RSX–11S
System Generation and Installation Guide

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PREFACE

MANUAL OBJECTIVES AND INTENDED AUDIENCE

The RSX-11S System Generation and Installation Guide describes the system generation and installation process for RSX-11S Version 4.2. This manual is intended for system managers as well as those users who are responsible for maintaining system software.

STRUCTURE OF THIS MANUAL

This manual is organized as follows:

- Chapter 1 describes the RSX-11S memory-resident operating system.
- Chapter 2 describes the RSX-11S supplied software.
- Chapter 3 describes the RSX-11S Version 4.2 distribution kits.
- Chapter 4 contains information on task-building the RSX-11S Executive as well as information on building system tasks.
- Chapter 5 explains the RSX-11S system generation process on an RSX-11M host system and gives an example of a typical system generation dialog.
- Chapter 6 explains the RSX-11S system generation process on an RSX-11M-PLUS host system.
- Chapter 7 explains the RSX-11S system generation process on a VAX/VMS host system and gives an example of a typical system generation dialog.
- Appendix A contains a description of the RSX-11S error messages.

ASSOCIATED MANUALS

Please read the following manuals before you perform the system generation:

- The RSX-11S Version 4.2 Update Notes
- The RSX-11M System Generation and Installation Guide
- The RSX-11M/RSX-11S Release Notes

CONVENTIONS USED IN THIS MANUAL

The following conventions are observed in this manual:

Convention	Meaning
CTRL/A	A symbol that indicates the CTRL key; it must be held down while another key is pressed. For example, CTRL/Z means hold down CTRL while pressing Z. In examples within this manual, this control key sequence is shown as ^A. For example, ^Z indicates the result of CTRL/Z because that is how the system echoes most control key combinations.
XXX	A 1- to 3-character key symbol. For example, RET indicates the RETURN key, LF indicates the LINE FEED key, and ESC indicates the ESC key.
^	The circumflex character; when appearing with another character, it represents the system response to receiving a control character. For example, when you type CTRL/Z while running some system tasks, the system echoes ^Z. (On some terminals, the up-arrow <^> is used in place of the circumflex.)
"print" and "type"	As these words are used in the text, the system prints and the user types.
[ ]	Square brackets; used to indicate optional syntax. Brackets that are part of directory names, however, do not indicate optional syntax. In addition, certain Basic MCR directives use brackets as part of their required syntax.
>	The prompting character that appears whenever control is returned to the user's terminal and the system is ready to accept input.
red ink	Color of ink used to show all user-entered commands in examples.

SUMMARY OF TECHNICAL CHANGES

The RSX-11S System Generation and Installation Guide has been revised to reflect the following changes to Version 4.2:

- Support for the RX50 (DU:) load device for the On-Line Task Loader (OTL)
- Support for the TK50 (MU:) cartridge tape subsystem
- Support for DIGITAL Storage Architecture (DSA) software
- Support for Network Command Terminal (NCT) software
- New installation dialogs for RSX-11S system generations performed on RSX-11M and VAX/VMS host systems

CHAPTER 1

INTRODUCTION TO RSX-11S

RSX-11S Version 4.2 is the memory-resident version of the RSX-11M operating system. RSX-11S and the tasks that run on it are created on a host RSX-11M, RSX-11M-PLUS, or VAX/VMS operating system, before being transported to the target system.

The following topics are described in this chapter:

- The RSX-11S update kit
- RSX-11S as a memory-resident operating system
- The relationship between the host and target systems
- The hardware and software configurations for an RSX-11S Version 4.2 system
- The Virtual Monitor Console Routine (VMR)

1.1 THE MEMORY-RESIDENT SYSTEM

The RSX-11S memory-resident operating system is compatible internally with RSX-11M. It supports an I/O driver interface identical to that supported by RSX-11M, and is a compatible subset of RSX-11M at the user level. It is designed primarily to provide a run-time environment for executing tasks.

Because RSX-11S is a memory-resident operating system, it does not support:

- A file system
- Nonresident tasks
- Checkpointing
- Disk-resident overlaid tasks (although memory-resident overlaid tasks are supported)
- Program development

The user interface to the RSX-11S operating system is supplied by a compatible subset of the RSX-11M Monitor Console Routine (MCR) called Basic MCR. Strict subset compatibility is provided by the RSX-11S system.

The following privileged tasks may also be included during RSX-11S system generation:

- The On-Line Task Loader (OTL), which is used to install, load, and fix tasks in an RSX-11S system
- The System Image Preservation (SIP) program, which saves an image of an operational RSX-11S system for subsequent bootstrapping
- The Task Termination Notification (TKTN) program, which returns messages about device status and abnormal task termination
- The set of display tasks (RSDV05, RSDV52, and RSDV1H), which provide video terminal displays of information concerning activity in the RSX-11S system

1.2 THE RSX-11S UPDATE KIT

If you have an RSX-11S Version 4.2 operating system, you will receive an update distribution kit, which replaces your existing RSX-11S distribution kit. This kit contains a fully corrected version of RSX-11S. Note that you must tailor this kit to your software operating system. Your updated RSX-11S kit will be contained on one of the following media:

- Magnetic tape (800 or 1600 bpi)
- RK06/RK07 disk
- RL01/RL02 disk
- TK50 tape cartridge

The RSX-11S Version 4.2 update distribution kit also includes corrections and enhancements made to RSX-11S layered products. However, you must perform a system generation before you can apply corrections to the layered products. Instructions for applying these corrections are contained in files (.DOC file type) located on the distribution kit.

There are two methods for accessing the correction files, one for magnetic tape and one for disks. For magnetic tape, type the following command:

```
>FLX ddnn:/RS=mmnn:[ggg,200]product.DOC/DO/RW/DNS:n
```

For disks, enter the following:

```
>PIP TI:=ddnn:[ggg,200]product.DOC
```

Both of the methods share the following elements:

ddnn: is the device and unit of the distribution kit

ggg is the directory group number for "product"

product is the name of the layered product

n is the density of the magnetic tape

To use your update distribution kit, you must run the system generation procedure. Please read the following manuals before you attempt to generate your system or apply the corrections contained on the update kit:

- RSX-11S System Generation and Installation Guide
- RSX-11S Version 4.2 Update Notes Revision A
- RSX-11M/RSX-11S Release Notes

1.3 HOST/TARGET SYSTEMS

Program development for and system generation of an RSX-11S Version 4.2 system require a host RSX-11M (Version 4.1 or later), RSX-11M-PLUS (Version 2.1 or later), or VAX/VMS operating system.

NOTE

To generate an RSX-11S system on a host VAX/VMS Version 4.0 (or later) system, VAX-11 RSX must be installed. See the Chapter 7 of this manual for more information.

The host system must be mapped and have at least 64K words of memory. You may write tasks in MACRO-11 assembly language or other supported high-level languages. Once you have assembled (or compiled) and linked these tasks to the host system, you will transport the tasks to an RSX-11S target system for program execution.

An RSX-11S operating system is generated on a host system in two phases. Table 1-1 describes both phases of the RSX-11S system generation program.

Table 1-1
RSX-11S System Generation Phases

Phase	Operation
Phase I	Define the RSX-11S system hardware configuration and assemble the Executive, device drivers, and laboratory device drivers.
Phase II	Task-build the Executive, device drivers, and all privileged tasks; configure the RSX-11S target system.

The complete RSX-11S operating system is constructed on the host system under the control of command files and an RSX-11M utility called the Virtual Monitor Console Routine (VMR). See Section 1.5 for more information about VMR.

The following three methods can be used to transport tasks from a host system to an RSX-11S operating system. You may

- Use the VMR command FIX on the host system to fix your tasks in the RSX-11S system image before writing the image to the transporting medium. You may use VMR to specify partitions and load device drivers, as well as to install and fix tasks.

- Use the File Transfer Utility Program (FLX, described in the RSX-11M/M-PLUS Utilties Manual) on the host system to write a task to the transport medium. Once the transfer is complete, you may use the On-Line Task Loader (OTL) to read the task from the medium and load it into memory.

- If you have DECnet support in both the host and the target RSX-11S systems (DECnet-VAX Version 2.0 for VAX/VMS), you may down-line task-load from the host system.

1.4 HARDWARE/SOFTWARE CONFIGURATIONS

RSX-11S is a hardware/software system capable of expanding from an 8K word configuration to a 1920K word system with a large number of peripherals. It supports all PDP-11 processors, from the LSI-11 to the PDP-11/84. RSX-11S Version 4.2 includes support for the following new systems and devices:

- **Systems**
  - PDP-11/84
  - MicroPDP-11/73
  - MicroPDP-11/83
- **Devices**
  - FPJ11 processor
  - KDA50-Q controller
  - LA210 Letterprinter
  - LN03 laser printer
  - LQP03 letter-quality printer
  - RC25 fixed/removable disk subsystem
  - RX50 diskette
  - TK25 magnetic tape cartridge
  - TK50 magnetic tape cartridge

Because RSX-11S is based on and is internally compatible with RSX-11M, RSX-11S enjoys most of the features inherent to that system. For example, RSX-11S automatically supports all the peripheral devices (except the console logger device) that RSX-11M supports. This capability also extends to other hardware features such as floating point, parity memory, and memory management. You select the options you want during the system generation process. Note that the more options you select, the more memory your system will require.

The basic software building blocks for an RSX-11S operating system and their approximate sizes (in decimal) are as follows:

- A subset of the features available in the RSX-11M Executive (2.5 to 4.5K words)
- All RSX-11M Version 4.2 I/O device drivers, except the console logger device driver (most drivers use an average of 1.5K words; the line printer driver needs less, the terminal driver needs more)
- Basic MCR (3K words)
- On-Line Task Loader (OTL) (3.5K words)
- System Image Preservation (SIP) program (2K words)
- Task Termination Notification (TKTN) program (1K words)
- System activity display programs RSDV05, RSDV52, and RSDV1H (6K words)

The minimum software system is a 2.5K Executive. However, you must enlarge this minimal Executive with other software for it to be useful. For example, two to four I/O drivers could be added at the expense of an additional 1.5K words of memory each. If operator communication is required, you can include Basic MCR in a system. Including Basic MCR, however, requires a 3K-word increase in memory.

On-line task loading in a system that is designed with 4K words for user tasks requires a minimum 14.5K-word system. This is because approximately 10.5K words are required for system software (that is, 2.5K-word Executive, 3K-word MCR, 1.5K-word I/O drivers, and 3.5K-word OTL).

1.5 VIRTUAL MONITOR CONSOLE ROUTINE

The Virtual Monitor Console Routine (VMR) is an RSX-11M system program that allows you to configure an RSX-11S system image. Using VMR, you can define partitions, load and unload device drivers, install and fix tasks, and establish other system parameters. You can then transfer the entire system to an appropriate (load) medium to be bootstrapped on the target system. VMR is documented in the RSX-11M/M-PLUS System Management Guide.

The RSX-11M-PLUS host system uses the RSX-11M VMR system program generate an RSX-11S system. It is installed and executed under the name VMM, but it issues the VMR prompt (VMR>). (The RSX-11M-PLUS host must also use the RSX-11M Task Builder.)

VAX/VMS also uses the RSX-11M VMR system program for generating an RSX-11S system. It is installed and executed under the name VMR. It too issues the VMR prompt (VMR>). (The VAX/VMS host must also use the RSX-11M Task Builder.)

CHAPTER 2

RSX-11S SUPPLIED SOFTWARE

The RSX-11S Version 4.2 distribution kit contains the following software:

- Basic MCR, which supplies the user interface
- On-Line Task Loader (OTL), which installs, loads, and fixes tasks
- System Image Preservation (SIP) program, which saves system images for subsequent bootstrapping
- Task Termination Notification (TKTN) program, which returns messages about device status abnormal and task termination
- SETTIM subroutine, which sets the system time
- System display tasks (RSDV05, RSDV52, and RSDV1H), which display system activity information on video terminals
- RSX-11S File Control Services (FCS), a subset of the RSX-11M FCS that performs basic record I/O

The following sections describe these tasks. Refer to Chapter 4 for information on how to build the tasks during the RSX-11S system generation procedure.

2.1 BASIC MCR

Basic MCR, which supplies user interface to RSX-11S, is a subset of the RSX-11M Monitor Console Routine (MCR). Basic MCR provides commands to control and modify the execution of tasks installed in an RSX-11S system. If Basic MCR is to be included in the RSX-11S system, you must configure a terminal driver and at least one terminal interface (DL11, DH11, DJ11, or DZ11) into the target system. See Section 4.2.1.2 for information on building the Basic MCR task.

2.1.1 Initiating Basic MCR

To use Basic MCR in an RSX-11S system, you must install and fix Basic MCR in the system image by running VMR on the host system.

2.1.2 Basic MCR Commands

MCR commands are documented in the RSX-11M/M-PLUS MCR Operations Manual. This section contains a brief summary of the Basic MCR commands.

Initialization Command

TIM[E] [hrs:mins[:secs]][month/day/year]

Use this command to set the system clock.

Task Control Commands

ABO[RT] taskname

Use this command to abort the specified task.

CAN[CEL] taskname

Use this command to cancel all time-based schedule requests for the specified task.

RED[IRECT] new:=old:

Use this command to redirect all I/O for the old device to the new device.

REM[OVE] taskname

Use this command to remove the specified task from the system and release its partition.

RES[UME] taskname

Use this command to resume the execution of the specified task that issued a SUSPEND directive.

RUN taskname [/keyword-1][/keyword-2]

Use this command to cause the specified task to be executed.

RUN taskname dtime [/keyword-1][/keyword-2]

Use this command to execute the specified task at the specified number of time units from command issuance.

RUN taskname sync [dtime][/keyword-1][/keyword-2]

Use this command to execute the specified task at the specified number of time units following the next specified whole time unit.

RUN taskname atime [/keyword-1][/keyword-2]

Use this command to execute the specified task at a specified time of day. Keywords are as follows:

/RSI - nnnnu
/UIC - [group-number,member-number]

For the /RSI (rescheduling interval) keyword, nnnn is the number of units to be clocked and u is the units field. The units field can be T (ticks), S (seconds), M (minutes), or H (hours.) The number of units cannot exceed 24 hours in the specified unit.

System Maintenance Commands

ATL[1]

Use this command to display the status of all active tasks.

BRK[2]

Use this command to pass control to the Executive Debugging Tool (XDT).

OPE[N] memory-address [+ or -n][/keyword][1]

Use this command to display the contents of the effective address. On mapped systems, the effective address is formed by decoding the specified memory address; applying the optional additive term (+ or -); and, if the optional keyword /PAR is specified, using the result as an offset from the start of the partition. On unmapped systems, only the memory address argument is permitted. After the slash, you may enter an optional value to replace contents-of-address, followed by one of the line terminator options. The format of the displayed contents is as follows:

(memory-address) (contents-of-address)/[value]line-terminator

The following keyword may be used with mapped systems only:

/PAR = partition name

The following line terminators may be used:

ESC	Escape or ALTMODE: Pressing the ESC or ALTMODE key does not open any additional location and terminatess the OPEN command. Pressing the ESC (or ALTMODE) key is the only way to exit from the MCR command OPEN.
RET	Carriage return: Pressing the RETURN key opens the next sequential location.
^ RET	Pressing the circumflex key (up-arrow on some terminals) and RETURN opens the previous location.
* RET or @ RET	Pressing the asterisk carriage key and RETURN or the at-sign key and RETURN opens the location pointed to by the final contents of the current location.

1. An option during RSX-11S system generation.

2. Included if Executive Debugging Tool (XDT) was selected during system generation.

TAL[1]

Use this command to display the status of all tasks installed in the system.

2.1.3 Basic MCR Error Messages

You may assemble Basic MCR with long or short error messages. Long error messages identify which component of Basic MCR is the source of the message, and give both a numeric error code and an ASCII description of the error condition. Short error messages exclude the ASCII description, thus conserving memory space.

Your distribution kit contains Basic MCR that assembles with short error messages. You can assemble Basic MCR with long error messages by editing the file BMPRE.MAC during Phase II of the system generation (see Section 4.2.1.2).

Basic MCR generates the following error messages. The error messages are shown in their long form. The XXX in the messages indicates the three-character component name of MCR that detected the error. Each message is followed by a brief explanation of its possible causes.

XXX -- 1 - ILLEGAL FUNCTION

Explanation: MCR could not recognize the entered command.

XXX -- 2 - SYNTAX ERROR

Explanation: This message generally indicates that the required information was entered incorrectly. Retype the command specification using the correct syntax.

XXX -- 3 - NO POOL SPACE

Explanation: The Executive could not currently satisfy MCR's request for dynamic memory.

XXX -- 4 - INVALID KEYWORD

Explanation: The specific command processor did not recognize a keyword specified in the command line.

XXX -- 5 - DEVICE NOT IN SYSTEM

Explanation: The device specified in the command was not generated into the system. Devices to be used in the system must be specified during system generation.

---

1. An option during RSX-11S system generation.

XXX -- 6 - PRIVILEGED COMMAND

Explanation: A command available only to privileged terminals was issued from a nonprivileged terminal.

XXX -- 7 - PARTITION NOT IN SYSTEM

Explanation: The partition name specified as an argument in a command could not be found in the system.

XXX -- 8 - IO ERROR

Explanation: In attempting to read the next command, either OPEN detected an error or an MCR terminal-write operation failed.

XXX -- 9 - BYTE ADDRESS

Explanation: An odd address was specified as the argument to the OPEN command.

XXX -- 10 - INVALID TIME PARAMETER

Explanation: A specified time field was entered incorrectly.

XXX -- 11 - TASK NOT IN SYSTEM

Explanation: The specified task was not installed in the system.

XXX -- 12 - INVALID ADDRESS

Explanation: The address specified as an argument by the OPEN command referenced a nonexistent memory location or an address outside the boundaries of the specified partition.

XXX -- 13 - TASK NOT ACTIVE

Explanation: The specified task is not currently active.

XXX -- 14 - TASK BEING ABORTED

Explanation: A request for the execution of a task was made, but the task was being aborted because of an error or an MCR command ABORT.

XXX -- 15 - TASK NOT SUSPENDED

Explanation: The task specified in the RESUME command line was never suspended.

XXX -- 16 - TASK ACTIVE

Explanation: The task used as the argument of the command was active.

XXX -- 17 - CIRCULAR REDIRECT ERROR

Explanation: The attempt to redirect a device would result in a circular list of redirection.

XXX -- 18 - OLD DEVICE NOT KNOWN TO SYSTEM

Explanation: The system did not know the old device in the REDIRECT command (the device does not exist in the device tables).

XXX -- 19 - NEW DEVICE NOT KNOWN TO SYSTEM

Explanation: The system did not know the new device in the REDIRECT command line (the device does not exist in the device tables).

XXX -- 20 - PSEUDO DEVICE REDIRECT ERROR

Explanation: An attempt was made to redirect one pseudo device to another pseudo device.

XXX -- 21 - OLD DEVICE ATTACHED

Explanation: An attempt was made to redirect an attached device.

XXX -- 22 - TI REDIRECT ERROR

Explanation: An attempt was made to redirect the pseudo device TI:. This device cannot be redirected.

XXX -- 23 - INVALID UIC

Explanation: A value of 0 was detected for either the group number or the member number. This is invalid.

XXX -- 24 - ILLEGAL KEYWORD VALUE

Explanation: A value entered for a keyword exceeded the limits for that argument. Enter a valid value.

XXX -- 26 - LISTING DEVICE NOT AVAILABLE

Explanation: MCR attempted to display information to a device unit that was attached and therefore unavailable for printed output.

XXX -- 27 - DEVICE NOT REDIRECTABLE

Explanation: The specified device cannot be redirected.

2.2 ON-LINE TASK LOADER

The RSX-11S On-Line Task Loader (OTL) performs the same functions as those of the MCR commands INSTALL and FIX in RSX-11M. The task images (including common blocks) read by OTL are produced by the RSX-11M Task Builder and are transferred to a load-device medium by means of the File Transfer Utility Program (FLX). OTL then performs the following operations:

1. Reads a task image from the load-device medium
2. Verifies the task image format
3. Checks for error conditions
4. Creates a Task Control Block (TCB) for the task
5. Places the TCB in the System Task Directory (STD)
6. Fixes the task in memory (thus making the task known to the system)

For system-controlled partitions, OTL allocates a subpartition PCB (Partition Control Block) for the task.

OTL expects the load-device medium to be written in either DOS or RT-11 format, depending on the load device. The load devices supported by OTL, and their required formats, are listed in Table 2-1.

Table 2-1
OTL Load Devices and Media Format

OTL Load Device	Media Format
PR11 paper tape reader (PR:)	DOS
RX01 flexible disk (DX:)	RT-11
RX02 flexible disk (DY:)	RT-11
RX50 flexible diskette (DU:)	RT-11
TU60 cassette tape (CT:)	DOS
TU56 DECtape (DT:)	RT-11
TE10,TU10,TS03 magnetic tape (MT:)	DOS
TS11,TU80,TSV05,TK25 magnetic tape (MS:)	DOS
TE16,TU16,TU45,TU77 magnetic tape (MM:)	DOS
TU58 DECtape II (DD:)	RT-11

When transferring a task image to a load-device medium other than paper tape, you must first initialize the volume with FLX (if this has not already been done). The /RT switch must be specified if the medium is to be written in RT-11 format. You can then transfer the task image file to the load device with a FLX transfer command. Additionally, include the appropriate format switch (/RT or /DO) on the output side of the command specification and the /RS switch (for Files-11 format) on the input side of the command specification.

For example, to transfer the task image file SIP.TSK from directory [1,50] on SY: to a cassette tape, type the following FLX commands:

```
FLX>CT:/ZE/DO
FLX>/DO=[1,50]SIP.TSK/RS
```

If you wish to transfer the same file to an RX01 flexible disk, type the following:

```
FLX>DX:/ZE/RT
FLX>DX:/RT=[1,50]SIP.TSK/RS
```

For a full description of the FLX Utility, see the RSX-11M/M-PLUS Utilities Manual.

NOTE

Because FLX is sensitive to the contents of the file type field in input file specifications, DIGITAL strongly recommends that the standard file extension type, .TSK, always be used. This will ensure that all task image files are written on load-device media in the proper format.

See Section 4.2.1.3 for information on building the OTL task.

2.2.1 Invoking OTL

Before you can use OTL in an RSX-11S system, both OTL and Basic MCR must be installed and fixed in the system image by the Virtual Monitor Console Routine (VMR). This is done during the system generation process while running on a host system (see the RSX-11M/M-PLUS System Management Guide and Chapter 1 of this manual). You can then invoke OTL in the RSX-11S system by entering the following Basic MCR command:

```
>RUN OTL
```

OTL then begins execution and indicates its readiness to accept a command line by displaying the following prompt:

```
OTL>
```

To exit from OTL, press CTRL/Z.

The OTL command line has the following format:

```
OTL>dev:[ufd]filename.type[/INC=n.]
```

where:

dev: specifies the load device, which contains the task image file. You must specify dev: in the command line since there is no default device.

[ufd] specifies the User File Directory (UFD), which consists of a group number and a member number in the form [g,m]. This UFD is associated with the task image file. The UFD need not be specified, and is ignored for all devices except magnetic tape (MM:, MS:, and MT:). The default UFD is the same as the User Identification Code (UIC) under which OTL runs.

filename specifies the six-character alphanumeric file name of the task image file. There is no default for filename. It must be specified with all devices except paper tape readers (PR:), for which it is optional.

type specifies the three-character alphanumeric file-type field (preceded by a period). The file type need not be specified; its default is .TSK. OTL interprets a file name followed only by a period as the specification for a null file type.

/INC=n. specifies the switch to increase the size of the task by the specified number of octal bytes (or decimal, if followed by a period). This allows buffering space at the end of the task.

Blank and tab characters are not allowed in an OTL command line. Following are examples and brief explanations of OTL command lines:

```
OTL>DX:SIP
```

Explanation: This command creates the Task Control Block (TCB) for the SIP task, and reads the task image from the RX01 disk and loads it into memory.

```
OTL>MM:[1,54]TKN
```

Explanation: This command creates the TCB for the TKN task, and reads the task image from the magnetic tape and loads it into memory. TKN is then renamed to TKTN.

```
OTL>PR:
```

Explanation: This command creates the TCB for the task on the paper tape and loads it into memory.

```
OTL>CT:TEST.TSK
```

Explanation: This command creates the TCB for the user-written task TEST.TSK, and reads it from the cassette tape and loads it into memory.

2.2.2 OTL Operation

When OTL accepts a command line, it first parses the line for proper syntax. If the syntax is correct, OTL determines whether the designated device was generated into the system as a load device. If it was, then the device is attached (except PR: devices) and a search operation is performed to locate the designated file.

When OTL finds the file, it reads the first block of the file to determine whether the file is a valid task image. If it is, OTL proceeds to install and fix the task or common block in the following manner:

1. Allocates and initializes a Task Control Block (TCB) if the image is a task
2. Verifies that the designated partition is in the system and is available

3. Finds space in a system-controlled partition (mapped system only) and allocates a subpartition Partition Control Block (PCB)

4. Reads and initializes the task's header

5. Loads the overlay segments into memory (memory-resident overlaid tasks)

6. Allocates and initializes a copy of the header in the Executive's pool space (if the system is mapped)

7. Loads the task or common block into memory

8. Inserts the TCB into the System Task Directory (STD) if the image is a task

OTL simultanenously performs additional validity checks.

2.2.3 Programming Hints

Except for the /INC keyword, OTL does not accept keyword input; consequently, you must specify all other attributes and options for a task when it is built. (The task must be built before OTL can load it.) Be certain to specify the partition and task name during the option input. If a task name is not specified in the task image, OTL defaults the task name to the file name that was specified in the command line. This default also occurs with paper tape, for which no file name is required.

Tasks installed by OTL cannot have disk overlays and cannot be checkpointed. An attempt to install a disk-overlaid task results in an error message and a failure to install the task. OTL ignores the checkpoint attribute and installs all checkpointable tasks as noncheckpointable. Tasks with memory-resident overlays, however, can be installed with OTL. (See the RSX-11M/M-PLUS and Micro/RSX Task Builder Manual for more information on the different kinds of tasks.)

OTL also supports tasks with memory-resident overlays that link to commons. You link the task with the common when the task is built. Additionally, OTL uses various methods to load tasks and common blocks into memory. These methods are described in the following section.

2.2.3.1 **Using OTL to Load Tasks and Common Blocks Into Memory** - When using task-controlled partitions, OTL fixes each task or common block that it installs in memory and marks the partition as occupied. OTL returns an error message in the event of one of the following errors:

- An attempt is made to install a task in an occupied main partition or subpartition.

- An attempt is made to install a task in a subpartition whose main partition is occupied.

- An attempt is made to install a task in a main partition that has an occupied subpartition.

(When a task is removed by means of Basic MCR, the task's partition is no longer occupied.)

With system-controlled partitions, OTL searches for sufficient contiguous memory into which it can load the task. OTL dynamically creates a subpartition for the memory it has allocated for the task. It then marks the subpartition as occupied and the subpartition PCB is linked into the PCB list.

When loading common blocks, OTL ignores the partition state. This permits you to overwrite previously loaded common blocks when desired. Furthermore, common main partitions and subpartitions can be occupied simultaneously. This feature allows you to install tasks with different access privileges to different parts of a common main partition.

For example, in Figure 2-1, the main partition (COMM) is consists of three subpartitions (C1, C2, C3). The main partition and each of its subpartitions have associated access rights. You may install a task with access to either the main partition, or to one or more subpartitions. A task installed with access to COMM has read-write access rights (indicated in the command line by /RW) to the entire main partition. A task installed with access to C1 has read only access rights (indicated in the command line by /RO) to that subpartition only.

