RSX–11M–PLUS System Generation and Installation Guide

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Contents

Chapter 2 Getting Started

Chapter 3 Running SYSGEN

Chapter 4 After SYSGEN

Chapter 5 Pregenerated RSX–11M–PLUS Kits

Examples

Figures

Tables

Preface

Manual Objectives

The *RSX–11M–PLUS System Generation and Installation Guide* is intended to guide a system manager through the steps required to generate an RSX–11M–PLUS operating system. It presents the information you need to generate a system for a specific hardware configuration and a set of application requirements.

Intended Audience

This manual is intended for the system manager who is responsible for generating an RSX–11M–PLUS system.

Document Structure

Chapter 1 contains an overview of the system generation process. It outlines the steps involved in producing an RSX–11M–PLUS operating system.

Chapter 2 describes the contents, copying, and use of the distribution kit.

Chapter 3 describes the step-by-step process followed in generating a system. It provides specific information on Executive and processor features, as well as specific device information.

Chapter 4 describes how to copy, save, and back up your generated system, how to run the Virtual Monitor Console Routine (VMR) task, and how to recover disk space after the system generation is complete. Also discussed are Digital-supplied template files that are useful in managing your new system, how to change the system without repeating SYSGEN, and how to put more than one system on the same volume. This chapter includes a list of system initialization error messages.

Chapter 5 describes the features and use of the pregenerated systems that are supplied on the RL02 disk for use with smaller PDP–11 configurations.

Appendix A supplies worksheets for gathering system information.

Appendix B lists devices included under RSX–11M–PLUS.

Appendix C provides examples of typical system generations.

Appendix D describes PDP–11 vector address conventions.

Associated Documents

You must read the *RSX–11M–PLUS Release Notes* before you attempt to perform a system generation. Information that was not included in this installation guide or in other RSX–11M–PLUS manuals but is vital to the performance of a successful system generation is contained in the Release Notes, along with a complete summary of the new features and characteristics of Version 4.3 of the RSX–11M–PLUS operating system.

The *RSX–11M–PLUS and Micro/RSX System Management Guide* contains information on utility programs that are used by the system manager to assign accounts, to verify proper system operation, to monitor active tasks and resources, to set up and run the Queue Manager (QMG) and batch processor, and to perform other related tasks.

The *RSX–11M–PLUS and Micro/RSX Guide to Writing an I/O Driver* provides information on using SYSGEN to incorporate drivers and databases into your system.

Conventions Used in This Document

The following conventions are used in this manual:

Convention	Meaning
Vr.u	The form Vr.u in text and examples refers generically to the current release version and update of the software. The actual number is included on the label of the distribution medium.
BLnn	The form BLnn refers generically to the current base level (BL) number of the software. The actual BL number is included on the label of the distribution medium.
>	A right angle bracket is the default prompt for the Monitor Console Routine (MCR), which is one of the command interfaces used on RSX–11M–PLUS systems. All systems include MCR.
$	A dollar sign followed by a space is the default prompt of the Digital Command Language (DCL), which is one of the command interfaces used on RSX–11M–PLUS and Micro/RSX systems. Many systems include DCL.
MCR>	This is the explicit prompt of the Monitor Console Routine (MCR).
DCL>	This is the explicit prompt of the Digital Command Language (DCL).
xxx>	Three characters followed by a right angle bracket indicate the explicit prompt for a task, utility, or program on the system.

Convention	Meaning
UPPERCASE	Uppercase letters in a command line indicate letters that must be entered as they are shown. For example, utility switches must always be entered as they are shown in format specifications.
command abbreviations	Where short forms of commands are allowed, the shortest form acceptable is represented by uppercase letters. The following example shows the minimum abbreviation allowed for the DCL command DIRECTORY: `$ DIR`
lowercase	Any command in lowercase must be substituted for. Usually the lowercase word identifies the kind of substitution expected, such as a filespec, which indicates that you should fill in a file specification. For example: `filename.filetype;version` This command indicates the values that comprise a file specification; values are substituted for each of these variables as appropriate.
/keyword, /qualifier, or /switch	A command element preceded by a slash (/) is an MCR keyword; a DCL qualifier; or a task, utility, or program switch. Keywords, qualifiers, and switches alter the action of the command they follow.
parameter	Required command fields are generally called parameters. The most common parameters are file specifications.
[option]	Square brackets indicate optional entries in a command line or a file specification. If the brackets include syntactical elements, such as periods (.) or slashes (/), those elements are required for the field. If the field appears in lowercase, you are to substitute a valid command element if you include the field. Note that when an option is entered, the brackets are not included in the command line.
[,...]	Square brackets around a comma and a horizontal ellipsis indicate that you can use a series of optional elements separated by commas. For example, (argument[,...]) means that you can specify a series of optional arguments by enclosing the arguments in parentheses and by separating them with commas.
{ }	Braces indicate a choice of required options. You are to choose from one of the options listed.
:argument	Some parameters and qualifiers can be altered by the inclusion of arguments preceded by a colon. An argument can be either numerical (COPIES:3) or alphabetical (NAME:QIX). In DCL, the equal sign (=) can be substituted for the colon to introduce arguments. COPIES=3 and COPIES:3 are the same.

Convention	Meaning
( )	Parentheses are used to enclose more than one argument in a command line. For example: `SET PROT = (S:RWED,O:RWED)`
,	Commas are used as separators for command line parameters and to indicate positional entries on a command line. Positional entries are those elements that must be in a certain place in the command line. Although you might omit elements that come before the desired element, the commas that separate them must still be included.
[g,m] [directory]	The convention [g,m] signifies a User Identification Code (UIC). The g is a group number and the m is a member number. The UIC identifies a user and is used mainly for controlling access to files and privileged system functions. This may also signify a User File Directory (UFD), commonly called a directory. A directory is the location of files. Other notations for directories are: [ggg,mmm], [gggmmm], [ufd], [name], and [directory]. The convention [directory] signifies a directory. Most directories have 1- to 9-character names, but some are in the same [g,m] form as the UIC. Where a UIC, UFD, or directory is required, only one set of brackets is shown (for example, [g,m]). Where the UIC, UFD, or directory is optional, two sets of brackets are shown (for example, [[g,m]]).
filespec	A full file specification includes device, directory, file name, file type, and version number, as shown in the following example: `DL2:[46,63]INDIRECT.TXT;3` Full file specifications are rarely needed. If you do not provide a version number, the highest numbered version is used. If you do not provide a directory, the default directory is used. Some system functions default to particular file types. Many commands accept a wildcard character (*) in place of the file name, file type, or version number. Some commands accept a filespec with a DECnet node name. A period in a file specification separates the file name and file type. When the file type is not specified, the period may be omitted from the file specification. A semicolon in a file specification separates the file type from the file version. If the version is not specified, the semicolon may be omitted from the file specification.

Convention	Meaning
@	The at sign invokes an indirect command file. The at sign immediately precedes the file specification for the indirect command file, as follows: `@filename[.filetype;version]`
. . .	A horizontal ellipsis indicates the following: • Additional, optional arguments in a statement have been omitted. • The preceding item or items can be repeated one or more times. • Additional parameters, values, or other information can be entered.
. . .	A vertical ellipsis shows where elements of command input or statements in an example or figure have been omitted because they are irrelevant to the point being discussed.
KEYNAME	This typeface denotes one of the keys on the terminal keyboard. For example, the RETURN key.
"print" and "type"	The term "print" refers to any output sent to a terminal by the system. The term "type" refers to any user input from a terminal.
black ink	In examples, what the system prints or displays is printed in black.
red ink	In interactive examples, what the user types is printed in red. System responses appear in black.
xxx	A symbol with a 1- to 3-character abbreviation, such as x or RET, indicates that you press a key on the terminal. For example, RET indicates the RETURN key, LF indicates the LINE FEED key, and DEL indicates the DELETE key.
CTRL/x	The symbol CTRL/x means that you are to press the key marked CTRL while pressing another key. Thus, CTRL/Z indicates that you are to press the CTRL key and the Z key together in this fashion. CTRL/Z is echoed on some terminals as ^Z. However, not all control characters echo.

Summary of Technical Changes

The following section lists the features that are new to the SYSGEN program or that have been modified for the RSX–11M–PLUS Version 4.3 operating system. These new features are documented in this revision of the *RSX–11M–PLUS System Generation and Installation Guide.*

New or Modified Features

SYSGEN has the following new or modified features:

- The RA70 and RA90 disks are supported.
- The LG01 and LG02 printers are supported LP: devices.

Chapter 1

Introduction to System Generation

The objective of the system generation procedure is to create an RSX–11M–PLUS operating system tailored to your hardware configuration (consisting of a PDP–11 processor and an assortment of peripherals) and performance requirements. This chapter provides an outline of the stages involved in performing a system generation, which is controlled and performed by a program called SYSGEN.

The terms *system generation* and *SYSGEN* are used extensively throughout this manual, but not interchangeably.

System generation is used to refer to the entire process of obtaining a running RSX–11M–PLUS operating system, beginning with use of the software components supplied to you by Digital and ending with a ready-to-use system.

The SYSGEN procedure uses the Indirect Command Processor (Indirect) to arrange and modify various software components and to assemble them into an RSX–11M–PLUS operating system that is tailored to a particular hardware configuration. The SYSGEN procedure is, therefore, a part of the system generation process.

Whenever this manual uses the term *system generation,* it indicates the entire process of producing an RSX–11M–PLUS operating system. The term *SYSGEN* is used to refer to the specific Indirect procedure used during system generation.

The first time a term that relates to system generation is used in this manual, it will appear in boldface type. A definition of that term can be found in Section 1.6.

1.1 Which Chapters of This Manual Should You Read?

The RSX–11M–PLUS software you have received is supplied in one of the following two forms:

- A *Distribution Kit*—A software kit that contains all the software components you need to perform a system generation using the SYSGEN procedure. This distribution kit is supplied on magnetic tape or on disk packs.

- A *Pregenerated System Kit*—A disk that contains a ready-to-run RSX–11M–PLUS operating system. You do not need to perform a system generation before using this system. The SYSGEN procedure and the software components necessary to generate a new RSX–11M–PLUS operating system are not supplied with this kit. There are a small number of minor changes you can make to adapt the pregenerated system kit to your processor model and number of peripherals.

If you have a distribution kit, you should read this and every chapter in this manual except Chapter 5. If you have the pregenerated system kit, do not concern yourself with the material in this chapter and subsequent chapters. Turn directly to Chapter 5, which explains how to start using your pregenerated system.

1.2 Flow of a System Generation

The process of generating an RSX–11M–PLUS operating system begins when you make a copy of the software components supplied to you on magnetic media and ends when you **hardware bootstrap** a system disk on a specific hardware installation. A typical system generation contains the following steps:

1. Preparing for a system generation
2. Copying the distribution kit
3. Invoking the SYSGEN procedure
4. Bootstrapping the generated system
5. Saving the generated system
6. Copying the generated system

After you have completed these steps, you might need to install layered software products (higher-level languages such as FORTRAN, or communications products such as DECnet–11).

1.2.1 Preparing for a System Generation

This manual assumes that you have a tested and working hardware system on which to generate an RSX–11M–PLUS operating system. This hardware system can be either of the following:

- A PDP–11 hardware configuration that includes a processor with 22-bit addressing capability and at least one of the disk drives listed in Chapter 2
- A VAX hardware configuration running VMS and VAX–11 RSX and at least one of the disk drives listed in Chapter 2

Depending on the type of distribution kit you have, your system must have certain other peripheral devices.

This manual also assumes that you know the parameters of the **target system**, the hardware configuration on which you intend to run the RSX–11M–PLUS operating system you are generating. You do not need to have this system available before you perform a system generation, but you need to know the specifics of the hardware and the uses for the system.

For complete information on the hardware configuration required for running RSX–11M–PLUS, see the RSX–11M–PLUS Software Product Description, which is included in every RSX–11M–PLUS documentation set. This is the definitive source for information on the systems and devices supported under RSX–11M–PLUS.

Before you begin generating an RSX–11M–PLUS operating system, you need to become familiar with the system generation process and with this manual. You also need various blank media and information about your hardware device configuration. Chapter 2 describes in detail what you need before you start.

1.2.2 Copying the Distribution Kit

Some RSX–11M–PLUS distribution kits are supplied on magnetic tape and must be transferred to disk before you can begin the SYSGEN procedure. The magnetic tapes can be used to make additional disk copies of the distribution kit when they are needed for generating RSX–11M–PLUS operating systems for changed hardware configurations.

Other RSX–11M–PLUS distribution kits are supplied on disk. You should make a copy of the Digital-supplied distribution kit disk and use the copy to perform a system generation. Save the Digital-supplied distribution kit disk as a master from which you can make additional copies when they are needed.

Chapter 2 lists the types and quantities of blank media necessary for copying the various distribution kits.

1.2.3 Invoking the SYSGEN Procedure

Invoking the SYSGEN indirect command procedure begins an interactive terminal session in which SYSGEN gathers the information necessary to assemble and build the Executive and system database. The SYSGEN procedure prints questions on your terminal or reads saved answer file input, or does both. SYSGEN then uses the information obtained to assemble, to build, and to initialize a binary system image.

This chapter contains short descriptions of the sections of the SYSGEN procedure; Chapter 3 presents the details of each SYSGEN section.

1.2.4 Bootstrapping the Generated System

You need to **software bootstrap** your generated system to determine if it runs successfully and to prepare for saving the system and moving it back to disk in hardware-bootable format. Chapter 4 contains information on what to do at this point in the system generation process.

1.2.5 Saving the Generated System

When you save the generated system with the MCR command SAV /WB, the contents of main memory are written into the system image file. After a system has been saved, you can hardware or software bootstrap the system to reload and restart it.

1.2.6 Copying the Generated System

To guard against accidental corruption and loss of your generated system, you should make a backup copy of the system. In some cases, it might be necessary to transfer the generated system to a different type of disk. Chapter 4 contains instructions for making copies of system images.

1.2.7 Layered Product Corrections

Correction files for layered products are supplied with every RSX–11M–PLUS distribution kit. Instructions for applying the corrections are provided in Chapter 2.

1.3 What Is SYSGEN?

SYSGEN is the Indirect command procedure used to tailor and to build an RSX–11M–PLUS operating system for a particular PDP–11 hardware configuration. The SYSGEN procedure asks questions about both the software features you want to include in your system and about your system's hardware configuration. SYSGEN uses the information to assemble and task build an RSX–11M–PLUS operating system specifically tailored to your needs.

You should read the *RSX–11M–PLUS Release Notes* before attempting to run the SYSGEN procedure. You should also be familiar with the material in this manual before attempting to generate your own system. This manual contains information that will help you understand the consequences of choosing or omitting the various system options. Attempts to run SYSGEN without first consulting the documentation usually yield undesired results.

1.4 SYSGEN Ease-of-Use Features

SYSGEN contains a number of features designed to allow you to generate a working system as easily and as rapidly as possible. The Full-functionality Executive option and the Autoconfigure task free you from the necessity of deciding among many options. The saved answer file feature lets you more easily modify your system later, if you decide to change your original configuration.

1.4.1 Full-Functionality Executive Option

The Full-functionality Executive contains all RSX–11M–PLUS optional features. For more information on these features and how to select the Full-functionality Executive, see Chapter 3.

1.4.2 Autoconfigure

The Autoconfigure task automatically determines the correct hardware configuration of the host system. If the hardware is set at the standard addresses, Autoconfigure determines the processor type, the control and status register (CSR) and vector addresses of the peripheral devices, and the presence of any optional hardware. This information can be directly used by SYSGEN, thereby reducing greatly the number of questions asked in the Choosing Peripheral Configuration (CP) section. For more information on using Autoconfigure, see Chapter 3.

1.4.3 Saved Answer Files

Your responses to questions asked by SYSGEN are saved in special files as you generate your system. You can use these saved answer files later to generate another system without having to answer all the SYSGEN questions again. For more information on using saved answer files, see Chapter 3.

1.5 Sections of the SYSGEN Procedure

The SYSGEN procedure is divided into functional sections; each section name describes the main task performed within that section. These tasks are normally performed in the order listed, with the SYSGEN procedure automatically beginning the next task when it finishes the current task.

During a complete SYSGEN, you perform the tasks in the following sections:

1. Choosing SYSGEN Options (SU)
2. Choosing Executive Options (CE)
3. Choosing Peripheral Configuration (CP)
4. Assembling the Executive and Drivers (AE)
5. Building the Executive and Drivers (BE)
6. Building the Privileged Tasks (BP)
7. Rebuilding the Supplied System Tasks (BN)
8. Creating the System Image File (CS)

An additional section, Adding a Device (AD), is not normally performed as part of the SYSGEN procedure. For more information on this section, see Chapter 4 of this manual and the *RSX-11M-PLUS and Micro/RSX Guide to Writing an I/O Driver*.

In certain circumstances you might need to perform only one section of the SYSGEN procedure or to enter the SYSGEN procedure at a point other than the beginning. You are given these choices in the first section of the SYSGEN procedure, Choosing SYSGEN Options (SU). Because certain sections rely on information obtained in other sections, you might not always be able to perform a given section without having to go back and redo previous sections.

For more information on the sections of SYSGEN and on running individual sections, see the descriptions in this chapter and in Chapter 3.

