive and a standard-size drive is the number of cylinders per drive.

The number of logical cylinders for the SCxx/C disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

5.4.4.3 Patch Procedure

1. Boot your system, and from the INIT "Option:" prompt, execute the following commands:

RK06:

```
Option: PATCH
File to patch? INIT.SYS
Base address? ONE
Offset address? 10126
  Base   Offset  Old      New?
105002  010126  064740  ? blocks
105002  010130  010362  ? ^Z                                     <ctrl-z>
Offset address? ^Z
Base address? DSI
Offset address? 7774
  Base   Offset  Old      New?
124232  007774  000632  ? cylinders-1
124232  007776  005767  ? ^Z
Offset address? ^Z
Base address? ^Z
File to patch? ^Z
```

Option: BOOT SY:

RK07:

```
Option: PATCH
File to patch? INIT.SYS
Base address? ONE
Offset address? 10140
  Base   Offset  Old      New?
105002  010140  151010  ? blocks
105002  010142  005304  ? ^Z                                     <ctrl-z>
Offset address? ^Z
Base address? DSI
Offset address? 10006
  Base   Offset  Old      New?
124232  010006  001456  ? cylinders-1
124232  010010  020200  ? ^Z
Offset address? ^Z
Base address? ^Z
File to patch? ^Z
```

Option: BOOT SY:

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The BOOT SY: command is used to reboot the system, to bring the patched version into memory. The PATCH command only changes the disk file INIT.SYS.

2. Your patch is now complete.

5.4.5 RSTS/E V8.0-06 PATCHES FOR RL01/02

5.4.5.1 Patch Description

This patch modifies RSTS V8.0-06 (SYSGEN level K) to permit the use of non-standard disk drive sizes with the Emulex SCxx/L controllers (RL01/02 emulations).

5.4.5.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

Only one location in the INIT.SYS system program will be patched. This location contains the block count for either an RL01 or an RL02. The DEC standard RL01 is 10240 decimal blocks, and the standard RL02 is 20480 decimal blocks; thus, the normal value at this location is 23754 octal (10220 decimal) for RL01, and 47754 octal (20460 decimal) for RL02. The octal disk block count is computed by taking the number of logical cylinders mapped by the controller, multiplying by 40, subtracting 20, and converting to octal.

The Emulex SCxx/L disk controllers perform a logical mapping of the tracks and sectors onto the drive so that only the number of logical cylinders per drive needs to be changed. This is done in such a way that the number of heads is always 2 and the number of sectors is always 40, in agreement with the DEC standard. Therefore, the only difference between a modified-capacity drive and a standard-size drive is the number of cylinders per drive.

The number of logical cylinders for the SCxx/L disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

5.4.5.3 Patch Notes

Although the DEC RL01 and RL02 have 40 sectors, you should assume that they have 20. This is because the number of bytes per sector is 256, whereas a DEC "block" is made up of 512 bytes. Therefore, to fill up a normal block of data, two sequential sectors must be read. This is handled in the DEC disk drivers and should be ignored. When calculating block sizes, use the sector value 20 instead of the actual value of 40.

CAUTION

When calculating the patch values for your RL01/02 patch, you must never exceed 512 cylinders. This is a hardware maximum for the controller which cannot be exceeded.

5.4.5.4 Patch Procedure

1. Boot your system, and from the INIT "Option:" prompt, execute the following commands:

RL01:

```
Option: PATCH
File to patch? INIT.SYS
Base address? ONE
Offset address? 7662
  Base   Offset  Old      New?
105002  007662  023754  ? blocks
105002  007664  010263  ? ^Z
Offset address? ^Z
Base address? ^Z
File to patch? ^Z
```

<ctrl-z>

Option: BOOT SY:

RL02:

```
Option: PATCH
File to patch? INIT.SYS
Base address? ONE
Offset address? 7674
  Base   Offset  Old      New?
105002  007674  047754  ? blocks
105002  007676  005300  ? ^Z
Offset address? ^Z
Base address? ^Z
File to patch? ^Z
```

<ctrl-z>

Option: BOOT SY:

The BOOT SY: command is used to reboot the system, to bring the patched version into memory. The PATCH command only changes the disk file INIT.SYS.

2. Your patch is now complete.

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5.4.6 RSTS/E V8.0-06 22-BIT PATCHES FOR SC02/C

5.4.6.1 Patch Description

This patch modifies RSTS V8.0-06 (SYSGEN level K) to permit the Emulex SC02/C disk to use 22-bit addressing on the DEC 11/23 Plus, Micro-PDP-11, or Micro-PDP-11/73 processors.

5.4.6.2 Patch Explanation

The DEC RK611 controller is an 18-bit disk controller; that is, it can access a memory address range of only 256K bytes without special mapping hardware. The Emulex SC02/C controller has the hardware capability of addressing a 22-bit memory address range (4M bytes).

This patch modifies the RSTS/E RK06/07 disk driver to place the most significant bits of the memory transfer address (bits <21:16>), ORed with the 22-bit address enable command, into the SPARE register of the SC02/C. Bits <21:18> are then masked off in preparation for setting up the CSR (RKCS1).

5.4.6.3 Patch Procedure

1. Boot your system, and from the INIT "Option:" prompt, execute the following commands:

```
Option: PATCH
File to patch? <lf>          (patch INSTALLED monitor SIL)
Module name? DSK
Base address? DMDSK          (use DMSEEK if overlapped seeks used)
Offset address? 252         (use 462 if overlapped seeks used)
```

```
Base      Offset  Old      New?
??????  000252  072127  ? 4537
??????  000254  000004  ? DSKPAT+150
??????  000256  ??????  ? ^Z                                     <ctrl-z>
```

```
Offset address? ^Z
Base address? DSKPAT+150
Offset address? 0
```

```
Base      Offset  Old      New?
??????  000000  000000  ? 52701
??????  000002  000000  ? 22000
??????  000004  000000  ? 10163
??????  000006  000000  ? 22
??????  000010  000000  ? 42701
??????  000012  000000  ? 177774
??????  000014  000000  ? 72127
??????  000016  000000  ? 4
??????  000020  000000  ? 205
??????  000022  000000  ? ^Z
```

Offset address? ^Z
 Base address? ^Z
 Module name? ^Z
 File to patch? ^Z

Option:

2. Your patch is now complete; bring up your system normally.

CAUTION

This patch was written to fit into the reserved PATCH area for the disk drivers (for DEC patches). If any of the values in the DSKPAT area under the "old" column are non-zero, **do not continue applying this patch.** You will be writing over a DEC patch that will cause unpredictable results.

This patch must be applied to all user-generated monitors.

5.4.7 RSTS/E V8.0-06 22-BIT PATCHES FOR SC03

5.4.7.1 Patch Description

This patch modifies RSTS V8.0-06 (SYSGEN level K) to permit the Emulex SC03 disk to use 22-bit addressing on the DEC 11/23 Plus, Micro-PDP-11, or Micro-PDP-11/73 processors.

5.4.7.2 Patch Explanation

The SC03 emulates a DEC RH70 disk subsystem. The characteristic that is unique to the RH70 is the existence of a Bus Address Extension (BAE) register, which allows direct support of the 22-bit address space. Because RH70-type peripherals are normally found only on an 11/70, RSTS/E does not know how to address this device correctly. This confusion prevents the operating system from correctly transferring data between the SC03 and high memory (greater than 256K bytes). RSTS boots and runs normally without this patch until enough jobs are added to force memory usage past 256K bytes; then it crashes.

This patch forces the RSTS monitor to recognize the BAE register of the SC03 disk controller and address it as a 22-bit device.