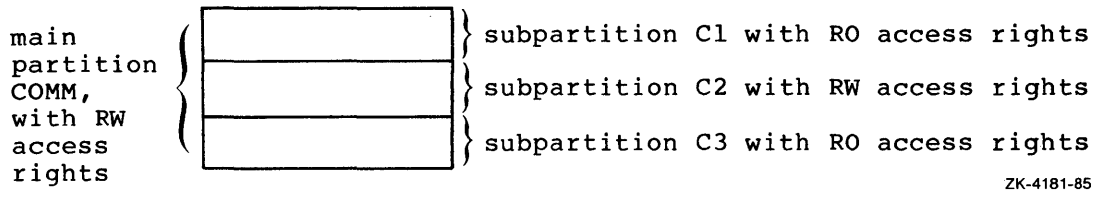

Figure 2-1 Relationship of Access Rights to Main Partition and Its Subpartitions

When writing task image files to cassette tape by means of the File Transfer Utility Program (FLX), you must use a block size (specified with the /BS switch) that evenly divides into 512(10) bytes. The default block size of 128(10) bytes is compatible with this requirement. Attempting to install a task image from cassette tape with a block size that does not evenly divide into 512(10) bytes results in an error message and terminates the operation.

For more information on building and loading tasks, refer to the RSX-11M/M-PLUS and Micro/RSX Task Builder Manual and the RSX-11M/M-PLUS and Micro/RSX Executive Reference Manual.

2.2.4 OTL Error Messages

When OTL detects an error condition, it takes the following steps:

1. Aborts its current operation
2. Displays an error message at the terminal from which it was activated
3. Prompts for another command line

If the detected error condition is NO POOL SPACE, OTL may immediately exit from the program because printing the error message also requires pool space.

You may assemble OTL using long or short error messages. Long error messages identify OTL as the source of the message and give both a numeric error code and an ASCII description of the error condition. Short error messages exclude the ASCII description, thus conserving memory space. Your distribution kit contains the version of OTL that assembles with short error messages. For information on assembling OTL with long error messages, see Section 4.2.1.3.

OTL generates the following error messages, shown here in their long form. Each message is followed by a brief explanation of its possible causes.

OTL -- 2 - SYNTAX ERROR

Explanation: A command was entered incorrectly. Retype the command line using the correct syntax.

OTL -- 3 - NO POOL SPACE

Explanation: When it issued an I/O request or attempted to allocate pool space, OTL detected insufficient pool space in the Executive. When this error condition occurs, OTL may exit without printing this error message.

OTL -- 5 - DEVICE NOT IN SYSTEM

Explanation: The device specified in the command line was not generated into the system. Devices to be used in the system must be specified during system generation.

OTL -- 7 - PARTITION NOT IN SYSTEM

Explanation: The partition specified in the task image was not defined in the system. Alternatively, the specified partition was defined, but some or all of its memory was not present in the current configuration.

OTL -- 8 - IO ERROR

Explanation: This message is returned in the event of one of the following errors:

- In attempting to read the next command, the MCR command OPEN operation detected an error.
- An MCR terminal-write operation failed.
- A hardware error was encountered as the result of an I/O request issued to the load device or terminal.
- The specified device was generated into the system, but it was not present in the hardware configuration.

OTL -- 40 - BASE ADDRESS MUST BE ON A 4K BOUNDARY

Explanation: A task image (not a common block) in a mapped system specified a base address not on a 4K boundary.

OTL -- 41 - ILLEGAL 1ST APR

Explanation: This message is returned in the event of one of the following errors:

- The image of a nonprivileged task in a mapped system specified a nonzero first Active Page Register (APR).
- The image of a privileged task in a mapped system specified a first APR that was not in the range APR4 through APR6.

OTL -- 42 - NOT ENOUGH APRS FOR TASK IMAGE

Explanation: There were not enough APRs to map the task as well as the resident library references that the task image may have had in a mapped system.

OTL -- 43 - FORMATTED BINARY CHECKSUM ERROR

Explanation: A checksum error was encountered while reading a task image from paper tape.

OTL -- 44 - FORMATTED BINARY FORMAT ERROR

Explanation: An invalid binary format was encountered in a task image being read from paper tape.

OTL -- 45 - UNEXPECTED END OF FILE ENCOUNTERED

Explanation: An end-of-file was encountered before the entire task image was read.

OTL -- 46 - SPECIFIED PARTITION TOO SMALL

Explanation: The partition specified in the task image was smaller than the load size of the task or common block.

OTL -- 47 - SPECIFIED PARTITION FOR COMMON BLOCK

Explanation: An attempt was made to install a task into a common block.

OTL -- 48 - TASK IS OVERLAID

Explanation: This message is returned in the event of one of the following errors:

- An attempt was made to install an overlaid task in a system without memory management directives.
- An attempt was made to install a task with disk-resident overlays.

OTL -- 49 - TASK NAME ALREADY IN USE

Explanation: An attempt was made to install a task with the same name as that of a task already installed.

OTL -- 50 - TASK NAME NOT DEFINED

Explanation: An attempt was made to install a task from paper tape without an optional file name specified. Additionally, the task image did not contain a task name. Retype the command line, specifying a file name that will become the task name by default.

OTL -- 51 - TASK AND PARTITION BASES MISMATCH

Explanation: An attempt was made to install a task in an unmapped system whose base address did not match that of its specified partition.

OTL -- 52 - INVALID COMMON BLOCK

Explanation: A task contained a library reference to a common block that was not in the system.

OTL -- 53 - PARTITION TOO LARGE FOR PRIVILEGED TASK

Explanation: An attempt was made to install a privileged task in a partition whose size was greater than 12K words. (This message occurs only on unmapped systems.)

OTL -- 54 - FILE NOT FOUND

Explanation: The specified file was not found.

OTL -- 55 - COMMON BLOCK IS TASK PARTITION

Explanation: A task image contained a library reference that had the same name as a task partition.

OTL -- 56 - COMMON BLOCK NOT LOADED

Explanation: A task image contained a library reference to a common partition that was not loaded.

OTL -- 57 - LENGTH MISMATCH COMMON BLOCK

Explanation: A task image contained a library reference to a common block that was smaller than the size specified when the task was built.

OTL -- 58 - BASE MISMATCH COMMON BLOCK

Explanation: A task image contained a library reference to a common block whose base address was different from the one specified when the task was built.

OTL -- 59 - COMMON BLOCK PARAMETER MISMATCH

Explanation: This message is returned in the event of one of the following errors:

- A task image contained a library reference to a common block that did not contain position-independent code. It was, however, expected to contain this code.

- A task image contained a library reference to a common block that did contain position-independent code. It was not, however, expected to contain this code.
- An attempt was made to load a common block whose task name did not match the partition name.

OTL -- 60 - PARTITION NOT COMMON

Explanation: An attempt was made to install a common block in a task partition.

OTL -- 61 - ILLEGAL DEVICE

Explanation: A task image contained a logical unit number (LUN) assignment to a device not in the system.

OTL -- 62 - FILE NOT TASK IMAGE

Explanation: Preliminary checks indicated that either the specified file was not a task image or the file was corrupted.

OTL -- 63 - PARTITION IS BUSY

Explanation: This message is returned in the event of one of the following errors:

- An attempt was made to fix a task in a main partition or occupied subpartition.
- An attempt was made to fix a task in a main partition that had an occupied subpartition.
- An attempt was made to fix a task in a subpartition that had an occupied main partition.
- An attempt was made to load a task into a system-controlled partition, but the partition did not have enough contiguous memory.

OTL -- 65 - INVALID BLOCK SIZE ON LOAD DEVICE

Explanation: The block size of a task image file (on cassette tape) could not be evenly divided into 512(10).

OTL -- 66 - FILE NAME REQUIRED

Explanation: No file name was specified with a device. A file name is required.

OTL -- 67 - INVALID LOAD DEVICE

Explanation: The version of OTL in use did not support (or was not assembled to support) the specified device.

OTL -- 68 - TOO MANY WINDOW BLOCKS

Explanation: The task required more than eight Active Page Registers (APRs).

OTL -- 69 - TASK BUILT FOR WRONG SYSTEM

Explanation: OTL determined that the task required one of the following features that the system does not support:

- The task was built for an RSX-11M-PLUS system.
- The wrong version of the Task Builder was used to build the task. (For memory-resident overlaid tasks, the version must be RSX-11M Version 3.2 or later.)

OTL -- 70 - ILLEGAL USE OF INCREMENT

Explanation: This message is returned in the event of one of the following errors:

- The specified increment caused the task to exceed 32K.
- An attempt was made to use an increment to install and fix an overlaid task. Overlaid tasks cannot be loaded with an increment.

2.3 SYSTEM IMAGE PRESERVATION PROGRAM

The RSX-11S System Image Preservation (SIP) program saves RSX-11S system images on a load device medium and writes to the bootstrap block. The format of these system images on all media, except paper tape, is as follows:

- The bootstrap block
- The label block
- The system image

For paper tape, the format is a system image in absolute loader format; there is no bootstrap or label block. See Section 4.2.1.4 for information on building the SIP task.

Table 2-2 lists the load device media that SIP supports as well as their required format.

Table 2-2
SIP Load Devices and Media Format

SIP Load Devices	Media Format
PP11 paper tape reader (PP:)	DOS
RX01 flexible disk (DX:)	RT-11
RX02 flexible disk (DY:)	RT-11
TU60 cassette tape (CT:)	DOS
TU56 DECtape (DT:)	RT-11
TE10,TU10,TS03 magnetic tape (MT:)	DOS
TE16,TU16,TU45,TU77 magnetic tape (MM:)	DOS

2.3.1 Invoking SIP

Before you can use SIP in an RSX-11S system, both SIP and Basic MCR must be installed and fixed in the system image. SIP may be installed and fixed in the system by any of the following:

- Virtual Monitor Console Routine (VMR)
- OTL running on the RSX-11S system
- Down-line loading with DECnet

Basic MCR is installed by using VMR on the host system. Invoke SIP by typing the following Basic MCR command:

```
>RUN SIP
```

SIP then begins execution and indicates its readiness to accept a command line by displaying the following prompt:

```
SIP>
```

To exit from SIP, press CTRL/Z .

The SIP command line has the following format:

```
SIP>dev:label
```

where:

dev: specifies the load device designated to receive the system image. You must specify dev: in the command line since there is no default device.

label specifies the label, which consists of 1 to 12 alphanumeric characters, to be associated with the system image. The label must be specified for all devices except paper tape, for which it is ignored.

Blank and tab characters are not allowed in a SIP command line. Following are examples and brief explanations of SIP command lines:

```
SIP>MM:RSX11S
```

Explanation: This command saves the RSX-11S system image on a magnetic tape.

```
SIP>PP:
```

Explanation: This commmand saves the RSX-11S system image on a paper tape.

```
SIP>DT1:11SMAPPEDSYS
```

Explanation: This command saves the RSX-11S system image on a DECtape. Another file name is used to distinguish between different versions of the system image on the DECtape.

2.3.2 SIP Operation

When SIP accepts a command line and no error conditions are encountered, it performs the following steps:

1. It parses the line for proper syntax and creates a label block.
2. It determines whether the designated device was generated into the current system as a load device.
3. It verifies that the system contains no outstanding I/O.
4. It attaches the device, rewinds it (if cassette tape or magnetic tape), and outputs the bootstrap and label blocks (if not paper tape).
5. It outputs the system image at processor priority level PR7. If the output device is the paper tape punch, the system image is output in absolute loader format.
6. It returns the processor priority level to PR0 and prompts for another command line.

The subsequently produced system image, with the exception of paper tape, may be bootstrapped directly with an appropriate hardware bootstrap. To bootstrap a paper tape image, the absolute loader must first be bootstrapped by means of the paper tape bootstrap. You can then bootstrap the paper tape produced by SIP with the absolute loader.

2.3.3 Hints on Using SIP

In general, any system saved by SIP on a device other than paper tape can be bootstrapped on another system with a different amount of memory. When you are transporting the saved system to a smaller system, however, the top of memory must not be lower than the physical top of SIP's task image in the saved system.

To enhance system transportability further, a system saved on a TM11/TMA11/TMB11 9-track magnetic tape drive in 800 bpi mode can be bootstrapped from a TU16 magnetic tape drive, or conversely.

The maximum memory size that can be saved is 124K words. SIP imposes maximum sizes on saved images in mapped systems for certain devices. If a mapped system is saved with a memory size greater than the maximum size imposed by SIP for the specified device, only the amount of memory equal to the maximum size and starting at physical location 0 is saved. A diagnostic error message is not issued. SIP imposes a maximum size on saved images for the following devices:

Device	Maximum Size
PC11/PR11 paper tape punch (PP:)	28K words
RX11/RX01 flexible disk (DX:)	122K words
RX211/RX02 flexible disk (DY:)	122K words for single-density disk
TA11/TU60 cassette tape (CT:)	28K words

SIP also determines the amount of memory to be saved by examining the location, $SYSIZ, in the Executive module SYSCM. This location is set to the size of physical memory (in 32K-word blocks) when the system is bootstrapped. You can reduce the size of the saved system by placing the desired value in this location when the system is not being used. However, you must restore the original value after the system is saved.

Certain restrictions must be enforced when you are not saving all the physical memory. SIP must be fixed entirely in the saved area or the system will not rebootstrap properly. Tasks that are fixed in memory outside of the saved area cannot be run when the system is rebootstrapped. DIGITAL recommends that you remove all such tasks before saving the system.

When a system is saved on paper tape, the last 300(8) bytes of the system image are not output; this is done to accommodate the absolute loader. Unmapped systems and mapped systems smaller than 28K words of memory that are saved on paper tape must be bootstrapped on a configuration having at least the same amount of memory. Mapped systems larger than 28K words that are saved on paper tape (of which only the first 28K words of the system image is saved) must be bootstrapped on a configuration having at least 28K words of memory. These restrictions are necessary to prevent the absolute loader from overwriting itself.

When you are bootstrapping from paper tape, the absolute loader halts if it encounters a checksum error. If the paper tape is backed up to a previous interblock gap and the CONTINUE switch on the processor console panel is pressed, the absolute loader will rettempt the read operation. Interblock gaps appear on the tape as a group of at least 4 nulls, followed by a 1, followed by another null. The tape should be positioned in the group of nulls. If the absolute loader encounters a hardware error on the paper tape reader, you must restart the loader.

2.3.4 SIP Error Messages

When the System Image Preservation (SIP) program detects an error condition, it takes the following steps:

- Aborts the current operation
- Displays an error message
- Prompts for another command line

The only exception to this procedure arises when the Executive has insufficient pool space. When this happpens, SIP immediately exits from the task because it has no additional pool space with which to display an error message. When an I/O error occurs while bootstrapping a system saved by SIP from a device other than paper tape, a "BR ." (branch to the same location) instruction, or its equivalent, is issued. This instruction causes the central processing unit (CPU) to enter a closed loop and, subsequently, all I/O is stopped.

You may assemble SIP with long or short error messages. Long error messages identify SIP as the source of the message and give both a numeric error code and a brief ASCII description of the error condition. Short error messages exclude the ASCII description, thus

conserving memory space. Your distribution kit contains the version of SIP that assembles with short error messages. Section 4.2.1.4 describes the steps necessary to assemble SIP with long error messages.

SIP generates the following error messages, shown here in their long form. Each message is followed by a brief explanation of its possible causes.

SIP -- 2 - SYNTAX ERROR

Explanation: A command was entered incorrectly. Retype the command line using the correct syntax.

SIP -- 5 - DEVICE NOT IN SYSTEM

Explanation: The device specified in the command line was not generated into the system. Devices to be used in the system must be specified during system generation.

SIP -- 8 - IO ERROR

Explanation: This message is returned in the event of one of the following errors:

- In attempting to read the next command, the MCR command OPEN detected an error
- An MCR terminal-write operation failed
- A hardware error was encountered as the result of an I/O request issued to the load device or terminal
- The specified device was generated into the system, but it was not present in the hardware configuration

SIP -- 66 - LABEL REQUIRED

Explanation: No label was specified with a device. A label is required.

SIP -- 67 - INVALID LOAD DEVICE

Explanation: The version of SIP in use did not support (or was not assembled to support) the specified device as a load device.

SIP -- 68 - IO OUTSTANDING

Explanation: An attempt was made to save the system at a time when one or more tasks had outstanding I/O .

2.4 TASK TERMINATION NOTIFICATION PROGRAM

The Task Termination Notification (TKTN) program outputs abnormal task termination and device status information.

If a task aborts, TKTN prints the notification and appropriate error message on the task's initiating terminal. TKTN also displays the contents of the task's registers when the task aborted. If a task aborts with I/O requests outstanding, the error message will include the phrase "and with pending I/O requests."

All task abort messages are printed or displayed at the initiating terminal. All other TKTN messages are printed on the console terminal. The messages printed on the console terminal generally identify error and status conditions relating to the system.

See Section 4.2.1.1 for information on building the TKTN program.

2.4.1 Invoking TKTN

TKTN is activated by the Executive when a task terminates abnormally or when a device driver wants to report unusual status information. You must use VMR to install and fix TKTN into the system during the RSX-11S system generation.

2.4.2 TKTN Error Messages

TKTN generates the following error messages in an RSX-11S system. In this section, each error message is followed by a brief description of the probable cause.

Error messages that are related to task termination will include a display of the contents of the task's registers at the time of termination. These are represented here by the "(registers)" notation.

Error messages that are related to devices are preceded by the device mnemonic, represented here by "ddnn:".

Task-related error messages:

TASK "taskname" TERMINATED -- ODD ADDRESS OR OTHER TRAP FOUR (registers)

Explanation: This message is returned in the event of one of the following errors:

- The task executed a word instruction with an odd address but no SST routine was specified to process the trap.
- The task referenced a nonexistent memory location in an unmapped system but no SST routine was specified to process the trap.

TASK "taskname" TERMINATED -- MEMORY PROTECT VIOLATION (registers)

Explanation: The task encountered a memory protect violation but no SST routine was specified to process the trap.

TASK "taskname" TERMINATED -- T-BIT TRAP OR BPT EXECUTION (registers)

Explanation: The task has either set the trace-bit (T-bit) in the Processor Status Word (PSW) or executed a Breakpoint Trap instruction, but no SST routine was specified to process the trap.

TASK "taskname" TERMINATED -- IOT EXECUTION (registers)

Explanation: The task executed an I/O Trap (IOT) instruction but no SST routine was specified to process the trap.

TASK "taskname" TERMINATED -- RESERVED INST EXECUTION (registers)

Explanation: The task executed an illegal instruction but no SST routine was specified to process the trap.

TASK "taskname" TERMINATED -- NON-RSX EMT EXECUTION (registers)

Explanation: The task executed an Emulator Trap (EMT) instruction that had an argument other than 377(8) but no synchronous system trap (SST) routine was specified to process the trap.

TASK "taskname" TERMINATED -- 11/40 F.P. EXCEPTION (registers)

Explanation: The task encountered a floating point exception while executing on a PDP-11/40 but no SST routine was specified to process the trap.

TASK "taskname" TERMINATED -- TRAP EXECUTION (registers)

Explanation: The task executed a TRAP instruction but no SST routine was specified to process the trap.

TASK "taskname" TERMINATED -- SST ABORT. BAD STACK (registers)

Explanation: This message is returned when an SST cannot be effected because of one of the following conditions:

- The SST parameters could not be pushed onto the task's stack.
- A stack overflow was detected in an unmapped system, as indicated by a nonzero value in the header guard word.

TASK "taskname" TERMINATED -- AST ABORT. BAD STACK (registers)

Explanation: An AST could not be effected because the AST parameters could not be pushed onto the task's stack.

TASK "taskname" TERMINATED -- ABORTED VIA DIRECTIVE OR CLI

Explanation: Either an Executive directive or a CLI command issued by another task caused the task to be aborted.

TASK EXIT WITH OUTSTANDING I/O (registers)

Explanation: (This is only a warning message.) The task terminated before all its I/O was completed.

PARITY ERROR (registers)

Explanation: A parity error occurred during task execution. The task is fixed in memory so that the memory cannot be reused for another task.

Device-related messages:

*** ddnn: NOT READY

Explanation: The specified device was not ready.

*** ddnn: SELECT ERROR

Explanation: The selected device was not ready or more than one drive had the same unit number.

*** ddnn: DISMOUNT COMPLETE

Explanation: This is an informational message. It indicates that the device requested for dismount is now logically disconnected from the system (that is, all files are deaccessed and the Volume Control Block (VCB) is deallocated).

MICRO CODE LOADER NOT INSTALLED

Explanation: This message is associated with KMC-controlled line printers. A system that includes the KMC11 driver (LKDRV) has been generated but the LPINIT task has not been installed.

2.5 THE SETTIM CALLABLE SUBROUTINE

SETTIM is a subroutine which can be called with FORTRAN to set the system's internal time. It is supplied to allow a running program to set the time in a configuration that does not include a console terminal and/or Basic MCR. The module is included in a user task by linking with the file SETTIM.OBJ, which resides in UFD [1,20] for unmapped systems or UFD [1,24] for mapped systems.

The format of the FORTRAN call is as follows:

```
CALL SETTIM (itime)
```

The variable itime is an eight-word integer array containing the time. The contents of the array are used in the following order:

Year	(since 1900)
Month	(1-12)
Day	(1-31)
Hour	(0-23)
Minute	(0-59)
Second	(0-59)
Tick of second	(depends on clock frequency)
Ticks per second	(depends on clock frequency)

Complete error checking occurs to ensure that the specified date and time are legal, but no errors are returned to the calling program. If an error is detected, the date or time is not changed. Calls made without an array specified simply return.

SETTIM may also be called with a six-word array by omitting the entries for tick of second and ticks per second. These two entries default to the values previously set for them.

To generate SETTIM, you need the SET SYSTEM TIME ($STIM) directive. This directive is one of the Executive options you can select during Phase I of the RSX-11S system generation procedure.

2.6 SYSTEM ACTIVITY DISPLAY PROGRAMS

RSDV05, RSDV52, and RSDV1H (referred to in this section as RSD) are privileged tasks that display information concerning task activity in an RSX-11S system. You can invoke and continually run these tasks on a VT05-B video terminal, a VT52 video terminal, and a VT100 video terminal, respectively. The display format is similar to that of the RMDEMO display, which is described in the RSX-11M/M-PLUS System Management Guide. RSD running on RSX-11S requires approximately 6K words.

RSD includes the following display features:

- The current date and time.
- The currently active task.
- All tasks, loaded drivers, and common blocks currently in memory, displayed in a graphic fashion to show their individual memory requirements and locations relative to other tasks.
- The number of active tasks currently in memory and the total amount of memory occupied by each task.
- The current amount of available system dynamic memory (pool). This includes the largest available block and the number of fragments, and the worst case of pool space since bringing up RSD (not displayed on a VT05-B).
- A graphic display of partition information.

RSD scales the display to the memory size of the computer on which it is executed. Graphically, total memory is represented in multiples of 32 words. For this reason, the display may not always represent the exact total memory for the associated computer.

RSD is a useful task designed to allow either a computer operator or a user to view the current state of the operating system. The information is presented in a graphic, easily understandable form.

Task locations and sizes displayed by RSD should be considered approximations. RSD is primarily designed to provide a visual display and system debugging tool. It does not accurately measure task size and location.

A specific instance in which RSD can help you is in locating certain system lockout problems or bugs in application and/or system-level software. You can detect and more easily reproduce bugs and other situations that cause pool exhaustion (resulting in unexplained suspended activity on a system). See Section 4.2.1.5 for information on building the RSD tasks.

2.7 FILE CONTROL SERVICES

RSX-11S does not have its own file system, but it does support a subset of the RSX-11M File Control Services (FCS) that performs basic record I/O. The RSX-11S FCS subset does not support the following:

- File-structured devices (Files-11 disk and ANSI magnetic tape)
- Block I/O operations
- Random access record I/O
- Sequential records

All the RSX-11M FCS calls are present in the RSX-11S FCS subset, even though they are not supported in RSX-11S. If a call is made to an unsupported FCS routine, the result is an immediate return to the caller or an error return. The level of support in each call in RSX-11S is described in Section 2.7.1.

In general, the FCS subset handles I/O operations in the same way that the RSX-11M FCS handles I/O for record I/O operations. Minor exceptions to this are noted in Section 2.7.1. Note that a MACRO-11 programmer must maintain the data structures (such as File Descriptor Block and Filename block) as described in the RSX-11M/M-PLUS and Micro/RSX I/O Operations Reference Manual.

Section 2.7.1 describes the macro calls used to process files, and Section 2.7.2 describes the file control routines. These calls and routines are fully documented in the RSX-11M/M-PLUS and Micro/RSX I/O Operations Reference Manual.

2.7.1 File-Processing Macro Calls

The file-processing macro calls are used to manipulate files. These calls, described in the following sections, allow you to open files for read and write operations.

2.7.1.1 **OPEN$x** - Generalized OPEN Macro Call - Although RSX-11S does not support a file system, the concept of file I/O is still applicable. Before you can transfer any data, you must open a file. This procedure has been simplified by the exclusion of directory-structured devices. In general, the OPEN$x macro calls perform as they do for record devices under standard FCS.

When FCS opens a file, it takes several steps to identify a file name. The FCS subset has reduced this procedure to a single step. Of the three fields in the file descriptor (device, directory, and file name), only the device string is significant, and it is parsed as usual. The directory-string field is ignored; the Master File Directory (MFD) is always assumed. The file name string is always ignored. As a result, all error status returns regarding the latter two fields are eliminated.

Because RSX-11S does not support a directory structure, there is no need to search the MFD and User File Directory (UFD). File identifications are always forced to be 1.

2.7.1.2 **OPNS$x** - Open File for Shared Access - File access protection is enforced by the file system primitives. Because RSX-11S does not support a file system, all files are implicitly opened for shared access.

2.7.1.3 **OPNT$W/OPNT$D** - Create and Open Temporary Files - Creating temporary files is similar to creating a file that does not have a directory entry associated with it. This applies for all file operations in this subset FCS.

2.7.1.4 **OFID$/OFNB$** - Open by File Identificaton/Open by Filename Block - All file identifications are forced to be 1. Therefore, no specific test is performed in OFID$ for a file identification.

2.7.1.5 **OPEN$** - Generalized Open for Specifying File Access - All comments in Sections 2.7.1.1 through 2.7.1.4 apply to this general OPEN$ call.

2.7.1.6 **CLOSE$** - Close Specified File - Because RSX-11S does not support record blocking, there are no partially filled buffers and consequently no need to empty them. Furthermore, there is no file deaccess because there is no file system. As a result, no FCS error conditions are possible.

2.7.1.7 **GET$x** - Read Logical Record - The GET$ and GET$S macro calls translate directly into requests to read from the device; there is no record unblocking. However, the virtual block number field (F.VBN) is maintained. Therefore, you may treat a block device as a record device having a direct translation of virtual block into logical block. The GET$R macro call is returned with an error code of IE.ISQ (illegal sequential operation).

2.7.1.8 **PUT$x** - Write Logical Record - The PUT$ and PUT$S macro calls translate directly into requests to write to the device; there is no record blocking. As with the input operations, the virtual block number is maintained in the FDB, allowing record I/O to block devices. The PUT$R macro call is returned with an error code of IE.ISQ (illegal sequential operation).

2.7.1.9 **READ$, WRITE$, WAIT$** - Virtual Block I/O - These calls are not applicable to record devices and therefore are not supported. Attempts to use these calls and to open a file for read/write I/O (record access parameter is FD.RWM) result in the return of an error code IE.ILL (illegal operation).

2.7.1.10 **DELET$** - Delete Specified File - Because RSX-11S does not maintain a file structure, the delete-file function is minimal. A parse of the device field is performed and the file is closed if it is currently open.

2.7.2 File Control Routines

The file control routines allow you to make changes to files. However, RSX-11S does not support all these routines. Sections 2.7.2.1 through 2.7.2.13 describe each routine and, if applicable, explain why it cannot be used on RSX-11S.