1.5.1 Choosing SYSGEN Options (SU)

In this section, you can choose SYSGEN options such as Autoconfigure and saved answer files. Also included is a "menu" that allows you to resume a partially completed SYSGEN at the appropriate section or to perform individual sections of SYSGEN.

1.5.2 Choosing Executive Options (CE)

In this section, you have the opportunity to select one of two Executive configurations.

Your first choice, the Full-functionality Executive, contains all the RSX–11M–PLUS service features. Selecting this Executive guarantees that there are no missing features for external tasks (for example, layered products). In addition, if you select this Executive, you are asked fewer questions, and so the SYSGEN process is faster. Unless you have reason not to want all the RSX–11M–PLUS features available to you, you should select this Executive.

Choosing the second option, the User-tailored Executive, allows you to tailor an Executive to your specific needs. The SYSGEN command files ask you a series of questions about the features that you want your Executive to contain. You would want to select this option in only a few situations. For example, if you are generating a system intended for use by a single user, you could exclude Resource Accounting from your Executive.

During the Choosing Executive Options (CE) section, SYSGEN also asks you about the processor hardware options on the system.

1.5.3 Choosing Peripheral Configuration (CP)

In this section, SYSGEN asks you a series of questions about your peripheral devices. These questions constitute the most complex portion of SYSGEN. Running Autoconfigure greatly reduces the number of questions you have to answer in this section.

1.5.4 Assembling the Executive and Drivers (AE)

In this section, SYSGEN assembles the Executive, the drivers, and the driver databases. SYSGEN allows you to decide whether you want assembly listings, and, if so, it directs them to a file or to the line printer.

1.5.5 Building the Executive and Drivers (BE)

In this section, SYSGEN task builds the Executive, the drivers, and the driver databases. SYSGEN also allows you to save the files from a previous system generation, which might be residing in directory [1,54]. If you choose to save the old system generation files, SYSGEN transfers them to a directory that you specify.

1.5.6 Building the Privileged Task (BP)

In this section, SYSGEN task builds the nonvectored privileged task SAV. Whenever you rebuild the Executive, you must rebuild the nonvectored privileged task SAV. There is only one nonvectored privileged task for RSX–11M–PLUS Version 4.3.

1.5.7 Rebuilding the Supplied System Tasks (BN)

In this section, SYSGEN task rebuilds designated supplied system tasks. A supplied system task need only be rebuilt if you have changed the default options in the task build command file. The questions in this section allow you to choose the supplied system tasks that need to be rebuilt. However, there is usually no need to rebuild system tasks.

1.5.8 Creating the System Image File (CS)

In this section, the system image file is initialized by the Virtual Monitor Console Routine (VMR) indirect command file named SYSVMR.CMD. (VMR is a utility that creates the data structure necessary to boot a newly created RSX–11M–PLUS system image file.) SYSVMR automatically establishes the partition boundaries for the system image, loads all the drivers, and installs the privileged tasks built during the Building the Privileged Tasks (BP) section.

If you want to set up the partitions in your system differently from the way in which SYSVMR sets them up or if you want to modify SYSVMR for any other reason, SYSGEN permits you to do so during this section.

1.5.9 Adding a Device (AD)

In this section, SYSGEN allows you to add or to change a loadable driver with a loadable database in an already generated system. SYSGEN asks you questions about the device's hardware configuration, generates a loadable database, and assembles and task builds the driver and its database. You can then load the driver into your system and bring its associated devices on line.

This section is not performed as part of a complete system generation. You can use it to add a new device or to change the configuration of a device type in an existing system. This section can also be used to add a user-supplied driver.

See Chapter 4 for more information on the Adding a Device (AD) section.

For a complete discussion of adding loadable device drivers, see the *RSX–11M–PLUS and Micro/RSX Guide to Writing an I/O Driver*.

1.6 Terms Relating to System Generation

This section defines some of the terms used in this manual. The purpose of defining these terms here is to familiarize you with them before you begin generating your RSX–11M–PLUS operating system. To find more information on a given term, look up the term in the *RSX–11M–PLUS Information Directory and Master Index*. If you have performed a system generation already and feel confident about the terms listed here, you can probably skip this section and go directly to Chapter 2.

ACP (Ancillary Control Processor)

An ACP is a privileged task that implements a particular file structure on a class of devices. It performs volume-related functions such as maintaining directories, allocating space for files, creating and deleting files, and enforcing file protection. When a volume is mounted, it is associated with the ACP that understands its file structure.

Usually, a task communicates with File Control Services (FCS), FCS communicates with the ACP, and the ACP communicates with the device driver.

RSX–11M–PLUS supplies two ACPs: Files–11 ACP (F11ACP) for the Files–11 disk structure and Magnetic Tape ACP (MTAACP) for the ANSI-formatted magnetic tape structure.

Autoconfigure

The Autoconfigure task automatically determines the correct hardware configuration of the host system, including the processor type, the control and status register (CSR) and vector addresses of the host system's peripheral devices, and the presence of optional hardware; however, the hardware must be set at the standard addresses. This information can be used directly by SYSGEN, thereby greatly reducing the number of questions asked during SYSGEN.

baseline system

The baseline system is the standalone RSX–11M–PLUS operating system included as part of the distribution kit. It contains those software components you need to generate an RSX–11M–PLUS operating system.

CSR (control and status register)

Every peripheral device has a unique address on the UNIBUS and Q-bus. When addressing a device, you are actually addressing a set of registers that communicate with the device. The CSR address is the address of a single register within that set of device registers; it is used by drivers to access any of the other registers within that set.

Digital-supplied driver

The RSX–11M–PLUS distribution kit contains drivers for the hardware devices supported by RSX–11M–PLUS. These drivers are referred to as Digital-supplied drivers and are supported by Digital.

driver

A driver is a set of subroutines called by the Executive I/O system in response to I/O requests from user programs. The driver translates I/O requests into instructions directed to a specific device type. Each type of peripheral device has its own driver.

A driver can be either resident or loadable. A resident driver resides within the Executive's address space, which reduces primary pool space. A loadable driver resides outside the Executive's address space, and the driver is mapped when it is needed.

Because resident drivers reside within the Executive, they must be incorporated at system generation. Loadable drivers can be added to an existing RSX–11M–PLUS operating system at any time, without requiring you to perform a new system generation.

In RSX–11M–PLUS operating systems with support for Executive data space, all drivers must be loadable.

A driver has an associated database that describes the particular device configuration.

See the *RSX–11M–PLUS and Micro/RSX Guide to Writing an I/O Driver* for a full discussion of drivers and databases.

dual-access device

A dual-access (or dual-ported) device is an I/O device that can be accessed by either of two controllers. To install a dual-access device, you must have a dual-access hardware option that is available only with certain devices. This hardware provides two ports for accessing the device, with each port connected to a different controller. Only one port is allowed access to the device at any one time.

Under RSX–11M–PLUS, each port is connected to different controllers on the same system. This setup provides high availability and allows load sharing between the two ports.

A dual-access device can also be connected to controllers on two separate systems, but RSX–11M–PLUS does not support this configuration.

Executive

The Executive is the software core, or kernel, of the RSX–11M–PLUS operating system. It is responsible for resource allocation, multiuser protection, and intertask communications. In general, the Executive monitors, controls, and services system-level activity. It provides a relatively machine-independent multiprogramming environment in which you can develop and run user applications.

FCS (File Control Services)

FCS is a set of routines that a task can use to access the file system. It allows both record-oriented and block-oriented I/O and provides for device-independent file operations such as creating, deleting, opening, closing, reading, and writing. To use FCS, a task invokes the FCS macros. The macros call FCS routines, which issue the actual queue I/O (QIO) directives.

The FCS routines are linked with a task when the task is task-built. These routines can reside in the task's image or in a separate resident library. (See the explanations of FCSFSL and FCSRES.)

Most of the RSX–11M–PLUS tasks and utilities use FCS.

FCSFSL

FCSFSL is the supervisor-mode library of commonly used FCS routines. You can build tasks to link to this single copy of the FCS routines rather than having to include the routines in each task image. Having only one copy of the FCS routines in memory instead of many reduces memory usage.

A task accesses a supervisor-mode library by using the supervisor-mode mapping registers, a hardware feature available on the PDP–11/44, PDP–11/70, MicroPDP–11/53, MicroPDP–11/73, MicroPDP–11/83, and PDP–11/84 processors. Mapping the library in supervisor mode allows the library to reside outside the task's logical address space, thereby permitting larger tasks.

If you include supervisor-mode library support during SYSGEN, many of the RSX–11M–PLUS tasks are built to use FCSFSL. SYSGEN includes the letters "FSL" in these task file names so that you can tell which tasks are built to use FCSFSL. The FCSFSL versions of the tasks have exactly the same software features as the versions that link to FCSRES or that include the FCS routines in their task images.

The same library image is used for both FCSFSL and FCSRES. When building a task by mapping the library in supervisor mode, the task uses FCSFSL files to generate the correct linkages. When the task runs, it uses the library image that is installed from FCSRES files. The FCSFSL files are only needed to build tasks that use the FCS library in supervisor mode; therefore, they should not be installed.

See the *RSX–11M–PLUS and Micro/RSX Task Builder Manual* for more information on supervisor-mode libraries.

FCSRES

FCSRES is a resident library of commonly used FCS routines. You can build tasks to link to this single copy of the FCS routines rather than including the routines in each separate task image. Having only one copy of the FCS routines in memory instead of many reduces memory usage.

A task accesses a resident library by using the user-mode mapping registers. These registers are also used to map the task code and data, so each task that uses the FCSRES library must reserve some of its logical address space to map the library.

The FCSRES library uses no special hardware; therefore, the library can be used on any of the processors RSX–11M–PLUS supports. If you cannot use FCSFSL tasks (because your processor does not support supervisor mode), you can instruct SYSGEN to build many of the RSX–11M–PLUS tasks to use FCSRES instead. SYSGEN includes the letters "RES" in these task file names so that you can tell which tasks are built to use FCSRES. The FCSRES versions of the tasks have exactly the same software features as the versions that link to FCSFSL or that include the FCS routines in their task images.

See the *RSX–11M–PLUS and Micro/RSX Task Builder Manual* for more information on resident libraries.

Full-functionality Executive

The Full-functionality Executive, which is one of the options you can select in the Choosing Executive Options (CE) section of SYSGEN, contains all the RSX–11M–PLUS service features. Selecting this Executive ensures that the generated Executive includes nearly all required features for external tasks (for example, layered products). In addition, if you select this Executive, the SYSGEN procedure is shorter.

hardware bootstrap

A hardware bootstrap is a process whereby you initiate a software system startup. Using the console switches or the console terminal, or both, you can instruct the bootstrap read-only memory (ROM) to load the hardware boot-block record from an input device into memory. The boot-block record contains the code you need to load the system image into memory.

host system

The host system is that system on which you perform an RSX–11M–PLUS system generation. It can be the same hardware on which you intend to run your new target system, or it can be a separate configuration that is more convenient to use for system generation.

interrupt

An interrupt is a mechanism whereby the various external hardware subsystems communicate a need for software servicing.

mapped system

PDP–11 processors supporting memory management hardware are known as mapped systems. The memory management hardware converts virtual addresses to physical addresses in memory. RSX–11M–PLUS does not support unmapped systems and only runs on systems incorporating memory management hardware.

mixed MASSBUS configuration

A mixed MASSBUS configuration is a peripheral configuration in which devices of different types are connected to the same MASSBUS controller (an RH controller).

Normally, a controller has only one type of device connected to it. For example, the first MASSBUS controller (RHA) might have all RP04s, RP05s, and RP06s (DB-type device) connected to it, the second controller (RHB) might have all RM03s and RM05s (DR-type device) connected to it, and so on.

In a mixed MASSBUS configuration, a controller has different types of devices connected to it. For example, the first MASSBUS controller (RHA) might have both an RP06 (DB-type device) and an RM03 (DR-type device) connected to it.

online system

An online system is an operating environment that shares resources with other processing or development work in progress. In the context of SYSGEN, generating an RSX–11M–PLUS system on line means that you are using host system software and not the baseline system provided on the distribution kit.

pool

Pool (sometimes called the dynamic storage region, or DSR) is an area in memory that is used as a workspace for storing system data structures such as system lists, control blocks, and I/O packets.

There are two kinds of pool in RSX–11M–PLUS: primary pool and secondary pool. They differ in their uses and in their location.

Primary pool is an area of memory within the Executive's address space. It is used for short-lived or frequently accessed data structures. Because it is used for many Executive and I/O operations, primary pool is a critical resource, and the amount of space available is limited. The size of primary pool is fixed when the system is generated. SYSGEN always makes primary pool as large as possible.

Secondary pool is a partition in memory outside the Executive's address space. It is used for more permanent or less frequently accessed data structures. Secondary pool can be as large as you want; it is limited only by the amount of available memory. The size of secondary pool is determined when the system image file is created by VMR. SYSGEN makes secondary pool a reasonable size for your hardware and software configuration.

PREPGEN

A PREPGEN is the SYSGEN procedure performed without executing the MCR command lines that assemble, task build, and manipulate certain files. You have the opportunity to answer all SYSGEN questions and to create saved answer files, but a new system is not assembled or built, and no files are deleted.

You are given the choice of performing a PREPGEN shortly after you invoke the SYSGEN procedure.

Performing a PREPGEN saves time and prevents mistakes. PREPGEN lets you run through the SYSGEN questions and become familiar with them before you actually use your answers to generate a new system. The saved answer files generated can then be used to perform an unattended SYSGEN.

saved answer file

Saved answer files contain the text of each question asked in the various sections of SYSGEN, along with your answers to those questions. These files are created by SYSGEN as you generate your system.

You can use previously generated saved answer files to generate a system without having to answer all the SYSGEN questions again.

saved system

A saved system is a system image that has been bootstrapped and then written back to the system image file on disk by using the MCR command SAV.

software bootstrap

A software bootstrap is a process whereby a privileged user initiates a new software system startup from an already running system. Software bootstrapping requires the use of the MCR command BOO. (See the *RSX–11M–PLUS MCR Operations Manual*, particularly the SAV and BOO commands, for details on software bootstrapping.) Any valid RSX–11M–PLUS system image can be software bootstrapped.

standalone system

A standalone system is an operating environment that is dedicated to a single activity. In the context of SYSGEN, generating a standalone RSX–11M–PLUS system means that you are using the baseline system provided on the distribution kit.

target system

The target system is the operating system produced by the system generation procedure, as well as the hardware configuration on which it is intended to run. System generation can take place on the target system computer or on a different computer. (See "host system.")

unsaved system

An unsaved system is a system image after SYSGEN has executed the SYSVMR.CMD indirect command file and before the system has been bootstrapped and saved.

user-supplied driver

Many users have applications that require customized or special-purpose drivers. Any device driver that is not included in the distribution kit is considered a user-supplied driver.

User-tailored Executive

The User-tailored Executive, which is one of the options you can select from the Choosing Executive Options (CE) section of SYSGEN, allows you to tailor an RSX–11M–PLUS Executive to your specific needs. The SYSGEN command files ask you a series of questions about the features that you want your Executive to contain. You would select this option only if the Full-functionality Executive contained features that were not compatible with your application or if a special application required a smaller Executive.

vector

Associated with every device is a unique 2-word location in the low end of memory called a vector. (The memory locations from 0 to 776_8 are the vector areas.) Each vector stores the Processor Status Word (PSW) and the program counter (PC) of the interrupt service routine for a specific device. When a device interrupts the processor, the processor saves the current PSW and PC on the stack and loads the PSW and PC from the device's vector. The address in the new PC points to the interrupt service routine.

Not all vectors are assigned to peripheral devices. Some are reserved for software interrupts. For instance, execution of the TRAP instruction causes an interrupt. A new PSW and PC are then loaded from the vector reserved for use only by the TRAP instruction.

In addition, there are what are known as "floating vectors." Floating vectors are those addresses from location 300_8 to location 776_8. The assignment of devices to those vectors is left to the discretion of the system manager and the Digital Field Service representative. Generally, floating vectors are used for assigning multiple devices of a given type that require more than one controller. See Appendix D for a description of the algorithm used to assign floating vectors.

Chapter 2
Getting Started

This chapter describes the steps you must perform before you invoke the SYSGEN procedure.

2.1 What You Need Before You Begin

Before you follow the system generation procedure described in this manual, you should gather the necessary media, software, and hardware information you will need during the system generation. The following is a list of the items essential to a successful system generation:

- *Distribution Kit*—Digital supplies the RSX–11M–PLUS system software components on magnetic tapes or disks that are used to generate a working system. Section 2.2 describes the contents of specific distribution kits.
- *Blank Media*—During system generation, you need a number of blank disks to back up the distribution kits and to contain the generated system. The type and quantity of media required depends on the type of distribution kit you have. See Section 2.1.2 for a discussion of blank media requirements.
- *Device, CSR, and Vector Data for the Target Hardware*—You need a list of the hardware devices to be supported on the generated system, their respective controllers, and the respective control and status register (CSR) and vector address data. You need this data even if you use Autoconfigure to aid in configuring your peripheral devices because some of your devices may have nonstandard CSR and vector addresses; therefore, your devices cannot be detected by Autoconfigure.