5.4.7.3 Patch Procedure

1. Boot your system, and from the INIT "Option:" prompt, execute the following commands:

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```
Option: PATCH
File to patch? INIT.SYS
Base address? START
Offset address? 11126
  Base   Offset  Old      New?
116002  011126  001025  ? 425
116002  011130  004767  ? ^Z
Offset address? 11264
  Base   Offset  Old      New?
116002  011264  012704  ? 721
116002  011266  170234  ? ^Z
Base address? ^Z
File to patch? ^Z
```

<ctrl-z>

Option: BOOT SY:

The BOOT SY: command is used to reboot the system, to bring the patched version into memory. The PATCH command only changes the disk file INIT.SYS.

2. Your patch is now complete.

5.5 RSTS/E V8.0-07 SYSGNL PATCHES

Patch kit C for RSTS V8.0 contained a new version of INIT.SYS and required a new system generation for installation. This new release was designed only to correct some minor "bugs" in INIT and the monitor. Thus, it became an edit release instead of a point release; that is, RSTS/E V8.0-06 to RSTS/E V8.0-07.

5.5.1 RSTS/E V8.0-07 PATCHES FOR RP02/03

5.5.1.1 Patch Description

This patch modifies RSTS V8.0-07 (SYSGEN level L) to permit the use of non-standard disk drive sizes with the Emulex SCxx/A controllers (RP02/03 emulations).

5.5.1.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

Only one location in the INIT.SYS system program will be patched. This location contains the block count for an RP02, which is one-half of the block count for an RP03. The DEC standard RP02 is 40000 decimal blocks, and the standard RP03 is 80000 decimal blocks; thus, the normal value at this location is 116100 octal, or 40000 decimal. You will replace this value with the octal disk block count if you have an RP02 emulation, or with one-half of the block count if you have an RP03 emulation (in which case RSTS will double it to get the

real block count). The octal disk block count is computed by taking the number of logical cylinders mapped by the controller, multiplying it by 200, and converting to octal.

The Emulex SCxx/A disk controllers perform a logical mapping of the tracks and sectors onto the drive so that only the number of logical cylinders per drive needs to be changed. This is done in such a way that the number of heads is always 20 and the number of sectors is always 10, in agreement with the DEC standard. Therefore, the only difference between a modified-capacity drive and a standard-size drive is the number of cylinders per drive.

The number of logical cylinders for the SC01/Ax and SC11/Ax controllers can be found in Appendix B of this document. The number of logical cylinders for the SC02/Ax and SC12/Ax disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

5.5.1.3 Patch Notes

Although the RP03 is a supported disk under the RSTS operating system, its size presents a problem: the number of blocks (234200 octal) is too large to fit into 16 bits. The RSTS operating system compensates for this by breaking the physical unit into two logical units (numbers 0 and 4), equivalent in size to a single RP02.

Therefore, use the integer value of the cylinders **divided by 2** for the number of cylinders when calculating the patch values. (The largest size that can be represented in 16 bits is 65535, so the maximum number of cylinders should never exceed 327 cylinders.)

5.5.1.4 Patch Procedure

1. Boot your system, and from the INIT "Option:" prompt, execute the following commands:

```
Option: PATCH
File to patch? INIT.SYS
Base address? ONE
Offset address? 10570
  Base   Offset  Old      New?
105002  010570  116100  ? smallsize      (See table)
105002  010572  016100  ? ^Z              <ctrl-z>
Offset address? ^Z
Base address? ^Z
File to patch? ^Z
```

Option: BOOT SY:

The BOOT SY: command is used to reboot the system, to bring the patched version into memory. The PATCH command only changes the disk file INIT.SYS.

RSTS/E V8.0-07 SYSGNL Patches

2. Your patch is now complete.

5.5.2 RSTS/E V8.0-07 PATCHES FOR RM02/03/05

5.5.2.1 Patch Description

This patch modifies RSTS/E V8.0-07 (SYSGEN level L) to permit the use of non-standard disk drive sizes with the Emulex SCxx/B1 and SCxx/B3 controllers (RM02/03/05 emulations).

5.5.2.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

There are many locations in INIT.SYS and the RSTS/E monitor SIL that will be patched. These locations contain the number of cylinders, tracks, sectors, blocks, and so on. You will replace these values with the logical sizes for your disk.

The Emulex SCxx/B disk controllers perform a logical mapping of the cylinders, tracks, and sectors onto the drive. The number of logical cylinders, tracks, and sectors for the SCxx/B disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

5.5.2.3 Patch Procedure

File to Patch: INIT.SYS

<u>BASE</u>	<u>OFFSET</u>	<u>IS</u>	<u>CHANGE TO</u>	<u>FOR</u>
ONE	011110	001454	000240	RM02/03/051
ONE	011264	000002	msblock	RM03
ONE	011266	000002	msblock	RM02
ONE	011272	000007	msblock	RM05
ONE	011344	001100	lsblock	RM03
ONE	011346	001100	lsblock	RM02
ONE	011352	121200	lsblock	RM05
ONE	011424	000004	devclus	RM03
ONE	011426	000004	devclus	RM02
ONE	011432	000010	devclus	RM05

I Only if msblock = 0

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DBDSK	000046	000240	tracks*sectors	RM02
DBDSK	000050	000040	sectors	RM02
DBDSK	000052	000240	tracks*sectors	RM03
DBDSK	000054	000040	sectors	RM03
DBDSK	000062	001140	tracks*sectors	RM05
DBDSK	000064	000040	sectors	RM05
DBDSK	001260	177440	sectors-400	RM02/03
DBDSK	001262	002400	tracks*400	RM02/03
DBDSK	001310	177440	sectors-400	RM05
DBDSK	001312	011400	tracks*400	RM05
DSIDAT	000112	151466	150000!cylinders-1	RM03
DSIDAT	000120	151466	150000!cylinders-1	RM02
DSIDAT	000134	151466	150000!cylinders-1	RM05
DSIDAT	000114	002037	hedsec-401	RM03
DSIDAT	000122	002037	hedsec-401	RM02
DSIDAT	000136	011037	hedsec-401	RM05
BLDBOT	000522	000240	tracks*sectors	RM02
BLDBOT	000524	000040	sectors	RM02
BLDBOT	000526	000240	tracks*sectors	RM03
BLDBOT	000530	000040	sectors	RM03
BLDBOT	000532	001140	tracks*sectors	RM05
BLDBOT	000534	000040	sectors	RM05
ROOT	006122	002440	hedsec	RM03
ROOT	006124	002440	hedsec	RM02
ROOT	006130	011440	hedsec	RM05

File to Patch: SYSGEN.SIL and RSTS.SIL:

Module to Patch: DSK

For non-overlapped seek driver:

DxDSK	000046	000240	tracks*sectors	RM02
DxDSK	000050	000040	sectors	RM02
DxDSK	000052	000240	tracks*sectors	RM03
DxDSK	000054	000040	sectors	RM03
DxDSK	000062	001140	tracks*sectors	RM05
DxDSK	000064	000040	sectors	RM05
DxDSK	001260	177440	sectors-400	RM02/03
DxDSK	001262	002400	tracks*400	RM02/03
DxDSK	001310	177440	sectors-400	RM05
DxDSK	001312	011400	tracks*400	RM05

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For overlapped seek driver:

DxSEEK	000046	000240	tracks*sectors	RM02
DxSEEK	000050	000040	sectors	RM02
DxSEEK	000052	000240	tracks*sectors	RM03
DxSEEK	000054	000040	sectors	RM03
DxSEEK	000062	001140	tracks*sectors	RM05
DxSEEK	000064	000040	sectors	RM05
DxSEEK	001436	177440	sectors-400	RM02/03
DxSEEK	001440	002400	tracks*400	RM02/03
DxSEEK	001466	177440	sectors-400	RM05
DxSEEK*	001470	011400	tracks*400	RM05

Where "x" is: "R" for standard address (DRDSK, DRSEEK)
"B" for alternate address (DBDSK, DBSEEK)

File to Patch: HOOK.SAV

BLDBOT	000522	000240	tracks*sectors	RM02
BLDBOT	000524	000040	sectors	RM02
BLDBOT	000526	000240	tracks*sectors	RM03
BLDBOT	000530	000040	sectors	RM03
BLDBOT	000532	001140	tracks*sectors	RM05
BLDBOT	000534	000040	sectors	RM05

File to Patch: SAVRES.SAV

BLDBOT	000522	000240	tracks*sectors	RM02
BLDBOT	000524	000040	sectors	RM02
BLDBOT	000526	000240	tracks*sectors	RM03
BLDBOT	000530	000040	sectors	RM03
BLDBOT	000532	001140	tracks*sectors	RM05
BLDBOT	000534	000040	sectors	RM05

5.5.3 RSTS/E V8.0-07 PATCHES FOR RP06

5.5.3.1 Patch Description

This patch modifies RSTS/E V8.0-07 (SYSGEN level L) to permit the use of non-standard disk drive sizes with the Emulex SCxx/B2 and SCxx/B4 controllers (RP06 emulations).

5.5.3.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

The Emulex SCxx/B disk controllers perform a logical mapping of the cylinders, tracks, and sectors onto the drive. The number of logical cylinders, tracks, and sectors for the SCxx/B disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

5.5.3.3 Patch Procedure

File to Patch: INIT.SYS

ONE	011110	001454	240 (Only if msblock = 0)
ONE	011260	000005	msblock
ONE	011340	031270	lsblock
ONE	011420	000010	devclus
DBDSK	000042	000642	tracks*sectors
DBDSK	000044	000026	sectors
DBDSK	001244	177426	177400!sectors
DBDSK	001246	011400	tracks*400
DSIDAT	000076	011456	010000!cylinders-1
DSIDAT	000100	011025	hedsec-401
BLDBOT	000516	000642	tracks*sectors
BLDBOT	000520	000026	sectors
ROOT	006116	011426	hedsec
CLN	000166	000005	msblock
CLN	000174	031270	lsblock

File to Patch: SYSGEN.SIL and RSTS.SIL:

Module to Patch: DSK

For non-overlapped seek driver:

DxDISK	000042	000642	tracks*sectors
DxDISK	000044	000026	sectors
DxDISK	001244	177426	177400!sectors
DxDISK	001246	011400	tracks*400

For overlapped seek driver:

DxSEEK	000042	000642	tracks*sectors
DxSEEK	000044	000026	sectors
DxSEEK	001422	177426	177400!sectors
DxSEEK	001424	011400	tracks*400

Where "x" is: "B" for standard address (DBDSK, DBSEEK)
 "R" for alternate address (DRDSK, DRSEEK)

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File to Patch: HOOK.SAV

BLDBOT	000516	000642	tracks*sectors
BLDBOT	000520	000026	sectors

File to Patch: SAVRES.SAV

BLDBOT	000516	000642	tracks*sectors
BLDBOT	000520	000026	sectors

5.5.4 RSTS/E V8.0-07 PATCHES FOR RK06/07

5.5.4.1 Patch Description

This patch modifies RSTS V8.0-07 (SYSGEN level L) to permit the use of non-standard disk drive sizes with the Emulex SCxx/C controllers (RK06/07 emulations).

5.5.4.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

Only two locations in the INIT.SYS system program will be patched. These locations contain the block and cylinder count for an RK06 or an RK07. The DEC standard RK06 is 27126 decimal blocks, and the standard RK07 is 53790 decimal blocks; thus, the normal value at the first location is 64740 octal (27104 decimal) for the RK06 or 151010 octal (53768 decimal) for RK07. You will replace this value with the octal disk block count. The octal disk block count is computed by taking the number of logical cylinders mapped by the controller, multiplying it by 66 (decimal), subtracting 22 (decimal), and converting to octal. The second location requires the number of logical cylinders minus 1.

The Emulex SCxx/C disk controllers perform a logical mapping of the tracks and sectors onto the drive so that only the number of logical cylinders per drive needs to be changed. This is done in such a way that the number of heads is always 3 and the number of sectors is always 22, in agreement with the DEC standard. Therefore, the only difference between a modified-capacity drive and a standard-size drive is the number of cylinders per drive.

The number of logical cylinders for the SCxx/C disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

5.5.4.3 Patch Procedure

1. Boot your system, and from the INIT "Option:" prompt, execute the following commands:

RK06:

```

Option: PATCH
File to patch? INIT.SYS
Base address? ONE
Offset address? 10466
  Base   Offset  Old      New?
105002  010466  064740  ? blocks
105002  010470  010362  ? ^Z
Offset address? ^Z
Base address? DSI
Offset address? 10006
  Base   Offset  Old      New?
124232  010006  000632  ? cylinders-1
124232  010010  005767  ? ^Z
Offset address? ^Z
Base address? ^Z
File to patch? ^Z

```

<ctrl-z>

Option: BOOT SY:

RK07:

```

Option: PATCH
File to patch? INIT.SYS
Base address? ONE
Offset address? 10500
  Base   Offset  Old      New?
105002  010500  151010  ? blocks
105002  010502  005304  ? ^Z
Offset address? ^Z
Base address? DSI
Offset address? 10020
  Base   Offset  Old      New?
124232  010020  001456  ? cylinders-1
124232  010022  020200  ? ^Z
Offset address? ^Z
Base address? ^Z
File to patch? ^Z

```

Option: BOOT SY:

The BOOT SY: command is used to reboot the system, to bring the patched version into memory. The PATCH command only changes the disk file INIT.SYS.

2. Your patch is now complete.

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5.5.5 RSTS/E V8.0-07 PATCHES FOR RL01/02

5.5.5.1 Patch Description

This patch modifies RSTS V8.0-07 (SYSGEN level L) to permit the use of non-standard disk drive sizes with the Emulex SCxx/L controllers (RL01/02 emulations).

5.5.5.2 Patch Explanation

Modifying the logical size of a disk drive requires that the baseline operating system and some stand-alone utilities be patched to reflect the modified size characteristics.

Only one location in the INIT.SYS system program will be patched. This location contains the block count for either an RL01 or an RL02. The DEC standard RL01 is 10240 decimal blocks, and the standard RL02 is 20480 decimal blocks; thus, the normal value at this location is 23754 octal (10220 decimal) for RL01 or 47754 octal (20460 decimal) for RL02. The octal disk block count is computed by taking the number of logical cylinders mapped by the controller, multiplying it by 40 (decimal), subtracting 20 (decimal), and converting to octal.

The Emulex SCxx/L disk controllers perform a logical mapping of the tracks and sectors onto the drive so that only the number of logical cylinders per drive needs to be changed. This is done in such a way that the number of heads is always 2 and the number of sectors is always 40, in agreement with the DEC standard. Therefore, the only difference between a modified-capacity drive and a standard-size drive is the number of cylinders per drive.

The number of logical cylinders for the SCxx/L disk controllers can be found in the Drive Configuration section of the applicable controller manual. The values for the patch can be calculated by following the procedure in Appendix A.

5.5.5.3 Patch Notes

Although the DEC RL01 and RL02 have 40 sectors, you should assume that they have 20. This is because the number of bytes per sector is 256, whereas a DEC "block" is made up of 512 bytes. Therefore, to fill up a normal block of data, two sequential sectors must be read. This is handled in the DEC disk drivers and should be ignored. When calculating block sizes, use the sector value 20 instead of the actual value of 40.

CAUTION

When calculating the patch values for your RL01/02 patch, you must never exceed 512 cylinders. This is a hardware maximum for the controller which cannot be exceeded.

5.5.5.4 Patch Procedure

1. Boot your system, and from the INIT "Option:" prompt, execute the following commands:

RL01:

```
Option: PATCH
File to patch? INIT.SYS
Base address? ONE
Offset address? 10222
  Base   Offset  Old      New?
105002  010222  023754  ? blocks
105002  010224  010263  ? ^Z
Offset address? ^Z
Base address? ^Z
File to patch? ^Z
```

<ctrl-z>

Option: BOOT SY:

RL02:

```
Option: PATCH
File to patch? INIT.SYS
Base address? ONE
Offset address? 10234
  Base   Offset  Old      New?
105002  010234  047754  ? blocks
105002  010236  005300  ? ^Z
Offset address? ^Z
Base address? ^Z
File to patch? ^Z
```

Option: BOOT SY:

The BOOT SY: command is used to reboot the system, to bring the patched version into memory. The PATCH command only changes the disk file INIT.SYS.

2. Your patch is now complete.

5.5.6 RSTS/E V8.0-07 22-BIT PATCHES FOR SC02/C

5.5.6.1 Patch Description

This patch modifies RSTS V8/0-07 (SYSGEN level L) to permit the Emulex SC02/C disk to use 22-bit addressing on the DEC 11/23 Plus, Micro-PDP-11, or Micro-PDP-11/73 processors.

5.5.6.2 Patch Explanation

The DEC RK611 controller is an 18-bit disk controller; that is, it can access a memory address range of only 256K bytes without special

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mapping hardware. The Emulex SC02/C controller has the hardware capability of addressing a 22-bit memory address range (4M bytes).

This patch modifies the RSTS/E RK06/07 disk driver to place the most significant bits of the memory transfer address (bits <21:16>), ORed with the 22-bit address enable command, into the SPARE register of the SC02/C. Bits <21:18> are then masked off in preparation for setting up the CSR (RKCS1).

5.5.6.3 Patch Procedure

1. Boot your system, and from the INIT "Option:" prompt, execute the following commands:

```
Option: PATCH
File to patch? <lf>      (patch INSTALLED monitor SIL)
Module name? DSK
Base address? DMDSK      (use DMSEEK if overlapped seeks used)
Offset address? 252      (use 462 if overlapped seeks used)
```

```
Base   Offset  Old      New?
?????? 000252  072127  ? 4537
?????? 000254  000004  ? DSKPAT+150
?????? 000256  ??????  ? ^Z
```

<ctrl-z>

```
Offset address? ^Z
Base address? DSKPAT+150
Offset address? 0
```

```
Base   Offset  Old      New?
?????? 000000  000000  ? 52701
?????? 000002  000000  ? 22000
?????? 000004  000000  ? 10163
?????? 000006  000000  ? 22
?????? 000010  000000  ? 42701
?????? 000012  000000  ? 177774
?????? 000014  000000  ? 72127
?????? 000016  000000  ? 4
?????? 000020  000000  ? 205
?????? 000022  000000  ? ^Z
```