2.7.2.1 **Default Directory String Routines** - RSX-11S does not support a directory structure. Calls to .RDFDR to read the default directory string descriptor always return a zero in R1, the size of the string in bytes. Calls to .WDFDR to write the string descriptor result in an immediate return.

2.7.2.2 **Default File Protection Word Routines** - File protection is a function of the file system, which is not present in RSX-11S. Therefore, calls to .RDFFP to read the default-file-protection word always return a zero in R1. Calls to .WDFFP to write a new default-file-protection word result in an immediate return.

2.7.2.3 **File Owner Word Routines** - File owner information is established at file creation and is relevant only to the file system. Thus, calls to .RFOWN to read the file-owner word always return a zero in R1. Calls to .WFOWN to write a new file-owner word result in an immediate return.

2.7.2.4 **ASCII/Binary UIC Conversion Routines** - The requirement to maintain and/or establish User Identification Codes (UICs) disappears with the absence of a file system. Calls to .ASCPP to convert an ASCII UIC string to binary always return a zero in the word location whose address is contained in R3. Calls to .PPASC to convert a binary UIC representation to ASCII always return a null value to the byte referenced by R2. Furthermore, the contents of R2 are increased by a value of 1.

2.7.2.5 **Filename Block Routines** - Directory and file name strings are ignored. As a result, a call to .PARSE is reduced to an examination of the device string, an assignment of a logical unit number (LUN) to that device, and the establishment of a default directory identification of [-1,-1] (the MFD). Calls to .PRSDV (parse a device string) and to .ASLUN (assign a logical unit number), however, remain unaffected.

2.7.2.6 **Directory Entry Routines** - File directories are not supported in the FCS subset. Therefore, calls to .ENTER (insert directory entry), .FIND (locate directory entry), and .REMOV (delete directory entry) are reduced to a LUN assignment and returned with a file identification of 1.

2.7.2.7 **Directory Information Routines** - Lack of directory structure support also reduces the capability of these routines. Both .GTDID (insert default directory information in filename block) and .GTDIR (insert directory information in filename block) calls now perform only a LUN assignment and fill in the directory-identification of [-1,-1].

2.7.2.8 **File-Positioning Routines** - The .POINT routine (position file to specified byte) unconditionally stores the virtual block number (VBN) field for treating block devices as though they were record devices.

The .POSIT and .POSRC routines are concerned with the positional relationship of records within a file. This relationship is of use only in random access programming and is not supported in RSX-11S. Calls to these routines return the error code IE.ISQ (illegal sequential operation).

2.7.2.9 **Queue I/O Function Routine** - The queue I/O function routine is called to execute a specified QUEUE I/O function and to wait for its completion. The queue I/O routine accepts parameters that include the address of the desired File Descriptor Block (FDB), the desired QUEUE I/O function code, and any optional parameters that are to be included in the QUEUE I/O directive.

2.7.2.10 **Rename-File Routine** - The rename-file function is concerned with entries in a directory structure. Because RSX-11S does not support a directory structure, calls to .RENAM produce the following results:

- The file whose FDB address is contained in R0 is closed.
- A parse (as defined in Section 2.7.2.5) is performed for both FDBs.
- No additional checks are made.

2.7.2.11 **File-Extension Routine** - You cannot extend a file without the support of a file system. Therefore, the file extend routine, .EXTND, simply parses the file name (as defined in Section 2.7.2.5) if the file is not already open.

2.7.2.12 **File-Deletion Routines** - The delete by filename block routine, .DLFNB, performs exactly as DELET$ does (described in Section 2.7.1.10). If the file is open, the .DLFNB call marks the file for deletion (.MRKDL). If the file is closed, the logical unit assignment occurs.

2.7.2.13 **Device Control Routine** - The routine to perform device-specific control functions, .CTRL provides users with a control interface to the ANSI magtape and Files-11 ACPs. Because neither of them is supported on RSX-11S, this routine returns an error code IE.ILL (illegal operation).

2.7.3 Using the FCS Subset

If you wish to acquire the features of FCS subset (as a result of either explicit use of macro calls or FORTRAN I/O), you should link your task against the subset object library, [1,1]11SLIB.OLB. Creating this library is an option in the RSX-11S system generation process. Failure to use this library results in the resolution of FCS code from the host system object library (SYSLIB.OLB). The FCS host system object library is much larger than the subset object library. It is also inappropriate to use the FCS host system object library with RSX-11S because it requires interaction with a file system to service several types of devices.

CHAPTER 3

RSX-11S VERSION 4.2 DISTRIBUTION KIT

3.1 RSX-11S VERSION 4.2 DISTRIBUTION MEDIA

RSX-11S Version 4.2 software is distributed on a variety of media. The following distribution kits are available:

- One RK06 cartridge disk
- One RK07 cartridge disk
- Two RL01 cartridge disks
- One RL02 cartridge disk
- One TK50 magnetic tape cartridge
- One magnetic tape, 9-track, 800 bpi, 2400-foot
- One magnetic tape, 9-track, 1600 bpi, 2400-foot

For RL01 distribution kits, the first volume is labeled 11SKIT and the second volume is labeled UPDATEA.

3.2 CONTENTS OF THE RSX-11S VERSION 4.2 DISTRIBUTION KIT

Table 3-1 lists most of the files contained in the RSX-11S Version 4.2 release kit. All files in this table are located in UFD [2,20]. Section 3.3 lists additional files needed for generating an RSX-11S system on an RSX-11M-PLUS or VAX/VMS host system.

The disk media are written in Files-11 format by the Peripheral Interchange Program (PIP). The magnetic tape media are created in DOS format by the File Transfer Utility Program (FLX). See the RSX-11M/M-PLUS and Micro/RSX Utilities Manual for more information on PIP and FLX.

Table 3-1
Contents of the RSX-11S Distribution Kits

File	Identification
BMPRE.MAC	Basic MCR assembly prefix file
ABOBAS.MAC	Basic MCR source file
ATLBAS.MAC	Basic MCR source file

(Continued on next page)

Table 3-1 (Cont.)
Contents of the RSX-11S Distribution Kits

File	Identification
BRKBAS.MAC	Basic MCR source file
ERRBAS.MAC	Basic MCR source file
ERRMSG.MAC	Basic MCR source file
FMTDV.MAC	Basic MCR source file
FNDUCB.MAC	Basic MCR source file
GNBLK.MAC	Basic MCR source file
GETNUM.MAC	Basic MCR source file
KEYWD.MAC	Basic MCR source file
LKLST.MAC	Basic MCR source file
MCRBAS.MAC	Basic MCR source file
OPEBAS.MAC	Basic MCR source file
PRSBAS.MAC	Basic MCR source file
REDBAS.MAC	Basic MCR source file
REMBAS.MAC	Basic MCR source file
RPSBAS.MAC	Basic MCR source file
RUNBAS.MAC	Basic MCR source file
TIMBAS.MAC	Basic MCR source file
OTLPRE.MAC	On-Line Task Loader (OTL) assembly prefix file
OTL.MAC	OTL source file
OTLCD.MAC	OTL source file
OTLERR.MAC	OTL source file
OTLHD.MAC	OTL source file
OTLLB.MAC	OTL source file
OTLLD.MAC	OTL source file
OTLQIO.MAC	OTL source file
OTLRD.MAC	OTL source file
SIPPRE.MAC	System Image Preservation (SIP) assembly prefix file
SIP.MAC	SIP source file
SIPB00.MAC	SIP source file

(Continued on next page)

Table 3-1 (Cont.)
Contents of the RSX-11S Distribution Kits

File	Identification
SIPCD.MAC	SIP source file
SIPERR.MAC	SIP source file
SIPLD.MAC	SIP source file
SIPQIO.MAC	SIP source file
TKTN.MAC	Task Termination Notification (TKTN) source file
FCS11S.OBJ	File Control Services (FCS) subset concatenated object modules
SETTIM.MAC	Source file of FORTRAN callable routine to set system time
RMDUNM.OLB	RMDEMO object library file for unmapped systems
RMDMAP.OLB	RMDEMO object library file for mapped systems
11SGEN.CMD	RSX-11S system generation command file for Phase I
11SGEN2.CMD	RSX-11S system generation command file for Phase II
BLXIOU.OBJ	Object file required to build OTL for unmapped systems
BLXIOM.OBJ	Object file required to build OTL for mapped systems

3.3 ADDITIONAL FILES REQUIRED FOR RSX-11M-PLUS AND VAX/VMS HOST SYSTEMS

The RSX-11S Version 4.2 distribution kits also contain additional files to generate RSX-11S on an RSX-11M-PLUS or VAX/VMS host system. These additional files include the following:

- Command files to perform the RSX-11S system generation
- The RSX-11M Task Builder task image file and the RSX-11M Virtual Monitor Console Routine (VMR) task image file
- Necessary portions of system macro and object libraries
- Command files to build process control device commons
- Executive and device driver source files
- Command files and object library to build the Crash Dump Analyzer (CDA) for use on the host system

The command file, 11SCOPY.CMD, copies all the needed files from the distribution kit to your target disk during Phase I of the system generation.

CHAPTER 4

TASK-BUILDING THE RSX-11S EXECUTIVE AND SYSTEM TASKS

This chapter briefly describes how to task build the Executive as well as the how to task build the system tasks. It also describes how to build user-written tasks and provides additional information you will need to generate your RSX-11S system.

4.1 BUILDING THE EXECUTIVE

The first step in building the Executive is to obtain the system generation output and the Executive object library. (The command files controlling the RSX-11S system generation will ensure that all required files are present.) This output consists of at least the following three files:

- RSX11S.OLB -- Executive object library
- RSXBLD.CMD -- Executive task-build command file
- RSXMC.MAC -- Executive assembly prefix file

Additional files are present provided that you included support for the DSS11, UDC11, or ICS/ICR11 subsystems in the Executive.

If you selected one or more user-written resident drivers during Phase I, you can insert the driver(s) and data base object module(s) into RSX11S.OLB during Phase II. However, you must edit the Executive task-build command file to include the resident drivers.

After TKB builds the target Executive, the task image file RSX11S.TSK and the symbol table files are placed in the following User File Directories (UFDs) designated for system tasks:

- [1,60] -- For unmapped systems
- [1,64] -- For mapped systems

To prevent the accidental loss of your system, you should maintain the task image file (RSX11S.TSK) as a backup after 11SGEN2 creates your system image file (RSX11S.SYS).

4.2 BUILDING THE RSX-11S TASKS

You can write RSX-11S tasks in MACRO-11 or FORTRAN. To ensure that FORTRAN tasks are linked properly to the Object Time System (OTS), you must place the OTS modules in a library. You must then specify that library in the task-build command line. The steps to include OTS are documented in the appropriate FORTRAN installation guide.

Section 4.2.1 describes how to build system tasks and Section 4.2.2 describes how to build other kinds of tasks.

4.2.1 System Tasks

The following system tasks may be included in the RSX-11S system:

- TKTN
- Basic MCR
- OTL
- SIP
- The system activity display programs (RSDV05, RSDV52, and RSDV1H)

During the 11SGEN process, you are asked whether the assembly listings and/or the task-build maps for these system tasks should be printed. If you choose to print either of these, your listing output is then sent to the line printer if one is available. If not, the listing is printed on the console terminal.

The sizes of Basic MCR, OTL, and SIP depend on whether you include optional features. The respective build files for each of these tasks allows for the maximum size of the task. However, even if you do not include all the options for Basic MCR, OTL, or SIP, it is not necessary to edit the build file to reduce the size of the partition for that task. When configuring the system with VMR, use the map listings to determine the size of the partition for each of the tasks. A task can be loaded into a partition smaller than the size specified in the build file, as long as the partition is large enough to include the task address limits.

4.2.1.1 **TKTN** - The Task Termination Notification (TKTN) program is the privileged task used by the Executive to print task termination and device status messages. If you select TKTN during Phase I, it is assembled and built during the 11SGEN2 procedure.

The command file TKN11SBLD.CMD specifies that you use partition SYSPAR, with a length of 3700(8) bytes and a base address of 20000 for unmapped systems. Normally, the default base address of TKTN for an unmapped system is not correct and must be changed to the proper address. On a mapped system, SYSPAR is 3700(8) bytes long.

4.2.1.2 **Basic MCR** - Basic MCR provides the RSX-11S user with a subset of the MCR commands available in RSX-11M. The commands are described in Section 2.1 of this manual.

The size of Basic MCR varies from approximately 6300(8) to 12100(8) bytes for unmapped systems and 6400(8) to 14000(8) bytes for mapped systems. Unmapped systems include a base address of 20000. The difference in size between the smaller and larger versions is due to the inclusion of optional features. These are the ATL/TAL commands, the OPEN command, and full error message text.

The distribution kit includes the Basic MCR assembly prefix file, BMPRE.MAC. This file produces a Basic MCR that includes none of the optional features. If you want to include an option, edit the assembly prefix file. You can edit the file by locating the control symbol corresponding to the desired option and removing the semicolon (;) from the beginning of the line (refer to the sample dialogs in Chapters 5 and 7). The control symbols, along with their corresponding options, are as follows:

- R$$ATL -- ATL/TAL commands
- R$$ERM -- Full error message text
- R$$OPE -- OPEN command

DIGITAL recommends that you choose the full form of the error messages so that you will not have to look them up every time an error occurs.

The Basic MCR task-build command file, BASMCRBLD.CMD, specifies that the partition MCRPAR be used, with a maximum length of 12100 bytes for unmapped systems (14000 for mapped systems). The base address is 20000 for unmapped systems.

When you begin task building, if the specification of a partition length is larger than necessary, it will have no effect on the task image. However, for an unmapped system, you must determine the partition base address by carefully examining the memory requirements of other system components.

4.2.1.3 **OTL** - The On-Line Task Loader (OTL) allows you to install and fix a task in an RSX-11S system. You must build the task on the host system and copy it to a medium supported by OTL and the RSX-11S system (that is, the device driver for that medium must be loaded in the RSX-11S system with VMR). If OTL is to be included, you must assemble and build it during the RSX-11S SYSGEN procedure.

The size of OTL varies from approximately 6200(8) to 10600(8) bytes for unmapped systems and from 10000(8) to 15000(8) bytes for mapped systems. The difference in size between the smaller and larger versions is due to the inclusion of optional error message text and device support.

The distribution kit contains a prefix file that does not include support for full error message text. If you wish, you may edit the assembly prefix file OTLPRE.MAC. This is done by locating the line in which the control symbol R$$ERM is assigned the value 0 and removing the semicolon (;) from the beginning of that line. DIGITAL recommends that you choose the full form of the error messages so that you will not have to look them up every time an error occurs.

Table 4-1 lists the load devices that OTL supports and the assembly control symbol associated with each medium.

Table 4-1
OTL Assembly Control Symbols and Load Devices

OTL Assembly Control symbol	Load Device
PR11, P$$R11	PC11/PR11 paper tape reader
RX11, R$$X11	RX11/RX01 flexible disk
RX21, R$$X21	RX211/RX02 flexible disk
RX50, R$$UDA	RUX50/RX50 flexible diskette
TA11, T$$A11	TA11/TU60 cassette tape
TC11, T$$C11	TC11/TU56 DECtape
TM11, T$$M11	TM11/TE10,TS03,TU10 magnetic tape
TS11, T$$S11	TS11/TK25,TS11,TSV05,TU80 magnetic tape
TU16, T$$J16	TM02/TE16,TU16,TU45,TU77 magnetic tape
TU58, T$$U58	DL11/TU58 DECtape II

If you include any of these devices during the RSX-11S system generation, OTL will support them. OTL requires that the driver for any device you want to use be in the system (either resident or loadable).

If you want to make OTL smaller, you may limit the types of devices supported by OTL. You can do this by editing the assembly prefix file OTLPRE.MAC. Locate the line that contains "INCLUDE" that is followed by the symbol for the device type you wish to exclude. (Refer to the OTL assembly control symbols listed in Table 4-1.) Insert a semicolon (;) from the beginning of the line. The line will be treated as a comment and the code required to support the device type will not be included in OTL when it is assembled.

The OTL task-build command file OTLBLD.CMD specifies that the partition OTLPAR be used. The partition may have a maximum length of 10600(8) for unmapped systems and 15000 for mapped systems. This would include a base address of 20000 for unmapped systems. You can edit this file according to the guidelines specified for Basic MCR.

4.2.1.4 **SIP** - The System Image Preservation (SIP) task allows you to save (up to 124K words) a copy of a running RSX-11S system on a medium that can be bootstrapped. If you wish to include SIP, it can be tailored in exactly the same manner as OTL.

The size of SIP varies from approximately 3500(8) to 6700(8) bytes for unmapped systems and from 3700(8) to 7400(8) bytes for mapped sytems. Again, the size difference between the smaller and larger versions is due to the inclusion of optional error message text and device support. You can adapt SIP to meet specific system needs by editing its assembly prefix file, SIPPRE.MAC, using the same guidelines as those presented for OTL.

The distribution kit file, SIPPRE.MAC, does not include full error message text. If you wish to include it, edit the assembly prefix file by locating the line in which the control symbol R$$ERM is assigned the value 0. Remove the semicolon (;) from the beginning of the line. DIGITAL recommends that you choose the full form of the error messages so that you will not have to look them up every time an error occurs.

There are some minor differences in device support between SIP and OTL. One difference concerns paper tape. OTL reads a task image into memory and therefore uses the paper tape reader. However, SIP writes a system image and must use the paper tape punch. The control symbol employed by SIP for the PC11 paper tape punch is PP11. Additionally, SIP does not support the following devices:

- RX50 flexible diskette
- TK25 magnetic cartridge
- TU58 DECtape II
- TS11 magnetic tapes

Table 4-2 lists the load devices that SIP supports and the assembly control symbol associated with each medium.

Table 4-2
SIP Load Devices

SIP Assembly Control Symbol	Load Device
PP11, P$$P11	PC11/PP11 paper tape punch
RX11, R$$X11	RX11/RX01 flexible disk
RX21, R$$X21	RX211/RX02 flexible disk
TA11, T$$A11	TA11/TU60 cassette tape
TC11, T$$C11	TC11/TU56 DECtape
TM11, T$$M11	TM11/TE10,TS03,TU10 magnetic tape
TU16, T$$J16	TM02/TU16,TU45,TU77 magnetic tape

The SIP task-build command file, SIPBLD.CMD, specifies that the partition SIPPAR be used. The maximum length is 6700(8) for unmapped systems and 7400(8) for mapped systems. This includes a base address of 20000 for unmapped systems. You should edit this file according to the guidelines given for Basic MCR.

4.2.1.5 **RSDV05, RSDV52, and RSDV1H (RSD)** - RSDV05, RSDV52, and RSDV1H are the system activity display programs. They are privileged tasks that run on VT05, VT52, and VT100 video terminals, respectively. The RSD tasks require approximately 6K words of memory to run on RSX-11S. (These display programs are similar to the RMDEMO display program on RSX-11M and RSX-11M-PLUS; see the RSX-11M/M-PLUS System Management Guide for more information.)

If you include any of the RSD tasks in your system, you should select the following two options during the system generation process:

- Executive AST support.
- Unsolicited input character AST (terminal driver option). This option is available in all terminal drivers except the baseline terminal driver.

Selecting these options will allow you to do the following:

- Exit cleanly from an RSD display by pressing CTRL/C or CTRL/Z . (Otherwise, you must press CTRL/C and then abort RSD.)
- Generate an updated display (replay) at any time by pressing the keyboard space bar or any other keyboard character.

4.2.2 Other Tasks

This section provides information on generating tasks that are not system tasks, but are tasks that you may need.

4.2.2.1 **K-series Lab Support Routines** - The K-series lab support routines are built by SGNKLAB, which is run separately after Phase II. During Phase I of the system generation, you will be asked if you want K-series support. If you answer Yes, the following will occur:

- You will be prompted for the required vector information. If the K-series devices, or any other devices, require an interrupt vector address greater than 400, you must specify the highest address needed.
- The CINT$ directive will be included in your system.
- Asynchronous system trap (AST) support will be included in the system.

To build these routines, use one of the following command lines after completing Phase II:

```
>@[200,200]SGNKLAB (on an RSX-11M host system)

>@[2,200]SGNKLAB (on an RSX-11M-PLUS or a VAX/VMS host system)
```

For more information on the K-series routines, refer to the RSX-11M/M-PLUS I/O Drivers Reference Manual.

4.2.2.2 **User-Written Tasks** - To properly assemble and link any user-written tasks that are to be included in the target system, special library conventions must be observed. You must use EXEMC.MLB as the macro library and 11SLIB.OLB as the system library. (System libraries are discussed in Section 4.4.1.)

4.3 FINAL CONFIGURATION OF THE EXECUTIVE

Once the RSX-11S Executive and all of the privileged tasks are built, the following steps must be completed before you can bootstrap and run the system. (You can run VMR on the system's task image file to complete these steps.)

1. Create the memory partitions in the system
2. Load the required device drivers
3. Install the needed tasks
4. Fix the tasks in memory

The minimum steps required to configure the Executive include creating all the partitions, loading the required device drivers and, if tasks are to be loaded on line, installing and fixing into memory Basic MCR and OTL. Once these are in memory, tasks and commons can be loaded into a running RSX-11S system by using OTL.

If the RSX-11S system is a DECnet node and it supports down-line task loading, OTL is not required for on-line loading of nonresident tasks (because the tasks can be down-line loaded by DECnet).

The following procedure details how to set up partitions and install required tasks on the target system:

1. Install and run VMR
2. Extend pool space to the base of the first partition
3. Set up partitions by consulting the maps for the privileged tasks
4. Load the loadable device drivers
5. Install the privileged tasks (Basic MCR, OTL, SIP, TKTN)
6. Fix the tasks into (virtual) memory
7. Set the time (optional) and save a copy of the system on a bootable medium
8. Exit from VMR

Example 4-1 shows the application of this procedure.

Example 4-1 Final Configuration of the Executive for a Mapped System with Executive Commons, System-Controlled Partitions, and Loadable Device Drivers

```
MCR>SET /UIC=[1,64]
MCR>INS $11MVMR/TASK=...VMM
MCR>VMM
ENTER FILENAME: RSX11S.SYS
VMR>SET /POOL=*
VMR>SET /MAIN=TTPAR:*:164:TASK
VMR>LOA TT:
VMR>SET /MAIN=DRVPAR:*:*:SYS
VMR>LOA MM:
VMR>LOA DM:
VMR>LOA DK:
VMR>SET /TOP=DRVPAR:-*
```

```
VMR -- *DIAG* Installed tasks may no longer fit in partition

VMR>SET /MAIN=SYSPAR:*:37:TASK
VMR>SET /MAIN=MCRPAR:*:140:TASK
VMR>SET /MAIN=OTLPAR:*:150:TASK
VMR>SET /MAIN=SIPPAR:*:74:TASK
VMR>SET /MAIN=EXCOM1:*:200:COM
VMR>INS EXCOM1

VMR -- *DIAG* Partition reduced to executive common size

VMR>SET /MAIN=EXCOM2:*:200:COM
VMR>INS EXCOM2

VMR -- *DIAG* Partition reduced to executive common size

VMR>SET /MAIN=GEN:*:*:TASK
VMR>INS TKN/FIX=YES
VMR>INS BASMCR/FIX=YES
VMR>INS OTL/FIX=YES
VMR>INS SIP/FIX=YES
VMR>^Z
```

NOTE

If you answered No to the Phase II question, "Do you want to configure the Executive at this time using VMR," you would follow the procedure described in Section 4.3. If you answered Yes, the Phase II program automatically creates the system image file and installs and runs VMR. When the VMR prompt appears follow the procedure outlined in Section 4.3

4.4 OPERATING CONSIDERATIONS

The remainder of this chapter gives information that you may find helpful in generating your RSX-11S system.

4.4.1 Libraries

The RSX-11S operating system contains the following three types of libraries:

- System object library
- System macro library
- Resident library

The following sections give brief descriptions of each of these libraries.

4.4.1.1 **System Object Library** - Although the host system has a complete system object library (SYSLIB.OLB) of its own, you should create an additional object library for tasks. This will allow you to

use several hardware/software features on the target RSX-11S system. Your RSX-11S system object library must contain the following modules to support these features:

FCS Subset	(Required with FORTRAN OTS)
FORTRAN OTS	
LPS/AR11	FORTRAN process I/O routines
ICS/ICR11	FORTRAN process I/O routines
UDC11	FORTRAN process I/O routines
DRS/DSS11	FORTRAN process I/O routines
Purdue ISA	FORTRAN process I/O routines (required with LPS/AR11, ICS/ICR11, UDC11, DRS/DSS11, LPA11, and LP routines)
LPA11	I/O support routines

During the RSX-11S system generation, this library (11SLIB.OLB) is created under the system directory of the target system device (SY:). (On RSX-11M, the system directory is [1,1]. On RSX-11M-PLUS and VAX/VMS, the directory is [g,1], where g is the group number specified for system files during the SYSGEN procedure.)

When you build tasks for the target RSX-11S system that require any of the previously listed features, you should include the file specification for your system object library in the task-build command input. This specification prevents the 11SGEN command file from referencing the host system's system library.

Also, note that if you have selected a UFD other than [1,1] for your system object library (RSX-11M-PLUS and VAX/VMS hosts only), you **must** specify the directory with the /DL switch when building a task. Otherwise, the Task Builder will expect to find SYSLIB.OLB in [1,1].

4.4.1.2 **System Macro Library** - You must use the standard system macro library RSXMAC.SML for program development on an RSX-11M, RSX-11M-PLUS, or VAX/VMS host. As with SYSLIB.OLB, if RSXMAC.SML is not in UFD [1,1], you **must** specify the directory in the MACRO-11 command line when assembling a module.

4.4.1.3 **FCS Subset Resident Library** - You create the standard FCS resident library by assembling the file [2,200]11SRES.MAC and task-building it according to the directions given in the file itself.

For more information on building, defining, and loading resident libraries into a system, see the RSX-11M System Generation and Installation Guide and the RSX-11M/M-PLUS and Micro/RSX Task Builder Manual.

4.4.2 Device Commons

Several DIGITAL-supplied support routines require direct access to the I/O page to service some process-I/O options. On mapped systems, the construction of a device common is required to obtain direct access. However, construction of a device common is optional on an unmapped system. Direct access is required to support the following options:

UDC11	Analog outputs
	Single-shot digital outputs
	Digital inputs
	Counter inputs

ICS/ICR11	Digital inputs Counter inputs
DSS11	All

The 11SGEN command procedure automatically constructs device commons when you request direct access for the previously mentioned devices or the device common itself (by answering Yes to the questions).

To load device commons into the system, create a partition that has the DEV attribute. This will map the desired portion of the I/O page. Then use the INSTALL command to mark the device common resident. You can perform these steps using VMR commands.

For more information on processing I/O device commons, see the RSX-11M/M-PLUS and Micro/RSX I/O Drivers Reference Manual.

4.4.3 Other Methods for Task Loading

By virtue of its memory-resident design, RSX-11S relies on a host/target system relationship for program development. Tasks for RSX-11S systems must be developed on the host system and may be transported to the target system. As previously discussed, the On-Line Task Loader (OTL) is provided to load tasks into a running RSX-11S system. There are, however, two alternative methods to accomplish task loading.

The first method relies on VMR to install and fix the task image into the RSX-11S system image. When this image is bootstrapped into memory, the task is available to be run.

The second method requires the facilities of DECnet-11 Version 3.0, the RSX-11 network software. A special network task loader is provided to down-line task load images over a communications line. Furthermore, the capability of RSX-11S is enhanced by DECnet to support task checkpointing to the host by means of the network loader. Both the host and target system must be configured with DECnet to use these features. Refer to the DECnet System Manager's Guide for more information.