  If you are generating an RSX–11M–PLUS operating system for the first time, you should obtain CSR and vector information from the Digital Customer Service personnel who installed your hardware system. If you are already running an RSX–11M–PLUS system on the hardware configuration for which you are generating a new RSX–11M–PLUS system, you can obtain this information by using the following CON command line:

```
CON DISPLAY ATTRIBUTES FULL
```

The resulting display lists the CSR and vector information contained in the system database, which generally, although not necessarily, reflects the actual hardware configuration. More information on the format of the display and on the CON command can be found in the *RSX–11M–PLUS and Micro/RSX System Management Guide.*

- *Completed Worksheets*—Appendix A contains a number of worksheets that you can use to collect and to organize the information you need to generate a system. There are worksheets for the CSR and vector address information you must gather, as well as an Executive options worksheet that you can use to record the choices you make as you read through the Choosing Executive Options (CE) section in Chapter 3.

  You should make copies of these worksheets, fill them out, and keep them with you when you invoke SYSGEN.

- *RSX–11M–PLUS Release Notes*—You must read the Release Notes before you attempt to perform a system generation. The Release Notes contain information and warnings that were not incorporated into this manual and other manuals.

- *RSX–11M–PLUS System Generation and Installation Guide*—This manual provides step-by-step instructions for each of the operations you must perform, and you should have it on hand as you proceed through the system generation procedure.

2.1.1 Supported Target System Disks

Before you can invoke SYSGEN, you must copy the distribution kit software to the disk on which you will generate the new system. Throughout this manual, this disk is called the *target system disk.*

For an RSX–11M–PLUS system generation, your target system disk may be one of the following:

RC25	RM03	RA81
RD52	RM05	RA82
RD53	RM80	RA90
RD54	RA60	RP04
RK07	RA70	RP05
RM02	RA80	RP06

2.1.2 Blank Media Requirements

Use the following guidelines in determining the quantity of blank media to have on hand as you generate your system:

- *Target System Disk*—If you have the magnetic tape kit, you need at least one disk to make a copy of the distribution kit. If you intend to use an RC25, RD52, or RK07 as the target system disk, you need two blank disks, because the entire magnetic tape distribution kit does not fit on one disk. If you have the RK07 disk kit, you need two blank RK07 disks to copy both of the distribution kit disks.

- *Backup Copy of Generated System*—You should keep a backup copy of the finished RSX–11M–PLUS system you generate, in case the system disk becomes corrupted accidentally. You can back up the target system disk to magnetic tape or to another disk, depending on your needs and on your hardware configuration. You need one 2400-foot magnetic tape (or two 2400-foot tapes if you save the system on tape at a density of 800 bits per inch (bpi) instead of at a density of 1600 bpi) or one TK50 magnetic tape cartridge for backing up the system to tape. If you back up the system to disk, you need a blank disk of sufficient size to hold the files on the target system disk.

If you have an RL02 pregenerated system kit, see Chapter 5 for blank media requirements.

2.1.3 Device Mnemonic Information

In RSX–11M–PLUS commands and in SYSGEN, peripheral devices are referred to both by their hardware names (for example, RM05 disk drive, TU77 tape drive) and by their software device mnemonics (for example, DR1 and MM0). Appendix B contains a list of hardware names and their respective software device mnemonics for all RSX–11M–PLUS devices.

2.2 The Distribution Kit

A distribution kit is a collection of magnetic media containing the software components you need to generate an RSX–11M–PLUS system. The types of distribution kits available for RSX–11M–PLUS are as follows:

- 1600-bpi magnetic tape
- 800-bpi magnetic tape
- TK50 magnetic tape cartridge
- RK07 disk
- RL02 disk

The RL02 disk kit is unlike the other kits. It contains a pregenerated, ready-to-use RSX–11M–PLUS system, and a system generation is not needed. You must follow different procedures for setting up and using this kit. See Chapter 5 for a complete description of the contents and use of the RL02 pregenerated system kit.

Procedures for handling the magnetic tape (including the TK50 magnetic tape cartridge) and RK07 disk kits are described in this chapter and subsequent chapters.

Each kit contains the following software items:

- *Distribution files*—The kit contains the RSX–11M–PLUS Executive and driver source files, privileged and nonprivileged tasks, object libraries, SYSGEN command files, and other files needed to generate an RSX–11M–PLUS system.
- *Baseline system*—This system is a pregenerated, bootable, RSX–11M–PLUS system supplied as an operating environment for performing a standalone system generation.
- *Standalone RSX–11S system (BRUSYS)*—This system is used to copy the distribution kit tape to disk (or, in the case of the RK07 disk kit, to copy the kit disk to another RK07 disk).

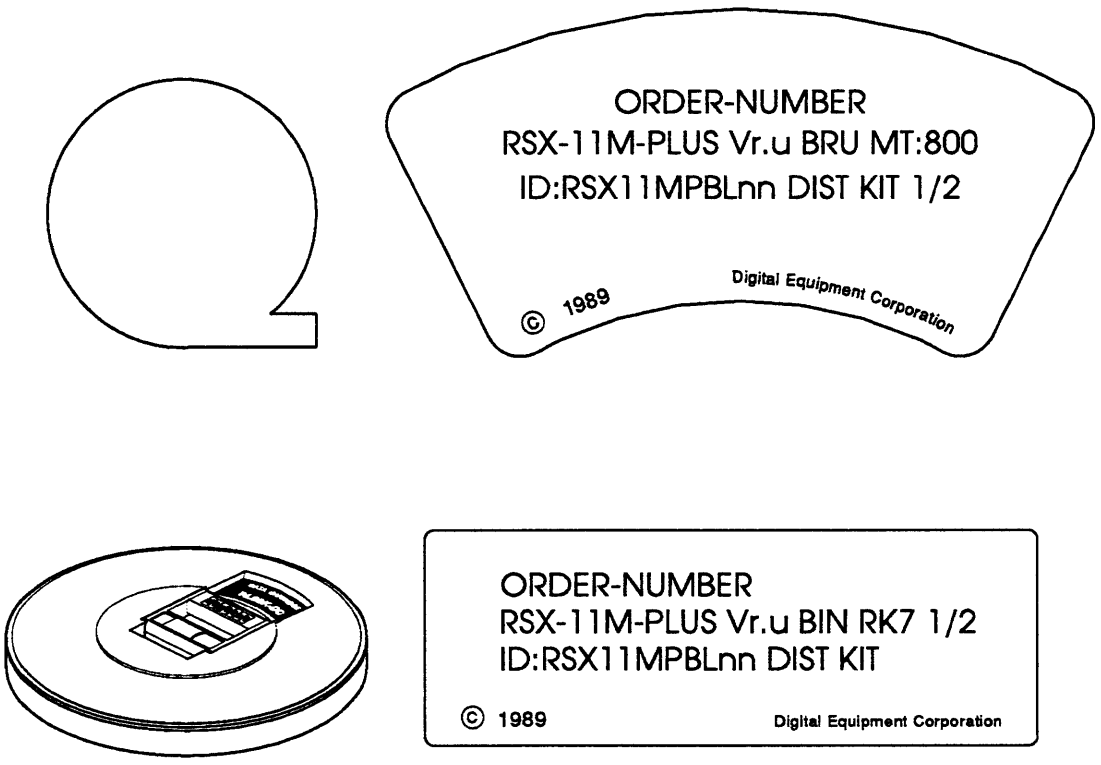
There are two types of distribution files: the first contains all the source, command, and object files needed to perform a system generation, while the second contains source and other miscellaneous files.

In magnetic tape kits and in the TK50 magnetic tape cartridge kits, both parts exist on the tape as backup sets created by the Backup and Restore Utility (BRU), with one backup set for each part. You must copy these backup sets to disk before you can perform a system generation.

In RK07 disk kits, each part is supplied on a separate disk. You should make a copy of the distribution kit disks and use those copies to perform a system generation. Save the Digital-supplied disks as masters from which you can make fresh copies of the unaltered distribution kit, should the need arise.

Figure 2–1 is an example of the paper labels that are attached to the magnetic tapes or disks in the RSX–11M–PLUS distribution kits.

Figure 2–1: Examples of Paper Labels for Magnetic Tapes and for Disks



Each paper label contains the following items of information:

- Current Digital product order number
- Current operating system name and version number

- Tape format (for example, BRU) or disk format (for example, BIN, meaning "binary")
- Density (for magnetic tapes only)
- Type of distribution kit (such as RK7 for the RK07 disk kit)
- Software volume label prefixed "ID:"; it should include the current base level number *nn* (such as ID:MPLUSBL*nn*SRC)
- Descriptive text (such as DIST KIT or BRUSYS STANDALONE COPY SYSTEM)
- Tape reel or disk number (such as 1/5, which means "reel one of five reels")

Check the tapes or disks you receive against the lists in the following sections to identify the various elements of the kit and to ensure that you have received a complete kit.

2.2.1 Magnetic Tape—1600 bpi

The 1600-bpi magnetic tape distribution kit consists of the following two magnetic tapes:

- Distribution kit (ID:RSX11MPBL*nn* DIST KIT)
- BRUSYS Standalone Copy System and Layered Product Corrections

2.2.2 Magnetic Tape—800 bpi

The 800-bpi magnetic tape distribution kit consists of the following three magnetic tapes:

- Distribution kit tape 1 (ID:RSX11MPBL*nn* DIST KIT 1/2)
- Distribution kit tape 2 (ID:MPBL*nn*SRC DIST KIT 2/2)
- BRUSYS Standalone Copy System and Layered Product Corrections

The first backup set is on the first tape, and the second backup set is on the second tape.

2.2.3 TK50 Magnetic Tape Cartridge

The TK50 magnetic tape cartridge distribution kit consists of the following two magnetic tape cartridges:

- Distribution kit (ID:RSX11MPBL*nn* DIST KIT)
- BRUSYS Standalone Copy System and Layered Product Corrections

2.2.4 RK07 Disk

The RK07 disk distribution kit consists of the following two RK07 disks:

- Distribution kit disk 1 (ID:RSX11MPBL*nn* DIST KIT)
- Distribution kit disk 2 (ID:MPBL*nn*SRC DIST KIT)

The first distribution kit disk contains all the software components needed to perform a complete system generation. The second distribution kit disk contains miscellaneous source files.

2.3 Host Systems for Generating RSX–11M–PLUS

To generate an RSX–11M–PLUS system, you must have a computer running RSX–11M–PLUS Version 3.0 or higher, or a VAX computer running VAX–11 RSX to manage the host computer's resources. The *host computer* is the computer on which you are generating your new RSX–11M–PLUS system. It may or may not be the computer for which you are generating the new RSX–11M–PLUS system; that computer is referred to as the *target computer*.

2.3.1 Generating a New RSX–11M–PLUS System Stand Alone

If your hardware installation is new or if you do not have access either to a computer running RSX–11M–PLUS Version 3.0 or higher, or to a VAX computer running VAX–11 RSX, you must use the baseline system supplied with the distribution kit to manage the host computer's resources and to run the SYSGEN procedure. This is known as a *standalone system generation*.

The baseline system has been modified to use a loadable crash dump driver. This allows baseline system crash dumps on all configurations, including devices supported by loadable crash dump drivers.

Previously, the baseline system had crash dump support for MM-type devices and could only produce crash dumps on configurations that included MM-type devices. The baseline system now has loadable crash dump support for MM-type devices, but you can change the crash dump driver by using the DCL command SET SYSTEM /CRASH_DEVICE=ddnn: or the MCR commands SET /CRASHDEV=ddnn: or SET /CRASH_DEVICE=ddnn:. Refer to the *RSX–11M–PLUS and Micro/RSX Crash Dump Analyzer Reference Manual* for more information on loading crash dump drivers.

To produce a crash dump of the baseline system, you must have previously loaded the appropriate crash dump driver for the crash dump device that you want. Digital recommends that you load the appropriate crash dump driver immediately after booting the baseline system because the crash dump driver cannot be loaded after the system crash occurs.

2.3.2 Generating a New RSX–11M–PLUS System On Line

If a host computer is already running an RSX–11M–PLUS system (Version 3.0 or higher) or if you have access to a VAX computer running VAX–11 RSX, you can use that running system to copy the distribution kit and to run the SYSGEN procedure and related tasks. This is known as an *online system generation*.

2.4 Copying the Distribution Kit

Before you can invoke SYSGEN, you must copy the distribution kit software to the target system disk. Even if you have an RK07 disk distribution kit, you should make a copy of the Digital-supplied distribution kit disk and use that copy as the target system disk. If you work on a copy of the distribution kit, you will always have an unaltered copy of the distribution kit to use should the target system disk accidentally become corrupted during the system generation procedure.

Because you must copy the magnetic tape distribution kit to a disk before invoking SYSGEN, the original kit tapes can be used at any time to make fresh disk copies. The procedure for copying your distribution kit depends on the type of kit you have and on whether you are performing a standalone or an online system generation.

Note

Your should always write-protect the distribution kit media before copying the kit in order to protect the contents from erasure.

If you have an RL02 pregenerated system kit, turn directly to the special instructions in Chapter 5. If you are generating your new system stand alone, read Section 2.4.1 next. If you are generating your new system on line, read Section 2.4.2 next. If you are generating your new system on a VAX host computer running VAX–11 RSX, read Section 2.4.3 next.

2.4.1 Copying Kits Stand Alone

If you have a magnetic tape distribution kit, you must copy the distribution kit to the target system disk. If you have an RK07 disk kit, you must make a copy of the distribution kit disk to use as the target system disk. The following sections describe the procedures used to copy each type of distribution kit by using the BRUSYS and baseline standalone systems.

2.4.1.1 The BRUSYS System

The BRUSYS system is a limited-feature, memory-resident RSX–11S system. It is meant to be used only to prepare the target system disk and to copy the magnetic tape distribution kit or to copy RK07 disk kits. The baseline system contained on the target system disk is used as the operating environment for standalone system generations. Included with the BRUSYS system are copies of the following utilities:

- Backup and Restore Utility (BRU)
- Bad Block Locator Utility (BAD)
- Disk Volume Formatter Utility (FMT)
- Disk Save and Compress Utility (DSC)

Also included is a special-purpose configuration program—the Standalone Configuration and Disk Sizing Program (CNF)—that allows you to change the CSR and vector addresses in the BRUSYS system. The BRUSYS system expects your devices to be at the following CSR and vector addresses:

Device	CSR	Vector
DB	176700	254
DM	177440	210
DR	176300	150
DU	172150	154

Device	CSR	Vector
MM (FOR=0)	172440	330
MS	172522	224
MT	160000	320
MU	174500	260

If your devices are at different CSR and vector addresses, if your MM-type magnetic tape drive is on a different formatter number, or if CNF returns an "Invalid device" message, you must change the values in BRUSYS. You can do this by using the following CNF switches when you enter the device name:

```
/CSR=csr address
/VEC=vector address
/FOR=formatter number
```

The vector addresses that BRUSYS expects for DR-, MM-, and MT-type devices are nonstandard. The CSR addresses that BRUSYS expects for DR- and MT-type devices are also nonstandard. If you are using one of these devices as an input or output device, you will usually have to change the values in BRUSYS to match the CSR and vector addresses of your hardware. You can enter the standard values for these devices by using the following responses to CNF:

```
DR:/CSR=176700/VEC=254
MM:/VEC=224
MT:/CSR=160000/VEC=224
```

To begin copying your distribution kit, you must hardware bootstrap the BRUSYS standalone system on your host computer. The procedure for hardware bootstrapping the BRUSYS system depends on the bootstrap hardware present on the host computer.

For information on the bootstrapping procedures for specific hardware configurations, refer to the documentation supplied with your hardware or consult Digital Customer Service.

If you have a magnetic tape kit, read Section 2.4.1.2 next. If you have an RK07 disk kit, read Section 2.4.1.3 next.

2.4.1.2 Copying the Magnetic Tape Kit Stand Alone

If your host computer is stand alone, use the following procedure to copy the 800-bpi magnetic tape, the 1600-bpi magnetic tape, or the TK50 magnetic tape cartridge kits. (The *output disk* referred to in this section is the blank disk you intend to use as the target system disk. All commands shown in this section are issued to the MCR command line interpreter (CLI).)

1. Put the BRUSYS tape and the output disk in the appropriate drives. If you are not familiar with the procedure for using the tape or disk drives, consult the hardware documentation for the drives.
2. Hardware bootstrap the BRUSYS tape. The RSX–11S standalone system prints an identification line on the console terminal, and then it begins to run CNF.

3. In response to the "Enter first device" prompt from CNF, enter the /DEV switch. CNF prints a list of the devices and the CSR address, vector address, and CSR status that BRUSYS expects for each device. For example:

```
>Enter first device:  /DEV RET

DB              176700        254         Present
DK              177404        220         Present
DL              174400        160         Present
DM              177440        210         Present
DP              176714        300         Not Present
DR              176300        150         Present
DU              172150        154         Present
MM FOR=0        172440        330         Not Present
MS              172522        224         Present
MT              160000        320         Not Present
MU              174500        260         Not Present
```

In the example, CNF does not find devices at the default CSR addresses for DP-, MM-, MT-, and MU-type devices. If you want to use any of those devices in copying the distribution kit, you enter the actual CSR or vector address for that device by using the /CSR or /VEC switch, or both.