```
Offset address? ^Z
Base address? ^Z
Module name? ^Z
File to patch? ^Z
```

Option:

2. Your patch is now complete. Bring up your system normally.

CAUTION

This patch was written to fit into the reserved PATCH area for the disk drivers (for DEC patches). If any of the values in the DSKPAT area under the "old" column are non-zero, **do not continue applying this patch.** You will be writing over a DEC patch that will cause unpredictable results.

This patch must be applied to **all** user-generated monitors.

5.5.7 RSTS/E V8.0-07 22-BIT PATCHES FOR SC03

5.5.7.1 Patch Description

This patch modifies RSTS V8.0-07 (SYSGEN level L) to permit the Emulex SC03 disk to use 22-bit addressing on the DEC 11/23 Plus, Micro-PDP-11, or Micro-PDP-11/73 processors.

5.5.7.2 Patch Explanation

The SC03 emulates a DEC RH70 disk subsystem. The characteristic that is unique to the RH70 is the existence of a Bus Address Extension (BAE) register, which allows direct support of the 22-bit address space. Because RH70-type peripherals normally are found only on an 11/70, RSTS/E does not know how to address this device correctly. This confusion prevents the operating system from correctly transferring data between the SC03 and high memory (greater than 256K bytes). RSTS boots and runs normally without this patch until enough jobs are added to force memory usage past 256K bytes; then it crashes.

This patch forces the RSTS monitor to recognize the BAE register of the SC03 disk controller and address it as a 22-bit device.

5.5.7.3 Patch Procedure

1. Boot your system, and from the INIT "Option:" prompt, execute the following commands:

```
Option: PATCH
File to patch? INIT.SYS
Base address? START
Offset address? 11166
  Base   Offset  Old      New?
116002  011166  001025  ? 425
116002  011170  004767  ? ^Z
Offset address? 11324
  Base   Offset  Old      New?
116002  011324  012704  ? 721
116002  011326  170234  ? ^Z
Base address? ^Z
File to patch? ^Z
```

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Option: BOOT SY:

The BOOT SY: command is used to reboot the system, to bring the patched version into memory. The PATCH command only changes the disk file INIT.SYS.

2. Your patch is now complete.

5.5.8 RSTS/E V8.0-07 PATCHES FOR CS01/02

5.5.8.1 Patch Description

This patch modifies RSTS V8.0-07 (SYSGNL, patch kit C) to permit the use of more than eight lines per emulation on Emulex CS01 and CS02 communications controllers (DH11 emulation).

5.5.8.2 Patch Explanation

In the RSTS V8.0-07 (patch kit C) release, DEC modified the communications initialization routine. All of the DEC LSI-11 bus communications controllers are limited to either four (DZV11) or eight (DHV11) lines, whereas the Emulex communication controllers have 16 lines per emulation. The change to the initialization code reduced the number of terminal lines by half on all LSI-11 bus processors.

This patch removes that limitation, so that all 16 lines (per emulation) can be accessed.

5.5.8.3 Patch Procedure

1. Boot your system, and from the INIT "Option:" prompt, execute the following commands:

```
Option: PATCH
File to patch? INIT.SYS
Base address? INIONE
Offset address? 2454
  Base   Offset   Old      New?
105310  002454  106263  ? 401
105310  002456  ??????  ? ^C
```

Option: BOOT SY:

2. You **must** reboot your system after applying this patch, in order to load the patched version of the INIT program into memory.
3. Your patch is now complete.

NOTE

This patch is not needed for CS02 running in DHV11 mode.

5.6 RSTS/E V9.0 PATCHES

5.6.1 RSTS/E V9.0 PATCHES FOR RP02/03

5.6.1.1 Patch Description

This patch modifies RSTS V9.0 to permit toe use of non-standard disk drive sizes with the Emulex SCXX/A controllers (RP02/03 emulations).

5.6.1.2 Patch Explanation

Only two locations in the INIT.SYS system program will be patched. One location contains the block count for an RP02, which is one-half of the block count for an RP03. The DEC standard RP02 is 40000 decimal blocks, and the standard RP03 is 80000 decimal blocks; the normal value at this location is 116100 octal, or 40000 decimal. You will be replacing this value with the octal disk block count if you have an RP02 emulation, or one-half of the block count if you have an RP03 emulation (in which case RSTS will double it to get the real block count). The second location contains the number of clusters on the disk. This value is computed by dividing the number of logical blocks by 2 (the clustersize of the RP02/03).

Only one location in the RSTS monitor SIL will need to be patched. This location contains the number of clusters on the disk; as in the INIT patch. This patch must be applied to every (new) RSTS monitor.

The number of logical cylinders for the SC01/AX and SC11/AX controllers can be found in the Application note: "Calculating Patch Values." The number of logical cylinders for the SC02/AX and SC12/AX controllers can be found in the Drive Configuration Appendix at the back of the controller manual.

5.6.1.3 Patch Locations

File to Patch: INIT.SYS

<u>BASE</u>	<u>OFFSET</u>	<u>IS</u>	<u>CHANGE TO</u>
ONE	010762	116100	smallsize
DPDSK	000246	047040	blocks/devclus

File to Patch: SYSGEN.SIL and RSTS.SIL:

Module to Patch: DSK

For non-overlap seek driver:

DPDSK	000246	047040	blocks/devclus
-------	--------	--------	----------------

For overlap seek driver:

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DPSEEK 000766 047040 blocks/devclus

5.6.2 RSTS/E V9.0 PATCHES FOR RM02/03/05

5.6.2.1 Patch Description

This patch modifies RSTS/E V9.0 to permit the use of non-standard disk drive sizes with the Emulex SCXX/B1, SCXX/B3, and SCXX/BX controllers (RM02/03/05 emulations).

5.6.2.2 Patch Explanation

The patch itself consists of a file to patch, a module in the file (if the file is a SIL), a base address, an offset from the base, a value that defines what is currently at the offset defined by the base and offset, and a variable or expression designating what value is to be placed at that address. The value for the expression can be found in the Application note: "Calculating Patch Values."

5.6.2.3 Patch Locations

File to Patch: INIT.SYS

<u>BASE</u>	<u>OFFSET</u>	<u>IS</u>	<u>CHANGE TO</u>	<u>FOR</u>
ONE	011320	001454	000240	RM02/03/05 Only if msblock=0
ONE	011474	000002	msblock	RM03
ONE	011476	000002	msblock	RM02
ONE	011502	000007	msblock	RM05
ONE	011554	001100	lsblock	RM03
ONE	011556	001100	lsblock	RM02
ONE	011562	121200	lsblock	RM05
ONE	011634	000004	devclus	RM03
ONE	011636	000004	devclus	RM02
ONE	011642	000010	devclus	RM05
DBDSK	000046	000240	tracks*sectors	RM02
DBDSK	000050	000040	sectors	RM02
DBDSK	000052	000240	tracks*sectors	RM03
DBDSK	000054	000040	sectors	RM03
DBDSK	000062	001140	tracks*sectors	RM05
DBDSK	000064	000040	sectors	RM05
DBDSK	000116	100220	blocks/devclus	RM03
DBDSK	000120	100220	blocks/devclus	RM02
DBDSK	000124	172120	blocks/devclus	RM05

DBDSK	000136	000004	devclus	RM03
DBDSK	000140	000004	devclus	RM02
DBDSK	000144	000010	devclus	RM05
DBDSK	001706	177440	sectors-400	RM02/03
DBDSK	001710	002400	tracks*400	RM02/03
DBDSK	001736	177440	sectors-400	RM05
DBDSK	001740	011400	tracks*400	RM05
DSIDAT	000112	151466	150000!cylinders-1	RM03
DSIDAT	000120	151466	150000!cylinders-1	RM02
DSIDAT	000134	151466	150000!cylinders-1	RM05
DSIDAT	000114	002037	hedsec-401	RM03
DSIDAT	000122	002037	hedsec-401	RM02
DSIDAT	000136	011037	hedsec-401	RM05
BLDBOT	000454	000240	tracks*sectors	RM02
BLDBOT	000456	000040	sectors	RM02
BLDBOT	000460	000240	tracks*sectors	RM03
BLDBOT	000462	000040	sectors	RM03
BLDBOT	000464	001140	tracks*sectors	RM05
BLDBOT	000466	000040	sectors	RM05
ROOT	006772	002440	hedsec	RM03
ROOT	006774	002440	hedsec	RM02
ROOT	007000	011440	hedsec	RM05

File to Patch: SYSGEN.SIL and RSTS.SIL:

Module to Patch: DSK

For non-overlap seek driver:

DxDISK	000046	000240	tracks*sectors	RM02
DxDISK	000050	000040	sectors	RM02
DxDISK	000052	000240	tracks*sectors	RM03
DxDISK	000054	000040	sectors	RM03
DxDISK	000062	001140	tracks*sectors	RM05
DxDISK	000054	000040	sectors	RM05
DxDISK	000116	100220	blocks/devclus	RM03
DxDISK	000120	100220	blocks/devclus	RM02
DxDISK	000124	172120	blocks/devclus	RM05
DxDISK	000136	000004	devclus	RM03
DxDISK	000140	000004	devclus	RM02
DxDISK	000144	000010	devclus	RM05
DxDISK	001706	177440	sectors-400	RM02/03
DxDISK	001710	002400	tracks*400	RM02/03
DxDISK	001736	177440	sectors-400	RM05
DxDISK	001740	011400	tracks*400	RM05

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For overlap seek driver:

DxSEEK	000046	000240	tracks*sectors	RM02
DxSEEK	000050	000040	sectors	RM02
DxSEEK	000052	000240	tracks*sectors	RM03
DxSEEK	000054	000040	sectors	RM03
DxSEEK	000062	001140	tracks*sectors	RM05
DxSEEK	000054	000040	sectors	RM05
DxSEEK	000116	100220	blocks/devclus	RM03
DxSEEK	000120	100220	blocks/devclus	RM02
DxSEEK	000124	172120	blocks/devclus	RM05
DxSEEK	000136	000004	devclus	RM03
DxSEEK	000140	000004	devclus	RM02
DxSEEK	000144	000010	devclus	RM05
DxSEEK	002044	177440	sectors-400	RM02/03
DxSEEK	002046	002400	tracks*400	RM02/03
DxSEEK	002074	177440	sectors-400	RM05
DxSEEK	002076	011400	tracks*400	RM05

Where "x" is:

"R" for standard address (DRDSK,DRSEEK)
"B" for alternate address (DBDSK,DBSEEK)

File to Patch: HOOK.SAV

BLDBOT	000454	000240	tracks*sectors	RM02
BLDBOT	000456	000040	sectors	RM02
BLDBOT	000460	000240	tracks*sectors	RM03
BLDBOT	000462	000040	sectors	RM03
BLDBOT	000464	001140	tracks*sectors	RM05
BLDBOT	000466	000040	sectors	RM05

File to Patch: SAVRES.SAV

BLDBOT	000454	000240	tracks*sectors	RM02
BLDBOT	000456	000040	sectors	RM02
BLDBOT	000460	000240	tracks*sectors	RM03
BLDBOT	000462	000040	sectors	RM03
BLDBOT	000464	001140	tracks*sectors	RM05
BLDBOT	000466	000040	sectors	RM05

5.6.3 RSTS/E V9.0 PATCHES FOR RP06

5.6.3.1 Patch Description

This patch modifies RSTS/E V9.0 to permit the use of non-standard disk drive sizes with the Emulex SCXX/B2, SCXX/B4, and SCXX/BX controllers (RP06 emulations).

5.6.3.2 Patch Explanation

The patch itself consists of a file to patch, a module in the file (if the file is a SIL), a base address, an offset from the base, a value that defines what is currently at the offset defined by the base and offset, and a variable or expression designating what value is to be placed at that address. The value for the expression can be found in the Application note: "Calculating Patch Values."

In RSTS/E Versions prior to Version 8.0 only 800 of the 815 cylinders were used for RP06s (this was attributed to "historical purposes"). In Version 8.0 and 9.0 all 815 cylinders are being utilized. Since version 9.0 also supports earlier versions of RSTS disks (RDS0), extreme care should be taken when attempting to use a Version 7 disk on an 8.0 or 9.0 system.

5.6.3.3 Patch Locations

File to Patch: INIT.SYS

<u>BASE</u>	<u>OFFSET</u>	<u>IS</u>	<u>CHANGE TO</u>
ONE	011320	001454	240 (Only if msblock = 0)
ONE	011470	000005	msblock
ONE	011550	031270	lsblock
ONE	011630	000010	devclus
DBDSK	000042	000642	tracks*sectors
DBDSK	000044	000026	sectors
DBDSK	000112	123127	blocks/devclus
DBDSK	000132	000010	devclus
DBDSK	001672	177426	sectors-400
DBDSK	001674	011400	tracks*400
DSIDAT	000076	011456	010000!cylinders-1
DSIDAT	000100	011025	hedsec-401
BLDBOT	000450	000642	tracks*sectors
BLDBOT	000452	000026	sectors
ROOT	006766	011426	hedsec

File to Patch: SYSGEN.SIL and RSTS.SIL:

Module to Patch: DSK

RSTS/E V8.0-07 SYSGNL Patches

For non-overlap seek driver:

DxDISK	000042	000642	tracks*sectors
DxDISK	000044	000026	sectors
DxDISK	000112	123127	blocks/devclus
DxDISK	000132	000010	devclus
DxDISK	001672	177426	sectors-400
DxDISK	001674	011400	tracks*400

For overlap seek driver:

DxSEEK	000042	000642	tracks*sectors
DxSEEK	000044	000026	sectors
DxSEEK	000112	123127	blocks/devclus
DxSEEK	000132	000010	devclus
DxSEEK	002030	177426	sectors-400
DxSEEK	002032	011400	tracks*400

Where "x" is: "B" for standard address (DBDISK, DBSEEK)
"R" for alternate address (DRDISK, DRSEEK)

File to Patch: HOOK.SAV

BLDBOT	000450	000642	tracks*sectors
BLDBOT	000452	000026	sectors

File to Patch: SAVRES.SAV

BLDBOT	000450	000642	tracks*sectors
BLDBOT	000452	000026	sectors

5.6.4 RSTS/E V9.0 PATCHES FOR RK06/07

5.6.4.1 Patch Description

This patch modifies RSTS V9.0 to permit the use of non-standard disk drive sizes with the Emulex SCXX/C controllers (RK06/07 emulations).

5.6.4.2 Patch Explanation

Only three locations in the INIT.SYS system program will be patched. Two of these locations contain the block count for an RK06 or an RK07. You will be replacing this value with the modified octal disk block count. The third location requires the number of logical cylinders minus one. The number of logical cylinders can be found in the Drive Configuration Appendix at the back of the controller manual.

Only one location in the RSTS monitor SIL will need to be patched. This location contains the number of blocks on the disk. This patch must be applied to every (new) RSTS monitor.

5.6.4.3 Patch Locations

File to Patch: INIT.SYS

<u>BASE</u>	<u>OFFSET</u>	<u>IS</u>	<u>CHANGE TO</u>	<u>FOR</u>
ONE	010654	064740	blocks	RK06
ONE	010666	151010	blocks	RK07
DSI	010326	000632	cylinders-1	RK06
DSI	010340	001456	cylinders-1	RK07
DMDSK	000466	064740	blocks	RK06
DMDSK	000504	151010	blocks	RK07

File to Patch: SYSGEN.SIL and RSTS.SIL:

Module to Patch: DSK

For non-overlap seek driver:

DMDSK	000466	064740	blocks	RK06
DMDSK	000504	151010	blocks	RK07

For overlap seek driver:

DMSEEK	000704	064740	blocks	RK06
DMSEEK	000722	151010	blocks	RK07

5.6.5 RSTS/E V9.0 PATCHES FOR RL01/02

5.6.5.1 Patch Description

This patch modifies RSTS V9.0 to permit the use of non-standard disk drive sizes with the Emulex SCXX/L controllers (RL01/02 emulations).

5.6.5.2 Patch Explanation

Only two locations in the INIT.SYS system program will be patched. These locations contain the block count for either an RL01 or an RL02. The number of logical cylinders can be found in the Drive Configuration Appendix at the back of the controller manual.

Only one location in the RSTS monitor SIL will need to be patched. This location contains the number of blocks on the disk. This patch must be applied to every (new) RSTS monitor.

RSTS/E V8.0-07 SYSGNL Patches

5.6.5.3 Patch Locations

File to Patch: INIT.SYS

<u>BASE</u>	<u>OFFSET</u>	<u>IS</u>	<u>CHANGE TO</u>	<u>FOR</u>
ONE	010410	023754	blocks	RL01
ONE	010422	047754	blocks	RL02
DLDSK	000572	023754	blocks	RL01
DLDSK	000610	047754	blocks	RL02

File to Patch: SYSGEN.SIL and RSTS.SIL:

Module to Patch: DSK

For non-overlap seek driver:

DLDSK	000572	023754	blocks	RL01
DLDSK	000610	047754	blocks	RL02

For overlap seek driver:

DLSEEK	000516	023754	blocks	RL01
DLSEEK	000534	047754	blocks	RL02

5.6.6 RSTS/E V9.0 22-BIT PATCH FOR SC02/C

5.6.6.1 Patch Description

The DEC RK611 controller is an 18 bit disk controller; that is, it can only access a memory address range of 256k bytes. The Emulex SC02/C controller has the hardware capability of addressing a 22-bit memory address range (4 megabytes).

This patch modifies RSTS/E V9.0 (the RK06/7 disk driver) to pass a 22-bit memory address to the Emulex SC02/C disk controller.

5.6.6.2 Patch Explanation

This patch modifies the RSTS/E RK06/7 disk driver to place the most significant bits of the memory transfer address <21:16>, ORed with the 22-bit address enable command, into the SPARE register of the SC02/C. Bits <21:18> are then masked off in preparation for setting up the CSR (RKCS1).

WARNING

This patch must be applied to ALL user generated RSTS/E V9.0 monitors. This patch assumes that you are running on an 11/23, 11/23 Plus, or 11/73 processor with a 22-bit backplane, 256k or greater words of memory, and the Emulex SC02/C running in 22-bit mode (with the 22-bit chip installed). If any of the above are missing, unpredictable results will occur.

5.6.6.3 Patch Procedure

1. Boot your system, and from the INIT 'Option: <Start>' prompt, execute the following commands:

```

Start timesharing? <Yes> PATCH
File to patch? <lf>      (patch INSTALLED monitor SIL)
Module name? DSK
Base address? DMDSK      (use DMSEEK if overlapped seeks used)
Offset address? 272     (use 504 if overlapped seeks used)
  Base   Offset  Old      New?
  ?????? 000272  072127  ? 4537
  ?????? 000274  000004  ? DSKPAT+230
  ?????? 000276  ??????? ? ^Z
Offset address? ^Z
Base address? DSKPAT+230
Offset address? 0
  Base   Offset  Old      New?
  ?????? 000000  000000  ? 52701
  ?????? 000002  000000  ? 22000
  ?????? 000004  000000  ? 10163
  ?????? 000006  000000  ? 22
  ?????? 000010  000000  ? 42701
  ?????? 000012  000000  ? 177774
  ?????? 000014  000000  ? 72127
  ?????? 000016  000000  ? 4
  ?????? 000020  000000  ? 205
  ?????? 000022  ??????? ? ^Z
Offset address? ^Z
Base address? ^Z
Module name? ^Z
File to patch? ^Z

Option: <Start>

```

CAUTION

This patch was written to fit into the reserved PATCH area for the disk drivers (for DEC patches). If any of the values under the "Old" column are non-zero, **do not continue applying this patch**; you will be writing over a DEC patch that will cause unpredictable results.

2. Your patch is now complete; bring up your system normally.

5.6.7 RSTS/E V9.0 22-BIT PATCH FOR TC02/MT

5.6.7.1 Patch Description

The DEC TM11 controller is an 18 bit tape controller; that is, it can only access a memory address range of 256k bytes. The Emulex TC02/MT controller has the hardware capability of addressing a 22-bit memory address range (4 megabytes).

This patch modifies RSTS/E V9.0 (the TM11 tape driver) to pass a 22-bit memory address to the Emulex TC02/MT tape controller.

5.6.7.2 Patch Explanation

This patch modifies the RSTS/E TM11 tape driver to place the most significant bits of the memory transfer address <21:16> into the Maintenance Register (MTM) register of the TC02/MT.

WARNING

This patch must be applied to ALL user generated RSTS/E V9.0 monitors. This patch assumes that you are running on an 11/23, 11/23 Plus, or 11/73 processor with a 22-bit backplane, 256k or greater words of memory, and the Emulex TC02/MT running in 22-bit mode (with the 22-bit chip installed). If any of the above are missing, unpredictable results will occur.

5.6.7.3 Patch Procedure

1. Boot your system, and from the INIT 'Option:' prompt, execute the following commands:

```

Start timesharing? <Yes> PATCH
File to patch? <lf>      (patch INSTALLed monitor SIL)
Module name? RSTS
Base address? MTDVR
Offset address? 2206
  Base  Offset  Old      New?
  ?????? 002206  072127 ? 10163
  ?????? 002210  000004 ? 12
  ?????? 002212  052601 ? 12601
  ?????? 002214  010263 ? ^Z
Offset address? ^Z
Base address? ^Z
Module name? ^Z
File to patch? ^Z

```

```

<Control-Z>
<Control-Z>
<Control-Z>
<Control-Z>
<Control-Z>

```

Option: <Start>

2. Your patch is now complete; bring up your system normally.

5.6.8 RSTS/E V9.0 TC02/03/05 TK25 EMULATION PATCH

5.6.8.1 Description

There is a problem with RSTS/E version 9.0 and the Emulex Qbus TS11 emulating tape controllers. It is recognized by the following line in a INIT hardware list:

```
TS0: 172520 224 Units: 0(TS05) Extended features disabled
```

5.6.8.2 Explanation

The Emulex TC02/3/5 tape controllers emulate the DEC TS11 tape controller, not the TSV05 or TK25 tape controllers. The extended features found in the TSV05 are not in our emulation and the TK25 has a extra bit that signifies twenty-two bit addressing that we don't use. This causes RSTS to think that the Emulex controllers are eighteen bit (Unibus) controllers on a twenty-two bit Qbus, which is an illegal configuration, and disables them.

5.6.8.3 Solution

The following is a software patch to correct this problem (note: you type the bolded text):

1. Boot the system to the INIT prompt:

Start timesharing? <Yes>

2. Enter the PATCH subcommand and enter the following patch:

```
Start timesharing? <Yes> PATCH
File to patch? INIT.SYS
Base address? INIONE
Offset? 6140
Base   Offset  Old      ? New
112310 006140 016700  ? 12700
112310 006142 005306  ? 1200
112310 006144 042700  ? ^C      <Control C>
```

Option: <Start> **BOOT SY:**

3. A hardware list will now show:

TS0: 172520 224 Units: 0(**TK25**) **Extended features enabled**

NOTE

This problem was also fixed in the firmware. Updating the firmware will make this patch unnecessary. However, in the past, DEC has corrected its software when it was determined that a modification to the current revision resulted in the "breaking" of a third parties hardware. DEC is aware of this problem and may fix this in a future release. It is suggested that this problem be fixed in software with this patch until DEC decides whether they will fix it in the operating system.

Appendix A CALCULATING PATCH VALUES

A.1 INTRODUCTION

This appendix presents the method for calculating the various values you may need to apply a disk capacity patch. Use the work sheet in the back to list your values. (You should go through the entire list whether you need the value or not, because some values are derived from previous values.) Be sure to check the list of size maximums to be sure that your calculated values are within the legal range.

Some values for common configuration are listed in other appendices. Check this list to see if your configuration has already been done.

A.1.1 MATERIALS

An octal/decimal converting calculator is recommended, although you can get by without one. Also, you should make copies of the work sheet for your first try at figuring the patch values, but be sure to copy the final values into this document in order to have a permanent record.

A.1.2 CONVENTIONS

The following conventions are used in this section.

1. A variable name in all CAPITAL letters, or a numeric value followed by a period, indicates a decimal value.
2. A variable name in all lowercase letters, or a numeric value without a period, indicates an octal value.

Some arithmetic symbols used in this section are:

@	Logical Exclusive OR (XOR)
!	Logical OR
&	Logical AND
*	Multiplication
/	Division
+	Addition
-	Subtraction
^	Raise to power
~	Ones complement (NOT)

Calculation Procedure

A.1.3 RP02/03 EMULATIONS

If you are patching for an SC01/A or SC11/A (RP02/03 emulation), you should find the controller model in Appendix B and use those values for patching.

If you are patching for an SC02/A or SC12/A, get the logical disk size from the appendix of the appropriate controller technical manual and continue to follow this procedure.

A.2 CALCULATION PROCEDURE

Follow this procedure to calculate the exact patch values necessary for your specific configuration.

1. Remove one copy of the worksheet from this document. Two copies have been provided: one for calculating values, and the other for preserving the final patch values for use in patches to later versions of the operating system.
2. Find the mapped values for CYLINDERS, TRACKS, and SECTORS in the appendices of the Emulex Disk Controller Technical Manual for your particular drive and configuration. Write these values in the appropriate locations.

NOTE

Emulex does not always use the exact configuration of the physical disk. Instead, a "logical disk" (or multiple logicals) is **mapped** onto the physical unit. Therefore, you should write in the mapped values, **not** the physical values.

3. Convert these values to octal and write them in the locations marked (3)cylinders, (3)tracks, and (3)sectors.
4. Multiply the decimal values for (2)CYLINDERS, (2)TRACKS, and (2)SECTORS together and write this value into the location marked (4)T_BLOCKS.
5. Multiply the value (4)T_BLOCKS by 512. (decimal), and divide this subtotal by 1,000,000. This is the **formatted capacity** of each logical unit in megabytes. Write this value into the location marked (5)DRIVE CAPACITY.
6. Multiply the number of (2)TRACKS times the number of (2)SECTORS and record this value in the location marked (6)TRACKS*SECTORS.
7. Multiply the number of (2)TRACKS times 256., and write this value into the location marked (7)TRACKS*256.

Calculation Procedure

8. Convert the values calculated in steps 6 and 7 to octal and write them into the locations marked **(8)tracks*sectors** and **(8)tracks*400** respectively.
9. Subtract 10. (decimal) from the number of **(2)SECTORS** and write this value into the location **(9)TRACKS-10**.
10. Convert the value calculated in step 9 to octal and write this value into the location **(10)sectors-12**.
11. Multiply the value of **(2)TRACKS** times 256. (decimal), and add the value of **(2)SECTORS**. Convert the resulting value to octal and write it into the location marked **(11)hedsec**.
12. Take the value calculated in step 11 and subtract 401 (octal). Write this value into the location marked **(12)hedsec-401**. This value can also be calculated as follows:

$$\text{hedsec-401} = ((\text{tracks} - 1) * 400) + (\text{sectors} - 1)$$

13. The value for **BLOCKS** is different for **RSX** (and **RT11**) and **RSTS/E**. **RSTS/E** takes out the last sector, reserved for the bad block file, before calculations; **RSX** wants the bad sector value included in this value.

RT11 and RSX:

Copy the value of **(4)T_BLOCKS** to the location marked **(13)BLOCKS**.

RSTS/E:

Subtract the value of **(2)SECTORS** from the value of **(4)T_BLOCKS**. Save this value in the location marked **(13)BLOCKS**.

14. Convert this value to octal and write it into the location marked **(14)blocks**.
15. Divide the value in **(13)BLOCKS** by 400. (decimal). Multiply the integer value of the number just calculated by 200. (decimal). Convert the resulting value to octal and write it into the location marked **(15)smallsize**.
16. Shift the value of **(14)blocks** right 16 places (20 octal). Write this value into the location marked **(16)msblock**.
17. Shift the value of **(16)msblock** left 16 places (20 octal) and Exclusive-OR the value of **(14)blocks**. Write this value into the location marked **(17)lsblock**.

Calculation Procedure

18. Divide the value of (13)BLOCKS by 32767. (decimal). Reduce the resulting value to the next smaller power of 2, and write this value into the location marked (18)DEVICE CLUSTERSIZE. If this value is less than 2, write the value 1 into that location.
19. Convert the value of (18)DEVICE CLUSTERSIZE to octal and write this value into the location marked (19)devclu.

You now have enough values to complete your patch. Be sure to check your values against the "Maximum Table Values" in Appendix F.

Appendix B
SCXX/A SIZE TABLE

B.1 SC01/A AND SC11/A SIZE TABLE

CONTROLLER	SCXX/A1	SCXX/A2	SCXX/A2	SCXX/A3
RP02 OR RP03	RP02	RP03	RP03	RP02
SECTORS	30.	30.	30.	32.
sectors	36	36	36	40
TRACKS (HEADS)	5.	5.	5.	2.
tracks	5	5	5	2
CYLINDERS	812.	812.	820.	319.
cylinders	1454	1454	1464	477
Values to use for RT11 and RSX-11M patches:				
BLOCKS	40600.	121800.	123000.	20416.
blocks	117230	355710	360170	47700
msblock	000000	000001	000001	000000
lsblock	117230	155710	160170	047700
Values to use for RSTS/E Patches:				
BLOCKS	40600.	121800.	123000.	20400.
blocks	117230	355710	360170	47660
msblock	000000	000001	000001	000000
lsblock	117230	155710	160170	047660
SMALLSIZE	40600.	* 60900.	* 61500.	20400.
smallsize	117230	* 166744	* 170074	47660

* Note that the value for **smallsize** has been reduced by one-half the block size for the RP03 emulations. This is because the DEC operating systems use one-half the block size value for RP03s and then doubles it.

SC01/A and SC11/A Size Table

CONTROLLER	SCXX/A3	SCXX/A4	SCXX/A5	SCXX/A6
RP02 OR RP03	RP02	RP02	RP03	RP02
SECTORS	32.	32.	32.	30.
sectors	40	40	40	36
TRACKS (HEADS)	4.	2./4./6.	3.	12.
tracks	4	2 /4 /6	3	14
CYLINDERS	318.	819.	813.	339.
cylinders	476	1463	1455	523
Values to use for RT11 and RSX-11M patches:				
BLOCKS	40704.	26200.	78048.	122040.
blocks	117400	631320	230340	356270
msblock	000000	000000	000001	000001
lsblock	117400	063130	030340	156270
Values to use for RSTS/E Patches:				
BLOCKS	40600.	26200.	78000.	40600.
blocks	117230	63130	230260	117230
msblock	000000	000000	000001	000000
lsblock	117230	063130	030260	117230
SMALLSIZE	40600.	26200.	* 39000.	40600.
smallsize	117230	63130	* 114130	117230

* Note that the value for **smallsize** has been reduced by one-half the block size for the RP03 emulations. This is because the DEC operating systems use one-half the block size value for RP03s and then doubles it.

SC01/A and SC11/A Size Table

CONTROLLER	SCXX/A7	SCXX/A7	SCXX/A7
RP02 OR RP03	RP02	RP03	RP03
SECTORS	30.	30.	30.
sectors	36	36	36
TRACKS (HEADS)	4.	8.	12.
tracks	4	10	14
CYLINDERS	339.	339.	339.
cylinders	523	523	523
Values to use for RT11 and RSX-11M patches:			
BLOCKS	40680.	81360.	122040.