4.4.4 System Loading

When you complete the RSX-11S system generation, you must bootstrap the system image file, RSX11S.SYS, into memory for it to become operational. On RSX-11M hosts, RSX11S.SYS resides in UFD [1,60] for unmapped systems and UFD [1,64] for mapped systems. On RSX-11M-PLUS and VAX/VMS hosts, the file resides in UFD [g,64], where g is the group number specified for system files during the system generation procedure.

VMR on the host system has the capability of saving the contents of the system task image file to a variety of device media in bootable format. You can load these system images directly on the target configuration by using the appropriate bootstrap mechanism.

A host system configured with DECnet allows the down-line loading of an RSX-11S system image. This feature eliminates the necessity of using VMR to SAVE an RSX-11S system image on media in bootable format.

As discussed in Section 4.2.1.4 you can save a running RSX-11S system using SIP, which produces a bootable image in exactly the format generated by the VMR command SAVE.

CHAPTER 5

RSX-11S SYSTEM GENERATION ON AN RSX-11M HOST SYSTEM

This chapter explains how to generate an RSX-11S system on an RSX-11M host system. It also contains an example of a typical terminal dialog from an RSX-11S system generation on an RSX-11M host system.

5.1 PERFORMING AN RSX-11S SYSTEM GENERATION ON AN RSX-11M HOST SYSTEM

A complete RSX-11S system generation is performed in two phases on an RSX-11M host system. In the first phase, the procedures are primarily the same as those followed for generating an RSX-11M system. (Consult the RSX-11M System Generation and Installation Guide for a detailed description of this phase of the SYSGEN command procedure.) This phase is controlled by the command file 11SGEN.CMD, which is found in User File Directory (UFD) [2,20] of the RSX-11S distribution medium labeled, "11SKIT".

NOTE

To perform your RSX-11S system generation on line, you **must** first make a copy of your latest RSX-11M distribution kit. This will serve as your target disk. You may then begin the system generation procedure.

The command file that controls the second phase of the RSX-11S system generation is 11SGEN2.CMD. This file is also located in UFD [2,20]. The RSX-11S system generation procedures, 11SGEN and 11SGEN2, expect to find 11SGEN.CMD and 11SGEN2.CMD in UFD [200,200] on your baseline disk. Therefore, you must copy them as described in Section 5.1.1.

The following operations are performed during the processing of 11SGEN.CMD:

- Prompting for the Executive options
- Assembling the Executive
- Assembling the drivers

The following operations are performed during the processing of 11SGEN2.CMD:

- Building the target Executive and the drivers
- Assembling (building) the RSX-11S system tasks
- Final configuration of the Executive (creating the system image)

The Phase II operations are discussed in Chapter 4.

5.1.1 Copying Procedures

Before you perform the RSX-11S system generation on an RSX-11M host, you must copy [2,20]11SGEN.CMD and [2,20]11SGEN2.CMD from the 11SKIT distribution media. These indirect command files must be copied to [200,200] on the disk on which the system generation is to be performed. If your distribution kit is on disk(s), use the PIP Utility to copy the files. For example,

```
>PIP ddnn:[200,200]=ddnn:[2,20]11SGEN.CMD
```

If your kit is on magnetic tape(s), you can use the FLX Utility. For example,

```
>FLX ddnn:[200,200]=mmnn:[2,20]11SGEN.CMD
```

NOTE

If you have an RL01 distribution kit, the command files are on the volume labeled "11SKIT".

5.1.2 Invoking the System Generation Programs

Type the following command to invoke the Phase I system generation programs:

```
>@11SGEN.CMD
```

Type the following command to invoke the Phase II system generation programs:

```
>@11SGEN2.CMD
```

5.1.3 Notes for RSX-11S Version 4.2 System Generation on an RSX-11M Host

This section contains information you should consider before you begin the system generation process.

1. If you are running on an RL01 kit, be sure to make a copy of the RSX-11M kit because 11SGEN2 deletes selected files to make room for later stages of the RSX-11S system generation.
2. If you are performing an RL01 RSX-11S system generation, listing files (.LST) for privileged tasks are deleted automatically to provide room for the SYSGEN.

3. If you are generating the system from the baseline disk, you may have to load the device driver for the RSX-11S distribution kit medium. After the files have been copied, you must unload the driver.

   Whether you are generating the system on line or from the baseline disk, you must dismount (and deallocate if you are on a multiuser system) the RSX-11S distribution kit device before you invoke the SYSGEN command procedure.

4. If you are generating the system on line, assign the baseline disk to be your system disk as follows:

   ```
   ASN ddnn:=SY:
   ```

5. Always perform the RSX-11S system generation with the command files in UFD [200,200].

6. You may want to do a preliminary system generation before you do your actual SYSGEN. To do a preliminary SYSGEN (PREPGEN), invoke the command file for Phase I of the SYSGEN (@11SGEN) and answer YES to the question, "Do you want to inhibit execution of MCR commands (PREPGEN)?"

   Phase I continues, but the answers you give to the questions are placed in a saved answer file instead of being used immediately. When Phase I finishes, reinvoke 11SGEN.CMD to run the phase again. This time, you do not inhibit MCR command line execution and the SYSGEN procedure uses the answers in the saved answer file.

   Performing a PREPGEN saves time and prevents mistakes. The sample dialog in Section 5.2 shows a PREPGEN being done before the actual SYSGEN.

7. During Phase I of the system generation procedure, 11SGEN.CMD asks for your system's device configuration and requests the system directives you would like in the Executive. In both cases, you may print out a table of the available options before you answer the question.

For further information on generating the RSX-11S system, refer to Chapter 4.

5.2 SYSGEN DIALOG ON AN RSX-11M HOST SYSTEM

This section contains an example of the text of a typical terminal dialog from an RSX-11S system generation on an RSX-11M host.

The dialog and procedures in Phase I are the same for RSX-11M and RSX-11S; for detailed explanations of the Phase I system generation questions, see the RSX-11M System Generation and Installation Guide.

The system generated in the example in this chapter supports the following hardware configuration for a PDP-11/23 processor:

```
128K memory
60    cycle line clock
1     RL02 cartridge disk controller with two drives
1     TU58 DECtape controller with two drives
1     LP11 line printer controller
1     null device driver
1     DZV11 terminal interface
1        DLV11 terminal interface
```

The following software support is included:

- Large (20K) RSX-11S Executive
- Support for:

  Executive common
  Memory management
  Send/receive directives
  Get mapping context directive
  Address checking
  I/O rundown
  Loadable device drivers
  ASTs
  Powerfail recovery
  Logical device assignment
  Crash notification
  Group-global event flags
  Memory parity

- TKTN
- XDT
- System-controlled partitions
- Basic MCR with support for OPEN, ATL/TAL, and full error-message text
- OTL with support for full error-message text and for all OTL devices generated into the RSX-11S system
- SIP with support for full error-message text and for all SIP devices generated into the RSX-11S system
- RSDV1H
- RSX-11S File Control Services (FCS) subset

The system generation is being performed on an RSX-11M Version 4.2 RL02 baseline system disk. The RSX-11S release kit consists of one RL02 labeled, "11SKIT".

Questions calling for a YES/NO answer can be answered by pressing the RETURN key for a "NO" answer. (This is the default answer.)

By pressing the RETURN key, you may specify the default answer to a question that asks for a value. This default value is displayed on the terminal screen.