If both devices you are using to copy the distribution kit are at the CSR and vector addresses that BRUSYS expects, follow the instructions in step 4.

BRUSYS expects nonstandard vector addresses for DR-, MM-, and MT-type devices. BRUSYS also expects nonstandard CSR addresses for DR- and MT-type devices. If you are using one of these devices to copy the distribution kit, skip to step 5 for instructions on how to change the values in BRUSYS to match the CSR and vector addresses of your hardware.

If one or both of the devices you are using to copy the distribution kit are not at the CSR and vector addresses that CNF prints on your terminal, skip to step 5.

4. Enter your device specifications in response to the prompts from CNF. The "first device" is the tape drive containing the BRUSYS tape; the "second device" is the drive containing the output disk.

   If CNF returns an "Invalid device" message when you enter either of the device specifications, follow the instructions in step 5. If CNF does not print the error message, skip to step 6.

5. If your magnetic tape controller or your disk controller are not connected to the CSR and vector addresses that BRUSYS expects or if your MM-type magnetic tape drive is on a formatter number other than zero, you must modify the software to incorporate the correct addresses. You can do this by using the following CNF switches when you enter each device name:

```
/CSR=csr address
/VEC=vector address
/FOR=formatter number
```

For example, if you have a TU16 magnetic tape at nonstandard CSR and vector addresses of 176300_8 and 150_8, respectively, and an RP04 with the default addresses, and the unit number of both units is zero, the following is the sequence of commands to CNF:

```
Enter first device:  MM0:/CSR=176300/VEC=150 [RET]
Enter second device:  DB0: [RET]
```

If CNF prints an "Invalid device" error message when you enter either of the device specifications, check to see that the actual CSR and vector addresses for that device are the ones you entered.

6. After you have entered device specifications for the first and second devices successfully, press the RETURN key and enter the date and time by using the TIM command. Then, use the TIM command again to verify that you entered the correct date and time, as follows:

```
Hit RETURN and enter date and time as 'TIM HH:MM MM/DD/YY' [RET]

> TIM 20:06 04/02/89 [RET]
> TIM [RET]
20:06:01 02-APR-89
>
```

7. Format the output disk, if necessary. Disks purchased from Digital are preformatted. You can skip this step if you are certain that your disk is formatted properly. Disks from other vendors or disks that have produced I/O errors may need to be formatted. For example, if your output disk is DB0, use the following command sequence:

```
> RUN FMT [RET]
>
FMT>  DB0:/VERIFY [RET]

** WARNING  - Data will be lost on DB0: **

Continue? [Y OR N]:  Y [RET]

Start formatting

Start verification

Operation complete

FMT>  [CTRL/Z]
```

8. Run the Bad Block Locator Utility (BAD) on your output disk. For example, if your output device is DB0, use the following command sequence:

```
> RUN BAD [RET]
>
BAD>  DB0:/LIST [RET]
BAD -- DB0: Total bad blocks= 0.
BAD>  [CTRL/Z]
```

9. Remove the BRUSYS tape from the tape drive, and replace it with the distribution kit tape. (If you have an 800-bpi tape kit, load the first of the two distribution kit tapes.)

10. Run the Backup and Restore Utility (BRU) to copy the first backup set on the distribution kit tape to the output disk.

In the BRU command line, you must specify the maximum number of files permitted on and the number of file headers initially allocated to the disk volume to which you are copying the distribution kit tape. To set these values, you need to use the BRU qualifiers /MAXIMUM and /HEADERS, respectively. Table 2–1 gives the appropriate values needed for the arguments to the /MAXIMUM and /HEADERS qualifiers.

Table 2–1: Disk Initialization Qualifier Values

Device	Value for /MAXIMUM	Value for /HEADERS
RA60	24617	12308
RA70	34180	25593
RA80	14629	7314
RA81	54815	51699
RA82	65500	51699
RA90	65500	65495
RC25	3130	1565
RD31	2558	10236
RD32	5117	20471
RD52	3719	1859
RD53	8529	4264
RD54	19143	9571
RK07	3308	1654
RM02/RM03	8099	4049
RM05	30781	25593
RM80	14923	7461
RP04/RP05	10567	5283
RP06	20956	10478

For example, if you have a 1600-bpi distribution kit tape mounted on MM0, and an RP06 output disk mounted on a drive designated as DB0, use the following command sequence:

```
> RUN BRU RET
>
BRU> /DENSITY:1600/VERIFY/MAX:20956/HEADERS:10478 RET
From:     MM0: RET
To:       DB0: RET

BRU - Starting Tape 1 on MM0:

BRU - End of Tape 1 on MM0:

BRU - Starting verify pass Tape 1 on MM0:
```

```
BRU - End of Tape 1 on MM0:

BRU - Completed

BRU> CTRL/Z
```

If you have a TK50 magnetic tape cartridge kit, do not use the /DENSITY switch in the command line.

If you have an 800-bpi tape kit, you must use 800 as the argument of the /DENSITY switch in the command line (for example, /DENSITY:800).

If BRU prints messages indicating that the verify operation failed, repeat this entire step. If the verify operation fails again, use a new output disk. If the verify operation fails once again, your distribution kit tape is probably defective and should be replaced.

When BRU finishes, the output disk contains a bootable baseline system and is referred to as the target system disk.

Note

If you have an 800-bpi distribution kit, remove the first tape; then, put the second tape in the appropriate drive.

If you have a 1600-bpi distribution kit, do not remove the tape from the drive at this point. The second backup set is automatically copied by the baseline startup procedure that runs as the next step.

11. Hardware bootstrap the target system disk. This brings the baseline system into memory. (Consult your hardware documentation or Digital Customer Service for information on bootstrapping disks on your particular hardware configuration.)

    When the baseline system comes up, it prints an identification line and invokes the baseline startup command file, BASTART.CMD, which asks a number of questions pertaining to your system. Answer these inquiries appropriately. BASTART then runs online BRU to copy the second backup set from the distribution kit tape. When BASTART exits, you can remove the distribution kit tape from the tape drive. Proceed to Chapter 3 for the next step in the system generation procedure.

2.4.1.3 Copying the RK07 Disk Kit Stand Alone

Use the following procedure to copy the RK07 disk kit when the host computer is stand alone. The *output disk* referred to in this section is the blank disk you intend to use as the target system disk. All commands shown in this section are issued to the MCR command line interpreter (CLI).

1. Put the first distribution kit disk and a blank RK07 disk in your RK07 drives. If you are not familiar with the procedure for using RK07 disk drives, consult the hardware documentation for the drives.
2. Hardware bootstrap the distribution kit disk. This brings the baseline system into memory. The baseline system prints an identification line and invokes the baseline startup command file, BASTART.CMD, which prompts you for the date and time. Press CTRL/Z in response to the prompt to exit from BASTART. This command file will be run again after you have copied your kit.

3. Write-protect the distribution kit disk by entering the write-protect switch on the drive. Then, software bootstrap the BRUSYS system by using the following command line:

```
>BOO [6,54]BRUSYS RET
```

This command line brings the BRUSYS system into memory. The RSX–11S standalone system prints an identification line on the console terminal and then runs CNF.

4. In response to the "Enter first device" prompt from CNF, enter the /DEV switch. CNF prints a list of the devices and the CSR address, vector address, and CSR status that BRUSYS expects for each device. For example:

```
>Enter first device:  /DEV RET

DB              176700        254         Present
DK              177404        220         Present
DL              174400        160         Present
DM              177440        210         Present
DP              176714        300         Not Present
DR              176300        150         Present
DU              172150        154         Present
MM FOR=0        172440        330         Not Present
MS              172522        224         Present
MT              160000        320         Not Present
MU              174500        260         Not Present
```

If the RK07 disk drives you are using to copy the distribution kit are at the CSR and vector addresses that CNF prints on your terminal, follow the instructions in step 5.

If the RK07 disk drives you are using to copy the distribution kit are not at the CSR and vector addresses that CNF prints on your terminal, skip to step 6.

5. Enter your device specifications in response to the prompts from CNF. The "first device" is the drive containing the distribution kit disk; the "second device" is the drive containing the output disk.

If CNF returns an "Invalid device" message when you enter either of the device specifications, follow the instructions in step 6. If CNF does not print the error message, skip to step 7.

6. If your disk controller is not connected to CSR and vector addresses that BRUSYS expects, you must modify the software to incorporate the correct addresses. You can do this by using the following CNF switches when you enter each device name:

```
/CSR=csr address
/VEC=vector address
```

For example, if your disk controller is at nonstandard CSR and vector addresses of 177444_8 and 240_8, respectively, and if you are using drives DM0 and DM1, the following is the sequence of commands to CNF:

```
Enter first device:  DM0:/CSR=177444/VEC=240 RET
Enter second device:  DM1:/CSR=177444/VEC=240 RET
```

If CNF prints an "Invalid device" error message when you enter either of the device specifications, check to see that the actual CSR and vector addresses for that device are the ones you entered.

7. After you have successfully entered device specifications for the first and second devices, press the RETURN key and enter the date and time by using the TIM command. Then use the TIM command again to verify that you entered the correct date and time, as follows:

```
Hit RETURN and enter date and time as 'TIM HH:MM MM/DD/YY' RET

>TIM 07:47 04/20/89 RET
>TIM RET
07:47:01 20-APR-89
>
```

8. Format the output disk, if necessary. Disks purchased from Digital are preformatted. You can skip this step if you are certain that your disk is formatted properly. Disks from other vendors or disks that have produced I/O errors may need to be formatted. For example, if your output disk is DM1, use the following command sequence:

```
>RUN FMT RET
>
FMT> DM1:/VERIFY RET

** WARNING - Data will be lost on DM1: **

Continue? [Y OR N]: Y RET

Start formatting

Start verification

Operation complete

FMT> CTRL/Z
```

9. Run the Bad Block Locator Utility (BAD) on your output disk. For example, if your output device is DM1, use the following command sequence:

```
>RUN BAD RET
>
BAD> DM1:/LIST RET
BAD -- DM1: Total bad blocks= 0.
BAD> CTRL/Z
```

10. Run the Backup and Restore Utility (BRU) to copy the distribution kit disk to the output disk. For example, if the distribution kit disk is mounted on DM0 and the output disk is mounted on DM1, use the following command sequence:

```
>RUN BRU RET
>
BRU>/VERIFY RET
From:    DM0: RET
To:      DM1: RET
BRU - Starting verify pass

BRU - Completed

BRU> CTRL/Z
```

If BRU prints messages indicating that the verify operation failed, repeat this entire step. If the verify operation fails again, use a new output disk. If the verify operation fails once again, your distribution kit disk is probably defective and should be replaced.

When BRU finishes, the output disk contains a bootable baseline system and is referred to as the target system disk.

11. Remove the first distribution kit disk and the copy you just made from their drives and replace them with the second distribution kit disk and another blank RK07 disk, respectively. Repeat steps 8, 9, and 10 to copy the second distribution kit disk.

    When BRU finishes, remove the second distribution kit disk and replace it with the copy of the first distribution kit disk (the target system disk). Write-enable the copy of the distribution kit disk.

    At this point, you should set aside your original distribution kit disks for safekeeping. The copies of these disks that you just made should be loaded and ready in your RK07 drives, and both disks should be write-enabled.

12. Hardware bootstrap the target system disk. This brings the baseline system into memory. (Consult your hardware documentation or Digital Customer Service for information on bootstrapping disks on your particular hardware configuration.)

    When the baseline system comes up, it prints an identification line and invokes the baseline startup command file, BASTART.CMD, which asks a number of questions pertaining to your system. Answer these inquiries appropriately. When BASTART exits, proceed to Chapter 3 for the next step in the system generation procedure.

2.4.2 Copying Kits On Line

The following two sections describe procedures for copying the magnetic tape (including the TK50 magnetic tape cartridge distribution kit) and RK07 distribution kits when using a host computer already running an RSX–11M–PLUS system.

If you are using a VAX host computer running VAX–11 RSX, go directly to Section 2.4.3 next. If you have a magnetic tape kit, read Section 2.4.2.1 next. If you have an RK07 disk kit, read Section 2.4.2.2 next.

2.4.2.1 Copying the Magnetic Tape Kit On Line

Use the following procedure to copy the 800-bpi magnetic tape, 1600-bpi magnetic tape, or TK50 magnetic tape cartridge kits when using a host computer running an RSX–11M–PLUS system. The *output disk* referred to in this section is the blank disk you intend to use as the target system disk. All commands shown in this section are issued to the MCR command line interpreter (CLI).

1. Log in to a privileged account on the host system.
2. Put the distribution kit tape and the output disk in the appropriate drives. (If you have an 800-bpi tape kit, use the first of the two distribution kit tapes.) If you are not familiar with the procedure for using the tape or disk drives, consult the hardware documentation for the drives.
3. Allocate and mount the distribution kit tape and the target system disk by using the MCR command MOU /FOR to mount the tape and the disk as foreign volumes. For example, if your distribution kit tape is on MS0 and your output disk is on DR2, use the following command sequence:

```
> ALL MS0: RET
> ALL DR2: RET
> MOU MS0:/FOR RET
> MOU DR2:/FOR RET
```

4. Format the output disk, if necessary. Disks purchased from Digital are preformatted. You can skip this step if you are certain that your disk is formatted properly. Disks from other vendors or disks that have produced I/O errors may need to be formatted. For example, if your output disk is DR2, use the following command sequence:

```
> RUN $FMT RET
FMT> DR2:/VERIFY RET

** WARNING - Data will be lost on DR2: **

Continue? [Y OR N]:  Y RET

Start formatting

Start verification

Operation complete

FMT>  CTRL/Z
```

5. Run the Bad Block Locator Utility (BAD) on your output disk. For example, if your output disk is DR2, use the following command sequence:

```
> RUN $BAD RET
BAD>  DR2:/LIST RET
BAD -- DR2: Total bad blocks= 0.
BAD>  CTRL/Z
```

6. Run the Backup and Restore Utility (BRU) to copy the first backup set on the distribution kit tape to the output disk.

   In the BRU command line, you must specify the maximum number of files permitted on and the number of file headers initially allocated to the disk volume to which you are copying the distribution kit tape. To set these values, you need to use the BRU qualifiers /MAXIMUM and /HEADERS, respectively. The following table gives the appropriate values needed for the arguments to the /MAXIMUM and /HEADERS qualifiers. (This table is the equivalent of Table 2–1.)

Device	Value for /MAXIMUM	Value for /HEADERS
RA60	24617	12308
RA70	34180	25593
RA80	14629	7314
RA81	54815	51699
RA82	65500	51699
RA90	65500	65495
RC25	3130	1565
RD31	2558	10236
RD32	5117	20471
RD52	3719	1859

Device	Value for /MAXIMUM	Value for /HEADERS
RD53	8529	4264
RD54	19143	9571
RK07	3308	1654
RM02/RM03	8099	4049
RM05	30781	25593
RM80	14923	7461
RP04/RP05	10567	5283
RP06	20956	10478

For example, if you have a 1600-bpi distribution kit tape mounted on MS0 and an RM03 output disk mounted on DR2, use the following command sequence:

```
> RUN $BRU RET
BRU> /DENSITY:1600/VERIFY/INITIALIZE/MAX:8099/HEADERS:4049 RET
From:     MS0: RET
To:       DR2: RET

BRU - Starting Tape 1 on MS0:

BRU - End of Tape 1 on MS0:

BRU - Starting verify pass Tape 1 on MS0:

BRU - End of Tape 1 on MS0:

BRU - Completed
BRU>  CTRL/Z
```

If you have a TK50 magnetic tape cartridge kit, do not use the /DENSITY switch in the command line.

If you have an 800-bpi tape kit, you must use 800 as the argument of the /DENSITY switch in the command line (for example, /DENSITY:800).

If BRU prints messages indicating that the verify operation failed, repeat this entire step. If the verify operation fails again, use a new output disk. If the verify operation fails once again, your distribution kit tape is probably defective and should be replaced.

When BRU finishes, the output disk contains a bootable baseline system and is referred to as the target system disk.

Note

If you have an 800-bpi distribution kit, remove the first tape; then, put the second tape in the appropriate drive.

If you have a 1600-bpi distribution kit, do not remove the tape from the drive at this point. The second backup set is automatically copied by the baseline startup procedure that runs after you bootstrap the baseline system in the next step.

7. Dismount the target system disk and mount it again; this time use the volume label (RSX11MPBL*nn*) instead of the /FOR switch. Then, set your device default to the target system disk device. For example, if your target system disk is DR2, use the following command sequence:

```
> DMO DR2:/LOCK=NOUNLOAD RET
DMO -- TT55:   dismounted from DR2:     *** Final dismount initiated ***
> MOU DR2:RSX11MPBLnn RET
> ASN DR2:=SY: RET
```

8. Change your default directory to [2,54]. Then, invoke the baseline startup command file, BASTART.CMD. Use the following command sequence:

```
> SET /NONAMED RET
> SET /DEF=[2,54] RET
> @BASTART RET
```

BASTART asks a number of questions pertaining to your system. Answer these inquiries appropriately. BASTART then runs BRU to copy the second backup set from the distribution kit tape. When BASTART exits, you can remove the distribution kit tape from the tape drive. Proceed to Chapter 3 for the next step in the system generation procedure.