blocks	117350	236720	356270
msblock	000000	000001	000001
lsblock	117350	036720	156270
Values to use for RSTS/E Patches:			
BLOCKS	40600.	81200.	121800.
blocks	117230	236460	355710
msblock	000000	000001	000001
lsblock	117230	036460	155710
SMALLSIZE	40600.	* 40600.	* 60900.
smallsize	117230	* 117230	* 166744

* Note that the value for **smallsize** has been reduced by one-half the block size for the RP03 emulations. This is because the DEC operating systems use one-half the block size value for RP03s and then doubles it.

SC01/A and SC11/A Size Table

CONTROLLER	SCXX/A8	SCXX/A8	SCXX/A8	SCXX/A8
RP02 OR RP03	RP02	RP03	RP02	RP03
SECTORS	** 32.	** 32.	** 32.	** 32.
sectors	40	40	40	40
TRACKS (HEADS)	6.	10.	3.	5.
tracks	6	12	3	5
CYLINDERS	350.	350.	700.	700.
cylinders	536	536	1274	1274
Values to use for RT11 and RSX-11M patches:				
BLOCKS	67200.	112000.	67200.	112000.
blocks	203200	332600	203200	332600
msblock	000001	000001	000001	000001
lsblock	034200	132600	034200	132600
Values to use for RSTS/E Patches:				
BLOCKS	63000.	*** 104800.	63000.	*** 104800.
blocks	173030	314540	173030	314540
msblock	000000	000001	000000	000001
lsblock	173030	114540	173030	114540
SMALLSIZE	63000.	* 52400.	63000.	* 52400.
smallsize	173030	* 146260	173030	* 146260

* Note that the value for **smallsize** has been reduced by one-half the block size for the RP03 emulations. This is because the DEC operating systems use one-half the block size value for RP03s and then doubles it.

** Only 30 sectors per track are used.

*** **NOTE:** If we are emulating an RP03, the logical cylinders must be an even number.

Appendix C
SCXX/B SIZE TABLE

C.1 SCXX/BX SIZE TABLE

DRIVE CAPACITY	40M bytes	80M bytes	160M bytes	160M bytes
SECTORS	32.	32.	32.	32.
sectors	40	40	40	40
TRACKS (HEADS)	5.	5.	10.	5.
tracks	5	5	12	5
CYLINDERS	411.	815.	823.	1646.
cylinders	633	1457	1467	3156
DEVICE CLUSTERSIZE	2.	2.	8.	8.
devclus	2	2	10	10
TRACKS*SECTORS	160.	160.	320.	160.
tracks*sectors	240	240	500	240
TRACKS*256.	1280.	1280.	2560.	1280.
tracks*400	2400	2400	5000	2400
hedsec	2440	2440	5040	2440
hedsec-401	2037	2037	4437	2037
Values to use for RSX-11M and RSX-11M-Plus patches:				
BLOCKS	65760.	130400.	263360.	263360.
blocks	200340	376540	1002300	1002300
msblock	000001	000001	000004	000004
lsblock	000340	176540	002300	002300
Values to use for RSTS/E Patches:				
BLOCKS	65728.	130368.	263328.	263328.
blocks	200300	376500	1002240	1002240
msblock	000001	000001	000004	000004
lsblock	000300	176500	002240	002240

SCxx/BX Size Table

DRIVE CAPACITY	300M bytes	300M bytes	500M bytes	600M bytes
SECTORS	32.	32.	32.	32.
sectors	40	40	40	40
TRACKS (HEADS)	19.	19.	19.	40.
tracks	23	23	23	50
CYLINDERS	815.	823.	1348.	842.
cylinders	1457	1467	2504	1512
DEVICE CLUSTERSIZE	8.	8.	16.	16.
devclus	10	10	20	20
TRACKS*SECTORS	608.	608.	608.	1280.
tracks*sectors	1140	1140	1140	2400
TRACKS*256.	4864.	4864.	4864.	10240.
tracks*400	11400	11400	11400	24000
hedsec	11440	11440	11440	24040
hedsec-401	11037	11037	11037	23437
Values to use for RSX-11M and RSX-11M-Plus patches:				
BLOCKS	495520.	500384.	819584.	1077760.
blocks	1707640	1721240	3100600	4071000
msblock	000007	000007	000014	000020
lsblock	107640	121240	100600	071000
Values to use for RSTS/E patches:				
BLOCKS	495488.	500352.	819552.	* 1048288.
blocks	1707600	1721200	3100540	3777340
msblock	000007	000007	000014	000017
lsblock	107600	121200	100540	177340

* Because of limitations with DEC operating systems, only 819 of the possible 842 cylinders for the 600M-byte disk can be used.

SCxx/BX Size Table

SPECIAL DRIVES	CDC LARK		FUJITSU EAGLE
	(unmapped)	(mapped)	
SECTORS	32.	32.	48.
sectors	40	40	60
TRACKS (HEADS)	2.	5.	20.
tracks	2	5	24
CYLINDERS	624.	249.	842.
cylinders	1160	371	1512
DEVICE CLUSTERSIZE	1.	1.	16.
devclus	1	1	20
TRACKS*SECTORS	64.	160.	960.
tracks*sectors	100	240	1700
TRACKS*256.	512.	1280.	5120.
tracks*400	1000	2400	12000
hedsec	1040	2440	12060
hedsec-401	437	2037	11457
Values to use for RSX-11M and RSX-11M-Plus patches:			
BLOCKS	39936.	39840.	808320.
blocks	116000	115640	3053600
msblock	000000	000000	000014
lsblock	116000	115640	052600
Values to use for RSTS/E patches:			
BLOCKS	39904.	39808.	808272.
blocks	115740	115600	3052520
msblock	000000	000000	000014
lsblock	115740	115600	052520

BLANK

Appendix D
SCXX/BF SIZE TABLE

D.1 SCXX/BF FIXED HEAD DISK SIZE TABLE

DRIVE CAPACITY	0.96M bytes	1.92M bytes	0.96M bytes	1.92M bytes
SECTORS	32.	32.	32.	32.
sectors	40	40	40	40
TRACKS (HEADS)	5.	5.	10.	10.
tracks	5	5	12	12
CYLINDERS	9.	19.	4.	9.
cylinders	11	23	4	11
DEVICE CLUSTERSIZE	1.	1.	1.	1.
devclus	1	1	1	1
TRACKS*SECTORS	160.	160.	320.	320.
tracks*sectors	240	240	500	500
TRACKS*256.	1280.	1280.	2560.	2560.
tracks*400	2400	2400	5000	5000
hedsec	2440	2440	5040	5040
hedsec-401	2037	2037	4437	4437
Values to use for RSX-11M and RSX-11M-Plus patches:				
BLOCKS	1440.	3040.	1280.	2880.
blocks	2640	5740	2400	5500
msblock	000000	000000	000000	000000
lsblock	002640	005740	002400	005500
Values to use for RSTS/E patches:				
BLOCKS	1408.	3008.	1248.	2848.
blocks	2600	5700	2340	5440
msblock	000000	000000	000000	000000
lsblock	002600	005700	002340	005440

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Appendix E
SCXX/C AND SCXX/L DISK SIZES

E.1 SCXX/C DISK SIZES

Drive type	CDC 9455	CDC 9457	Amcodyne 7110
DRIVE CAPACITY	6.69M bytes	20M bytes	21.09M bytes
SECTORS	22.	22.	22.
sectors	26	26	26
TRACKS (HEADS)	3.	3.	3.
tracks	3	3	3
CYLINDERS	198.	592.	624.
cylinders	306	1120	1160
DEVICE CLUSTERSIZE	1.	1.	1.
devclus	1	1	1
TRACKS*SECTORS	66.	66.	66.
tracks*sectors	102	102	102
TRACKS*256.	768.	768.	768.
tracks*400	1400	1400	1400
hedsec	1426	1426	1426
hedsec-401	1025	1025	1025
Values to use for RT11, RSX-11M and RSX-11M-Plus:			
BLOCKS	13068.	39072.	41184.
blocks	31414	114240	120340
msblock	000000	000000	000000
lsblock	031414	114240	120340
Values to use for RSTS/E:			
BLOCKS	13046.	39050.	41162.
blocks	31366	114212	120312
msblock	000000	000000	000000
lsblock	031366	114212	120312

SCXX/L Disk Sizes

E.2 SCXX/L DISK SIZES

Drive Type	CDC 9455
DRIVE CAPACITY	6.72M bytes
SECTORS	20.
sectors	24
TRACKS (HEADS)	2.
tracks	2
CYLINDERS	328.
cylinders	510
DEVICE CLUSTERSIZE	1.
devclus	1
TRACKS*SECTORS	40.
tracks*sectors	50
TRACKS*256.	512.
tracks*400	1000
hedsec	1024
hedsec-401	423

Values to use for RT11, RSX-11M and RSX-11M-Plus:	
BLOCKS	13120.
blocks	31500
msblock	000000
lsblock	031500

Values to use for RSTS/E:	
BLOCKS	13100.
blocks	31454
msblock	000000
lsblock	031454

**Appendix F
DISK SIZES**

F.1 STANDARD DEC DISK SIZES

DISK	DT	CYL	TRK	SEC	CS	SIZE	M BYTES
RL01		256	2	* 40	1	* 10240	5.24
RL02		512	2	* 40	1	* 20480	10.48
RK06		411	3	22	1	27126	13.89
RK07		815	3	22	1	53790	27.54
RP02		200(3)	20	10	2	40000	20.48
RP03		400(6)	20	10	2	80000	40.96
RM02	25	823	5	32	4	131680	67.42
RM03	24	823	5	32	4	131680	67.42
RM80	26	559(2)	14	31(1)	4	242606	124.21
RP06	22	815	19	22	8	334400	174.42
RM05	27	823	19	32	8	500384	256.19
DT = Drive type CYL = Cylinders TRK = Tracks SEC = Sectors CS = Cluster size							

Maximum Disk Sizes

F.2 MAXIMUM DISK SIZES

DISK	CYL	TRK	SEC	CS	SIZE	M BYTES
RL01	512	2	40	x	* 20480	10.48
RL02	512	2	40	x	* 20480	10.48
RK06	992	3	22	x	65472	33.52
RK07	992	3	22	x	65472	33.52
RP02	327	20	10	x	65400	33.48
RP03	654	20	10	x	130800	66.97
RM02	2047	256	256	16	1048560	536.86
RM03	2047	256	256	16	1048560	536.86
RM80	2047	256	256	16	1048560	536.86
RP06	2047	256	256	16	1048560	536.86
RM05	2047	256	256	16	1048560	536.86
CYL = Cylinders TRK = Tracks SEC = Sectors CS = Cluster size						

* The RL01/2 stores only 256 bytes per sector. Because the normal DEC block size is 512 bytes, the operating system drivers must perform two sector reads for each block.

PATCH WORKSHEET

(2) CYLINDERS	_____	(3) cylinders	_____
(2) TRACKS (HEADS)	_____	(3) tracks	_____
(2) SECTORS	_____	(3) sectors	_____
(4) T_BLOCKS	_____		
(5) DRIVE CAPACITY	_____	M bytes	
(6) TRACKS*SECTORS	_____	(8) tracks*sectors	_____
(7) TRACKS*256.	_____	(8) tracks*400	_____
(9) TRACKS-10.	_____	(10) tracks-12	_____
		(11) hedsec	_____
		(12) hedsec-401	_____
(13) BLOCKS	_____	(14) blocks	_____
		(15) smallsize	_____
		(16) msblock	_____
		(17) lsblock	_____
(18) DEVICE CLUSTERSIZE	_____	(19) devclu	_____

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PATCH WORKSHEET

(2) CYLINDERS	_____	(3) cylinders	_____
(2) TRACKS (HEADS)	_____	(3) tracks	_____
(2) SECTORS	_____	(3) sectors	_____
(4) T_BLOCKS	_____		
(5) DRIVE CAPICITY	_____	M bytes	
(6) TRACKS*SECTORS	_____	(8) tracks*sectors	_____
(7) TRACKS*256.	_____	(8) tracks*400	_____
(9) TRACKS-10.	_____	(10) tracks-12	_____
		(11) hedsec	_____
		(12) hedsec-401	_____

(13) BLOCKS	_____	(14) blocks	_____
		(15) smallsize	_____
		(16) msblock	_____
		(17) lsblock	_____

(18) DEVICE CLUSTERSIZE	_____	(19) devclu	_____
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