5.3 EXAMPLE OF AN RSX-11S SYSTEM GENERATION DIALOG ON AN RSX-11M HOST SYSTEM

Following is the actual dialog for an RSX-11S system generation on an RSX-11M host system.

```
   RSX-11M V4.2 BL38   124.k Mapped (BASELINE)
>RED DL:=SY
>RED DL:=LB:
>MOU DL:RSXM38
>@DL:[1,2]STARTUP
```

```
>* PLEASE ENTER TIME AND DATE (HR:MN DD-MMM-YY) [S]: 13:40 29-MAY-85
>TIM 13:40 29-MAY-85
>* ENTER WIDTH OF THIS TERMINAL [D D:132.]:
>SET /BUF=TI:132.
>ACS SY:/BLKS=512.
>@ <EOF>
>MOU DL1:11SKIT
>INS $PIP
>PIP DL0:[200,200]/NV=DL1:[2,20]11SGEN.CMD,11SGEN2.CMD
>DMO DL1:
DMO -- TT0:    dismounted from DL1:    *** Final Dismount Initiated ***
13:40:50  *** DL1: -- Dismount complete

>@11SGEN
>;
>; RSX-11S Version 4.2 BL38 System Generation done on RSX-11M
>;
>; Copyright (C) 1979,1981,1983,1985
>; Digital Equipment Corporation, Maynard, Mass.
>; All Rights Reserved.
>;
>;
>; RL01/RL02 distribution kit
>;
>*  3. Do you want to inhibit execution of MCR commands? [Y/N]: Y
>* 3A. Do you want to create the assembly and build files on the SY: device? [Y/N D:Y] N
>*  5. Are you generating a mapped system? [Y/N]: Y
>*  6. Use an input saved answer file? [Y/N]:
>*  9. Name of output saved answer file [D: SYSSAVED.CMD] [S]:
>;
>; Phase I output saved answers created in file DL0:[200,200]SYSSAVED.CMD;1
>;
>* 16. enter device for EXCPRV disk when it is ready (ddu:) [D: DL1:] [S]: DL1:
>MOU DL1:EXCPRV
>;
>; Target configuration
>;
>*  1. Processor Type [D: 11/34]  [S]: 11/23
>*  2. Does processor have a switch register? [Y/N D:N]:
>*  3. Memory Size (in K-word blocks) [D R:16.-1920. D:16.]: 128.
>*  4. Include support for K-series devices? [Y/N D:N]:
>*  6. Floating point processor (FP-11) present? [Y/N D:N]: Y
>*  8. Extended instruction set (EIS) present? [Y/N D:N]:
>* 10. Line frequency: A- 60 HZ B- 50 HZ [D: A] [S]:
>* 11. KW11-Y Watchdog timer support? [Y/N D:N]:
>* 12. Memory parity support? [Y/N D:N]: Y
>;
>; The response to the following question specifies the highest interrupt
>; vector.  If you respond with a value less than or equal to 400, SYSGEN
>; will assign the value associated with the highest interrupt vector
>; specified during the Peripheral Section.  Therefore, if your system
>; will include devices that are not specified during the Peripheral
>; Section and which have vectors above 400 (devices such as K-series and
>; certain communication devices), specify that value in the next question.
>;
>* 14. Highest interrupt vector [O R:0-774 D:0]:
>;     For device configuration: "*" Prints device table, "."  Terminates inquiry
>;                               "?" Prints current configuration
>;     Enter devices and number of controllers for devices which require drivers
>* 15. Devices [S]: *
>;
>;    Device codes for A/D and industrial/laboratory devices:
>;
```

```
>;      AD- AD01-D A/D Converter
>;      AF- AFC11 A/D Converter
>;      AR- AR11 Laboratory Subsystem
>;      IC- ICR11/ICS11 Industrial Control Subsystem
>;      IS- DRS11/DSS11 Industrial Control Subsystem
>;      LA- LPA11 Laboratory Subsystem
>;      LS- LPS11 Laboratory Subsystem
>;      UD- UDC11 Universal Digital Controller
>;
>;    Device codes for Interprocessor communication devices:
>;
>;      XB- DA11-B Interprocessor Link
>;      XE- DEUNA Unibus Ethernet Controller
>;      XL- DL11-E Interprocessor Link
>;      XM- DMC11-E/DMR11 Interprocessor Link
>;      XP- DP11 Synchronous Interface
>;      XQ- DQ11 Synchronous Interface
>;      XU- DU11 Synchronous Interface
>;      XW- DUP11 Synchronous Interface
>;
>;    Device codes for unit record devices:
>;
>;      CR- CR11/CM11-E Card Reader
>;      GR- VT11/VS60 Graphics Subsystem
>;      LP- LA11/LP11/LS11/LV11/LN01 Line Printer
>;      PP- PC11 Paper Tape Punch
>;      PR- PC11/PR11 Paper Tape Punch and Reader
>;
>;    Device codes for disks devices:
>;
>;      DB- RP04/RP05/RP06 Disk Drive
>;      DD- TU58 Cartridge DECtape II
>;      DF- RF11 Fixed Head Disk Drive
>;      DK- RK03/RK05 Disk Drive
>;      DL- RL01/RL02 Disk Drive
>;      DM- RK06/RK07 Disk Drive
>;      DP- RP02/RP03 Disk Drive
>;      DR- RM02/RM03/RM05/RM80 Disk Drive
>;      DS- RS03/RS04 Fixed Head Disk Drive
>;      DT- TU56 DECtape
>;      DU- RA60/RA80/RA81/RC25/RD51/RD52/RD53/RX50 Disk Drive
>;      DX- RX01 Floppy Disk Drive
>;      DY- RX02 Floppy Disk
>;      EM- ML11 Non-Rotating Electronic Memory
>;
>;    Device codes for Magnetic tape devices:
>;
>;      CT- TU60 Cassette Tape Drive
>;      MM- TU16/TU45/TU77/TE16 Magtape Drive
>;      MS- TS11/TU80/TSV05 Magtape Drive
>;      MT- TU10/TE10/TS03 Magtape Drive
>;      MU- TU81/TK50 Magtape Drive
>;
>;    Device codes for terminal interface devices:
>;
>;      YH- DH11 Asynchronous Terminal Interface
>;      YV- DHU11/DHV11 Asynchronous Terminal Interface
>;      YJ- DJ11 Asynchronous Terminal Interface
>;      YL- DL11-A/-B/-C/-D/-E/-J/-W Asynchronous Terminal Interface
>;      YZ- DZ11/DZV11 Asynchronous Terminal Interface
>;
```

```
>;    Device codes for pseudo devices:
>;
>;      CO- console device
>;      NL- null device
>;
>;     Enter responses as: dev1=number controllers,dev2=number controllers, ...
>;     If a device is specified without the number of controllers, the number
>;     of controllers defaults to 1.
>;
>;     Example: DK,DM=2,YL,NL.
>;
>* 15. Devices [S]: DD,DL,LP,NL,YL,YZ.
>;
>; Processor:11/23  Memory Size:128K,Mapped  System:RSX-11S
>;
>; Host configuration
>;
>*  1. Is a line printer available? [Y/N]: Y
>*  3. Does the listing/map device have at least 120 columns? [Y/N]: Y
>*  4. Assembly listings device (ddu:) [D: "NL:"] [S]:
>*  5. Map device for Executive and device drivers (ddu:) [D: DL1:] [S]:
>;
>* EOS * Do you want to: <CR>-continue R-repeat section E-exit P-pause [S]:
>;
>; Executive Options
>;
>;     Answer Y(ES) if the following support is desired
>;
>*  6. Executive common? [Y/N]: Y
>*  7. Memory management (PLAS) directives? [Y/N]: Y
>*  8. Send/Receive by reference directives? [Y/N]: Y
>*  9. Get mapping context directive? [Y/N]: Y
>;     Address checking support will be included
>;     I/O rundown support will be included
>* 15. Loadable device drivers? [Y/N]: Y
>* 16. Should the default for all applicable drivers be loadable? [Y/N]: Y
>;     AST support will be included
>* 18. Include support for Cancel Selective Marktime? [Y/N]: Y
>* 19. Task termination and device not ready messages (TKTN)? [Y/N]: Y
>* 20. Power fail recovery? [Y/N]: Y
>* 22. Large (20K) Executive? [Y/N]: Y
>* 23. Logical device assignment? [Y/N]: Y
>* 25. Do you intend to include a user-written driver? [Y/N]:
>* 30. Executive Debugging Tool (XDT)? [Y/N]:
>* 32. Include support for communications products (such as DECnet)? [Y/N]:
>* 33. System controlled partitions? [Y/N]: Y
>* 36. Group global event flags? [Y/N]: Y
>;
>;     For directives:
>;
>;     * - Prints the table
>;     . - Terminates inquiry
>;     % - Gets all valid directives and terminates inquiry
>;
>* 37. Enter code for system directives [S]: *
>;
>;     A- Get partition parameters   B- Get task parameters
>;     C- Send/Receive               D- Alter priority
>;     E- Extend task                F- Connect to interrupt vector
>;     G- Get sense switch           H- Set system time
>;     I- Stop bit                   J- Specify requested exit AST
>;     K- Parent offspring tasking   L- Parent offspring tasking with chaining
>;
>;     Enter responses as code1code2code3... (no commas) (e.g.: ABCDF.)
>;
```

```
>* 37. Enter code for system directives [S]: %
>* 38. Number of pre-allocated QIO packets [D R:0.-15. D:5.]:
>* 39. Size of data transfer vector in words [D R:0.-33. D:33.]:
>* 40. Round-robin scheduling interval in ticks [D R:0.-1000. D:5.]:
>* 41. Highest priority class for consideration [D R:1.-249. D:150.]:
>* 42. Lowest priority class for consideration [D R:1.-150. D:1.]:
>* 46. Seconds between printer not ready messages [D R:0.-255. D:30.]:
>* 48. System crash register and stack dump device CSR [O R:0-177700 D:177564]:
>* 51. Crash dump analysis:  A- PANIC  B- Crash Dump Analysis (CDA)  C-None   [D:  B] [S]:
>* 52. CDA output notification device CSR [O R:160000-177700 D:177564]:
>* 53. Enter CDA memory dump device mnemonic (ddu:) [S R:3-4]: DL1:
>* 54. Enter CDA memory dump device CSR [O R:160000-177700 D:177404]:
>;
>* EOS *  Do you want to: <CR>-continue R-repeat section E-exit P-pause [S]:
>;
>;
>; Terminal driver options
>;
>*  1. Terminal driver desired (A/B/C/D, * prints table) [S]: *
>;
>;     Terminal drivers:  A- Tailorable half duplex
>;                          B- Tailored half duplex (user-oriented)
>;                          C- Full duplex
>;                          D- Baseline half duplex
>;
>*  1. Terminal driver desired (A/B/C/D, * prints table) [S]: C
>*  2. Unsolicited input timeout value in seconds [D R:0.-255. D:120.]:
>;
>;     Answer Y(ES) if the following support is desired
>;
>*  6. Unsolicited input character AST? [Y/N]: Y
>*  8. Breakthrough write? [Y/N]: Y
>;     CTRL/R support will be included
>* 10. Escape sequence handling? [Y/N]: Y
>* 11. Get multiple characteristics? [Y/N]: Y
>* 12. Set multiple characteristics? [Y/N]: Y
>* 13. Get terminal driver options? [Y/N]: Y
>* 17. Read after prompt? [Y/N]: Y
>* 20. CRT rubout support? [Y/N]: Y
>* 25. Hardware unrecoverable input error notification? [Y/N]: Y
>* 26. Device independent cursor positioning? [Y/N]: Y
>;
>* EOS * Do you want to: <CR>-continue R-repeat section E-exit P-pause [S]:
>;
>;
>; System Options
>;
>;
>;     Answer Y(ES) if the following support is desired
>;
>*  2A. Include support for the IP11 Industrial I/O Subsystem? [Y/N]:
>* 11. What name would you like to give your system [D: RSX11S] [S R:0-6]:
>;
>* EOS * Do you want to: <CR>-continue R-repeat section E-exit P-pause [S]:
>;
>;     Thinking ...
>; End of Executive option generation at 13:51:09 on 29-MAY-85
>;
>; Peripheral Configuration
>;
>;     Parameters appearing in square brackets "[...]" can only be
>;     specified for the first controller of a particular device.
>;     Parameters appearing in parentheses "(...)" only need be specified
>;     if the indicated option is present on the target system.
>;
```

```
>;     The default for loadable drivers has been set to *TRUE*.
>;     To override this setting enter R (resident) as the first parameter
>;     for the first controller of the specified device.
>;
>; A/D and Laboratory devices: None specified
>;
>; Interprocessor communication devices: None specified
>;
>; Unit record devices: LP
>;
>; Enter [L/R,] vector, CSR, printer option
>;              (,[KMC timeout count <0=no KMC>, KMC vector, KMC CSR]) for:
>;
>* 16. LP controller 0 [D: 200,177514,LA180,0,300,160130] [S]:  ,,LP11-B
>;
>; Disks: DD, DL
>;
>; Enter [L/R,] vector, CSR, number of drives for:
>;
>*  3. DD controller 0 [D: 300,176500]              [S]: ,,2
>;
>*  3. DL controller 0 [D: 160,174400]              [S]: ,,2
>* 53. Contr 0 unit 0. is an RL01/RL02 [D: RL01]    [S]: RL02
>* 53. contr 0 unit 1. is an RL01/RL02 [D: RL01]    [S]: RL02
>;
>; Tapes: None specified
>;
>; Non-physical (pseudo) devices: CO, NL, TI, CL, LB, SY
>;
>; Terminal interface devices: YL, YZ
>;
>; Enter vector, CSR, E=DL11-E modem support/NO=no for:
>;
>* 21. YL controller 0 [D: 60,177560,NO]           [S]:
>;
>; Enter vector, CSR, highest line number <0 to 7> [, answer speed] for:
>;
>* 24. YZ controller 0 [D: ,160100,,300]           [S]: 310,160100,3,300
>;
>* EOS *  Do you want to: <CR>-continue E-exit P-pause [S]:
>;
>;
>; End of interrupt vector area has been set to 400
>;
>;
>; Create Executive build files
>;
>;
>*  1. Do you wish to edit any of the Executive files? [Y/N]: N
>;
>;
>* EOS * Do you want to: <CR>-continue R-repeat section E-exit P-pause [S]:
>;
>;
>;
>; Prepare for task building
>;
>;
>; Clean-up extraneous object files
>;
>;
>* EOS * Do you want to: <CR>-continue R-repeat section P-pause [S]:
>DMO DL1:EXCPRV
DMO -- TT0:    dismounted from DL1:    *** Final dismount initiated ***
13:59:48  *** DL1: -- Dismount complete
```

```
>;
>; End of 11SGEN phase I at 13:59:50 on 29-MAY-85
>;      -- To continue type: @[200,200]11SGEN2
>;
>@ <EOF>
>
>@11SGEN
>;
>; RSX-11S Version 4.2 BL38 System Generation done on RSX-11M
>;
>; Copyright (C) 1979,1981,1983,1985
>; Digital Equipment Corporation, Maynard, Mass.
>; All Rights Reserved.
>;
>;
>; RL01/RL02 distribution kit
>;
>*  3. Do you want to inhibit execution of MCR commands (PREPGEN)? [Y/N]: N
>INS $UFD
>INS $EDI
>INS $LBR
>INS $INI
>INS $MAC
>*  4. Have you made a copy of the distribution kit? [Y/N]: Y
>*  5. Are you generating an unmapped system? [Y/N]: N
>*  6. Use an input saved answer file? [Y/N]: Y
>*  7. Name of input saved answer file [D: SYSSAVED.CMD] [S]:
>;
>; Phase I input saved answers
>; created on 29-MAY-85 at 14:01:05
>; by 11SGEN version 2.10
>; are from file DL0:[200,200]SYSSAVED.CMD;1
>;
>*  9. Name of output saved answer file [D: DL0:[200,200]SYSSAVED.CMD] [S]:
>;
>; Phase I output saved answers created in file DL0:[200,200]SYSSAVED.CMD;2
>;
>* 10.Use saved host configuration? [Y/N]: Y
>* 11.Use saved peripheral configuration? [Y/N]: Y
>* 12:Skip end of section (EOS) breakpoints? [Y/N]: Y
>* 13.Skip end of execution (EOX) breakpoints? [Y/N]: Y
>* 14.Clean up files from previous GENs? [Y/N]: Y
>* 16.Enter device for EXCPRV disk when it is ready (ddu:) [D: DL1:] [S]:
>;
>MOU DL1:EXCPRV
>SET /UIC=[1,1]
>PIP [1,20]RSXBLD.CMD;*/DE/NM
>PIP [11,20]*.OBJ;*/DE/NM,*.UDC;*,*.ICR;*,*.IDS;*,*.PCS;*
>PIP [11,24]*.OBJ;*/DE/NM,*.UDC;*,*.ICR;*,*.IDS;*,*.TTY;*,*.PCS;*
>PIP [11,10]RSXMC.MAC;*/DE/NM,ICTAB;*,[200,200]SGNPARM.CMD;*
>PIP [200,200]RSXBLD.CMD;*/DE/NM,TTDRVBLD;*
>PIP SY:[11,20]RSXASM.CMF;*.DE.NM,RSXDRVASM;*.[12,20]MCRSETASM;*
>PIP SY:[11,24]RSXASM.CMF;*.DE.NM,RSXDRVASM;*.[12,20]MCRSETASM;*
>PIP DL1:[11,24]RSXASM.CMF;*.DE.NM,RSXDRVASM;*.[12,20]MCRSETASM;*
>PIP /FR

DL0: has 13825. blocks free, 6655. blocks used out of 20480.
Largest contiguous space = 9578. blocks
1383. file headers are free, 153. headers used out of 1536.
```

```
>SET /UIC=[11,10]
>;
>; Target configuration
>;
>: Processor:11/23   Memory Size:128k, Mapped   System:RSX-11S
>;
>;           Floating Point Processor
>;           Parity Memory
>;
>; Host Configuration
>;
>; Executive Options
>;
>; Terminal driver options
>;
>; System Options
>;
>;
>;     Thinking...
>; End of Executive option generation at 14:10:40 on 29-MAY-85
>;
>; Peripheral configuration
>;
>;     Parameters appearing in square brackets "[...]" can only be
>;     specified for the first controller of a particular device.
>;     Parameters appearing in parentheses "(...)" only need be specified
>;     if the indicated option is present on the target system.
>;
>;     The default for loadable drivers has been set to *TRUE*.
>;     To override this setting enter R (resident) as the first parameter
>;     for the first controller of the specified device.
>;
>; A/D and Laboratory devices: None specified
>;
>; Interprocessor communication devices: None specified
>;
>; Unit record devices: LP
>;
>; Disks: DD, DL
>;
>; Tapes: None specified
>;
>; Non-physical (pseudo) devices: CO, NL, TI, CL, LB, SY
>;
>; Terminal interface devices: YL, YZ
>;
>SET /UIC=[1,24] ! Creating TTDRVBLD.CMD
>SET /UIC=[11,10]
>; End of interrupt vector area has been set to 400
>;
>;
>; Create Executive build files
>;
>; PIP RSXMC.MAC=DL1:RSXMC0.MAC/AP
>ASN SY:LB:
>;
>; Start of Executive assembly at 14:15:38 on 29-MAY-85
>SET /UIC=[11,24]
>MAC @SY:RSXASM
>;
>; End of Executive assembly at 14:33:22 on 29-MAY-85
>;
>:
```

```
>; Start of device drivers assembly at 14:33:23 on 29-MAY-85
>MAC @SY:RSXDRVASM
>;
>; End of device drivers assembly at 14:46:34 on 29-MAY-85
>ASN =LB:
>;
>; Prepare for task building
>;
>SET /UIC=1,24]
>PIP RSX11S.OBS=[11,24]*.OBJ
>PIP TTDRV.PBJ=[11,24]*.TTY
>LBR RSX11S/CR:100.:1010.:128.=RSX11S.OBS
>LBR TTDRV/CR:30.:380.:64.=TTDRV
>PIP /NV=[11,10]RSXBLD.CMD
>PIP [11,10]RSXBLD.CMD;*/DE/NM
>REM LBR
>;
>; Clean-up extraneous object files
>;
>PIP RSX11S.OBS;*/DE/NM,TTDRV.OBJ;*[11,24]*.OBJ;*,*/TTY;*
>DMO DL1:EXCPRV
DMO -- TT0:    dismounted from DL1:    *** Final dismount initiated ***
10:25:16  *** DL1: -- Dismount complete

>REM MAC
>REM UFD
>REM INI
>REM EDI
>;
>; End of 11SGEN phase I at 14:52:18 on 29-MAY-85
>;     -- To continue type: @[200,200]11SGEN2
>;
>SET /UIC=[200,200]
>@ <EOF>



>@[200,200]11SGEN2
>;
>; RSX-11S Version 4.2 BL38 System Generation Phase II
>;
>; Copyright (C) 1975,1981,1983,1985
>; Digital Equipment Corp., Maynard, MA.  01754
>; All Rights Reserved.
>;
>;      Build The Executive And All Required Tasks
>;
>; This command file will produce the target system on your SY: disk.
>; If it is an RL01 or an RL02, this command file will delete a number
>; of files from this disk to make room for those required to complete
>; this 11SGEN.  You must be running on an expandable copy of
>; your disk.  Note however, that the disk will be left in a
>; state such that RSX-11S sysgens may be performed at a later
>; date.  In addition, the sysgen itself may be terminated and
>; may be restarted at just about any point to rebuild particular
>; pieces of the system.
>;
>* In what UIC is SGNPARM.CMD if not [2,200] [S]:
>; RL01/RL02 distribution kit 11SGEN version 2.10 for RSX-11M BL38
>;
```

```
>; Continuation from 11SGEN PHASE I done on 29-MAY-85 at 14:48:11
>TIM
17:51:36 29-MAY-85
>;
>; The map device specified must already be mounted with UIC [1,34].
>; If it is not, respond to the next question with ^Z and do so.
>;
>* In which device is the PRVBLD disk [DDU:] [S]: DL1:
>MOU DL1:PRVBLD
>ASN SY:=LB:
>;
>; Expanded comments provide a complete description of every step in
>; this 11SGEN command file.  On the other hand, short comments
>; provide virtually no explanatory text.
>;
>* Do you want expanded comments? [Y/N]: Y
>;
>; Make room on the basline disk to complete the 11SGEN
>;
>SET /UIC=[1,1]
>PIP [1,34]*.*/PU/NM
>PIP [1,54]CTDRV.TSK;*/DE/NM,DBDRV.TSK;*,DPDRV.TSK;*,DRDRV.TSK;*
>PIP [1,54]CTDRV.STB;*/DE/NM,DBDRV.STB;*,DPDRV.STB;*,DRDRV.STB;*
>PIP [200,200]SYSGEN2.CMD;*/DE/NM
>PIP /FR

DL0: has 12902. blocks free, 7578. blocks used out of 20480.
Largest contiguous space = 9578. blocks
1343. file headers are free, 193. headers used out of 1536.

>;
>; Create RSX-11S subset system library
>; if you have not already done so.
>;
>* Have you already created 11SLIB.OLB? [Y/N]: N
>LBR LB:11SLIB/CR:30.:896.:320.
>REM LBR
>* Have you already built the Exec? [Y/N]: N
>SET /UIC=[1,24]
>;
>; Purge Exec build command files and assembly prefix files
>;
>PIP RSXBLD.CMD/PU/NM
>PIP [11,10]RSXMC.MAC/PU/NM
>:
>; Now we build the Executive
>; If you must make changes to the Executive build files
>; answer yes to the following question. Edit RSXBLD.CMD
>; by issuing the command  EDI LB:RSXBLD.EMD. 11SGEN2 will
>; build the Executive after you resume from the pause.
>;
>* Do you wish to edit the Executive build file? [Y/N]: N
>INS SY:$TKB
>TKB @LB:RSXBLD
>* Did the Executive build successfully? [Y/N]: Y
>;
>; You now need the Executive maps to layout
>; the partitions in you new system.
>;
>; Do you have the maps already? [Y/N]: Y
>;
```

```
>; Look in the map of the Exec for the symbol "$SYTOP" which
>; indicates the last address allocated to the Exec.  User
>; partitions may start at any location beyond this address
>; as long as they fall on a 64 byte boundary.  See the RSX-11M
>; Sysgen manual for a description of how to set up partitions.
>; You may wish to stop at this time to layout your partitions.
>;
>SET /UIC=[1,64]
>* Do you want to build any loadable drivers now? [Y/N]:
>SET /UIC=[1,24]
>PIP RSX11S.OBJ;*/DE/NM
>* Have you already built the full duplex terminal driver? [Y/N]: Y
>* Do you want to continue and build the privileged tasks? [Y/N]: Y
>DMO DL1:
DMO -- TT0:    dismounted from DL1:    *** Final dismount initiated ***
17:53:06  *** DL1: -- Dismount complete
>;
>; Prepare to assemble and build the RSX-11S privileged
>; software components.
>;
>; The tasks TKTN, BASMCR, OTL, and SIP must be assembled, and the
>; task build command files possibly edited before they can be built.
>; The tasks RSDV05, RSDV52, and RSDV1H need only to be built, but
>; their command files may also be edited before they are built.
>; It is not necessary to save/print the assembly listings;
>; However, we recommand that you save/print the task build
>; maps.  This is especially important when generating
>; an unmapped system -- without maps it will be difficult
>; to determine partition limits.
>;
>* Assembly list device for privileged tasks (DDNN:) [D: NL:] [S]:
>* Map device for privileged tasks (DDNN:) [D: SY:] [S]:
>* Have you already built task TKTN? [Y/N]: N
>;
>; Task TKTN will be included in your 11S system as a result
>; of your selection in 11SGEN Phase I.
>;
>;
>; The privileged tasks BASMCR, OTL, and SIP were specially designed
>; for use in the RSX-11S environment.  Their inclusion in the system
>; is optional.  If desired, they will be assembled and built under
>; control of this command file.
>;
>* Do you wish to include BASMCR, OTL, or SIP in your system? [Y/N]: Y
>;
>; The tasks RSDV05, RSDV52, and RSDV1H dynamically display
>; the status of memory on a graphics terminal and can be built
>; for the VT05B terminal, VT52 terminal, and VT100 terminal
>; respectively.  These tasks display which tasks are in memory
>; and where in memory they reside, which task is currently
>; running, and the status of pool.
>;
>* Do you want to include RSDV05, RSDV52, or RSDV1H? [Y/N]: Y
>;
>; The RSX-11S subset file control services (FCS) are dist-
>; ributed as a single file containing the concatenated object
>; modules.  They cannot be placed in the RSX-11M system object
>; library (SYSLIB.OLB).  However, users who require this FCS
>; should link with the RSX-11S subset of SYSLIB (11SLIB.OLB)
>; created during this Sysgen.
>;
```

```
>* Do you wish to include the RSX-11S subset FCS? [Y/N]: Y
>;
>; If you have previously done an RSX-11S Sysgen on this disk, all
>; of the files were transferred to the UFD [2,20]. These were
>; optionally deleted by the Sysgen process.  Therefore, unless
>; it was specified to delete the files or they were later
>; deleted independently, there is no need to copy all of the
>; files from the release kit again.
>;
>* Do you have to copy the files from the release kit? [Y/N]: Y
>* Enter device and unit of RSX-11S distribution kit (DDNN:) [S]: DL1:
>;
>; Place the RSX-11S release kit cartridge disk in drive DL1:
>;
>* Is the disk ready in drive DL1:? [Y/N]: Y
>SET /UIC=[2,20]
>INS SY:$UFD
>UFD SY:[2,20]
UFD -- Directory already exists
>REM UFD
>PIP *.*;*/DE/NM
>MOU DL1:11SKIT
>PIP SY:=DL1:
>DMO DL1:
DMO -- TT0:    dismounted from DL1:    *** Final dismount initiated ***
17:57:04  *** DL1: -- Dismount complete

>SET /UIC=[11,10]
>* Do you wish to make corrections to RSX-11S source modules? [Y/N]:
>INS SY:$MAC
>SET /UIC=[1,24]
>MAC @TKNASM
>PIP TKNASM.CMD;*/DE
>REM MAC
>;
>; The task build command file for TKTN specifies that it run in
>; partition SYSPAR, having a length of 3700 octal.
>; If you must change the partition name or length,
>; you will have to edit its task build command file.
>;
>* Do you have to edit the task build command file for TKTN? [Y/N]:
>INS SY:$TKB
>TKB @TKN11SBLD.CMD
>REM TKB
>;
>; BASMCR is a privileged task which supplies a subset (or basic
>; set) of the RSX-11M MCR commands.  It cannot be included if
>; during SYSGEN Phase I you indicated that you did not want any
>; terminal devices.  Its size, depending upon options, ranges
>; from 6400 to 14000 octal on mapped systems.
>;
>* Do you want to include task BASMCR? [Y/N]: Y
>INS SY:$UFD
>UFD SY:[16,10]
>UFD SY:[16,24]
>REM UFD
>SET /UIC=[16,10]
>PIP BMPRE.MAC;*/DE/NM
>PIP *.MAC;*/RM/NM
>PIP [16,*]*.*;*/DE/NM
>PIP [16,10]=[2,20]BMPRE.MAC
```

```
>PIP [16,10]/EN=[2,20]ABOBAS.MAC,ATLBAS,BRKBAS,ERRBAS,ERRMSG
>PIP [16,10]/EN=[2,20]FMTDV.MAC,FNDUCB,GNBLK,GETNUM,KEYWD
>PIP [16,10]/EN=[2,20]LKLST.MAC,MCRBAS,OPEBAS,PRSBAS,REDBAS
>PIP [16,10]/EN=[2,20]REMBAS.MAC,RPSBAS,RUNBAS,TIMBAS
>SET /UIC=[16,24]
>;
>; The size of BASIC MCR is dependent upon the inclusion of
>; conditional assembly code.  The inclusion of the code is
>; controlled by symbol definitions appearing in an assembly
>; prefix file.  The default for these conditionals is
>; exclusion.  The following options, along with the corres-
>; ponding control symbols, are available:
>;
>;      R$$ATL - ATL/TAL COMMANDS
>;      R$$ERM - ERROR MESSAGE TEXT
>;      R$$OPE - OPEN COMMAND
>;
>; To include an option locate the desired conditional symbol
>; and remove the semicolon at the beginning of the line.  For
>; example:
>;
>;      *PL ;R$$ATL
>;      ;R$$ATL = 0              ;INCLUDE ATL
>;      *C /;//
>;      R$$ATL = 0               ;INCLUDE ATL
>;      *
>;
>; Repeat this for all desired options.  Note that the symbols
>; appear on consecutive lines in alphabetical order in the file.
>;
>* Do you wish to edit the assembly prefix file for BASMCR? [Y/N]: Y
>EDI [16,10]BMPRE.MAC
[00029 lines read in]
[Page    1]
*PL ;R$$ATL
;R$$ATL = 0                ; INCLUDE ATL
*C /;//
R$$ATL =  0          ; INCLUDE ATL
*PL ;R$$ERM
;R$$ERM = 0                ; INCLUDE ERROR MESSAGES
*C /;//
R$$ERM =  0                ; INCLUDE ERROR MESSAGES
*PL ;R$$OPE
;R$$OPE = 0                ; INCLUDE OPEN
*C /;//
R$$OPE  = 0                ; INCLUDE OPEN
*EX
[Exit]

>INS SY:$MAC
>MAC @BASMCRASM.CMD
>REM MAC
>SET /UIC=[1,24]
>PIP [16,10]BMPRE.MAC;*/DE/NM
>PIP [16,10]*.MAC;*/RM/NM
>PIP BASMCR.OBJ=[16,24]*.OBJ
>PIP [16,24]*.*;*/DE/NM
>LBR BASMCR/CR:21.:64.:64.=BASMCR
>PIP BASMCR.OBJ;*/DE/NM
>;
```

```
>; The task build command file for BASMCR specifies that it
>; run in partition MCRPAR, length 16000 octal (mapped).
>; If you must change the partition name or length,
>; you will have to edit its task build command file.
>;
>* Do you wish to edit the task build command file for BASMCR? [Y/N]:
>INS SY:$TKB
>TKB @BASMCRBLD.CMD
>REM TKB
>;
>; OTL is a privileged task which is the RSX-11S on-line task loader.
>; It performs the install, load, and fix functions for tasks which
>; were created on a host development system and copied via FLX to a
>; load medium.  Depending on the number of load devices, etc, OTL
>; ranges from 8000 to 15000 octal on mapped systems.
>;
>* Do you want to include task OTL? [Y/N: Y
>INS SY:$UFD
>UFD SY:[20,10]
>UFD SY:[20,24]
>REM UFD
>SET /UIC=[20,10]
>PIP SY:OTLPRE.MAC;*/DE/NM
>PIP SY:*.MAC;*/RM/NM
>PIP [20,*]*.*;*/DE/NM
>PIP [20,10]=[2,20]OTLPRE.MAC
>PIP [20,10]/EN=[2,20]OTL.MAC,OTLCD,OTLCM,OTLERR
>PIP [20,10]/EN=[2,20]OTLHD.MAC,OTLLB,OTLLD,OTLQIO,OTLRD
>SET /UIC=[20,24]
>;
>; The size of OTL is dependent upon the inclusion of conditional
>; assembly code.  The inclusion of the code is done in two ways,
>; by a single symbol definition and by macro calls appearing
>; in an assembly prefix file.  The first controls the inclusion
>; of error message text.  To include this option, locate the
>; symbol R$$ERM, and remove the semicolon from the beginning
>; of the line.  The default for error message text is exclusion.
>; For example:
>;
>;       *PL ;R$$ERM
>;       ;R$$ERM=0
>;       *C /;//
>;       R$$ERM=0
>;
>; The other type of option concerns the exclusion of unwanted
>; device support.  For each of the OTL load devices which
>; were included in Sysgen Phase I, corresponding support will be
>; generated in OTL.  Naturally, support will not be generated for
>; those OTL load devices which were not included in SYSGEN Phase I.
>; The following devices along with corresponding control symbols
>; may be supported by OTL:
>;
>;       PR: - PR11, paper tape reader
>;       DX: - RX11, flexible disk
>;       DY: - RX21, flexible disk
>;       DU: - RX50, flexible diskette
>;       CT: - TA11, cassette tape
>;       DT: - TC11, DECtape
>;       MT: - TM11, magtape
>;       MS: - TS11, magtape
>;       MM: - TU16, magtape
>;       DD: - TU58, cartridge
>;
```

```
>; To exclude OTL support for a device which has been generated into
>: your RSX-11S Executive, locate the corresponding device symbol
>; and place a semicolon at the beginning of the line.  For example:
>;
>;      *PL PR11
>;              INCLUD PR11,P$$R11      ;PC11/PR11 paper tape reader
>;      *C //;/
>;      ;       INCLUD PR11,P$$R11      ;PC11/PR11 paper tape reader
>;      *
>;
>; Perform this for all of the above devices which will be part of
>; your RSX-11S Executive, but for which you do not want OTL
>; support.  Note that the symbols appear on consecutive lines in
>; alphabetical order in the file.
>;
>* Do you wish to edit the assembly prefix file for OTL? [Y/N]: Y
>EDI [20,10]OTLPRE.MAC
[00036 lines read in]
[Page    0]
*PL ;R$$ERM
[00036 lines read in]
;R$$ERM=0
*C /;//
R$$ERM=0
*EX
[Exit]

>INS SY:$MAC
>MAC @OTLASM.CMD
>REM MAC
>SET /UIC=[1,24]
>PIP [20,10]OTLPRE.MAC;*/DE/NM
>PIP [20,10]*.MAC;*/RM/NM
>PIP OTL.OBJ=[20,24]*.OBJ
>PIP [20,24]*.*;*/DE/NM
>LBR OTL/CR:21.:128.:64.=OTL
>LBR OTL=[2,20]BLXIOM
>PIP OTL.OBJ;*/DE/NM
>;
>; The task build command file for OTL specifies that it
>; run in partition OTLPAR, length 15000 octal (mapped).
>; If you must change the partition name or length,
>; you will have to edit its task build command file.
>;
>* Do you wish to edit the task build command file for OTL? [Y/N]:
>INS SY:$TKB
>TKB @OTLBLD.CMD
>REM TKB
>;
>; SIP is a privileged task which performs the RSX-11S system
>; image preservation duties.  It replaces the RSX-11M SAV MCR
>; command.  Depending on the number of load devices, etc, SIP
>; ranges from 3700 to 7400 octal on mapped systems.
>;
>* Do you want to include task SIP? [Y/N]: Y
>INS SY:$UFD
>UFD SY:[21,10]
>UFD SY:[21,24]
>REM UFD
>SET /UIC=[21,10]
>PIP SY:SIPPRE.MAC;*/DE/NM
>PIP SY:*.MAC;*/RM/NM
>PIP [21,*]*.*;*/DE/NM
```

```
>PIP [21,10]=[2,20]SIPPRE.MAC
>PIP [21,10]/EN=[2,20]SIP.MAC,SIPBOO,SIPCD,SIPERR
>PIP [21,10]/EN=[2,20]SIPLD.MAC,SIPQIO
>SET /UIC=[21,24]
>;
>; The size of SIP is dependent upon conditional assembly code
>; in exactly the same manner as OTL.  There are only a few minor
>; differences.  OTL supports the paper tape reader using the
>; control symbol PR11; SIP on the other hand supports the paper
>; tape punch using the control symbol PP11.  In addition, OTL
>; supports DECtape II cartridges using control symbol TU58,
>; TS11 magnetic tape drives using the control symbol TS11
>; and RX50 flexible diskettes using the control symbol RX50.
>; Edit SIPPRE.MAC in the same way described for OTL. For example:
>;
>;      *PL PP11
>;              INCLUD PP11,P$$P11      ;PC11/PP11 paper tape punch
>;      *C //;/
>;      ;       INCLUD PP11,P$$P11      ;PC11/PP11 paper tape punch
>;      *
>;
>* Do you wish to edit the assembly prefix file for SIP? [Y/N]: Y
>EDI [21,10]SIPPRE.MAC
[00036 lines read in]
[Page    0]
*PL ;R$$ERM
[00036 lines read in]
;R$$ERM=0
*C /;//
R$$ERM=0
*EX
[Exit]

>INS SY:$MAC
>MAC @SIPASM.CMD
>REM MAC
>SET /UIC=[1,24]
>PIP [21,10]SIPPRE.MAC;*/DE/NM
>PIP [21,10]*.MAC;/RM/NM
>PIP SIP.OBJ=[21,24]*.OBJ
>PIP [21,24]*.*;*/DE/NM
>LBR SIP/CR:20.:64.:64.=SIP
>PIP SIP.OBJ;*/DE/NM
>;
>; The task build command file for SIP specifies that it
>; run in partition SIPPAR, length 7400 octal (mapped).
>; If you must change the partition name or length,
>; you will have to edit its task build command file.
>;
>* Do you wish to edit the task build command file for SIP? [Y/N]:
>INS SY:$TKB
>TKB @SIPBLD.CMD
>REM TKB
>SET /UIC=[1,24]
>PIP RMD.OLB/NV=[2,20]RMDMAP.OLB
>* Do you want to include task RSDV05? [Y/N]:
>* Do you want to include task RSDV52? [Y/N]:
>* Do you want to include task RSDV1H? [Y/N]: Y
>;
>; The task build command file for RSDV1H specifies that it
>; run in partition RSDV1H, length 40000 (octal).
>; If you must change the partition name or length, you
>; will have to edit the task build command file.
>;
```

```
>; Do you wish to edit the task build command file for RSDV1H? [Y/N]:
>INS SY:$TKB
>TKB @RSDV1HBLD.CMD
>REM TKB
>;
>; Add subset FCS to the RSX-11S system object library.
>;
>SET /UIC=[1,1]
>LBR LB:11SLIB/RP=[2,20]FCS11S
>PIP LB:11SLIB.OLB/PU/NM
>SET /UIC=[1,64]
>PIP *.*/PU/NM
>PIP [1,24]*.*/PU/NM
>;
>; The operation left to be performed is that of the final
>; configuration of the virgin executive using Virtual MCR.
>;
>* Do you want to configure the Exec at this time using VMR? [Y/N]: Y
>;
>; The contents of your RSX-11S release kit currently resides
>; under the UFD [2,20].  If your SY: disk is not an RK06/07 or an
>; RP04/05/06 you may want to delete these files.  Leaving
>; them on the disk will save the time of re-copying them the next
>; time you perform an RSX-11S Sysgen.
>;
>* Do you want to delete the RSX-11S kit from this disk? [Y/N]:
>;
>; We will now make a copy of your target system
>;
>PIP RSX11S.SYS/NV/CO/BL:498.=RSX11S.TSK
>;
>; If you wish to make a copy of your task or system image file
>; on another device we will pause to allow you to do so.
>;
>* Do you wish to copy your system to another device? [Y/N]:
>;
>; RSX11S.TSK is a backup copy of the 11S system you have just built.
>; If you do not wish to retain it, we will delete it now.
>;
>* Do you wish to delete the system backup file RSX11S.TSK? [Y/N]:
>;
>; Your target system is now ready to set up partitions and install
>; the required tasks.  The procedure to follow is:
>;       1) Run Virtual MCR
>;       2) Extend POOl space to base of first partition
>;       3) Set up your partitions
>;       3B) Load needed drivers
>;       3C) Set up a partition for the Directive Common
>;       4) Install tasks (BASMCR, OTL, SIP, TKTN)
>;       5) Fix tasks into (virtual) memory
>;       6) Optionally set the time and save a copy of THE
>;          system on a bootable medium
>;       7) Exit from virtual MCR and boot in your target system
>;
>; VMR example:
>;
>;       >VMR                      ! RUN VIRTUAL MCR
>;       ENTER FILENAME:RSX11S.SYS  ! VMR PROMPTS FOR FILE NAME
>;       VMR>SET /POOL=XXX         ! EXTEND POOL TO FIRST PARTITION BASE
>;       VMR>SET /MAIN=TTPAR:XXX:XXX:TASK  !SET UP FULL DUPLEX TT PARTITION
>;       VMR>SET /MAIN=DRVPAR:XXX:XXX:TASK  ! SET UP DRIVER PARTITION
>;       VMR>SET /MAIN=EXCOM1:XXX:200:COM  ! SET 1ST EXEC. COMMON
>;       VMR>INS EXCOM1            !INSTALL 1ST EXECUTIVE COMMON
>;       VMR>SET /MAIN=EXCOM2:XXX:200:COM  ! SET 2ND EXEC. COMMON
```

```
>;      VMR>INS EXCOM2          !INSTALL 2ND EXECUTIVE COMMON
>;      VMR>SET /MAIN=SYSPAR:XXX:XXX:TASK  ! SET UP TKTN PARTITION
>;      VMR>SET /MAIN=MCRPAR:XXX:XXX:TASK  ! SET UP MCR PARTITION
>;      VMR>SET /MAIN=OTLPAR:XXX:XXX:TASK  ! SET UP OTL PARTITION
>;      VMR>SET /MAIN=SIPPAR:XXX:XXX:TASK  ! SET UP SIP PARTITION
>;      VMR>SET /MAIN=GEN:XXX:XXX:SYS  ! IF SYSTEM CONTROLLED PAR.
>;      VMR>SET /MAIN=GEN:XXX:XXX:TASK ! IF USER CONTROLLED PARTITION
>;      VMR>LOA XX:             ! LOAD XXDRV
>;      VMR>INS TKN/FIX=YES     ! INSTALL TASK TERMINATION TASK
>;      VMR>INS BASMCR/FIX=YES  ! INSTALL BASIC MCR
>;      VMR>INS OTL/FIX=YES     ! INSTALL ONLINE TASK LOADER
>;      VMR>INS SIP/FIX=YES     ! INSTALL SYSTEM PRESERVATION TASK
>;      VMR>TIM 10:45 05/30/85  ! SET TIME AND DATE
>;      VMR>SAV DX:RSX11S       ! SAVE SYSTEM ON RX01 FLOPPY
>;      VMR>^Z                  ! EXIT FROM VIRTUAL MCR
>;
>; End of VMR example
>;
>;
>;
>; Now we will run Virtual MCR so that you may initialize
>; your system.  Be sure to define all required partitions
>; at this time, because the SET function is not supported
>; in RSX-11S BASIC MCR.  Furthermore, if you plan to
>; include BASIC MCR and OTL in your system, they must
>; be installed and fixed into memory.  Other tasks,
>; such as SIP and TKTN may be loaded into a running
>; RSX-11S system using OTL.
>;
>;      NOTE: Since LOAD and UNLOAD are not supported on
>;      a running RSX-11S system, all required loadable
>;      drivers must be loaded using VMR.
>;
>;      NOTE: You have requested to include the
>;      directive common.  You must install the
>;      common prior to exiting Virtual MCR
>;      or your RSX-11S system will not boot.
>INS SY:$VMR
>VMR
Enter filename: RSX11S
VMR>SET /POOL=*
VMR>SET /MAIN=TTPAR:*:400:TASK
VMR>LOA TT:
VMR -- *DIAG*-Loadable driver larger than 4K
VMR>SET /MAIN=DRVPAR:*:*:SYS
VMR>LOA DD:
VMR>LOA DL:
VMR>LOA LP:
VMR>SET /TOP=DRVPAR:-*
VMR -- *DIAG*-Installed tasks may no longer fit in partition
VMR>SET /MAIN=EXCOM1:*:200:COM
VMR>INS EXCOM1
VMR -- *DIAG*-Partition reduced to executive common size
VMR>SET /MAIN=EXCOM2:*:200:COM
VMR>INS EXCOM2
VMR -- *DIAG*-Partition reduced to executive common size
VMR>SET /MAIN=SYSPAR:*:101:TASK
VMR>SET /MAIN=MCRPAR:*:137:TASK
VMR>SET /MAIN=OTLPAR:*:150:TASK
VMR>SET /MAIN=SIPPAR:*:74:TASK
VMR>SET /MAIN=RSDV1H:*:400:TASK
VMR>SET /MAIN=GEN:*:*:SYS
VMR>INS TKN/FIX=YES
VMR>INS BASMCR/FIX=YES
VMR>INS OTL/FIX=YES
VMR>INS SIP/FIX=YES
```

```
VMR>INS RSDV1H/FIX=YES
VMR>REA RSDV1H 1 TT1:
VMR>REA RSDV1H 2 TT1:
VMR>SAV DD1:11S
VMR -- *DIAG*-saved system truncated to 492. blocks
VMR>^Z
;
>;
>; When this command file completes, your RSX-11S system is
>; ready to run.
>;
>REM VMR
>SET /UIC=[200,200]
>TIM
11:17:10  30-MAY-85
>;
>@ <EOF>
>
```

CHAPTER 6

RSX-11S SYSTEM GENERATION ON AN RSX-11M-PLUS HOST SYSTEM

This chapter explains how to generate an RSX-11S system on an RSX-11M-PLUS host system.

6.1 PERFORMING AN RSX-11S SYSTEM GENERATION ON AN RSX-11M-PLUS HOST SYSTEM

Performing the RSX-11S system generation on an RSX-11M-PLUS host requires an that RSX-11S distribution kit be contained on one of the following medium:

- RK06
- RK07
- RL01 (two disks)
- RL02
- TK50
- Magnetic tape

In addition, you will need another disk on which to perform the RSX-11S system generation.

During the system generation process, a number of files will be transferred to this disk. The disk must have approximately 8000 free blocks to accommodate these files and the system generation of the target system.

You can perform an RSX-11S system generation on the host system disk or on another disk. If you use the host system disk, you can select group numbers during the system generation procedure for the RSX-11S system and Executive files. This will ensure that the group numbers will not conflict with the files already on the disk. The valid group numbers you may select are 3 through 10. The default group number is 3.

You may also select the group numbers if you use a disk other than the host system disk. However, the valid group numbers are 1 through 10 for the system files (1 is the default) and 1 through 11 for Executive files (11 is the default).

If you select alternate group numbers for the system and Executive files, note that you **must** specify the User File Directory (UFD) in the command line. This must be done whenever you want to use such files as the system object library (SYSLIB.OLB) or the system macro library (RSXMAC.SML). Normally, the Task Builder (TKB) and the MACRO-11 assembler expect to find these libraries in UFD [1,1]. Refer to Section 4.1 for more information.