2.4.2.2 Copying the RK07 Disk Kit On Line

Use the following procedure to copy the RK07 disk kit when using a host computer running an RSX–11M–PLUS system. (The *output disk* referred to in this section is the blank disk you intend to use as the target system disk. All commands shown in this section are issued to the MCR command line interpreter (CLI).)

Note

This procedure requires two free RK07 drives. If your system has only two RK07 drives, and one of them contains your system disk, you cannot copy your RK07 kit on line. You must use the standalone copying procedure described in Section 2.4.1.3.

1. Log in to a privileged account on the host system.
2. Put the first distribution kit disk and a blank RK07 disk in your RK07 drives; then, write-protect the distribution kit disk. If you are not familiar with the procedure for using RK07 disk drives, consult the hardware documentation for the drives.
3. Allocate and mount the kit disk and the output disk by using the /FOR switch with the MOU command to mount the disks as foreign volumes. For example, if your distribution kit disk is DM0 and your output disk is DM1, use the following command sequence:

```
> ALL DM0: RET
> ALL DM1: RET
> MOU DM0:/FOR RET
> MOU DM1:/FOR RET
```

4. Format the output disk, if necessary. Disks purchased from Digital are preformatted. You can skip this step if you are certain that your disk is formatted properly. Disks from other vendors or disks that have produced I/O errors may need to be formatted. For example, if your output disk is DM1, use the following command sequence:

```
> RUN $FMT [RET]
FMT> DM1:/VERIFY [RET]

** WARNING - Data will be lost on DM1: **

Continue? [Y OR N]: Y [RET]

Start formatting

Start verification

Operation complete

FMT> [CTRL/Z]
```

5. Run the Bad Block Locator Utility (BAD) on your output disk. For example, if your output disk is DM1, use the following command sequence:

```
> RUN $BAD [RET]
BAD> DM1:/LIST [RET]
BAD -- DM1: Total bad blocks= 0.
BAD> [CTRL/Z]
```

6. Run the Backup and Restore Utility (BRU) to copy the distribution kit disk to the output disk. For example, if the distribution kit disk is mounted on DM0 and the output disk is mounted on DM1, use the following command sequence:

```
> RUN $BRU [RET]
BRU> /VERIFY/INITIALIZE [RET]
From:    DM0: [RET]
To:      DM1: [RET]
BRU - Starting verify pass

BRU - Completed

BRU> [CTRL/Z]
```

   If BRU prints messages indicating that the verify operation failed, repeat this entire step. If the verify operation fails again, use a new output disk. If the verify operation fails once again, your distribution kit disk is probably defective and should be replaced.

   When BRU finishes, the output disk contains a bootable baseline system and is referred to as the target system disk.

7. Dismount the first distribution kit disk and the copy you just made. For example, if the distribution kit disk is mounted on DM0 and the copy is mounted on DM1, use the following command sequence:

```
> DMO DM0:/LOCK=UNLOAD [RET]
DMO -- TT36:   dismounted from DM0:    *** Final dismount initiated ***
> DMO DM1:/LOCK=UNLOAD [RET]
DMO -- TT36:   dismounted from DM1:    *** Final dismount initiated ***
```

   Remove the first distribution kit disk and the copy from their drives and replace them with the second distribution kit disk and another blank RK07 disk, respectively. Repeat steps 3, 4, 5, and 6 to copy the second distribution kit disk.

   When BRU finishes, remove the second distribution kit disk and replace it with the copy of the first distribution kit disk (the target system disk). Write-enable the copy of the distribution kit disk.

At this point, you should set aside your original distribution kit disks for safekeeping. The copies you just made of these disks should be loaded and ready in your RK07 drives, and both disks should be write-enabled.

8. Dismount the target system disk and mount it again; this time use the volume label (RSX11MPBL*nn*) instead of the /FOR switch. Then, set your device default to the target system disk device. For example, if your target system disk is DM0, use the following command sequence:

```
> DMO DM0:/LOCK=NOUNLOAD RET
DMO -- TT13:   dismounted from DM0:     *** Final dismount initiated ***
> MOU DM0:RSX11MPBLnn RET
> ASN DM0:=SY: RET
```

9. Change your default directory to [2,54]. Then invoke the baseline startup command file, BASTART.CMD. Use the following command sequence:

```
> SET /NONAMED RET
> SET /DEF=[2,54] RET
> @BASTART RET
```

BASTART asks a number of questions pertaining to your system. Answer these inquiries appropriately. When BASTART exits, proceed to Chapter 3 for the next steps in the system generation process.

2.4.3 Copying Kits on a VAX Host Running VAX-11 RSX

VAX-11 RSX emulates many of the software features of an RSX-11M-PLUS operating system on a VAX host running VMS. You can use a VAX host computer running VAX-11 RSX to generate an RSX-11M-PLUS system for a PDP-11 target computer.

You must have VAX-11 RSX installed and running on the VMS host computer before you can continue with the instructions in this section.

2.4.3.1 Logging In and Setting Up Privileges

Before you can begin to copy the distribution kit, you must set certain VMS privileges and terminal characteristics:

- You must have change mode to kernel (CMKRNL) privilege. This allows you to perform a SET /UIC command, which changes your default User Identification Code (UIC).
- You must have the system logical name (SYSNAM) privilege. This allows you to create system logical names.
- You must have logical I/O (LOG_IO) privilege. This allows VMR to perform logical I/O on system files.
- You must have volume protection (VOLPRO) privilege. This allows you to mount volumes with the /FOREIGN keyword for the MOUNT command.
- You must have system protection (SYSPRV) privilege. This allows you to create files in other directories.

- You must disable the line editing characteristic for your terminal (SET TERMINAL /NOLINE_EDITING). This allows you to enter an escape character to get help from SYSGEN.

Use the following procedure to log in and set up the necessary privileges.

1. Log in to the VMS system by using the /CLI=MCR qualifier so that you can use MCR; all copying and SYSGEN CLI commands use MCR:

```
Username:   SYSTEM/CLI=MCR [RET]
Password:   [RET]
```

2. Set up the required privileges by entering the following command line:

```
> SET PROCESS/PRIVILEGES=(CMKRNL,SYSNAM,LOG_IO,VOLPRO,SYSPRV) [RET]
```

3. Disable the line editing characteristic for your terminal by using the following command line:

```
> SET TERMINAL /NOLINE_EDITING [RET]
```

2.4.3.2 Using $$n Logical Names

Because physical device names on VMS systems are longer than those on RSX systems, the complete physical device name is not recognized by the RSX SYSGEN procedure or by RSX utilities such as the Backup and Restore Utility (BRU). This limitation is overcome by using what is known as a $$n logical name to refer to the device.

During startup, VAX–11 RSX defines the $$n logical names for the devices on your VMS system or VAXcluster. See the *VAX–11 RSX Installation Guide* and *VAX–11 RSX Release Notes* for additional information on how the $$n names for your system are defined. The *VAX–11 RSX Compatibility Mode Reference Manual* provides more detailed information on $$n logical names.

The $$n logical name for a device should be used in place of the VMS physical device name wherever a device specification is required. By entering the following command, you can determine which $$n logical names correspond to the devices you are using.

```
> SHOW LOGICAL $$* [RET]
```

The following example illustrates how $$n names are used to copy a magnetic tape distribution kit and to prepare to invoke SYSGEN on a VAXcluster. The tape used is a TU78 on a HSC controller; the disk used is a local RK07 on controller B.

```
> SHOW LOGICAL $$* [RET]
```

```
(LNM$PROCESS_TABLE)
(LNM$JOB_803299A0)
(LNM$GROUP_000301)
(LNM$SYSTEM_TABLE)
"$$0" = "ALEX$DMA0:"
"$$1" = "ALEX$DMB1:"
"$$10" = "BLKHOL$MUA0:"
"$$11" = "BLKHOL$MUA1:"
"$$12" = "CSA1:"
"$$13" = "SYS$SPECIFIC:"
"$$14" = "SYS$COMMON:"
"$$2" = "ALEX$MMA0:"
"$$3" = "BLKHOL$DUA0:"
"$$4" = "BLKHOL$DUA4:"
"$$5" = "BLKHOL$DUA5:"
"$$6" = "BLKHOL$DUA6:"
"$$7" = "BLKHOL$DUA7:"

> MOU $$10:/FOR RET
> MOU $$1:/FOR RET
> BAD $$1:/LIST RET
> BRU RET
BRU> /DENSITY:1600/VERIFY/INITIALIZE/MAX:3308/HEADERS:1654 RET
From: $$10: RET
To:   $$1: RET

BRU - Starting Tape 1 on $$10:

BRU - End of Tape 1 on $$10:

BRU - Starting verify pass Tape 1 on $$10:

BRU - End of Tape 1 on $$10:

BRU - Completed

BRU> CTRL/Z

> SET DEF $$1: RET
```

.
.
.

Although using the $$n logical name is recommended because it allows the use of any device on the system, using $$n logical names is not necessary in all cases.

If the devices you are using to copy the distribution kit and perform the SYSGEN are on "controller A" (the first controller for that device type) and if they are local to the system you are using (not on another system or HSC controller in a VAXcluster), you can use an abbreviated form of the device name that omits the controller letter and node name. For example, the devices that appear in the SHOW DEVICE display, shown in the preceding example as ALEX$MMA0: and ALEX$DMA0:, can be referred to as MM0: and DM0: respectively.

The following two sections describe procedures for copying the magnetic tape (including the TK50 magnetic tape cartridge distribution kit) and the RK07 distribution kits when using a VAX host computer running VAX–11 RSX.

If you have a magnetic tape distribution kit, read Section 2.4.3.3 next. If you have an RK07 disk distribution kit, read Section 2.4.3.4 next.

2.4.3.3 Copying the Magnetic Tape Kit Under VAX–11 RSX

Use the following procedure to copy the 800-bpi or 1600-bpi magnetic tape kits or the TK50 magnetic tape cartridge kit when using a VAX host computer running VAX–11 RSX. (The *output disk* referred to in this section is the blank disk you intend to use as the target system disk. All commands shown in this section are issued to the MCR command line interpreter (CLI).)

1. Put the distribution kit tape and the output disk in the appropriate drives. (If you have an 800-bpi tape kit, load the first of the two distribution kit tapes.) If you are not familiar with the procedure for using the tape or disk drives, consult the hardware documentation for the drives.
2. Mount the distribution kit tape and the output disk by using the /FOR switch with the MOU command to mount them as foreign volumes. For example, if your distribution kit tape is on MS0 and your output disk is on DR2, use the following command sequence:

```
> MOU MS0:/FOR RET
> MOU DR2:/FOR RET
```

3. Run the Bad Block Locator Utility (BAD) on your output disk. For example, if your output disk is DR2, use the following command sequence:

```
> BAD RET
Device:  DR2:/LIST RET
```

4. Run the Backup and Restore Utility (BRU) to copy the first backup set on the distribution kit tape to the output disk.

   In the BRU command line, you must specify the maximum number of files permitted on and the number of file headers initially allocated to the disk volume to which you are copying the distribution kit tape. To set these values, you need to use the BRU qualifiers /MAXIMUM and /HEADERS, respectively. The following table gives the appropriate values needed for the arguments to the /MAXIMUM and /HEADERS qualifiers. (This table is the equivalent of Table 2–1.)

Device	Value for /MAXIMUM	Value for /HEADERS
RA60	24617	12308
RA70	34180	25593
RA80	14629	7314
RA81	54815	51699
RA82	65500	51699
RA90	65500	65495
RC25	3130	1565
RD31	2558	10236
RD32	5117	20471

Device	Value for /MAXIMUM	Value for /HEADERS
RD52	3719	1859
RD53	8529	4264
RD54	19143	9571
RK07	3308	1654
RM02/RM03	8099	4049
RM05	30781	25593
RM80	14923	7461
RP04/RP05	10567	5283
RP06	20956	10478

For example, if you have a 1600-bpi distribution kit tape mounted on MS0 and an RM03 output disk mounted on DR2, use the following command sequence:

```
>BRU [RET]
BRU>/DENSITY:1600/VERIFY/INITIALIZE/MAX:8099/HEADERS:4049 [RET]
From:    MS0: [RET]
To:      DR2: [RET]

BRU - Starting Tape 1 on MS0:

BRU - End of Tape 1 on MS0:

BRU - Starting verify pass Tape 1 on MS0:

BRU - End of Tape 1 on MS0:

BRU - Completed

BRU> [CTRL/Z]
```

If you have a TK50 magnetic tape cartridge kit, do not use the /DENSITY qualifier in the command line.

If you have an 800-bpi tape kit, you must use 800 as the argument of the /DENSITY switch in the command line (for example, /DENSITY:800).

If BRU prints messages indicating that the verify operation failed, repeat this entire step. If the verify operation fails again, use a new output disk. If the verify operation fails once again, your distribution kit tape is probably defective and should be replaced.

When BRU finishes, the output disk contains a bootable baseline system and is referred to as the target system disk.

Note

If you have an 800-bpi distribution kit, remove the first tape; then, put the second tape in the appropriate drive.

If you have a 1600-bpi distribution kit, do not remove the tape from the drive at this point. The second backup set is automatically copied by the baseline startup procedure that runs after you bootstrap the baseline system in the next step.

5. Dismount the target system disk and mount it again; this time use the volume label (RSX11MPBL*nn*) instead of the /FOR switch. For example, if your target system disk is DR2, use the following command sequence:

```
>DMO DR2:/NOUNLOAD RET
>MOU DR2:RSX11MPBLnn RET
```

6. Change your device default to the target system disk and your default directory to [2,54]. Then, invoke the baseline startup command file, BASTART.CMD. Use the following command sequence:

```
>SET DEF DR2: RET
>SET /UIC=[2,54] RET
>@BASTART RET
```

BASTART asks a number of questions pertaining to your system. Answer these inquiries appropriately. BASTART then runs BRU to copy the second backup set from the distribution kit tape.

When BASTART exits, proceed to Chapter 3 for the next steps in the system generation procedure.

2.4.3.4 Copying the RK07 Disk Kit Under VAX-11 RSX

Use the following procedure to copy the RK07 disk RSX–11M–PLUS distribution kit when using a VAX host computer running VAX–11 RSX. The *output disk* referred to in this section is the blank disk you intend to use as the target system disk. All commands shown in this section are issued to the MCR command line interpreter (CLI).

Note

This procedure requires two free RK07 drives. If your system has only one RK07 drive, you cannot copy your RK07 kit on that system.

1. Put the first distribution kit disk and a blank RK07 disk in your RK07 drives; then, write-protect the distribution kit disk. If you are not familiar with the procedure for using RK07 disk drives, consult the hardware documentation for the drives.
2. Mount the distribution kit disk and the output disk by using the /FOR switch with the MOU command to mount the disks as foreign volumes. For example, if your distribution kit disk is DM0 and your output disk is DM1, use the following command sequence:

```
>MOU DM0:/FOR RET
>MOU DM1:/FOR RET
```

3. Run the Bad Block Locator Utility (BAD) on your output disk. For example, if your output disk is DM1, use the following command sequence:

```
>BAD RET
Device: DM1:/LIST RET
```

4. Run the Backup and Restore Utility (BRU) to copy the distribution kit disk to the output disk. For example, if the distribution kit disk is mounted on DM0 and the output disk is mounted on DM1, use the following command sequence:

```
> BRU [RET]
BRU> /VERIFY/INITIALIZE [RET]
From:     DM0: [RET]
To:       DM1: [RET]
BRU - Starting verify pass

BRU - Completed

BRU>  [CTRL/Z]
```

If BRU prints messages indicating that the verify operation failed, repeat this entire step. If the verify operation fails again, use a new output disk. If the verify operation fails once again, your distribution kit disk is probably defective and should be replaced.

When BRU finishes, the output disk contains a bootable baseline system and is referred to as the target system disk.

5. Dismount the first distribution kit disk and the copy you just made. For example, if the distribution kit disk is mounted on DM0 and the copy is mounted on DM1, use the following command sequence:

```
> DMO DM0:/UNLOAD [RET]
> DMO DM1:/UNLOAD [RET]
```

Remove the first distribution kit disk and the copy from their drives and replace them with the second distribution kit disk and another blank RK07 disk, respectively. Repeat steps 2, 3, and 4 to copy the second distribution kit disk.

When BRU finishes, remove the second distribution kit disk and replace it with the copy of the first distribution kit disk (the target system disk). Write-enable the copy of the distribution kit disk.

At this point, you should set aside your original distribution kit disks for safekeeping. The copies you just made of these disks should be loaded and ready in your RK07 drives, and both disks should be write-enabled.

6. Dismount the target system disk and mount it again; this time use the volume label (RSX11MPBL*nn*) instead of the /FOR switch. Then, set your device default to the target system disk device. For example, if your target system disk is DM0, use the following command sequence:

```
> DMO DM0:/NOUNLOAD [RET]
> MOU DM0:RSX11MPBLnn [RET]
> SET DEF DM0: [RET]
```

7. Set your default directory to [2,54]. Then, invoke the baseline startup command file, BASTART.CMD, as follows:

```
> SET /UIC=[2,54] [RET]
> @BASTART [RET]
```

BASTART asks a number of questions pertaining to your system. Answer these inquiries appropriately.