If you generate more than one RSX-11S system on the same target disk by specifying additional system and Executive group numbers, be sure that the disk has enough free blocks on it to contain each additional RSX-11S SYSGEN. Each additional RSX-11S system generation is segregated from the previous SYSGEN(s).

A complete RSX-11S system generation is performed in two phases on an RSX-11M-PLUS host. The procedure is controlled by the indirect command files, 11SGEN.CMD and 11SGEN2.CMD, which reside on the distribution media. In the first phase, the procedures are controlled by the command file 11SGEN.CMD and are primarily the same as those followed for generating an RSX-11M system. (Consult the RSX-11M System Generation and Installation Guide for a detailed description of Phase I of the SYSGEN command procedure.) The second phase of the RSX-11S system generation is controlled by the command file 11SGEN2.CMD.

Because the RSX-11S system generation programs, 11SGEN and 11SGEN2, expect to find the files 11SGEN.CMD and 11SGEN2.CMD in UFD [2,200] on your target disk, you must copy them as described in Sections 6.1.1 and 6.1.3.

The following operations are performed during the processing of 11SGEN.CMD:

- Prompting for the Executive options
- Assembling the Executive
- Assembling the drivers

The following operations are performed during the processing of 11SGEN2.CMD:

- Building the target Executive and the drivers
- Assembling (building) the RSX-11S system tasks
- Final configuration of the Executive (creating the system image)

The Phase II operations are discussed in Chapter 4.

6.1.1 Copying Procedures

Your distribution kit (labeled, "11SKIT") contains a file that must be copied before you can perform the system generation. You should copy the file, [2,20]11SGEN.CMD, to UFD [2,200] on the disk upon which the system generation is to be performed. If your distribution kit is on disk(s), use the PIP Utility to copy the files. For example,

```
>PIP TI:=ddnn:[2,200]11SGEN.CMD
```

If your kit is on magnetic tape(s), you can use the FLX Utility. For example,

```
>FLX ddnn:[2,200]=mmnn:[2,20]11SGEN.CMD
```

NOTE

If you have an RL01 (a two-volume) distribution kit, the command files are on the volume labeled, "11SKIT".

All other files that are required for the system generation will be copied to your target disk by the procedure 11SCOPY.CMD. This procedure is invoked by 11SGEN. The file-copying process takes approximately 60 to 90 minutes.

6.1.2 Invoking the System Generation Programs

Type the following command to invoke the Phase I system generation programs:

```
>@11SGEN.CMD
```

Type the following command to invoke the Phase II system generation programs:

```
>@11SGEN2.CMD
```

6.1.3 Notes for RSX-11S Version 4.2 System Generation on an RSX-11M-PLUS Host

This section contains information you should consider before you begin the system generation process.

1. Copy 11SGEN.CMD from UFD [2,20] on the distribution media to UFD [2,200] on the target disk.
2. Assign SY: to the target device (ASN ddnn:=SY:).
3. Always perform the RSX-11S system generation with the command files in UFD [2,200].
4. Install the following tasks:

PIP	LBR	FLX	LOA
UFD	MOU	INI	UNL
EDI	DMO	MAC	TKB

5. Listing (.LST) files of privileged tasks are not automatically deleted.
6. The RSX-11M VMR is used for generating the RSX-11S system on an RSX-11M-PLUS host system. It is installed and run under the name VMM, but it still prompts with VMR>.
7. The RSX-11M Task Builder is used to build the RSX-11S tasks on an RSX-11M-PLUS host system. It is installed and run under the name TKM, and it prompts with TKM>.

8. If you are planning to save the target system (using VMR SAVE) to some device, MOUNT the device with the FOREIGN keyword (/FOR) before beginning the system generation.

9. You may want to do a preliminary system generation before you do your actual SYSGEN. To do a preliminary SYSGEN (PREPGEN), invoke the command file for Phase I of the SYSGEN (@11SGEN) and answer YES to the question, "Do you want to inhibit execution of MCR commands (PREPGEN)?"

   Phase I continues, but the answers you give to the questions are placed in a saved answer file instead of being used immediately. When Phase I finishes, reinvoke 11SGEN.CMD to run the phase again. This time, do not inhibit MCR command line execution; the SYSGEN procedure uses the answers in the saved answer file. Doing a PREPGEN will save time and prevents mistakes.

10. During Phase I of the system generation procedure, 11SGEN.CMD asks for your systems's device configuration and requests the system directives you would like in the Executive. In both cases, you may print out a table of the available options before you answer the question.

For further information on generating the RSX-11S system, refer to Chapter 4.

6.2 SYSGEN DIALOG ON AN RSX-11M-PLUS HOST SYSTEM

The dialog for an RSX-11S system generation on an RSX-11M-PLUS host system is very similar to that of an RSX-11S system generation on an RSX-11M host. The primary differences are as follows:

- You must use the MCR command line interpreter. (Use the command SET /MCR=TI: to set your terminal to MCR.)

- You must set your default to nonamed directory mode. (Use the command SET /NONAMED to set your default.)

Examine the example of the RSX-11S system generation on an RSX-11M host system in Chapter 5.

Additionally, the dialog and procedures in Phase I are the same as those for an RSX-11M system generation. For detailed explanations of the Phase I system generation questions, see the RSX-11M System Generation and Installation Guide.

CHAPTER 7

RSX-11S SYSTEM GENERATION ON A VAX/VMS HOST SYSTEM

This chapter explains how to generate an RSX-11S system on a VAX/VMS host system. It also contains an example of a typical terminal dialog from an RSX-11S system generation on a VAX/VMS host system.

7.1 PERFORMING AN RSX-11S SYSTEM GENERATION ON A VAX/VMS HOST SYSTEM

RSX-11S Version 4.2 is available on the following distribution medium for VAX/VMS host systems:

- Magnetic tape
- RK07 disk cartridge
- RL02 disk cartridge

VAX/VMS uses RSX-11M indirect command files to generate an RSX-11S target system.

NOTE

In order for you to perform an RSX-11S system generation on a host VAX/VMS Version 4.0 (or later) system, VAX-11 RSX must be installed. See the VAX-11 RSX Installation Guide and Release Notes for more information.

This section explains how to perform the system generation. Subsequent sections detail the following information:

- Section 7.1.1 describes the privileges you must have to set up and run the system generation.
- Section 7.1.2 describes the procedure for beginning the system generation.
- Section 7.1.3 contains additional information about performing the RSX-11S system generation.
- Section 7.2 contains the text of a typical dialog from an RSX-11S system generation on a VAX/VMS host system.

You can perform an RSX-11S system generation on the host system disk or on another disk. If you use the host system disk, you can select group numbers during the system generation procedure for the RSX-11S system and Executive files so that they will not conflict with files already on the disk. The valid group numbers you may select are 3 through 10. The default group number is 3.

You may also select the group numbers, provided that you use a disk other than the host system disk. In this case, the valid group numbers are 1 through 10 for the system files (1 is the default) and 1 through 11 for the Executive files (11 is the default).

If you select alternate group numbers for the system and Executive files, note that you **must** specify the User File Directory (UFD) in the command line whenever you want to use such files as the system object library (SYSLIB.OLB) or the system macro library (RSXMAC.SML). Normally, the Task Builder and the MACRO-11 Assembler expect to find these libraries in UFD [1,1]. See Section 4.4 for more information.

If you generate more than one RSX-11S system on the same target disk by specifying additional system and Executive group numbers, the disk must have enough free blocks on it to contain each additional RSX-11S SYSGEN. Each additional RSX-11S system generation is segregated from the previous SYSGEN(s).

You must have a command line interpreter (CLI) symbol table of at least 40 pages to perform an RSX-11S system generation on a VAX/VMS system. Because the table is established when the system is bootstrapped, you must rebootstrap the system to set a new symbol table space if it is not already adequate. Determine your current symbol table size by running the VAX/VMS SYSGEN Utility. To increase the symbol table space, run VAX/VMS SYSGEN to set a new value for the CLISYMTBL parameter and then rebootstrap the system (see the VAX-11 Software Installation Guide). For example:

```
Username:  SYSTEM/CLI=MCR
Password:

> RUN SYS$SYSTEM:SYSGEN
SYSGEN> SHOW CLISYMTBL
Parameter Name              Current   Default   Minimum   Maximum Unit   Dynamic
--------------              -------   -------   -------   ------- ----   -------
CLISYMTBL                        20        20        10       128 Pages        D
SYSGEN> SET CLISYMTBL 40
SYSGEN> SHOW CLISYMBTL
Parameter Name              Current   Default   Minimum   Maximum Unit   Dynamic
--------------              -------   -------   -------   ------- ----   -------
CLISYMTBL                        40        20        10       128 Pages        D
SYSGEN> WRITE CURRENT
SYSGEN> EXIT
>
```

The numbers shown in the CLI symbol table are the current number of pages, the default number, the minimum number, and the maximum number. After you have made the desired changes to the symbol table, rebootstrap the system, and log in on the system again.

NOTE

If you are generating an RSX-11S operating system on a VAX/VMS (Version 3.0 or later) operating system, you do not have to increase the CLISYMTBL space.

Note that the VAX/VMS version of the RSX-11M Task Builder produces image files whose file extension type is .EXE.

If you wish to build a task on a VAX/VMS system with the On-Line Debugging Tool (ODT), you **must** include ODT/DA on the input file side of the task-build command line. You must include the debugging switch with the ODT file name and you must have the terminal included in your RSX-11S system. The following command line shows how to include ODT for an RSX-11S task built under a VAX/VMS system:

```
MCR>TKB TEST=[g,1]ODT/DA,TEST
```

NOTE

Normally, the ODT object file (ODT.OBJ) is on the target system disk in UFD [1,1]. If during the system generation, however, you selected an alternate group number for the system files, you **must** specify this group number (g) in the TKB command line.

7.1.1 Establishing VAX/VMS Privileges

You must be logged in to a VAX/VMS system and have certain privileges in order to set up and run the RSX-11S system generation. If you perform the system generation from the system manager's account that is distributed with the VAX/VMS system (as long as its privileges have not been altered), you will have access to the following required privileges:

- System Protection Privilege (SYSPRV), which allows you to create files in directories not owned by the current UIC. (You must set this privilege before you can set the remaining privileges.)
- Change Mode to Kernel Privilege (CMKRNL), which allows you to change default UICs and directories.
- Logical I/O Privilege (LOG_IO), which permits RSX-11M VMR to do logical I/O on task image files.
- Volume Protection Override Privilege (VOLPRO), which is used only with an RSX-11S magnetic tape distribution kit. This privilege allows you to mount the magnetic tape with the /FOREIGN qualifier.

If you have the SETPRV privilege, you can establish the required privileges with the following MCR command:

```
> SET PROCESS/PRIVILEGE=(privilege[,...])
```

Specify the following MCR command lines to find out what privileges you have:

```
> SHOW PROCESS/PRIVILEGE
```

You should have CMKRNL, LOG_IO, VOLPRO, and SYSPRV (the privileges described in the previous bulleted list). These privileges are described in the VAX/VMS System Manager's Guide.

7.1.2 Copying and Invoking the RSX-11S System Generation Programs

The following steps enable you to begin an RSX-11S system generation on a VAX/VMS host system. After you log in on the system and mount the RSX-11S distribution kit, you can proceed with the RSX-11S system generation.

If your distribution kit is on disk, use the following steps:

1. Log in on the VAX/VMS system with the /CLI=MCR qualifier so that you can use MCR, which is the required command line interpreter (CLI) for the RSX-11S system generation.

```
Username:  SYSTEM/CLI=MCR
Password:
```

2. Set up the required privileges as described in Section 7.1.1

3. Mount the RSX-11S distribution kit.

```
> MOUNT ddnn:  11SKIT
```

4. Set your default disk and User Identification Code (UIC) to [2,200] on the target disk.

```
> SET DEFAULT ddnn:
> SET /UIC=[2,200]
```

5. Create the UFD on your target disk.

```
> UFD ddnn:[2,200]
```

6. Copy [2,20]11SGEN.CMD from the 11SKIT distribution medium to UFD [2,200] on your target disk.

```
> PIP ddnn:/NV=ddnn:[2,20]11SGEN.CMD
```

7. Dismount the distribution kit.

```
> DMO ddnn:/NOUNLOAD
```

8. Make sure your UIC is set to [2,200] and execute the RSX-11S system generation procedure.

```
> SHOW DEFAULT
   .
   .
   .
> @11SGEN
```

If your distribution kit is on magnetic tape, use the following steps:

1. Log in on the VAX/VMS system with the /CLI=MCR qualifier so that you can use MCR, which is the required command line interpreter (CLI) for the RSX-11S system generation.

```
Username:  SYSTEM/CLI=MCR
Password:
```

2. Set up the required privileges as described in Section 7.1.

3. Mount the RSX-11S distribution kit as foreign.

```
> MOUNT mmnn:/FOR
```

4. Mount the target disk.

```
> MOUNT ddnn: volume-name
```

5. Set your default UFD on the target disk to be [2,200].

```
> SET DEFAULT ddnn:
> SET /UIC=[2,200]
```

6. Create the UFD on your target disk.

```
> UFD ddnn:[2,200]
```

7. Copy [2,20]11SGEN.CMD from the distribution medium to UFD [2,200] on your target disk.

```
> FLX ddnn:/RS=mmnn:[2,20]11SGEN.CMD/DNS:1600/DO/RW
```

8. Dismount the distribution kit.

```
DMO mmnn:/NOUNLOAD
```

(Specifying the /NOUNLOAD keyword allows you to dismount and remount the tape without having to reload it.)

9. Make sure your UIC is set to [2,200] and execute the RSX-11S system generation procedure.

```
> SHOW DEFAULT
   .
   .
   .
> @11SGEN
```

All the files needed for the system generation are copied to the target disk by 11SCOPY.CMD, which is invoked by 11SGEN. The file-copying process takes approximately 20 minutes.

Note that to save a bootable RSX-11S system image onto the system console device, you must use the device name CS:. To put the console device on line (if it currently is not), specify the following:

```
$ SET PROCESS/PRIVILEGE=CMKRNL
$ MCR SYSGEN
SYSGEN>CON CON
```

Following is an example showing how to save the RSX-11S system image on the console device:

```
VMR> (RET)
ENTER FILENAME:  <filename>
VMR>SAVE CS:label
```

VMR is documented in the RSX-11M/M-PLUS System Management Guide.

7.1.3 Notes for the RSX-11S System Generation on a VAX/VMS Host

This section contains information you should consider before you begin the system generation process.

1. If you have disk quota checking on your SYS$LOGIN device (your work disk), it must be disabled before you begin your RSX-11S system generation. This is because the compatibility

mode task, MAC, needs to create temporary work files in UICs that probably do not have an established disk quota on SYS$LOGIN. Otherwise, MAC cannot assemble any files during the system generation.

To disable disk quota checking, invoke the Disk Quota Utility (DISKQOUTA) by issuing the following command line:

```
$ RUN SYS$SYSTEM:DISKQUOTA
```

When the DISKQUOTA prompt appears on your terminal, issue the following command lines:

```
DISKQ>USE diskname:   (RET)
DISKQ>DISABLE  (RET)
DISKQ> (CTRL/Z)
$
```

Diskname: is the name of the SYS$LOGIN device.

Now disk quota checking is disabled and you are ready to begin your RSX-11S system generation.

2. You may want to do a preliminary system generation before you do your actual SYSGEN. To do a preliminary SYSGEN (PREPGEN), invoke the command file for Phase I of the SYSGEN (@11SGEN) and answer YES to the question, "Do you want to inhibit execution of MCR commands (PREPGEN)?"

   Phase I continues, but the answers you give to the questions are placed in a saved answer file instead of being used immediately. When Phase I finishes, reinvoke 11SGEN.CMD to run the phase again. This time, do not inhibit MCR command line execution; the SYSGEN procedure uses the answers in the saved answer file.

   Doing a PREPGEN saves time and prevents mistakes. The sample dialog shows a PREPGEN being done before the actual SYSGEN.

3. During Phase I of the system generation procedure, 11SGEN.CMD asks for your system's device configuration, the system directives you would like in the Executive, and the type of terminal driver you want to use. For these questions, you can print out a table of the available options before you answer the question.

4. During Phase I, you can also select different group numbers for the system and Executive files. In the sample SYSGEN, group number 3 is selected for the system files and group number 10 for the Executive files. (The default group numbers are 1 and 11, respectively.)

7.2 SYSGEN DIALOG ON A VAX/VMS HOST SYSTEM

This section contains an example of the text of a typical terminal dialog from an RSX-11S system generation on a VAX/VMS host system.

The dialog and procedures in Phase I are the same as those for an RSX-11M host. For detailed explanations of the Phase I system generation questions, see the RSX-11M System Generation and Installation Guide.

The system generated in the example supports the following hardware configuration for a PDP-11/84 processor:

```
128K memory
60   cycle line clock
1    RP06 disk controller with 1 drive
1    RL02 cartridge disk controller with 2 drives
1    RC25 cartridge disk controller with 2 drives
1    TE16 magnetic tape controller with 1 drive
1    null device driver
1    DL11 terminal interface
```

The following software support is included:

- Large (20K) RSX-11S Executive
- Support for:

  Memory parity support
  Cache memory
  Executive common
  Memory management directives
  Send/receive-by-reference directives
  Get mapping context directive
  Address checking
  I/O rundown
  Loadable device drivers
  ASTs
  Cancel selective marktime
  Powerfail recovery
  Logical device assignment
  System-controlled partitions
  Group-global event flags

- TKTN
- Full-duplex terminal driver
- Basic MCR with support for the OPEN and ATL/TAL commands and full error-message text
- OTL with support for full error-message text and for all OTL devices generated into the RSX-11S system
- SIP with support for full error-message text and for all SIP devices generated into the RSX-11S system
- CDA for crash dump analysis on the host system
- RSX-11S File Control Services (FCS) subset
- SETTIM

The system generation is being performed on a VAX/VMS host system with an RK07 as the target disk. The RSX-11S release kit is a 2400-foot magnetic tape.

Questions calling for a YES/NO answer can be answered by pressing the RETURN key for a "NO" answer. (This is the default answer.)

By pressing the RETURN key, you may specify the default answer to a question that asks for a value. This default value is displayed on the terminal screen.

7.3 EXAMPLE OF AN RSX-11S SYSTEM GENERATION DIALOG ON A VAX/VMS HOST SYSTEM

Following is the actual dialog from an RSX-11S system generation on a VAX/VMS Version 4.0 host system.

```
Username: SWABODA/CLI=MCR
Password:

         Welcome to VAX/VMS Version V4.0

> SET PROC/PRIV=(SYSPRV,CMKRNL,LOG_IO,VOLPRO)
> MOU MT0:/FOR
%MOUNT-I-WRITELOCK, volume is write locked
%MOUNT-I-MOUNTED,  mounted on _MTA0:
> ALL DM0:
%MCR-I-ALLOC, _DMA0: allocated
> INI DM0: 11SDSK/STRUCTURE=1
> MOU DM0: 11SDSK
%MOUNT-I-MOUNTED, 11SDSK       mounted on _DMA0:
> SET DEFAULT DM0:
> SET /UIC=[2,200]
> UFD DM0:[2,200]
> FLX DM0:/RS=MT0:[2,20]11SGEN.CMD/DNS:1600/DO/RW
> DMO MT0:/NOUNLOAD
> SH DEF
  DM0:[2,200]
> @11SGEN
>;
>; RSX-11S Version 4.2 BL38 System Generation done on VAX/VMS
>;
>; Copyright (C) 1979,1981,1983,1985
>; Digital Equipment Corporation, Maynard, Mass.
>; All Rights Reserved.
>;
>;
>; RSX-11S system generation set-up section
>;
>; The system device is the disk on which all of the host'S, VAX/VMS,
>; system files are stored. If your 11S target disk is the system device
>; then there may possibly be a conflict in some file names (e.g., SYSLIB).
>;
>* Is the target disk, $$0:, the system device? [Y/N]: N
>* What is the group number for the system files [O R:1-10 D:1]:
>* What is the group number for the executive files [O R:1-11 D:11]:
>* Target device name [S]: DM0:
>SET DEFAULT DM0:
>ASN DM0:=SY:
>ASN DM0:=SY0:
>ASN DM0:=LB:
>ASN DM0:=LB0:
>ASN MP:=MP0:
>ASN TK:=TK0:
>ASN DM0:[1,54]11MTKB.TSK=TKB
>ASN DM0:[1,54]11MVMR.TSK=VMR
>ASN DM0:=WK:
>ASN DM0:=WK0:
>* Copy the RSX-11S distribution files to the target disk? [Y/N]: Y
>* Enter device for the RSX-11S distribution kit [S]: MT0:
>;
>; Place the TAPE labeled 11SKIT on MT0:
>;
>* Is the TAPE ready on MT0:? [Y/N]: Y
```

```
>MOU MT0:/FOR
%MOUNT-I-WRITELOCK, volume is write locked
%MOUNT-I-MOUNTED,  mounted on _MTA0:
>FLX DM0:/RS=MT0:[200,200]11SCOPY.CMD/DO/RW/DNS:1600
>UFD SY:[1,1]
>UFD SY:[1,2]
>UFD SY:[1,4]
>UFD SY:[2,20]
>UFD SY:[1,54]
>UFD SY:[1,60]
>UFD SY:[1,64]
>UFD SY:[1,20]
>UFD SY:[1,24]
>UFD SY:[11,20]
>UFD SY:[11,24]
>UFD SY:[1,30]
>UFD SY:[1,34]
>UFD SY:[11,30]
>UFD SY:[11,34]
>UFD SY:[12,20]
>UFD SY:[12,24]
>UFD SY:[45,10]
>UFD SY:[45,20]
>UFD SY:[45,24]
>UFD SY:[45,30]
>UFD SY:[45,34]
>UFD SY:[11,10]
>PIP [1,1]EXEMC.*;*/DE/NM,EXELIB.OLB;*,EXEUTL.OBJ;*,UCTDF.OBJ;*
>PIP [1,1]DIRSYM.OBJ;*/DE/NM,GCML.OBJ;*,ARITH.OBJ;*,ODT.OBJ;*
>PIP [1,1]LPA.OBJ;*/DE/NM,RSXMAC.SML;*,FCSRES.MAC;*
>PIP [1,1]PURUDC.OBJ;*/DE/NM,PURISA.OBJ;*,PURICR.OBJ;*,PURPCS.OBJ;*,LPS.OBJ;*
>PIP /FR

LB0: has 52702. blocks free, 1088. blocks used out of 53790.
Largest contiguous space = 26837. blocks
13417. file headers are free, 30. headers used out of 13447.

>FLX [2,200]=MT0:[200,200]*.*,[2,20]11SGEN2.CMD/DNS:1600
>FLX [2,20]=MT0:[2,20]*.*/DNS:1600
>PIP [2,20]11SGEN.CMD;*/DE/NM,11SGEN2.CMD;*
>FLX [1,1]=MT0:[1,1]*.*/DNS:1600
>FLX [1,20]=MT0:[1,20]*.*/DNS:1600
>FLX [1,24]=MT0:[1,24]*.*/DNS:1600
>FLX [1,54]/CO/BL:180.=MT0:[1,54]11MVMR.TSK/DNS:1600
>FLX [1,54]/CO/BL:180.=MT0:[1,54]11MTKB.TSK/DNS:1600
>PIP [1,54]11MVMR.TSK/PU/NM,11MTKB
>FLX [11,10]=MT0:[11,10]*.*/DNS:1600
>FLX [45,10]=MT0:[45,10]*.*/DNS:1600
>FLX [45,20]=MT0:[45,20]*.*/DNS:1600
>FLX [45,24]=MT0:[45,24]*.*/DNS:1600
>PIP [1,20]*.*/PU/NM,[1,24]*.*
>PIP [2,20]*.*/PU/NM,[45,10]*.*,[45,20]*.*,[45,24]*.*
>PIP /FR

LB0: has 43411. blocks free, 10379. blocks used out of 53790.
Largest contiguous space = 26837. blocks
13123. file headers are free, 324. headers used out of 13447.

>;
>; Distribution kit copy is now complete
>;
>DMO MT0:
>;
>; You may now remove your distribution kit from drive MT0:.
>;
```

```
>SET /UIC=[2,200]
>;
>; Big disk distribution kit
>;
>*  3. Do you want to inhibit execution of MCR commands (PREPGEN)? [Y/N]: Y
>*  5. Are you generating an unmapped system? [Y/N]: N
>*  6. Use an input saved answer file? [Y/N]: N
>*  9. Name of output saved answer file [D: SYSSAVED.CMD] [S]:
>;
>; Phase I output saved answers created in file $$0:[2,200]SYSSAVED.CMD;1
>;
>;
>; Target configuration
>;
>*  1. Processor Type  [D: 11/34]  [S]: 11/84
>*  3. Memory size (in K-word blocks) [D R:32.-1920. D:32.]: 256.
>*  4. Include support for K-series devices? [Y/N D:N]:
>*  6. Floating point processor (FP-11) present? [Y/N D:N]: Y
>*  8. Extended instruction set (EIS) present? [Y/N D:N]: Y
>*  9. If using KW11-P as system clock: number of intrps./sec. [D R:0.-1000. D:0.]:
>* 10. Line frequency:   A- 60 Hz    B- 50 Hz    [D: A] [S]:
>* 11. KW11-Y Watchdog timer support? [Y/N D:N]:
>* 12. Memory parity support? [Y/N D:N]: Y
>* 13. Cache memory? [Y/N D:N]: Y
>;
>; The response to the following question specifies the highest interrupt
>; vector.  If you respond with a value less than or equal to 400, SYSGEN
>; will assign the value associated with the highest interrupt vector
>; specified during the Peripheral Section.  Therefore, if your system
>; will include devices that are not specified during the Peripheral
>; Section and which have vectors above 400 (devices such as K-series and
>; certain communication devices), specify that value in the next question.
>;
>* 14. Highest interrupt vector [O R:0-774 D:0]:
>;     For device configuration: "*" Prints device table, "." Terminates inquiry
>;                               "?" Prints current configuration
>;     Enter devices and number of controllers for devices which require drivers
>* 15. Devices [S]: *
>;
>;    Device codes for A/D and industrial/laboratory devices:
>;
>;        AD- AD01-D A/D Converter
>;        AF- AFC11 A/D Converter
>;        AR- AR11 Laboratory Subsystem
>;        IC- ICR11/ICS11 Industrial Control Subsystem
>;        IS- DRS11/DSS11 Industrial Control Subsystem
>;        LA- LPA11 Laboratory Subsystem
>;        LS- LPS11 Laboratory Subsystem
>;        UD- UDC11 Universal Digital Controller
>;
>;    Device codes for Interprocessor communication devices:
>;
>;        XB- DA11-B Interprocessor Link
>;        XE- DEUNA Unibus Ethernet Controller
>;        XL- DL11-E Interprocessor Link
>;        XM- DMC11-E/DMR11 Interprocessor Link
>;        XP- DP11 Synchronous Interface
>;        XQ- DQ11 Synchronous Interface
>;        XU- DU11 Synchronous Interface
>;        XW- DUP11 Synchronous Interface
>;
```

```
>;    Device codes for unit record devices:
>;
>;        CR- CR11/CM11-E Card Reader
>;        GR- VT11/VS60 Graphics Subsystem
>;        LP- LA11/LP11/LS11/LV11/LN01 Line Printer
>;        PP- PC11 Paper Tape Punch
>;        PR- PC11/PR11 Paper Tape Punch and Reader
>;
>;    Device codes for disk devices:
>;
>;        DB- RP04/RP05/RP06 Disk Drive
>;        DD- TU58 Cartridge DECtape II
>;        DF- RF11 Fixed Head Disk Drive
>;        DK- RK03/RK05 Disk Drive
>;        DL- RL01/RL02 Disk Drive
>;        DM- RK06/RK07 Disk Drive
>;        DP- RP02/RP03 Disk Drive
>;        DR- RM02/RM03/RM05/RM80 Disk Drive
>;        DS- RS03/RS04 Fixed Head Disk Drive
>;        DT- TU56 DECtape
>;        DU- RA60/RA80/RA81/RC25/RD51/RD52/RD53/RX50 Disk Drive
>;        DX- RX01 Floppy Disk Drive
>;        DY- RX02 Floppy Disk
>;        EM- ML11 Non-Rotating Electronic Memory
>;
>;    Device codes for Magnetic tape devices:
>;
>;        CT- TU60 Cassette Tape Drive
>;        MM- TU16/TU45/TU77/TE16 Magtape Drive
>;        MS- TS11/TU80/TSV05 Magtape Drive
>;        MT- TU10/TE10/TS03 Magtape Drive
>;        MU- TU81/TK50 Magtape Drive
>;
>;    Device codes for terminal interface devices:
>;
>;        YH- DH11 Asynchronous Terminal Interface
>;        YV- DHU11/DHV11 Asynchronous Terminal Interface
>;        YJ- DJ11 Asynchronous Terminal Interface
>;        YL- DL11-A/-B/-C/-D/-E/-J/-W Asynchronous Terminal Interface
>;        YZ- DZ11/DZV11 Asynchronous Terminal Interface
>;
>;    Device codes for pseudo devices:
>;
>;        CO- console device
>;        NL- null device
>;
>;     Enter responses as: dev1=number controllers,dev2=number controllers, ...
>;     If a devices is specified without the number of controllers, the number
>;     of controllers defaults to 1.
>;
>;     Example: DK,DM=2,YL,NL.
>;
>* 15. Devices [S]: DU=2,DL,DB,MU,YL,YV,NL.
>;
>; Processor:11/84   Memory Size:256K,Mapped   System:RSX-11S
>;
>; Host configuration
>;
>*  1. Is a line printer available? [Y/N]: Y
>*  3. Does the listing/map device have at least 120 columns? [Y/N]: Y
>*  4. Assembly listings device (ddu:) [D: "NL:"] [S]: SY:
>*  5. Map device for Executive and device drivers (ddu:) [D: SY0:] [S]:
>;
```

```
>* EOS * Do you want to: <CR>-continue R-repeat section E-exit P-pause [S]:
>;
>; Executive Options
>;
>;     Answer Y(ES) if the following support is desired
>;
>*  6. Executive Common? [Y/N]: Y
>*  7. Memory management (PLAS) directives? [Y/N]: Y
>*  8. Send/Receive by reference directives? [Y/N]: Y
>*  9. Get mapping context directive? [Y/N]: Y
>;     Address checking support will be included
>;     I/O rundown support will be included
>* 15. Loadable device drivers? [Y/N]: Y
>* 16. Should the default for all applicable drivers be loadable? [Y/N]: Y
>;     AST support will be included
>* 18. Include support for Cancel Selective Marktime? [Y/N]: Y
>* 19. Task termination and device not ready messages (TKTN)? [Y/N]: Y
>* 20. Power fail recovery? [Y/N]: Y
>* 22. Large (20K) Executive? [Y/N]: Y
>* 23. Logical device assignment? [Y/N]: Y
>* 25. Do you intend to include a user-written driver? [Y/N]:
>* 30. Executive Debugging Tool (XDT)? [Y/N]:
>* 32. Include support for communications products (such as DECnet)? [Y/N]: Y
>;
>;  If you will be generating DECnet into this system, be sure you have
>;  read the section on SYSGEN requirements in the  "RSX DECnet Network
>;  Generation and Installation Guide."
>;  Several  DECnet  features  (eg. remote terminal support,  11S  task
>;  loading/upline dumping, etc.) require special  consideration during
>;  SYSGEN.
>;
>;     ACP support will be included
>* 32A. Include Network Command Terminal support? [Y/N]: Y
>* 33. System controlled partitions? [Y/N]: Y
>* 36. Group global event flags? [Y/N]: Y
>;
>;     For directives:
>;
>;     * - Prints the table
>;     . - Terminates inquiry
>;     % - Gets all valid directives and terminates inquiry
>;
>* 37. Enter code for system directives [S]: *
>;
>;     A- Get partition parameters   B- Get task parameters
>;     C- Send/Receive               D- Alter priority
>;     E- Extend task                F- Connect to interrupt vector
>;     G- Get sense switch           H- Set system time
>;     I- Stop bit                   J- Specify requested exit AST
>;     K- Parent offspring tasking   L- Parent offspring tasking with chaining
>;
>;     Enter responses as codelcode2code3... (no commas) (e.g.: ABCDF.)
>;
>* 37. Enter code for system directives [S]: ABCDEFHIJK.
>* 38. Number of pre-allocated QIO packets [D R:0.-15. D:5.]:
>* 39. Size of data transfer vector in words [D R:0.-33. D:33.]:
>* 40. Round-robin scheduling interval in ticks [D R:0.-1000. D:5.]:
>* 41. Highest priority class for consideration [D R:1.-249. D:150.]:
>* 42. Lowest priority class for consideration [D R:1.-150. D:1.]:
>* 48. System crash register and stack dump device CSR [O R:0-177700 D:177564]:
>* 51. Crash dump analysis:  A- PANIC  B- Crash Dump Analysis (CDA)  C- None  [D:  B] [S]:
>* 52. CDA output notification device CSR [O R:160000-177700 D:177564]:
>* 53. Enter CDA memory dump device mnemonic (ddu:) [S R:3-4]: MU0:
>* 54. Enter CDA memory dump device CSR [O R:160000-177700 D:174500]:
>;
```

```
>* EOS *  Do you want to: <CR>-continue R-repeat section E-exit P-pause [S]:
>;
>;
>; Terminal driver options
>;       The Full Duplex Terminal Driver will be included.
>*  2. Unsolicited input timeout value in seconds [D R:0.-255. D:120.]: 0
>;
>;     Answer Y(ES) if the following support is desired
>;
>*  6. Unsolicited input character AST? [Y/N]: Y
>*  8. Breakthrough write? [Y/N]: Y
>;     CTRL/R support will be included
>* 10. Escape sequence handling? [Y/N]: Y
>* 11. Get multiple characteristics? [Y/N]: Y
>* 12. Set multiple characteristics? [Y/N]: Y
>* 13. Get terminal driver options? [Y/N]: Y
>* 17. Read after prompt? [Y/N]: Y
>* 20. CRT rubout support? [Y/N]: Y
>* 25. Hardware unrecoverable input error notification? [Y/N]: Y
>* 26. Device independent cursor positioning? [Y/N]: Y
>;
>* EOS * Do you want to: <CR>-continue R-repeat section E-exit P-pause [S]:
>;
>;
>; System Options
>;
>;
>;     Answer Y(ES) if the following support is desired
>;
>*  2A. Include support for the IP11 Industrial I/O Subsystem? [Y/N]: N
>* 11. What name would you like to give your system [D: RSX11S] [S R:0-6]:
>;
>* EOS * Do you want to: <CR>-continue R-repeat section E-exit P-pause [S]:
>;
>;     Thinking ...
>; End of Executive option generation at 10:06:51 on 29-MAY-85
>;
>; Peripheral configuration
>;
>;     Parameters appearing in square brackets "[...]" can only be
>;     specified for the first controller of a particular device.
>;     Parameters appearing in parentheses "(...)" only need be specified
>;     if the indicated option is present on the target system.
>;
>;     The default for loadable drivers has been set to *TRUE*.
>;     To override this setting enter R (resident) as the first parameter
>;     for the first controller of the specified device.
>;
>; A/D and Laboratory devices: None specified
>;
>; Interprocessor communication devices: None specified
>;
>; Unit record devices: None specified
>;
>; Disks: DB, DL, DU
>;
>; Enter [L/R,] vector, CSR, number of drives, unit number of first drive,
>;              [O=offset recovery support/NO=no support] for:
>;
>*  2. DB controller 0 [D: 254,176700,,0,0]          [S]: ,,1
>* 52. Contr 0 unit 0. is an RP04,05/RP06 [D: RP06] [S]:
>;
```

```
>; Enter [L/R,] vector, CSR, number of drives for:
>;
>*  3. DL controller 0 [D: 160,174400]              [S]: ,,1
>* 53. Contr 0 unit 0. is an RL01/RL02 [D: RL01]    [S]: RL02
>;
>*  3. DU controller 0 [D: 154,172150]              [S]: ,,2
>*  3. DU controller 1                              [S]: 360,172154,2
>;
>; Tapes: MU
>;
>; Enter [L/R,] vector, CSR for:
>;
>*  1. MU controller 0 [D: 260,174500]              [S]:
>;
>; Non-physical (pseudo) devices: CO, NL, TI, CL, LB, SY
>;
>; Terminal interface devices: YL, YV
>;
>; Enter vector, CSR, E=DL11-E modem support/NO=no for:
>;
>* 21. YL controller 0 [D: 60,177560,NO]           [S]:
>;
>; Enter vector, CSR, highest line number <0 to 15> [, answer speed] for:
>;
>* 26. YV controller 0 [D: ,160440,,300]           [S]: 300,160440,4
>;
>* EOS *  Do you want to: <CR>-continue E-exit P-pause [S]:
>;
>;
>; End of interrupt vector area has been set to 400
>;
>;
>; Create Executive build files
>;
>;
>*  1. Do you wish to edit any of the Executive files? [Y/N]:
>;
>;
>* EOS * Do you want to: <CR>-continue R-repeat section E-exit P-pause [S]:
>;
>;
>;
>; Prepare for task building
>;
>;
>; Clean-up extraneous object files
>;
>;
>* EOS * Do you want to: <CR>-continue R-repeat section P-pause [S]:
>;
>; End of 11SGEN phase I at 10:40:17 on 29-MAY-85
>;     -- To continue type: @[2,200]11SGEN2
>;
>@ <EOF>


> @11SGEN
>;
>; RSX-11S Version 4.2 BL38 System Generation done on VAX/VMS
>;
>; Copyright (C) 1979,1981,1983,1985
>; Digital Equipment Corporation, Maynard, Mass.
>; All Rights Reserved.
>;
>;
```

```
>; RSX-11S system generation set-up section
>;
>; The system device is the disk on which all of the host'S, VAX/VMS,
>; system files are stored. If your 11S target disk is the system device
>; then there may possibly be a conflict in some file names (e.g., SYSLIB).
>;
>* Is the target disk, LB0:, the system device? [Y/N]: N
>* What is the group number for the system files [O R:1-10 D:1]:
>* What is the group number for the executive files [O R:1-11 D:11]:
>* Target device name [S]: DM0:
>SET DEFAULT DM0:
>ASN DM0:=SY:
%MCR-I-SUPERSEDE, previous value of SY has been superseded
>ASN DM0:=SY0:
%MCR-I-SUPERSEDE, previous value of SY0 has been superseded
>ASN DM0:=LB:
%MCR-I-SUPERSEDE, previous value of LB has been superseded
>ASN DM0:=LB0:
%MCR-I-SUPERSEDE, previous value of LB0 has been superseded
>ASN MP:=MP0:
%MCR-I-SUPERSEDE, previous value of MP0 has been superseded
>ASN TK:=TK0:
%MCR-I-SUPERSEDE, previous value of TK0 has been superseded
>ASN DM0:[1,54]11MTKB.TSK=TKB
%MCR-I-SUPERSEDE, previous value of TKB has been superseded
>ASN DM0:[1,54]11MVMR.TSK=VMR
%MCR-I-SUPERSEDE, previous value of VMR has been superseded
>ASN DM0:=WK:
%MCR-I-SUPERSEDE, previous value of WK has been superseded
>ASN DM0:=WK0:
%MCR-I-SUPERSEDE, previous value of WK0 has been superseded
>* Copy the RSX-11S distribution files to the target disk? [Y/N]:
>;
>; Big disk distribution kit
>;
>*  3. Do you want to inhibit execution of MCR commands (PREPGEN)? [Y/N]:
>*  5. Are you generating an unmapped system? [Y/N]: N
>*  6. Use an input saved answer file? [Y/N]: Y
>*  7. Name of input saved answer file [D: SYSSAVED.CMD] [S]:
>;
>; Phase I input saved answers
>; created on 29-MAY-85 at 09:41:56
>; by 11SGEN version 2.10
>; are from file LB0:[2,200]SYSSAVED.CMD;1
>;
>*  9. Name of output saved answer file [D: LB0:[2,200]SYSSAVED.CMD] [S]:
>;
>; Phase I output saved answers created in file LB0:[2,200]SYSSAVED.CMD;2
>;
>* 10. Use saved host configuration? [Y/N]: Y
>* 11. Use saved peripheral configuration? [Y/N]: Y
>* 12. Skip end of section (EOS) breakpoints? [Y/N]: Y
>* 13. Skip end of execution (EOX) breakpoints? [Y/N]: Y
>* 14. Clean up files from previous GENs? [Y/N]: Y
>SET /UIC=[1,1]
>PIP [1,20]RSXBLD.CMD;*/DE/NM
>PIP [1,24]RSXBLD.CMD;*/DE/NM,TTDRVBLD;*
>PIP [11,20]*.OBJ;*/DE/NM,*.UDC;*,*.ICR;*,*.IDS;*,*.PCS;*
>PIP [11,24]*.OBJ;*/DE/NM,*.UDC;*,*.ICR;*,*.IDS;*,*.TTY;*,*.PCS;*
>PIP [11,30]*.LST;*/DE/NM,[11,34]*.LST;*
>PIP [11,10]RSXMC.MAC;*/DE/NM,ICTAB;*,[2,200]SGNPARM.CMD;*
>PIP [2,200]RSXBLD.CMD;*/DE/NM,TTDRVBLD;*
>PIP SY:[11,20]RSXASM.CMD;*/DE/NM,RSXDRVASM;*,[12,20]MCRSETASM;*
>PIP SY:[11,24]RSXASM.CMD;*/DE/NM,RSXDRVASM;*,[12,20]MCRSETASM;*
>PIP SY0:[11,24]RSXASM.CMD;*/DE/NM,RSXDRVASM;*,[12,24]MCRSETASM;*
>PIP /FR
```

```
LB0: has 43372. blocks free, 10418. blocks used out of 53790.
Largest contiguous space = 26837. blocks
13119. file headers are free, 328. headers used out of 13447.

>SET /UIC=[11,10]
>;
>; Target configuration
>;
>; Processor:11/84   Memory Size:256K,Mapped   System:RSX-11S
>;
>;           Switch Register
>;           Floating Point Processor
>;           Extended Instruction Set
>;           Parity Memory
>;           Cache Memory
>;
>; Host configuration
>;
>; Executive Options
>;
>;     ACP support will be included
>;
>;
>; Terminal driver options
>;        The Full Duplex Terminal Driver will be included.
>;
>; System Options
>;
>;
>;     Thinking ...
>; End of Executive option generation at 11:05:37 on 29-MAY-85
>;
>; Peripheral configuration
>;
>;     Parameters appearing in square brackets "[...]" can only be
>;     specified for the first controller of a particular device.
>;     Parameters appearing in parentheses "(...)" only need be specified
>;     if the indicated option is present on the target system.
>;
>;     The default for loadable drivers has been set to *TRUE*.
>;     To override this setting enter R (resident) as the first parameter
>;     for the first controller of the specified device.
>;
>; A/D and Laboratory devices: None specified
>;
>; Interprocessor communication devices: None specified
>;
>; Unit record devices: None specified
>;
>; Disks: DB, DL, DU
>;
>; Tapes: MU
>;
>; Non-physical (pseudo) devices: CO, NL, TI, CL, LB, SY
>;
>; Terminal interface devices: YL, YV
>;
>SET /UIC=[1,24] ! Creating TTDRVBLD.CMD
>SET /UIC=[11,10]
>; End of interrupt vector area has been set to 400
>;
>;
>; Create Executive build files
>;
```

```
>PIP RSXMC.MAC=SY0:RSXMC0.MAC/AP
>ASN SY:=LB:
%MCR-I-SUPERSEDE, previous value of LB has been superseded
>;
>; Start of Executive assembly at 11:25:50 on 29-MAY-85
>SET /UIC=[11,24]
>MAC @SY:RSXASM
>;
>; End of Executive assembly at 14:30:32 on 29-MAY-85
>;
>;
>; Start of device drivers assembly at 14:30:33 on 29-MAY-85
>MAC @SY:RSXDRVASM
>;
>; End of device drivers assembly at 18:53:30 on 29-MAY-85
>ASN =LB:
>;
>; Prepare for task building
>;
>SET /UIC=[1,24]
>PIP RSX11S.OBS=[11,24]*.OBJ
>PIP TTDRV.OBJ=[11,24]*.TTY
>LBR RSX11S/CR:100.:1010.:128.=RSX11S.OBS
>LBR TTDRV/CR:30.:380.:64.=TTDRV
>PIP /NV=[11,10]RSXBLD.CMD
>PIP [11,10]RSXBLD.CMD;*/DE/NM
>;
>; Clean-up extraneous object files
>;
>PIP RSX11S.OBS;*/DE/NM,TTDRV.OBJ;*,[11,24]*.OBJ;*,*.TTY;*
>;
>; End of 11SGEN phase I at 18:57:06 on 29-MAY-85
>;     -- To continue type: @[2,200]11SGEN2
>;
>SET /UIC=[2,200]
>@ <EOF>


> @11SGEN2
>;
>; RSX-11S Version 4.2 BL38 System Generation Phase II
>;
>; Copyright (C) 1975,1981,1983,1985
>; Digital Equipment Corp., Maynard, MA.  01754
>; All Rights Reserved.
>;
>;        Build The Executive And All Required Tasks
>;
>; This command file will produce the target system on your SY: disk.
>; If it is an RL01 or RL02, this command file will delete a number
>; of files from this disk to make room for those required to complete
>; this 11SGEN.  You must be running on an expendable copy of
>; your disk.  Note however, that the disk will be left in a
>; state such that RSX-11S sysgens may be performed at a later
>; date.  In addition, the sysgen itself may be terminated and
>; may be restarted at just about any point to rebuild particular
>; pieces of the system.
>;
>* In what UIC is SGNPARM.CMD if not [2,200] [S]:
>; Big disk distribution kit 11SGEN version 2.10 for RSX-11M BL38
>;
>; Continuation from 11SGEN PHASE I done on 29-MAY-85 at 18:56:57
>TIM
  30-MAY-1985 09:22:43
```

```
>* Target device name [S]: DM0:
>SET DEFAULT DM0:
>ASN DM0:=SY:
%MCR-I-SUPERSEDE, previous value of SY has been superseded
>ASN DM0:=SY0:
%MCR-I-SUPERSEDE, previous value of SY0 has been superseded
>ASN DM0:=LB:
%MCR-I-SUPERSEDE, previous value of LB has been superseded
>ASN DM0:=LB0:
%MCR-I-SUPERSEDE, previous value of LB0 has been superseded
>ASN TK:=TK0:
%MCR-I-SUPERSEDE, previous value of TK0 has been superseded
>ASN MP:=MP0:
%MCR-I-SUPERSEDE, previous value of MP0 has been superseded
>ASN DM0:[1,54]11MTKB.TSK=TKB
%MCR-I-SUPERSEDE, previous value of TKB has been superseded
>ASN DM0:[1,54]11MVMR.TSK=VMR
%MCR-I-SUPERSEDE, previous value of VMR has been superseded
>ASN DM0:=WK:
%MCR-I-SUPERSEDE, previous value of WK has been superseded
>ASN DM0:=WK0:
%MCR-I-SUPERSEDE, previous value of WK0 has been superseded
>SET NOON
>;
>; The map device specified must already be mounted with UIC [1,34].
>; If it is not, respond to the next question with ^Z and do so.
>;
>ASN SY:=LB:
>;
>; Expanded comments provide a complete description of every step in
>; this 11SGEN command file.  On the other hand, short comments
>; provide virtually no explanatory text.
>;
>* Do you want expanded comments? [Y/N]: Y
>;
>; Create RSX-11S subset system library
>; if you have not already done so.
>;
>SET /UIC=[1,1]
>* Have you already created 11SLIB.OLB? [Y/N]:
>LBR LB:11SLIB/CR:30.:896.:320.
>* Have you already built the Exec? [Y/N]:
>SET /UIC=[1,24]
>;
>; Purge Exec build command files and assembly prefix files
>;
>PIP RSXBLD.CMD/PU/NM
>PIP [11,10]RSXMC.MAC/PU/NM
>;
>; Now we build the Executive
>; If you must make changes to the Executive build files
>; answer yes to the following question. Edit RSXBLD.CMD
>; by issuing the command EDI LB:RSXBLD.CMD. 11SGEN2 will
>; build the Executive after you resume from the pause.
>;
>* Do you wish to edit the Executive build file? [Y/N]:
>TKB @LB:RSXBLD
>* Did the Executive build successfully? [Y/N]: Y
>;
>; You now need the Executive maps to layout
>; the partitions in your new system.
>;
```

```
>* Do you have the maps already? [Y/N]:
>PIP LP:=SY0:[1,34]RSX11S.MAP,EXCOM1.MAP,EXCOM2.MAP
>;
>; Look in the map of the Exec for the symbol "$SYTOP" which
>; indicates the last address allocated to the Exec.  User
>; partitions may start at any location beyond this address
>; as long as they fall on a 64 byte boundary. See the RSX-11M
>; Sysgen manual for a description of how to set up partitions.
>; You may wish to stop at this time to layout your partitions.
>;
>SET /UIC=[1,64]
>* Do you want to build any loadable drivers now? [Y/N]: Y
>;
>; Build Loadable drivers
>;
>*  3. Device for driver's maps [D: NL:] [S]: DM0:
>SET /UIC=[1,24]
>;
>; The following are mnemonics of the loadable device drivers selected.
>;
>;     DB      DL      DU      MU
>;
>; When all drivers are built, strike carriage return.
>;
>*  5. Driver 2-character device mnemonic [S]: DB
>*  6. Drive partition name [D: DRVPAR] [S]:
>TKB @SY:DBDRVBLD
>*  5. Driver 2-character device mnemonic [S]: DL
>*  6. Drive partition name [D: DRVPAR] [S]:
>TKB @SY:DLDRVBLD
>*  5. Driver 2-character device mnemonic [S]: DU
>*  6. Drive partition name [D: DRVPAR] [S]:
>TKB @SY:DUDRVBLD
>*  5. Driver 2-character device mnemonic [S]: MU
>*  6. Drive partition name [D: DRVPAR] [S]:
>TKB @SY:MUDRVBLD
>*  5. Driver 2-character device mnemonic [S]:
>SET /UIC=[1,64]
>SET /UIC=[1,24]
>* Have you already built the full duplex terminal driver? [Y/N]:
>;
>; Now we build the full duplex terminal driver
>;
>;
>; The  task build command file for the full duplex terminal drive
>; specifies that it run in partition TTPAR, having a length of
>; 40000 octal.
>;
>* Do you wish to edit the build command file for the terminal driver? [Y/N]:
>TKB @LB:TTDRVBLD.CMD
>* Did the terminal driver build successfully? [Y/N]: Y
>* List full duplex terminal driver map? [Y/N]: Y
>PIP LP:=SY0:[1,34]TTDRV.MAP
>* Do you want to continue and build the privileged tasks? [Y/N]: Y
>;
>; Prepare to assemble and build the RSX-11S privileged
>; software components.
>;
>; The tasks TKTN, BASMCR, OTL, and SIP must be assembled, and the
>; task build command files possibly edited before they can be built.
>; The tasks RSDV05, RSDV52, and RSDV1H need only to be built, but
>; their command files may also be edited before they are built.
```

```
>; It is not necessary to save/print the assembly listings;
>; However, we recommend that you save/print the task build
>; maps.  This is especially important when generating
>; an unmapped system -- without maps it will be difficult
>; to determine partition limits.
>;
>* Assembly list device for privileged tasks (DDNN:) [D: NL:] [S]: DM0:
>* Is DM0: mounted as a FILES-11 volume with UFD [1,34]? [Y/N]: Y
>* Map device for privileged tasks (DDNN:) [D: SY:] [S]:
>* Have you already built task TKTN? [Y/N]:
>;
>; Task TKTN will be included in your 11S system as a result
>; of your selection in 11SGEN Phase I.
>;
>;
>; The privileged tasks BASMCR, OTL, and SIP were specially designed
>; for use in the RSX-11S environment.  Their inclusion in the system
>; is optional.  If desired, they will be assembled and built under
>; control of this command file.
>;
>* Do you wish to include BASMCR, OTL, or SIP in your system? [Y/N]: Y
>;
>; The tasks RSDV05, RSDV52, and RSDV1H dynamically display the
>; the status of memory on a graphics terminal and can be built
>; for the VT05B terminal, VT52 terminal, and VT100 terminal
>; respectively.  These tasks display which tasks are in memory
>; and where in memory they reside, which task is currently
>; running, and the status of pool.
>;
>* Do you want to include RSDV05, RSDV52, or RSDV1H? [Y/N]: Y
>;
>; The RSX-11S subset file control services (FCS) are dist-
>; ributed as a single file containing the concatenated object
>; modules.  They cannot be placed in the RSX-11M system object
>; library (SYSLIB.OLB).  However, users who require this FCS
>; should link with the RSX-11S subset of SYSLIB (11SLIB.OLB)
>; created during this Sysgen.
>;
>* Do you wish to include the RSX-11S subset FCS? [Y/N]: Y
>;
>; The RSX-11M crash dump analyzer (CDA)
>; may also be built to run on a non-M
>; host system for analysis of RSX-11S
>; crash dumps.
>;
>* Do you wish to build CDA for your host system? [Y/N]: Y
>SET /UIC=[11,10]
>* Do you wish to make corrections to RSX-11S source modules? [Y/N]:
>SET /UIC=[1,24]
>MAC @TKNASM
>PIP TKNASM.CMD;*/DE
>;
>; The task build command file for TKTN specifies that it run in
>; partition SYSPAR, having a length of 3700 octal.
>; If you must change the partition name or length,
>; you will have to edit its task build command file.
>;
>* Do you have to edit the task build command file for TKTN? [Y/N]:
>TKB @TKN11SBLD.CMD
>;
>; BASMCR is a privileged task which supplies a subset (or basic
>; set) of the RSX-11M MCR commands. It can not be included if
>; during Sysgen Phase I you indicated that you did not want any
>; terminal devices.  Its size, depending upon options, ranges
>; from 6400 to 16000 octal on mapped systems.
>;
```

```
Do you want to include task BASMCR? [Y/N]: Y
>UFD SY:[16,10]
>UFD SY:[16,24]
>UFD DM0:[16,34]
>SET /UIC=[16,10]
>PIP BMPRE.MAC;*/DE/NM
>PIP *.MAC;*/RM/NM
>PIP [16,*]*.*;*/DE/NM
>PIP [16,10]=[2,20]BMPRE.MAC
>PIP [16,10]/EN=[2,20]ABOBAS.MAC,ATLBAS,BRKBAS,ERRBAS,ERRMSG
>PIP [16,10]/EN=[2,20]FMTDV.MAC,FNDUCB,GNBLK,GETNUM,KEYWD
>PIP [16,10]/EN=[2,20]LKLST.MAC,MCRBAS,OPEBAS,PRSBAS,REDBAS
>PIP [16,10]/EN=[2,20]REMBAS.MAC,RPSBAS,RUNBAS,TIMBAS
>SET /UIC=[16,24]
>;
>; The size of BASIC MCR is dependent upon the inclusion of
>; conditional assembly code.  The inclusion of the code is
>; controlled by symbol definitions appearing in an assembly
>; prefix file.  The default for these conditionals is
>; exclusion.  The following options, along with the corres-
>; ponding control symbols, are available:
>;
>;        R$$ATL - ATL/TAL COMMANDS
>;        R$$ERM - ERROR MESSAGE TEXT
>;        R$$OPE - OPEN COMMAND
>;
>; To include an option locate the desired conditional symbol
>; and remove the semicolon at the beginning of the line.  For
>; example:
>;
>;        *PL ;R$$ATL
>;        ;R$$ATL = 0  ;INCLUDE ATL
>;        *C /;//
>;        R$$ATL = 0  ;INCLUDE ATL
>;        *
>;
>; Repeat this for all desired options.  Note that the symbols
>; appear on consecutive lines in alphabetical order in the file.
>;
>* Do you wish to edit the assembly prefix file for BASMCR? [Y/N]: Y
>EDI [16,10]BMPRE.MAC
[00029 lines read in]
[Page    1]
*PL ;R$$ATL
;R$$ATL    = 0  ; INCLUDE ATL
*C /;//
R$$ATL    = 0  ; INCLUDE ATL
*PL ;R$$ERM
;R$$ERM    = 0  ; INCLUDE ERROR MESSAGES
*C /;//
R$$ERM    = 0  ; INCLUDE ERROR MESSAGES
*PL R$$OPE
;R$$OPE    = 0  ; INCLUDE OPEN
*C /;//
R$$OPE    = 0  ; INCLUDE OPEN
*EXIT
[Exit]
>MAC @BASMCRASM.CMD
>SET /UIC=[1,24]
>PIP [16,10]BMPRE.MAC;*/DE/NM
>PIP [16,10]*.MAC;*/RM/NM
>PIP BASMCR.OBJ=[16,24]*.OBJ
>PIP [16,24]*.*;*/DE/NM
>LBR BASMCR/CR:21.:64.:64.=BASMCR
>PIP BASMCR.OBJ;*/DE/NM
>;
```

```
>; The task build command file for BASMCR specifies that it
>; run in partition MCRPAR, length 16000 octal (mapped).
>; If you must change the partition name or length,
>; you will have to edit its task build command file.
>;
>* Do you wish to edit the task build command file for BASMCR? [Y/N]:
>TKB @BASMCRBLD.CMD
>;
>; OTL is a privileged task which is the RSX-11S on-line task loader.
>; It performs the install, load, and fix functions for tasks which
>; were created on a host development system and copied via FLX to a
>; load medium.  Depending on the number of load devices, etc, OTL
>; ranges from 8000 to 15000 octal on mapped systems.
>;
>* Do you want to include task OTL? [Y/N]: Y
>UFD SY:[20,10]
>UFD SY:[20,24]
>UFD DM0:[20,34]
>SET /UIC=[20,10]
>PIP SY:OTLPRE.MAC;*/DE/NM
>PIP SY:*.MAC;*/RM/NM
>PIP [20,*]*.*;*/DE/NM
>PIP [20,10]=[2,20]OTLPRE.MAC
>PIP [20,10]/EN=[2,20]OTL.MAC,OTLCD,OTLCM,OTLERR
>PIP [20,10]/EN=[2,20]OTLHD.MAC,OTLLB,OTLLD,OTLQIO,OTLRD
>SET /UIC=[20,24]
>;
>; The size of OTL is dependent upon the inclusion of conditional
>; assembly code.  The inclusion of the code is done in two ways,
>; by a single symbol definition and by macro calls appearing
>; in an assembly prefix file.  The first controls the inclusion
>; of error message text. To include this option, locate the
>; symbol R$$ERM, and remove the semicolon from the beginning
>; of the line.  The default for error message text is exclusion.
>; For example:
>;
>;        *PL ;R$$ERM
>;        ;R$$ERM=0
>;        *C /;//
>;        R$$ERM=0
>;
>; The other type of option concerns the exclusion of unwanted
>; device support.  For each of the OTL load devices which
>; were included in Sysgen Phase I, corresponding support will be
>; generated in OTL.  Naturally, support will not be generated for
>; those OTL load devices which were not included in Sysgen Phase I.
>; The following devices along with corresponding control symbols
>; may be supported by OTL:
>;
>;      PR: - PR11, paper tape reader
>;      DX: - RX11, flexible disk
>;      DY: - RX21, flexible disk
>;      DU: - RX50, flexible diskette
>;      CT: - TA11, cassette tape
>;      DT: - TC11, DECtape
>;      MT: - TM11, magtape
>;      MS: - TS11, magtape
>;      MM: - TU16, magtape
>;      DD: - TU58, cartridge
>;
```

```
>; To exclude OTL support for a device which has been generated into
>; your RSX-11S Executive, locate the corresponding device symbol
>; and place a semicolon at the beginning of the line.  For example:
>;
>;       *PL PR11
>;               INCLUD PR11,P$$R11      ;PC11/PR11 paper tape reader
>;       *C //;/
>;       ;       INCLUD PR11,P$$R11      ;PC11/PR11 paper tape reader
>;       *
>;
>; Perform this for all of the above devices which will be part of
>; your RSX-11S Executive, but for which you do not want OTL
>; support.  Note that the symbols appear on consecutive lines in
>; alphabetical order in the file.
>;
>* Do you wish to edit the assembly prefix file for OTL? [Y/N]: Y
>EDI [20,10]OTLPRE.MAC
[00142 lines read in]
[Page    1]
*PL ;R$$ERM
;R$$ERM=0
*C /;//
R$$ERM=0
*EXIT
[Exit]
>MAC @OTLASM.CMD
>SET /UIC=[1,24]
>PIP [20,10]OTLPRE.MAC;*/DE/NM
>PIP [20,10]*.MAC;*/RM/NM
>PIP OTL.OBJ=[20,24]*.OBJ
>PIP [20,24]*.*;*/DE/NM
>LBR OTL/CR:21.:128.:64.=OTL
>LBR OTL=[2,20]BLXIOM
>PIP OTL.OBJ;*/DE/NM
>;
>; The task build command file for OTL specifies that it
>; run in partition OTLPAR, length 15000 octal (mapped).
>; If you must change the partition name or length,
>; you will have to edit its task build command file.
>;
>* Do you wish to edit the task build command file for OTL? [Y/N]:
>TKB @OTLBLD.CMD
>;
>; SIP is a privileged task which performs the RSX-11S system
>; image preservation duties.  It replaces the RSX-11M SAV MCR
>; command.  Depending on the number of load devices, etc, SIP
>; ranges from 3700 to 7400 octal on mapped systems.
>;
>* Do you want to include task SIP? [Y/N]: Y
>UFD SY:[21,10]
>UFD SY:[21,24]
>UFD DM0:[21,34]
>SET /UIC=[21,10]
>PIP SY:SIPPRE.MAC;*/DE/NM
>PIP SY:*.MAC;*/RM/NM
>PIP [21,*]*.*;*/DE/NM
>PIP [21,10]=[2,20]SIPPRE.MAC
>PIP [21,10]/EN=[2,20]SIP.MAC,SIPBOO,SIPCD,SIPERR
>PIP [21,10]/EN=[2,20]SIPLD.MAC,SIPQIO
>SET /UIC=[21,24]
>;
```

```
>; The size of SIP is dependent upon conditional assembly code
>; in exactly the same manner as OTL.  There are only a few minor
>; differences.  OTL supports the paper tape reader using the
>; control symbol PR11;  SIP on the other hand supports the paper
>; tape punch using the control symbol PP11. In addition, OTL
>; supports DECtape II cartridges using control symbol TU58,
>; TS11 magnetic tape drives using the control symbol TS11
>; and RX50 flexible diskettes using the control symbol RX50.
>; Edit SIPPRE.MAC in the same way described for OTL.  For example:
>;
>;      *PL PP11
>;              INCLUD PP11,P$$P11      ;PC11/PP11 paper tape punch
>;      *C //;/
>;      ;       INCLUD PP11,P$$P11      ;PC11/PP11 paper tape punch
>;      *
>;
>* Do you wish to edit the assembly prefix file for SIP? [Y/N]: Y
>EDI [21,10]SIPPRE.MAC
[00085 lines read in]
[Page    1]
*PL ;R$$ERM
;R$$ERM=0
*C /;//
R$$ERM=0
*EXIT
[Exit]
>MAC @SIPASM.CMD
>SET /UIC=[1,24]
>PIP [21,10]SIPPRE.MAC;*/DE/NM
>PIP [21,10]*.MAC;*/RM/NM
>PIP SIP.OBJ=[21,24]*.OBJ
>PIP [21,24]*.*;*/DE/NM
>LBR SIP/CR:20.:64.:64.=SIP
>PIP SIP.OBJ;*/DE/NM
>;
>; The task build command file for SIP specifies that it
>; run in partition SIPPAR, length 7400 octal (mapped).
>; If you must change the partition name or length,
>; you will have to edit its task build command file.
>;
>* Do you wish to edit the task build command file for SIP? [Y/N]:
>TKB @SIPBLD.CMD
>SET /UIC=[1,24]
>PIP RMD.OLB/NV=[2,20]RMDMAP.OLB
>* Do you want to include task RSDV05? [Y/N]: N
>* Do you want to include task RSDV52? [Y/N]: N
>* Do you want to include task RSDV1H? [Y/N]: Y
>;
>; The task build command file for RSDV1H specifies that it
>; run in partition RSDV1H, length 40000 (octal).
>; If you must change the partition name or length, you
>; will have to edit the task build command file.
>;
>* Do you wish to edit the task build command file for RSDV1H? [Y/N]:
>TKB @RSDV1HBLD.CMD
>SET /UIC=[1,24]
>;
>; It may be necessary to edit the task build command file and ODL file
>; to build CDA for the non-M host.  Change the partition name and
>; base address to match that of the partition (on the host system) into
>; which CDA will be installed. You will also need to change the ODL
>; file to reference the correct device on the host where SYSLIB and
>; EXELIB reside.  The files are named CDABLD.CMD and CDABLD.ODL.
>; We will now pause to allow you to edit the command files.
>; 11SGEN2 -- Pausing.  To continue type "CONTINUE".
IND     --  Pausing. To continue type "RES"
>RES
```

```
IND    -- Continuing
>; 11SGEN2 -- continuing
>SET /UIC=[1,64]
>TKB @[1,24]CDABLD
>; The CDA.TSK file resides in [1,64] on your RSX-11S sysgen disk
>; and can be run on the host system.
>; CDA must be run in compatibility mode on VAX/VMS hosts.
>SET /UIC=[1,24]
>;
>; Add subset FCS to the RSX-11S system object library
>;
>SET /UIC=[1,1]
>LBR LB:11SLIB/RP=[2,20]FCS11S
>PIP LB:11SLIB.OLB/PU/NM
>SET /UIC=[1,64]
>PIP *.*/PU/NM
>PIP [1,24]*.*/PU/NM
>;
>; The operation left to be performed is that of the final
>; configuration of the virgin executive using Virtual MCR.
>;
>* Do you want to configure the Exec at this time using VMR? [Y/N]: Y
>;
>; The contents of your RSX-11S release kit currently resides
>; under the UFD [2,20].  If your SY: disk is not an RK06/07 or an
>; RP04/05/06 you may want to delete these files.  Leaving
>; them on the disk will save the time of re-copying them the next
>; time you perform an RSX-11S Sysgen.  If your SY: disk is an RK05,
>; they will be automatically deleted.
>;
>* Do you want to delete the RSX-11S kit from this disk? [Y/N]:
>;
>; We will now make a copy of your target system
>;
>PIP RSX11S.SYS/NV/CO/BL:498.=RSX11S.TSK
>;
>; If you wish to make a copy of your task or system image file
>; on another device we will pause now to allow you to do so.
>;
>* Do you wish to copy your system to another device? [Y/N]:
>;
>; RSX11S.TSK is a backup copy of the 11S system you have just built.
>; If you do not wish to retain it, we will delete it now.
>;
>* Do you wish to delete the system backup file RSX11S.TSK? [Y/N]:
>;
>; Your target system is now ready to set up partitions and install
>; the required tasks.  The procedure to follow is:
>;        1) Run Virtual MCR
>;        2) Extend POOL space to base of first partition
>;        3) Set up your partitions
>;        3B) Load needed drivers
>;        3C) Set up a partition for the Directive Common
>;        4) Install tasks (BASMCR, OTL, SIP, TKTN)
>;        5) Fix tasks into (virtual) memory
>;        6) Optionally set the time and save a copy of THE
>;           system on a bootable medium
>;        7) Exit from virtual MCR and boot in your target system
>;
```

```
>; VMR example:
>;
>;        >VMR    ! RUN VIRTUAL MCR
>;        ENTER FILENAME:RSX11S.SYS  ! VMR PROMPTS FOR FILE NAME
>;        VMR>SET /POOL=XXX ! EXTEND POOL TO FIRST PARTITION BASE
>;        VMR>SET /MAIN=TTPAR:XXX:XXX:TASK  !SET UP FULL DUPLEX TT PARTITION
>;        VMR>SET /MAIN=DRVPAR:XXX:XXX:TASK  ! SET UP DRIVER PARTITION
>;        VMR>SET /MAIN=PUCOM:XXX:XXX:COM    ! SET UP COMMON FOR DU OR MU DRIVER
>;        VMR>INS PUCOM      ! INSTALL DU OR MU DRIVER COMMON
>;        VMR>SET /MAIN=EXCOM1:XXX:200:COM  ! SET 1ST EXEC. COMMON
>;        VMR>INS EXCOM1  !INSTALL 1ST EXECUTIVE COMMON
>;        VMR>SET /MAIN=EXCOM2:XXX:200:COM  ! SET 2ND EXEC. COMMON
>;        VMR>INS EXCOM2  !INSTALL 2ND EXECUTIVE COMMON
>;        VMR>SET /MAIN=SYSPAR:XXX:XXX:TASK  ! SET UP TKTN PARTITION
>;        VMR>SET /MAIN=MCRPAR:XXX:XXX:TASK  ! SET UP MCR PARTITION
>;        VMR>SET /MAIN=OTLPAR:XXX:XXX:TASK  ! SET UP OTL PARTITION
>;        VMR>SET /MAIN=SIPPAR:XXX:XXX:TASK  ! SET UP SIP PARTITION
>;        VMR>SET /MAIN=RSDV1H:XXX:XXX:TASK !SET UP RSDV1H PAR
>;        VMR>SET /MAIN=GEN:XXX:XXX:SYS  ! IF SYSTEM CONTROLLED PAR.
>;        VMR>SET /MAIN=GEN:XXX:XXX:TASK ! IF USER CONTROLLED PARTITION
>;        VMR>LOA XX:  ! LOAD XXDRV
>;        VMR>INS TKN/FIX=YES ! INSTALL & FIX TKTN
>;        VMR>INS BASMCR/FIX=YES ! INSTALL & FIX BASIC MCR
>;      VMR>INS RCT/FIX=YES     ! INSTALL & FIX RCT
>;        VMR>INS OTL/FIX=YES ! INSTALL & FIX OTL
>;        VMR>INS SIP/FIX=YES ! INSTALL & FIX SIP
>;        VMR>INS RSDV1H/FIX=YES ! INSTALL & FIX RSDV1H
>;        VMR>TIM 10:45 11/10/77 ! SET TIME AND DATE
>;        VMR>SAV DX:RSX11S ! SAVE SYSTEM ON RX01 FLOPPY
>;        VMR>^Z   ! EXIT FROM VIRTUAL MCR
>;
>; End of VMR example
>;
>;
>;
>; Now we will run Virtual MCR so that you may initialize
>; your system.  Be sure to define all required partitions
>; at this time, because the SET function is not supported
>; in RSX-11S BASIC MCR.  Furthermore, if you plan to
>; include BASIC MCR and OTL in your system, they must
>; be installed and fixed into memory.  Other tasks,
>; such as SIP and TKTN may be loaded into a running
>; RSX-11S system using OTL.
>;
>;        NOTE: Since LOAD and UNLOAD are not supported on
>;        a running RSX-11S system, all required loadable
>;        drivers must be loaded using VMR.
>;
>;        NOTE: You have requested to include the
>;        directive common.  You must install the
>;        common prior to exitting Virtual MCR
>;        or your RSX-11S system will not boot.
>VMR
Enter filename: RSX11S.SYS
VMR>SET /POOL=*
VMR>SET /MAIN=TTPAR:*:314:TASK
VMR>LOA TT:
VMR -- *DIAG*-Loadable driver larger than 4K
VMR>SET /MAIN=DRVPAR:*:*:SYS
VMR>LOA DB:
VMR>LOA DL:
VMR>LOA DU:
VMR>LOA MU:
```

```
VMR>SET /TOP=DRVPAR:-*
VMR -- *DIAG*-Installed tasks may no longer fit in partition
VMR>SET /MAIN=PUCOM:*:62:COM
VMR>INS PUCOM
VMR>SET /MAIN=EXCOM1:*:200:COM
VMR>INS EXCOM1
VMR -- *DIAG*-Partition reduced to executive common size
VMR>SET /MAIN=EXCOM2:*:200:COM
VMR>INS EXCOM2
VMR -- *DIAG*-Partition reduced to executive common size
VMR>SET /MAIN=SYSPAR:*:36:TASK
VMR>SET /MAIN=MCRPAR:*:136:TASK
VMR>SET /MAIN=OTLPAR:*:142:TASK
VMR>SET /MAIN=SIPPAR:*:40:TASK
VMR>SET /MAIN=RSDV1H:*:314:TASK
VMR>SET /MAIN=GEN:*:*:SYS
VMR>INS TKN/FIX=YES
VMR>INS BASMCR/FIX=YES
VMR>INS RCT/FIX=YES
VMR>INS OTL/FIX=YES
VMR>INS SIP/FIX=YES
VMR>INS RSDV1H/FIX=YES
VMR>^Z
>;
>; When this command file completes, your RSX-11S system is
>; ready to run.
>;
>SET /UIC=[2,200]
>TIM
  30-MAY-1985 11:14:20
>;
>@ <EOF>
> MOU MT0:/FOR
%MOUNT-I-MOUNTED,  mounted on _MTA0:
> SET /UIC=[1,64]
> SET DEF [1,64]
> VMR
Enter filename: RSX11S
VMR>TIM 30-MAY-85 11:40
VMR>SAV MT0:RSX11S
VMR>^Z
```