8. When BASTART exits, proceed to Chapter 3 for the next steps in the system generation process.

2.5 Applying Layered Product Corrections

Correction files are used to apply any corrections to layered products that are supported on RSX–11M–PLUS. For the tape distribution kits, the layered product correction files are located in backup sets on the separate tape that contains BRUSYS. For disk distribution kits, the layered product correction files are located in directories on the second disk.

There is a documentation file (DOC file type) for each layered product that explains how to apply the corrections to the layered product. Read the documentation files for each layered product that you have on your system.

You should apply any corrections to layered products *after* you use the SYSGEN procedure to generate a new system. The layered products require the corrected versions of certain files (for example, SYSLIB.OLB) that are produced during the system generation procedure.

If you are installing an RSX–11M–PLUS system for the first time, turn now to Chapter 3 for instructions on performing a system generation.

2.5.1 Accessing the Corrections with the Magnetic Tape Package

If you have the magnetic tape distribution kit, the files for each product are contained in a BRU backup set on the BRUSYS tape. You must restore the backup set from the tape to the disk before you can apply the layered product files. Use BRU to restore the backup set to disk, and then type or print the appropriate documentation file for further instructions.

You can display a documentation file at your terminal by entering the following command line, replacing ddnn: with the name of the drive containing the disk and replacing [directory] with the appropriate directory specification as listed in the *RSX–11M–PLUS Release Notes*:

```
PIP TI:=ddnn:[directory]product.DOC
```

To restore a backup set, mount the layered product correction tape as a foreign volume and copy the backup set by using BRU. For example, if the tape is loaded on drive MM0 and the disk to which you wish to copy the PDP–11 FORTRAN-77/RSX backup set is DM0 (an RK07 mounted as a Files–11 volume), use the following command sequence:

```
> MOU MM0:/FOR RET
> BRU /NOINI/UFD/DENS:1600/SUPER/BAC:F77 MM0: DM0: RET
```

If you have an 800-bpi tape, substitute /DENS:800 in the command line above. If you have a TK50 magnetic cartridge tape, do not include the /DENS switch. For other layered products, substitute the correct backup set name.

2.5.2 Accessing the Corrections on RK07 or RL02 Distribution Kits

If you have the RK07 distribution disk, mount the second RK07 disk as a Files–11 volume and type or print the appropriate documentation file.

If you have the RL02 distribution disk, mount the second RL02 disk as a Files–11 volume and type or print the appropriate documentation file.

You can display an instruction file at your terminal by entering the following command line, replacing ddnn: with the name of the drive containing the disk and replacing [directory] with the appropriate directory specification as listed in the *RSX–11M–PLUS Release Notes*:

```
PIP TI:=ddnn:[directory]product.DOC
```

You can copy the contents of selected directories to disk by creating the necessary directories by using the MCR command UFD and then by using the Peripheral Interchange Program (PIP). For example, to copy the contents of directory [252,200] from an RK07 disk mounted on DM1 to your system disk mounted on DM0, use the following command sequence:

```
>UFD DM0:[252,200] RET
>PIP DM0:[252,200]/CD/FO/SU=DM1:[252,200] RET
```

Refer to the *RSX–11M–PLUS Release Notes* for a list of the directories that contain the various layered product files.

Chapter 3

Running SYSGEN

3.1 What You Should Know Before You Start

This section contains general information concerning SYSGEN format, conventions, and features.

3.1.1 Format of SYSGEN Questions

The Indirect Command Processor (Indirect) determines the format that SYSGEN questions take. Generally, SYSGEN questions begin with an asterisk (*) followed by the question number, the text of the question, and a prompt (contained within brackets) indicating the type of response required.

Question numbers consist of 2 characters designating the section of SYSGEN followed by a number designating the particular question in that section (for example, SU010). The following are the 2-character designators for each section:

SU Choosing SYSGEN Options

CE Choosing Executive Options

CP Choosing Peripheral Configuration

AE Assembling the Executive and Drivers

BE Building the Executive and Drivers

BP Building the Privileged Tasks

BN Rebuilding the Supplied System Tasks

CS Creating the System Image File

The questions are numbered sequentially, but not consecutively. You can use question numbers for looking up a particular question in this chapter; the question numbers printed by SYSGEN are the same as the ones in this chapter.

The prompt at the end of each SYSGEN question indicates the type of response that is required, the range of acceptable responses, and the default response.

SYSGEN questions require a response in one of the following ways:

- A character (ASCII) string response
- A logical response—Y (for Yes) or N (for No)
- A numeric response

Most SYSGEN questions have an implied response, known as the default. The default is the value assumed by SYSGEN if an option is not explicitly specified. Many of the SYSGEN questions contain the default response within brackets immediately following the text of the question. How the default response appears in a given question depends on the type of response required for that question (ASCII string, logical, or numeric).

Press the RETURN key without entering any characters to select the default response for any SYSGEN question (unless the explanatory text that accompanies the question explicitly states that there is no default for that question).

The following is a typical SYSGEN question requiring an ASCII string response:

```
* CE010  What is your target processor type? [S R:5.-12. D:"11/44"]:
```

The first key letter (S) inside the brackets indicates that the response should be an ASCII string—in this case, a processor type. The second key letter (R) indicates that the range or number of characters allowed in the response is from 5 to 12_{10}. The third key letter (D) indicates that the default response is 11/44. Pressing the RETURN key without entering any characters enters the default response.

The following is a typical SYSGEN question requiring a Yes or No response:

```
* CE270   Do you want to include XDT? [Y/N D:N]:
```

The prompt Y/N at the end of the question indicates that the response should be either a Y (for Yes) or an N (for No). The default response for this example is No, but Yes/No questions can also have a default response of Yes.

The following is a typical SYSGEN question requiring a numeric response:

```
* CP0836  What is the physical unit number of DB2:? [O R:0-7 D:2]:
```

The prompt R:0-7 at the end of the question indicates that the question requires a numeric response. The first key letter (O) inside the bracket indicates that the response is an octal number. A key letter of D in this position indicates that the response is a decimal number. The second key letter (R) indicates that the range for the response is from 0 to 7. The third key letter (D) indicates that the default response is 2.

If you are not certain how to answer a particular question, take the default by pressing the RETURN key without entering any characters. The defaults have been chosen so that they will produce acceptable results with most systems. You can change your answer and perform another SYSGEN later. It is easier to generate a simple, working system first, and then to tailor that system by performing additional system generations later when you have gained experience and familiarity with SYSGEN and RSX–11M–PLUS.

If you answer a question with an incorrect value, SYSGEN displays a message describing the error and suggests a procedure to correct the problem. The question then appears again on your terminal.

3.1.2 How to Get Help

All the questions posed during SYSGEN have associated help paragraphs. You can have the help paragraphs printed on your terminal before each question is asked by entering Yes to the following question:

```
* SU010   Do you always want the explanation printed?
```

If you feel sufficiently familiar with the SYSGEN procedure and do not choose to have the help paragraphs automatically printed, you can still examine the help paragraphs for any question by pressing the ESCAPE key in response to the question. SYSGEN then prints the help paragraphs and asks the question again.

Other manuals in the RSX–11M–PLUS documentation set contain information that is relevant to system generation. Where appropriate, this manual contains pointers to specific manuals and, sometimes, to chapters within those manuals.

3.1.3 What to Do if You Make a Mistake

If you enter a response out of the proper range for a specific question or set of questions or if you choose options that are incompatible, SYSGEN prints an error message on your terminal.

If the message is labeled as a warning, take appropriate action as described in the error message or simply note the content of the message for later reference.

If the message is labeled as fatal, SYSGEN exits. After correcting the condition that caused the error, you can restart SYSGEN by doing the following:

1. Change your default directory back to [200,200] by entering the following command line:

   ```
   > SET /UIC=[200,200] RET
   ```

2. Check to see whether the saved answer files are usable (see Section 3.1.4). If they are not usable, delete them.

3. Invoke SYSGEN as follows:

   ```
   > @SYSGEN RET
   ```

Note

If you exit from the SYSGEN procedure by pressing CTRL/Z, you may render the current saved answer files unsuitable for future use. For more information on dealing with saved answer files, see Section 3.1.4.

If you are performing a PREPGEN (as you should before actually generating a system) and you make a mistake, you can redo the PREPGEN and correct the mistake. When you run the PREPGEN the second time, use the saved answer files for those sections that are correct; do not use the saved answer file for the Section 3.1.5 for information on performing a PREPGEN.

If you do not discover a mistake until after you have completed SYSGEN, you might still be able to correct the mistake without performing another complete SYSGEN.

Most of your answers in the Choosing Executive Options (CE) section govern conditionally assembled code in the Executive and therefore cannot be changed without performing another SYSGEN. However, you can make changes to the following:

- The Queue Manager (QMG) can be task built and added to the system at any time.
- The batch processor can be task built and added to the system if virtual terminal support and QMG have been included.
- Either version of the file system Ancillary Control Processor (ACP) (FCPMDL or FCPLRG) can be task built and added to the system at any time.
- Your answer to the memory size question is not crucial. The size you specify is used as the size of the unsaved system. Once the system is bootstrapped and saved, the actual memory size is determined and used.
- If you choose Floating Point Processor support, the system will run on processors with or without a floating-point unit.

If you made a mistake in the answers that you gave to the following questions in the Choosing Peripheral Configuration (CP) section, you can correct the mistake after you have completed SYSGEN:

- SYSGEN asks for the control and status register (CSR) and vector addresses of every controller in your system. If you specify a wrong address, you can change it after your system image file has been created by using the VMR command CON.
- SYSGEN asks for the drive type for many of the disk units. For example:

  ```
  * CP0860  Is DB0: an RP04, RP05, or RP06?
  ```

  This information determines the size of the disk and is only important for the device on which you will be bootstrapping the system image and for RK05F disks.

  If you will be bootstrapping the unsaved system from an RK06 or RK07 disk drive, you must specify the correct drive type during SYSGEN. If you will be bootstrapping the system from any other type of disk, you must specify the correct drive type or the drive type of a larger disk. When the system is bootstrapped and the devices are brought on line, the actual drive type overrides whatever you specified during SYSGEN.

  The RK05F disk is treated as two units. It is important to specify the correct drive type for these devices so that SYSGEN will generate the correct number of units.
- If you leave out a device whose driver can be built with a loadable database, you can add the device to your system after the SYSGEN is complete. See Chapter 4 for a description of adding a device after SYSGEN.
- If you specify the wrong configuration for a device whose driver is built with a loadable database, you can respecify the configuration and replace the incorrect database after the SYSGEN is complete. See Chapter 4 for a description of adding a device after SYSGEN.

3.1.4 Saved Answer Files

Whenever you answer a question during SYSGEN, the text of the question as asked and your response are placed in files on the target disk. These saved answer files can be used to redo a SYSGEN without requiring you to answer all the questions again.

SYSGEN creates the following saved answer files:

SYSGENSA1.CMD	Contains the responses to questions in the Choosing Executive Options (CE), Assembling the Executive and Drivers (AE), Building the Executive and Drivers (BE), Building the Privileged Tasks (BP), and Creating the System Image File (CS) sections.
SYSGENSA2.CMD	Contains the responses to questions in the Choosing Peripheral Configuration (CP) section.
SYSGENSA3.CMD	Contains the responses to questions in the Rebuilding the Supplied System Tasks (BN) section.

In later system generations, you can use these files as input.

When you specify these files as input, SYSGEN uses the information contained in the files as answers to SYSGEN questions, without printing the questions on your terminal. If SYSGEN encounters a question for which there is no saved answer, it prints that question on your terminal and prompts you for a response.

Before creating each saved answer file, SYSGEN asks you for a comment describing the system being generated. This comment is included in the saved answer file as documentation and is printed when the saved answer file is used as input. This comment may contain more than one line. SYSGEN will continue prompting for input until you enter a null line (produced by pressing the RETURN key without entering any characters in response to the prompt).

Each saved answer file contains a list of the SYSGEN questions, with each question followed by its response. The files also include headings that indicate when each file was created. The responses are in the form of Indirect .SET directives.

Format

.SET symbol value

Parameters

symbol
Specifies an internal SYSGEN symbol.

value
Specifies your response.

In the Choosing SYSGEN Options (SU) section, SYSGEN asks whether you want to use saved answer files for input. If you enter Yes, the saved answer file that you specify will supply the answers to the proper section or sections.

Every time you perform SYSGEN, it creates saved answer files with the three file names just listed. Each time you specify saved answer files as input, SYSGEN uses the saved answer files from the last time SYSGEN was performed (unless you specify different input files).

If you exit SYSGEN by pressing CTRL/Z, the saved answer file is closed at the point where it was interrupted. If you later use that file as input, SYSGEN examines the file and prints a message warning that the file may be incomplete. SYSGEN reads the answers that the file contains, and SYSGEN then begins asking questions from the point at which you left off in the aborted SYSGEN. As you answer further questions, SYSGEN appends your answers to the incomplete file.

If SYSGEN exits abnormally, the saved answer files it was creating may be incomplete or locked. You may have to unlock or delete these incomplete files; therefore, it is important that you keep track of the various versions of saved answer files you are creating. One way to do this is to rename the current saved answer files with meaningful names after you exit SYSGEN.

You can use saved answer files to perform a SYSGEN without having to spend much time at a terminal waiting for assembly and task building to complete; see Section 3.1.5.

3.1.5 PREPGEN

PREPGEN is the SYSGEN procedure performed with MCR command lines inhibited. You have the opportunity to answer all the questions, and saved answer files are created; however, a new system is not assembled or built, and no files are deleted. Performing a PREPGEN is a way of quickly generating saved answer files that can then be used to perform a "real" SYSGEN unattended.

To perform a PREPGEN, invoke SYSGEN as you normally would and enter Yes to the following question:

```
* SU080   Do you want to do a PREPGEN?
```

If you have never generated an RSX–11M–PLUS system before or if you are unfamiliar with this version of RSX–11M–PLUS, you may find it useful to run through the questions a number of times to ensure that you make the proper choices for your installation. PREPGEN allows you to change your choices in, for example, the Choosing Peripheral Configuration (CP) section without having to reanswer the questions in the Choosing Executive Options (CE) section. After you are satisfied with your answers, you can then perform a "real" SYSGEN by using the saved answer files from the PREPGEN.

3.1.6 Autoconfigure

Of all the sections of SYSGEN, the longest and most complicated is the Choosing Peripheral Configuration (CP) section. It is not always convenient to obtain the correct CSR and vector addresses for your specific peripheral devices.

If you are performing a standalone system generation and the host computer is the computer for which you are generating an RSX–11M–PLUS system, you can avoid confusion by directing SYSGEN to run Autoconfigure on your hardware.

To run Autoconfigure, enter Yes when SYSGEN asks the following question:

```
* SU100   Do you want to run Autoconfigure on the host system hardware?
```

3.1.6.1 What Autoconfigure Does

When you answer Yes to the Autoconfigure question, SYSGEN automatically determines the correct hardware configuration of your host system: the processor type, the CSR and vector addresses of your peripheral devices, and any optional hardware that may be present (such as floating-point or extended instruction set hardware). SYSGEN displays complete configuration information at your terminal after Autoconfigure has finished.

You can use the Autoconfigure results for responses to questions in the Choosing Peripheral Configuration (CP) section of SYSGEN. In this case, SYSGEN automatically answers (and, therefore, bypasses) any questions for which Autoconfigure results can be used as responses. You can also override the results of Autoconfigure (see Section 3.1.6.2).

Autoconfigure is a valid option *only* if you are generating RSX–11M–PLUS on the baseline system (that is, performing a standalone system generation). Autoconfigure can accurately determine the hardware configuration only when there is no pending I/O. Autoconfigure uses a complex series of device interrupts, which requires that there be *no* other activity on the system.

If you use an input saved answer file containing a saved peripheral configuration and also run Autoconfigure on the host system, SYSGEN merges the device information from both the saved answer file and the autoconfiguration into a single list. Where there are discrepancies in the saved answer file and the Autoconfigure list, the saved answer file always overrides the Autoconfigure results.

If SYSGEN fails to produce an Autoconfigure report like that in Example 3–1 within 1 minute, then Autoconfigure has failed to determine the configuration of your hardware. If this occurs, you must rebootstrap the baseline system and invoke SYSGEN again without choosing the Autoconfigure option. When SYSGEN fails to report Autoconfigure results, a severe hardware malfunction might have occurred, or your devices might not be at addresses corresponding to the standard Digital configuration algorithm (detailed in Appendix D).

Autoconfigure does not find all the devices about which SYSGEN asks questions. Section 3.1.6.3 describes those devices that Autoconfigure finds. Note that, for many devices, Autoconfigure finds only the first controller.

If you use Autoconfigure, SYSGEN does not ask about any of the devices that Autoconfigure finds, but SYSGEN uses the Autoconfigure results instead. SYSGEN always asks about those devices not found by Autoconfigure.

Table 3–1 lists all the remarks that Autoconfigure might include with the configuration information.

Example 3–1: Sample Autoconfigure Output

```
Processor Type:  11/70                    Memory Size:  512. Kw

Options:

        Floating Point Processor (FP11)
        Extended Instruction Set (EIS)
        Extended (22-bit) Addressing
        Switch Register (SWR)
        Display Register
        Cache Memory
        Parity Memory

Name      Vector      CSR       Unit      Type      Remarks

DKA         220       177404
                                0         RK05
                                2         RK05
DMA         210       177440
                                0         RK06
                                1         RK06
                                2         RK07
RHA         224       172440
                                0_0       TU77      TM03
                                0_1       TU77      TM03
RHB         150       176300
                                0         RM03
RHC         204       176400
                                0         ML11A
RHD         254       176700
                                0         RP06
                                1         RP06
                                2         RP05
                                3         RP05      Dual access
DXA         264       177170
DTA         214       177342
LPA         200       177514
LPB         270       164004
YLA         060       177560
YLB         ???       175610                        Failed to interrupt
YMA         310       170500
YMB         314       170510
YMC         324       170520
YHA         340       160020
YHB         350       160040
YHC         360       160060
YHD         ???       160100                        Failed to interrupt
```

Table 3–1: Autoconfigure Remarks and Meanings

Remark	Meaning
Failed to interrupt	The specified device is either malfunctioning or the hardware configuration is nonstandard, causing Autoconfigure to report unreliable information. Autoconfigure places three question marks (???) in the vector field of the report. SYSGEN does not include the specified device in the resulting system.
Mixed MASSBUS devices	Autoconfigure has detected a MASSBUS controller configured with several classes of peripherals attached to it (for example, an RM03 and an RP06 drive).
TM02 TM03	Indicates the type of magnetictape formatter associated with this tape drive. Magnetic tape unit numbers are displayed in the following format: 0_1 where: 0 is the formatter unit number. 1 is the tape drive unit number.
Priority n	Autoconfigure has detected a device with an interrupt priority higher than expected. The actual interrupt priority is n.
Dual access	The specified unit has the dual access option installed. Dual access allows a unit to be shared by two controllers.
??? (in the vector field)	See "Failed to interrupt" remark.
Sector interleaved	The RS03 or RS04 displayed supports sector interleaving, which allows the unit to optimize data accesses.

3.1.6.2 Overriding Autoconfigure Results

When you direct SYSGEN to run Autoconfigure, SYSGEN asks the following question, allowing you to override the results of Autoconfigure:

```
* SU110   Do you want to override the Autoconfigure results?
```

This option directs SYSGEN to display the Autoconfigure results in the default field of each question. Instead of directing SYSGEN to use Autoconfigure results as responses to the questions in the Choosing Peripheral Configuration (CP) section, each SYSGEN question appears with the Autoconfigure results as the default instead of the standard default response. You can then examine the Autoconfigure results and either enter a different response or press the RETURN key to use the Autoconfigure result.

You can override Autoconfigure results to enter information not normally determined by Autoconfigure. For example, if your system has four RK06 drives, but one is down with serious hardware problems, Autoconfigure would only report finding three of them. If you know that the drive will be repaired soon, you can override the Autoconfigure results by

entering 4 as the number of units for the RK06 drives, instead of the default of 3 provided by Autoconfigure.

Table 3–2 lists the devices supported by the Autoconfigure option. Devices that are not listed in Table 3–2, as well as any malfunctioning devices, cannot be automatically configured.

3.1.6.3 Hardware Supported by Autoconfigure

Autoconfigure supports most standard devices supplied by Digital. For those Digital devices in your hardware configuration not supported by Autoconfigure, SYSGEN asks the appropriate question in the Choosing Peripheral Configuration (CP) section to get the specific controller information for those devices.

Autoconfigure does not determine the number of units for DK, DP, DT, or MT devices. However, it does determine the CSR and vector addresses for those devices. SYSGEN asks questions in the Choosing Peripheral Configuration (CP) section that require you to input the number of units for those devices.

All devices that are to be configured into your system by Autoconfigure must be connected to the system bus and must be powered up. In addition, DK-type and DU-type devices must have a disk spinning in the drive for Autoconfigure to work properly.

Table 3–2 is a list of the hardware supported by Autoconfigure. Refer to Appendix D for more information on the hardware supported by Autoconfigure and the algorithm used to assign addresses to devices attached to the UNIBUS.

Note

Your host system configuration must conform to the standard PDP–11 configuration algorithm (described in Appendix D) for Autoconfigure to report reliable information.

Table 3–2: Hardware Supported by Autoconfigure

Processor	
PDP–11/23–PLUS	(Also called MicroPDP–11/23)
PDP–11/24	
PDP–11/44	
PDP–11/70	
PDP–11/53	(Also called MicroPDP–11/53)
PDP–11/73	(Also called MicroPDP–11/73)
PDP–11/83	(Also called MicroPDP–11/83)
PDP–11/84	

(continued on next page)

Table 3–2 (Cont.): Hardware Supported by Autoconfigure

Processor	Memory Options
FP–11	FPP—Floating Point Processor
KE–11E	EIS—Extended Instruction Set CIS—Commercial Instruction Set
KW–11P	Programmable Clock Cache Memory Switch Register Display Register Parity Memory

I/O Peripheral and Controller	Devices
CT	TA11 cassette[1]
DB	RP04/05/06 disk drive
DD	TU58 DECtape II
DK	RK11/RK05 cartridge disk controller [1]
DL	RL211/RL01/RL02 disk drive[2]
DM	RK611/RK711 RK06/RK07 disk drive[1]
DP	RP11/RP02/RP03 disk drive[1]
DR	RM02/RM03/RM05/RM80/RP07 disk drive
DS	RS03/RS04 fixed-head disk drive
DT	TC11/TU56 DECtape[1]
DU	KDA50/UDA50/RC25/RA60/RA70/RA80/RA81/RA82/RA90 disk drive[2] RQDX1/RQDX2/RQDX3/RD51/RD52/RD53 disk drive[2] RX33/RX50/RUX50 diskette drive[2]
DX	RX11/RX01 diskette drive[1]
DY	RX211/RXV21/RX02 diskette drive[1]
EM	ML11 semiconductor disk emulator
LP	LP/LS/LV11 line printer
MM	TU16/45/77/TE16 magnetic tape drive
MS	TK25/TS11/TU80/TSV05 magnetic tape drive

[1]Autoconfigure detects only the first controller for these devices.
[2]For pregenerated RSX–11M–PLUS systems only, Autoconfigure detects up to four controllers for these devices.

(continued on next page)

Table 3–2 (Cont.): Hardware Supported by Autoconfigure

I/O Peripheral and Controller	Devices
MT	TM11/TU10/TE10/TS03 magnetic tape controller[1]
MU	TK50/TU81/TU81E magnetic tape drive[2]
PR	PR11/PC11 paper tape reader[1]
PP	PC11 paper tape punch[1]
RH	RH11/RH70 MASSBUS controller
YH	DH11 asynchronous terminal interface
YL	DL11/DLV11–A/B asynchronous interface
YL	DL11/DLV11–C/D/E asynchronous interface
YL	DL11/DLV11–J asynchronous interface
YL	DL11–W console interface with line clock
YM	DM11–BB modem controller for DH11
YV	DHV11/DHU11/DHQ11 CXA16/CXB16/CXY08 asynchronous terminal interface
YZ	DZ11/DZQ11/DZV11 asynchronous terminal interface

[1]Autoconfigure detects only the first controller for these devices.
[2]For pregenerated RSX–11M–PLUS systems only, Autoconfigure detects up to four controllers for these devices.

3.1.6.4 The Baseline System

The baseline system is a basic RSX–11M–PLUS system included with the distribution kit. It contains all the software components and Executive features you need to generate an RSX–11M–PLUS system. The baseline system provides sufficient capability for many users, but is not customized. To acquire a customized system that is optimized for the requirements of your site, you must go through the SYSGEN dialogue and specify options.

If you copied your distribution kit on line and intend to invoke SYSGEN on line, you do not need the baseline system.

If you copied your distribution kit stand alone according to the directions in Chapter 2, the baseline system should be currently running on the host computer, and you can use it to invoke and perform the SYSGEN procedure. If the baseline system is not running, you must hardware bootstrap the distribution kit disk before you invoke SYSGEN. This brings the baseline system into memory and starts it running.

The baseline system that Digital supplies in the distribution kit uses a loadable crash dump driver. This allows baseline system crash dumps on all configurations, including devices supported by loadable crash dump drivers.

In earlier versions, the baseline system had crash dump support for MM-type devices and could produce crash dumps only on configurations that included MM-type devices. The baseline system now has loadable crash dump support for MM-type devices, but you can change the crash dump driver with the following DCL command:

```
SET SYSTEM /CRASH_DEVICE=ddnn:
```

You can also use either of the following MCR commands:

```
SET /CRASHDEV=ddnn:
SET /CRASH_DEVICE=ddnn:
```

Refer to the *RSX–11M–PLUS and Micro/RSX Crash Dump Analyzer Reference Manual* for more information on loading crash dump drivers.

To enable a crash dump of the baseline system, you must have previously loaded the appropriate crash dump driver for the crash dump device that you want. Digital recommends that you load the appropriate crash dump driver immediately after booting the baseline system because the crash dump driver cannot be loaded after the system crash occurs.

Tables 3–3 and 3–4 show the peripheral devices generated into the baseline system.

Table 3–3: RSX–11M–PLUS Baseline Device Configuration

Device Mnemonic	No. of Units	CSR	Vector
DB	8	176700	254
DR	8	176700	254
MM	2	172440	224
DK	2	177404	220
DM	2	177440	210
DL	2	174400	160
DU	4	172150	154
MU	1	174500	260
MS	1	172522	400
DX	2	177170	264
DY	2	160000	410
DD	2	160000	420
LP	1	177514	200
MT	2	160000	430

Table 3–4: Terminal Configuration

Controller Mnemonic	Controller Type	Terminal Lines	CSR	Vector
YLA (Console)	DL11/DLV11	1	177560	60
YLB	DL11/DLV11	1	160000	440
YHA	DH11	8	160000	450
YVA	DHV11/DHQ11/CXY08	8	160000	460
YVA	CXA16/CXB16/DHU11	16	160000	460
YZA	DZ11/DZQ11/DZV11	4	160000	470

3.1.7 Invoking SYSGEN

Before you invoke SYSGEN, you should have made a copy of your distribution kit according to the instructions in Chapter 2. After you have made a copy of your distribution kit, invoke the SYSGEN procedure by following these two steps:

1. If it is not mounted already, mount your target system disk and assign logical device SY to it. For example, if your target system disk is spinning in DB0, use the following command sequence:

```
> MOU DB0:RSX11MPBLnn [RET]
> ASN DB0:=SY: [RET]
```

2. Set your default directory to [200,200] and invoke the SYSGEN command file, as follows:

```
> SET /UIC=[200,200] [RET]
> @SYSGEN [RET]
```

This procedure invokes the first SYSGEN indirect command file and starts the SYSGEN procedures.

3.1.7.1 Invoking SYSGEN on a VAX Host Running VAX-11 RSX

Before you invoke SYSGEN, you should have made a copy of your distribution kit following the instructions in Chapter 2. Also, refer to Section 2.4.3.2 for information on using $$n logical names to refer to devices.

When you are ready to invoke SYSGEN, use the following procedure:

1. If it is not mounted already, mount your target system disk. For example, if your target system disk is DR0, enter the following command line:

```
> MOU DR0:RSX11MPBLnn [RET]
```

2. Set your default device to the target system disk. For example, if your target system disk is DR0, enter the following command line:

```
> SET DEF DR0: [RET]
```

3. Set your default User Identification Code (UIC) and directory to [200,200] and invoke the SYSGEN command file. For example:

```
> SET /UIC=[200,200] RET
> @SYSGEN RET
```

This procedure invokes the first SYSGEN indirect command file and starts the SYSGEN questions.

3.2 SYSGEN Questions

The rest of this chapter describes the questions that the SYSGEN procedure asks. SYSGEN uses your responses to assemble and task build a version of RSX–11M–PLUS that meets your specific needs and is tailored to your hardware configuration.

If this is your first time generating an RSX–11M–PLUS system, you should use Autoconfigure to determine (if possible) your peripheral configuration, and you should choose the Full-functionality Executive option. Choosing these options reduces the number of questions you must answer, and, although the system that results may not be optimized for your needs, you will have a correct, full-functionality system.

When you have gained experience and familiarity with your system, you can perform another SYSGEN to produce a system that is tailored specifically to your requirements.

SYSGEN *never* asks all the questions described in this chapter because many questions involve choices that are mutually exclusive. Therefore, although not every question in a sequence appears on your terminal, the order in which they are listed in this section parallels the order in which SYSGEN asks them.

The questions are divided into eight sections:

- Choosing SYSGEN Options (SU)
- Choosing Executive Options (CE)
- Choosing Peripheral Configuration (CP)
- Assembling the Executive and Drivers (AE)
- Building the Executive and Drivers (BE)
- Building the Privileged Tasks (BP)
- Rebuilding the Supplied System Tasks (BN)
- Creating the System Image File (CS)

3.2.1 Choosing SYSGEN Options (SU)

In this section, SYSGEN asks questions about the kind of SYSGEN you wish to perform. You can specify the saved answer files to be used, whether you want to do a PREPGEN, whether you want to use Autoconfigure, or whether you want to do a complete SYSGEN.

Your answers to the questions in this section are not saved in a saved answer file; you must answer them each time you invoke SYSGEN.

SYSGEN Options (SU)

The following pages describe all the possible questions you could be asked in the Choosing SYSGEN Options (SU) section.

```
* SU010   Do you always want the explanation printed? [Y/N D:N]:
```

If you are unfamiliar with SYSGEN, the help paragraph for each question can be printed automatically before the question appears on your terminal.

Enter Yes if you have not performed a SYSGEN before or if you are performing a Version 4.2 SYSGEN for the first time and you want to have the explanation printed.

If you enter No, you can still obtain the help paragraph for any question by pressing the ESCAPE key in response to the question.

```
* SU020   Do you want to use a saved answer file as input for
*         the Executive options? [Y/N D:N]:
```

SYSGEN always creates saved answer files containing your responses to the questions asked during a particular SYSGEN. The following is a list of the files created and the responses they contain:

SYSGENSA1.CMD	Choosing Executive Options, Assembling the Executive and Drivers, Building the Executive and Drivers, Building the Privileged Tasks, Creating the System Image File
SYSGENSA2.CMD	Choosing Peripheral Configuration
SYSGENSA3.CMD	Rebuilding the Supplied System Tasks

If you have performed a SYSGEN (or PREPGEN) before, you can use the saved answer files created during the previous SYSGEN as input to your current SYSGEN. The SYSGEN procedure uses the saved answers as your responses to the questions in the current SYSGEN.

You should perform a PREPGEN first to create saved answer files and then perform a SYSGEN specifying those saved answer files as input to the various SYSGEN sections.

If you enter Yes, SYSGEN asks you to provide the file name for the saved answer file that contains answers to the questions in the Choosing Executive Options (CE), Assembling the Executive and Drivers (AE), Building the Executive and Drivers (BE), Building the Privileged Tasks (BP), and Creating the System Image File (CS) sections.

If you enter No, SYSGEN proceeds to Question SU040.

For more information on saved answer files, see Section 3.1.4.

```
* SU030   Enter saved answer file name [S D:"SYSGENSA1.CMD"]:
```

This question appears only if you indicated that you wanted to use saved answers to the "Executive group" questions.

Enter the file specification of the saved answer file containing previously generated answers to the questions in the Choosing Executive Options (CE), Assembling the Executive and Drivers (AE), Building the Executive and Drivers (BE), Building the Privileged Tasks (BP), and Creating the System Image File (CS) sections.

```
* SU040   Do you want to use a saved answer file as input for
*         the peripheral configuration? [Y/N D:N]:
```

If you enter Yes, SYSGEN asks you to provide the file name for the saved answer file that contains answers to questions in the Choosing Peripheral Configuration (CP) section.

If you enter No, SYSGEN proceeds to Question SU060.

```
* SU050   Enter saved answer file name [S D:"SYSGENSA2.CMD"]:
```

This question appears only if you indicated that you wanted to use saved answers to the Choosing Peripheral Configuration (CP) section.

Enter the file specification of the saved answer file containing previously generated answers to the questions in the Choosing Peripheral Configuration (CP) section.

```
* SU060   Do you want to use a saved answer file as input for
*         the supplied system  task builds? [Y/N D:N]:
```

If you enter Yes, SYSGEN asks you to provide the file name for the saved answer file that contains answers to questions in the Rebuilding the Supplied System Tasks (BN) section.

If you enter No, SYSGEN proceeds to Question SU080.

```
* SU070   Enter saved answer file name [S D:"SYSGENSA3.CMD"]:
```

This question appears only if you indicated that you wanted to use saved answers to the supplied system task-build questions.

Enter the file specification of the saved answer file containing previously generated answers to the questions in the Rebuilding the Supplied System Tasks (BN) section.

```
* SU080   Do you want to do a PREPGEN? [Y/N D:N]:
```

PREPGEN allows you to answer all the SYSGEN questions and to create saved answer files without performing SYSGEN: no MCR commands are executed, no files are deleted, and the Executive is not assembled or built. After successfully completing the PREPGEN, you can invoke SYSGEN and use the saved answer files generated during PREPGEN. Then, SYSGEN proceeds unattended. For more information on PREPGEN, see Section 3.1.5.

```
* SU090   Enter the name of the disk drive containing your
*         target system disk [ddnn:] [S R:2-5]:
```

Enter the unit designation (for example, DB2:) of the drive containing the copy of the distribution kit prepared according to the instructions in Chapter 2. This disk volume is referred to in this and subsequent chapters as the target system disk.

```
* SU100   Do you want to run Autoconfigure on the host system
*         hardware? [Y/N D:N]:
```

This question appears only if you are running on the baseline system (that is, if you are performing a standalone SYSGEN).