APPENDIX A

RSX-11S ERROR MESSAGES

The following list of error messages is a subset of the RSX-11M error messages. The error message format is as follows:

XXX -- ## - ERROR MESSAGE

where:

XXX	indicates the three-character mnemonic of the On-Line Task Loader (OTL), System Image Preservation (SIP) program, or Monitor Console Routine (MCR).
##	indicates the numerical error code assigned to the particular error message.
ERROR MESSAGE	indicates the possible cause of the error and, if appropriate, suggests remedial action.

NOTE

The following list omits the 3-character mnemonic to make a numerical search easier for you. Refer to Section 2.1.3 (for BASIC MCR), Section 2.2.4 (for OTL), and Section 2.3.4 (for SIP) for the particular error message.

1 - ILLEGAL FUNCTION

Explanation: A command was entered that MCR could not recognize or an inappropriate keyword was specified.

2 - SYNTAX ERROR

Explanation: This message generally indicates that the required information was entered incorrectly. Retype the command line using the correct syntax.

3 - NO POOL SPACE

Explanation: This message is returned in the event of one of the following errors:

- The Executive could not currently satisfy MCR's request for dynamic memory.

- OTL detected insufficient pool space in the Executive when it issued an I/O request or attempted to allocate pool space. Note that when this error condition occurs, OTL may exit without printing this error message.

4 - INVALID KEYWORD

Explanation: A keyword was specified in the command line that the specific command processor did not recognize.

5 - DEVICE NOT IN SYSTEM

Explanation: The device specified in the command line was not generated into the system. Devices to be used in the system must be specified during system generation.

6 - PRIVILEGED COMMAND

Explanation: A command available only to privileged terminals was issued from a nonprivileged terminal.

7 - PARTITION NOT IN SYSTEM

Explanation: This message is returned in the event of one of the following errors:

- The partition name specified as an argument in a command line could not be found in the system.
- The partition specified in the task image was not defined in the system.
- The specified partition was defined, but some or all of its memory was not present in the current configuration.

8 - IO ERROR

Explanation: This message is returned in the event of one of the following errors:

- In attempting to read the next command, the MCR command OPEN detected an error.
- An MCR terminal-write operation failed.
- A hardware error was encountered as the result of an I/O request issued to the load device or terminal.
- The specified device was generated into the system, but it was not present in the hardware configuration.

9 - BYTE ADDRESS

Explanation: An odd address was specified as the argument to the MCR command OPEN.

10 - INVALID TIME PARAMETER

Explanation: A specified time field was incorrect.

11 - TASK NOT IN SYSTEM

Explanation: The specified task was not installed in the system.

12 - INVALID ADDRESS

Explanation: The address specified as an argument by the OPEN command referenced one of the following:

- A nonexistent memory location
- An address outside the boundaries of the specified partition

13 - TASK NOT ACTIVE

Explanation: The specified task was not active.

14 - TASK BEING ABORTED

Explanation: The task is being aborted because either the MCR command ABORT was issued or an error was detected.

15 - TASK NOT SUSPENDED

Explanation: The task specified in the RESUME command line was never suspended.

16 - TASK ACTIVE

Explanation: The task used as the argument of the command was active.

17 - CIRCULAR REDIRECT ERROR

Explanation: The attempt to redirect a device would result in a circular list of redirections.

18 - OLD DEVICE NOT KNOWN TO SYSTEM

Explanation: The system did not know the old device in the REDIRECT command (the device does not exist in the device tables).

19 - NEW DEVICE NOT KNOWN TO SYSTEM

Explanation: The system did not know the new device in the REDIRECT command (the device does not exist in the device tables).

20 - PSEUDO DEVICE REDIRECT ERROR

Explanation: An attempt was made to redirect one pseudo device to another pseudo device.

21 - OLD DEVICE ATTACHED

Explanation: An attempt was made to redirect an attached device.

22 - TI REDIRECT ERROR

Explanation: An attempt was made to redirect the pseudo device TI:. This device cannot be redirected.

23 - INVALID UIC

Explanation: A value of 0 was detected for either the group number or the member number. This is invalid.

24 - ILLEGAL KEYWORD VALUE

Explanation: A value entered for a keyword exceeded the limits for that argument. Enter a valid value.

26 - LISTING DEVICE NOT AVAILABLE

Explanation: MCR attempted to display information to a device unit that was attached, and therefore unavailable for printed output.

27 - DEVICE NOT REDIRECTABLE

Explanation: The specified device cannot be redirected.

40 - BASE ADDRESS MUST BE ON A 4K BOUNDARY

Explanation: A task image (not a common block) in a mapped system specified a base address not on a 4K boundary.

41 - ILLEGAL 1ST APR

Explanation: This message is returned in the event of one of the following errors:

- The image of a nonprivileged task in a mapped system specified a nonzero first Active Page Register (APR).
- The image of a privileged task in a mapped system specified a first APR that was not in the range APR4 through APR6.

42 - NOT ENOUGH APRS FOR TASK IMAGE

Explanation: There are not enough APRs to map the task as well as the resident library references that the task image may have in a mapped system.

43 - FORMATTED BINARY CHECKSUM ERROR

Explanation: A checksum error was encountered while reading a task image from paper tape.

44 - FORMATTED BINARY FORMAT ERROR

Explanation: An invalid binary format was encountered in a task image being read from paper tape.

45 - UNEXPECTED END OF FILE ENCOUNTERED

Explanation: An end-of-file was encountered before the entire task image was read.

46 - SPECIFIED PARTITION TOO SMALL

Explanation: The partition specified in the task image was smaller than the load size of the task or common block.

47 - SPECIFIED PARTITION FOR COMMON BLOCK

Explanation: An attempt was made to install a task into a common block.

48 - TASK IS OVERLAID

Explanation: This message is returned in the event of one of the following errors:

- An attempt was made to install an overlaid task in a system without memory management directives.
- An attempt was made to install a task that has disk-resident overlays.

49 - TASK NAME ALREADY IN USE

Explanation: An attempt was made to install a task with the same name as that of a task already installed.

50 - TASK NAME NOT DEFINED

Explanation: An attempt was made to install a task from paper tape without an optional file name specified. Additionally, the task image did not contain a task name. Retype the command line, specifying a file name that will become the task name by default.

51 - TASK AND PARTITION BASES MISMATCH

Explanation: An attempt was made to install a task in an unmapped system whose base address did not match that of its specified partition.

52 - INVALID COMMON BLOCK

Explanation: A task contained a library reference to a common block that was not in the system.

53 - PARTITION TOO LARGE FOR PRIVILEGED TASK

Explanation: An attempt was made to install a privileged task in a partition whose size was greater than 12K words. (This message occurs only on unmapped systems.)

54 - FILE NOT FOUND

Explanation: The specified file was not found.

55 - COMMON BLOCK IS TASK PARTITION

Explanation: A task image contained a library reference that had the same name as a task block.

56 - COMMON BLOCK NOT LOADED

Explanation: A task image contained a library reference to a common block that was not loaded.

57 - LENGTH MISMATCH COMMON BLOCK

Explanation: A task image contained a library reference to a common block that was smaller than the size specified when the task was built.

58 - BASE MISMATCH COMMON BLOCK

Explanation: A task image contained a library reference to a common block whose base address was different from the one specified when the task was built.

59 - COMMON BLOCK PARAMETER MISMATCH

Explanation: This message is returned in the event of one of the following errors:

- A task image contained a library reference to a common block that did not contain position-independent code. It was, however, expected to contain this code.
- A task image contained a library reference to a common block that contained position-independent code. It was not, however, expected to contain this code.
- An attempt was made to load a common block whose task name did not match the partition name.

60 - PARTITION NOT COMMON

Explanation: An attempt was made to install a common block in a task partition.

61 - ILLEGAL DEVICE

Explanation: A task image contained a logical unit number (LUN) assignment to a device not in the system.

62 - FILE NOT TASK IMAGE

Explanation: Preliminary checks indicated that either the specified file was not a task image, or the file was corrupted.

63 - PARTITION IS BUSY

Explanation: This message is returned in the event of one of the following errors:

- An attempt was made to fix a task in a main partition or occupied subpartition.
- An attempt was made to fix a task in a main partition that had an occupied subpartition.
- An attempt was made to fix a task in a subpartition that had an occupied main partition.
- An attempt was made to load a task into a system-controlled partition, but the partition did not have enough contiguous memory.

65 - INVALID BLOCK SIZE ON LOAD DEVICE

Explanation: The block size of a task image file (on cassette tape) was not able to be evenly divided into 512(10).

66 - FILE NAME REQUIRED

Explanation: No file name was specified with a device. A file name is required (OTL message).

66 - LABEL REQUIRED

Explanation: No label was specified with a device. A label is required (SIP message).

67 - INVALID LOAD DEVICE

Explanation: The version of OTL or SIP in use did not support (or was not assembled to support) the specified device.

68 - TOO MANY WINDOW BLOCKS

Explanation: The task would require more than eight Active Page Registers (APRs; OTL message).

68 - IO OUTSTANDING

Explanation: An attempt was made to save the system at a time when one or more tasks had outstanding I/O (SIP message).

69 - TASK BUILT FOR WRONG SYSTEM

Explanation: OTL determined that the task required one of the following features that the system does not support:

- The task was built for an RSX-11M-PLUS system
- The wrong version of the Task Builder was used to build the task. (For memory-resident overlaid tasks, the version must be RSX-11M Version 3.2 or later.)

70 - ILLEGAL USE OF INCREMENT

Explanation: This message is returned in the event of one of the following errors:

- The specified increment causes the task to exceed 32K.
- An attempt was made to install and fix an overlaid task with an increment. Overlaid tasks cannot be loaded with an increment.

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