Enter Yes if you want to use the Autoconfigure task to determine the hardware configuration of the host system. For a description of the Autoconfigure task, see Section 3.1.6.

If the host processor is not the processor for which you are generating this system, enter No.

SYSGEN Options (SU)

After determining your hardware configuration, Autoconfigure prints a table of what it found. If no results are printed within a few minutes, Autoconfigure has failed and you should rebootstrap your system and restart the SYSGEN. Do not use Autoconfigure the next time.

If you have already performed a PREPGEN or SYSGEN during which you ran Autoconfigure, and you are using the saved answer files from that PREPGEN or SYSGEN, you do not need to run Autoconfigure again. The saved answer files contain all the device information from Autoconfigure.

```
* SU110   Do you want to override the Autoconfigure results? [Y/N D:N]:
```

If you enter Yes, the configuration data obtained by Autoconfigure appears in the default fields of each question. You can then choose to use some of the Autoconfigure results (by pressing the RETURN key and by taking the default), or you can override the Autoconfigure results by entering a different response.

If you enter No, SYSGEN uses all the information Autoconfigure obtained to answer the questions in the Choosing Peripheral Configuration (CP) section. Questions about devices that Autoconfigure supports but did not find in your configuration are not asked. Questions about devices that Autoconfigure does not support are asked as usual.

If you are using both the Autoconfigure results and a saved answer file, the saved answer file responses take precedence over the Autoconfigure results.

For additional information on Autoconfigure, see Section 3.1.6.

```
* SU120   Do you want to do a complete SYSGEN? [Y/N D:Y]:
```

Every time you start SYSGEN, you have the following options:

- You can do a complete SYSGEN.
- You can continue a previous SYSGEN.
- You can do an individual section of SYSGEN.

A complete SYSGEN performs all the following sections of SYSGEN:

- Choosing SYSGEN Options (SU)
- Choosing Executive Options (CE)
- Choosing Peripheral Configuration (CP)
- Assembling the Executive and Drivers (AE)
- Building the Executive and Drivers (BE)
- Building the Privileged Tasks (BP)
- Rebuilding the Supplied System Tasks (BN)
- Creating the System Image File (CS)

If you are generating a new RSX–11M–PLUS system, you should enter Yes.

If you enter Yes, each section leads directly into the next section, and SYSGEN proceeds to Question CE010.

If you enter No, SYSGEN proceeds to Question SU130.

```
* SU130   Do you want to continue a previous SYSGEN from
*         some point? [Y/N D:Y]:
```

If you have an incomplete SYSGEN that you want to continue or if you want to redo part of a previous SYSGEN, you can start SYSGEN at any of the sections just listed. SYSGEN proceeds from that section to the end.

Note

Before you continue SYSGEN at a particular section, all previous sections must have been completed successfully.

If you enter Yes, SYSGEN proceeds to Question SU140.

If you enter No, SYSGEN proceeds to Question SU150.

```
* SU140   At which section would you like to restart SYSGEN? [S R:0-1]:
```

This question appears only if you entered Yes to Question SU130.

Enter the letter of the section at which you want to restart SYSGEN as follows:

A Choosing Executive Options (CE)

B Choosing Peripheral Configuration (CP)

C Assembling the Executive and Drivers (AE)

D Building the Executive and Drivers (BE)

E Building the Privileged Tasks (BP)

F Rebuilding the Supplied System Tasks (BN)

G Creating the System Image File (CS)

```
* SU150   Do you want to do any individual sections of SYSGEN? [Y/N D:Y]:
```

Instead of performing a complete SYSGEN or continuing a previous SYSGEN, you can specify individual sections of SYSGEN that you want to perform. You would perform only selected sections of the SYSGEN procedure if you wanted to add a new device to a previously generated system or if you wanted to create a new system image file. See Chapter 4 for further information on making changes to a system you have generated already.

Note that the SYSGEN sections must be done in order because each depends upon the output of the previous sections. Do not perform the sections out of order.

If you enter Yes, SYSGEN proceeds to Question SU160.

If you enter No, SYSGEN exits.

```
* SU160   Which sections would you like to do? [S R:0.-15.]:
```

This question appears only if you entered Yes to Question SU150.

Executive Options (CE)

Enter the letters (separated by commas) of the sections of SYSGEN you want to perform, as follows:

A Choosing Executive Options (CE)

B Choosing Peripheral Configuration (CP)

C Assembling the Executive and Drivers (AE)

D Building the Executive and Drivers (BE)

E Building the Privileged Tasks (BP)

F Rebuilding the Supplied System Tasks (BN)

G Creating the System Image File (CS)

H Adding a Device (AD)

3.2.2 Choosing Executive Options (CE)

The questions in this section pertain to the RSX–11M–PLUS Executive. You can assemble one of the following Executives:

- Full-functionality
- User-tailored

The Full-functionality Executive is the recommended choice because it includes all RSX–11M–PLUS Executive options. Selecting this Executive saves time (options are included automatically and questions do not appear) and ensures that important options are not inadvertently excluded.

The User-tailored Executive requires that you explicitly select the options for which you want support. Among these options are several that are required for optimum system performance. Select the User-tailored Executive only when specific applications require exclusion of an option.

Your answers to questions in this section are put in the saved answer file [200,200]SYSGENSA1.CMD.

The following pages describe all the possible questions in the Choosing Executive Options (CE) section.

```
* CE010   What is your target processor type? [S R:5.-12. D:"11/70"]:
```

Enter the processor type of the target system, choosing from the following list:

LSI–11/73
PDP–11/23–PLUS (Also called MicroPDP–11/23 and 11/23–B)
PDP–11/24
PDP–11/44
PDP–11/53 (Also called MicroPDP–11/53)
PDP–11/70
PDP–11/73 (Also called MicroPDP–11/73)
PDP–11/83 (Also called MicroPDP–11/83)
PDP–11/84

Executive Options (CE)

The processor type determines whether Executive data space and supervisor-mode library support can be included in the system. You can run an RSX–11M–PLUS system with Executive data space or supervisor-mode library support only on a PDP–11/44, PDP–11/70, MicroPDP–11/73, MicroPDP–11/83, or PDP–11/84 processor. You can run a system without this support on any of the specified processors.

```
* CE020   Do you want the Full-functionality Executive? [Y/N D:Y]:
```

Enter Yes to select an Executive that includes all the following RSX–11M–PLUS operating system options:

- Support for Executive data space and user data space (option is included in the Full-functionality Executive only if your processor contains hardware for instruction and data space, such as the PDP–11/44, PDP–11/70, MicroPDP–11/73, MicroPDP–11/83, and PDP–11/84)
- Support for supervisor-mode libraries (tasks linked to FCSFSL; PDP–11/44, PDP–11/70, MicroPDP–11/73, MicroPDP–11/83, and PDP–11/84)
- Tasks linked to FCSRES (MicroPDP–11/23, PDP–11/23–PLUS, and PDP–11/24 only)
- Fast-mapping facility
- Task headers out-of-pool support
- Extended logical name support
- All Digital-supplied drivers loadable
- Interrupt Control Block (ICB) pool size of 128 words
- Decimal version numbers in file specifications
- Shadow Recording (SHA) support
- Disk data caching
- Console driver support
- Resource Accounting support
- Batch processor support
- Queue Manager (QMG) for spooling
- DCL and alternate command line interpreter (CLI) support
- CTRL/C abort support
- High-performance file control processor (FCP)
- File windows in secondary pool
- Virtual terminal support (maximum virtual terminal unit buffer size is 184_{10} bytes; default virtual terminal unit buffer size is 120_{10} bytes)
- Character translation support
- Terminal driver extended I/O support

Executive Options (CE)

- Timeout on unsolicited terminal input after 30_{10} seconds

Enter No to select the User-tailored Executive. This option requires you to specify which Executive options you want to include in your system. Choosing this Executive is not recommended. Select this Executive only if your application demands that specific RSX–11M–PLUS options be excluded from the system.

If you enter Yes, SYSGEN proceeds to Question CE120.

If you enter No, SYSGEN proceeds to Question CE030.

```
* CE030   Do you want to reconsider your selection? [Y/N D:N]:
```

Enter Yes if, having read the previous descriptions and recommendations, you want to select the Full-functionality Executive. SYSGEN then proceeds to Question CE120.

If you enter No, SYSGEN proceeds to Question CE050.

```
* CE050   Do you want Executive data space support? [Y/N D:N]:
```

This question appears only if you selected the User-tailored Executive and if your target processor is a PDP–11/44, PDP–11/70, MicroPDP–11/73, MicroPDP–11/83, or PDP–11/84.

Enter Yes to generate an Executive with separate instruction and data space. (The hardware for instruction and data space separates code from data and maps the two separately).

Enter No if you do not want to include Executive data space support. The MicroPDP–11/23, PDP–11/23–PLUS, and PDP–11/24 processors do not contain hardware for instruction and data space; systems generated with software support for Executive data space will not run on these processors. Also, you should enter No if you need to generate a system that will run on both types of processors: those that cannot support instruction and data space (MicroPDP–11/23, PDP–11/23–PLUS, or PDP–11/24) and those that can support instruction and data space (PDP–11/44, PDP–11/70, MicroPDP–11/73, MicroPDP–11/83, or PDP–11/84).

This option significantly increases the available amount of system pool.

If you answer Yes, SYSGEN automatically includes support for supervisor-mode libraries. In addition, SYSGEN makes all Digital-supplied drivers and their databases loadable.

Note

In a system including Executive data space support, all drivers must be loadable. Therefore, if you want to include a resident, user-written driver, you must exclude this option by entering No.

```
* CE060   Do you want user data space support? [Y/N D:N]:
```

This question appears only if you selected the User-tailored Executive, your target processor is a PDP–11/44, PDP–11/70, MicroPDP–11/73, MicroPDP–11/83, or PDP–11/84, and you selected Executive data space support.

User data space support allows tasks to use the user-mode instruction and data space mapping hardware to map code and data separately.

```
* CE070   Do you want support for task headers out-of-pool? [Y/N D:N]:
```

This question appears only if you selected the User-tailored Executive.

Enter Yes to allow task headers to reside in physical memory outside of the dynamic storage region (pool), which increases the amount of pool available for other system functions.

Out-of-pool task headers are required for RTEM–11, the RT–11 emulator that runs under RSX–11M–PLUS. Note that RTEM–11 must be purchased and installed separately. Enter Yes if you intend to install RTEM–11 on your system.

```
* CE075   Do you want extended logical name support? [Y/N D:N]:
```

This question appears only if you selected the User-tailored Executive.

Enter Yes to include the directives to create, delete, and translate logical names into their equivalence strings. Extended logical name support also includes the directives used for parsing and merging file specifications into an expanded format or into data blocks compatible with File Control Services (FCS) or RMS–11.

Entering No results in an Executive that includes only the traditional RSX limited logical name support (the ability to assign logical names of the form ddnn: to devices).

Choosing extended logical name support decreases the amount of available secondary pool and affects system performance if a large number of logical names are defined.

```
* CE080   Do you want supervisor-mode library support? [Y/N D:N]:
```

This question appears only if you selected the User-tailored Executive and excluded Executive data space support and if your target processor is a PDP–11/44, PDP–11/70, MicroPDP–11/73, MicroPDP–11/83, or PDP–11/84.

Enter Yes to generate an Executive that can map large, pure libraries in supervisor space rather than in the user's address space. The *RSX–11M–PLUS and Micro/RSX Task Builder Manual* supplies details on using supervisor-mode libraries.

If you enter Yes, SYSGEN builds many of the privileged tasks to link to FCSFSL, the FCS supervisor-mode library. It also allows you to use the prebuilt supplied system tasks of the form xxxFSL.TSK that are supplied on the distribution kit. See Section 3.2.7.

```
* CE090   Do you want to use FCSRES, the FCS resident library? [Y/N D:N]:
```

This question appears only if you did not include support for supervisor-mode libraries or if you chose the User-tailored Executive and your processor is a PDP–11/23–PLUS, PDP–11/24, or MicroPDP–11/23.

FCSRES is a resident library of commonly used FCS routines. Tasks can be built to map to the FCS routines in this library instead of including the FCS routines in their task images. This saves physical memory, because the many separate copies of FCS routines that would occur in task images are replaced by a single, shared copy used by all tasks.

If you enter Yes, SYSGEN builds many of the privileged tasks to link to FCSRES. It also allows you to use the prebuilt supplied system tasks of the form xxxRES.TSK supplied on the distribution kit. For more information, see Section 3.2.7.

```
* CE094   Do you want support for the fast map facility? [Y/N D:N]:
```

This question appears only if you selected the User-tailored Executive.

Executive Options (CE)

Enter Yes to include an alternate interface to the memory management hardware, which is much faster than the memory management directives. You can use the fast-mapping facility to improve the performance of memory-resident overlaid tasks and FORTRAN tasks that use virtual arrays. The memory management directives are still included if you enter Yes.

```
* CE100   Do you want all Digital-supplied drivers and their databases
*         to be loadable? [Y/N D:N]:
```

This question appears only if you selected the User-tailored Executive and if you excluded Executive data space support. It applies only to Digital-supplied drivers (those provided with the RSX–11M–PLUS distribution kit). If you intend to include user-supplied drivers, you will be asked to specify whether each user-supplied driver and database is loadable or resident in the Choosing Peripheral Configuration (CP) section.

If you enter Yes, all Digital-supplied drivers and their databases are built as loadable.

If you enter No, you are asked to specify whether each driver and database is loadable or resident in the Choosing Peripheral Configuration (CP) section of SYSGEN.

```
* CE110   What is the ICB pool size (in words)? [D R:16.-1024. D:128.]:
```

This question appears only if you did not include Executive data space support.

For loadable drivers, the hardware cannot dispatch directly to an interrupt service routine in the driver. The driver is outside the Executive address space and therefore must be mapped before you use it. The code required initially to service an interrupt and dispatch to the proper driver resides in an Executive structure called the Interrupt Control Block (ICB). Thus, the interrupt vector for a controller serviced by a loadable driver points to an ICB rather than to the driver. See the *RSX–11M–PLUS and Micro/RSX Guide to Writing an I/O Driver* for details.

On a system without Executive data space, ICBs are allocated from the system pool. On a system with Executive data space, ICBs are allocated from a separate ICB pool. Your response to this question determines the minimum size of the ICB pool in the unsaved system image. When the unsaved system is saved, more space is automatically allocated to the ICB pool.

For every 16_{10} controllers of a given type, there must be one ICB, 8_{10} words long, that can be loaded in the unsaved system image.

The default response allocates 128_{10} words for ICB pool space. This amount is adequate for most systems and is the recommended response.

If you do not enter the default response, the acceptable range is from 16 to 1024_{10}.

```
* CE120   Do you want support for communications products
*         (such as DECnet, PSI,and LAT)? [Y/N D:N]:
```

Enter Yes if you intend to use DECnet, PSI, LAT, or other communications products. Refer to the specific product documentation for more information. Note that DECnet and other communications products must be purchased and installed separately.

If you enter Yes, DCL and alternate CLI support and Network Command Terminal (NCT) support is also included.

```
* CE130   What is the system name? [S R:0-6 D:"RSXMPL"]:
```

The system name is an arbitrary character string. It should be the same as the DECnet node name, if any. Enter an alphanumeric string of 6 or fewer characters to be used to identify your system.

```
* CE140   Do you want shadow recording support? [Y/N D:N]:
```

This question appears only if you selected the User-tailored Executive.

Shadow Recording (SHA) creates mirror images of disk volumes. For more information on Shadow Recording, see the *RSX–11M–PLUS and Micro/RSX System Management Guide.*

```
* CE145   Do you want disk data caching support? [Y/N D:N]:
```

This question appears only if you selected the User-tailored Executive.

Enter Yes to include support for disk data caching. Keep in mind that although disk data caching can improve disk I/O and overall system performance, it takes up space in memory and increases processor overhead. See the *RSX–11M–PLUS and Micro/RSX System Management Guide* for more information.

```
* CE150   Do you want console driver support? [Y/N D:N]:
```

This question appears only if you selected the User-tailored Executive.

Enter Yes to include support for the console driver. Console driver support provides a means of intercepting and logging console terminal messages. See the *RSX–11M–PLUS and Micro/RSX System Management Guide* for more information on the Console Output Task (COT) and the console driver.

```
* CE160   Do you want accounting support? [Y/N D:N]:
```

This question appears only if you selected the User-tailored Executive.

Enter Yes to include support for Resource Accounting. See the *RSX–11M–PLUS and Micro/RSX System Management Guide* for more information on Resource Accounting.

```
* CE170   Do you want to include the batch processor? [Y/N D:N]:
```

This question appears only if you selected the User-tailored Executive.

The batch processor (BPR) provides background processing of job streams.

If you enter Yes, the Queue Manager (QMG) and virtual terminal support are also included.

For more information on the batch processor, see the *RSX–11M–PLUS Batch and Queue Operations Manual.*

```
* CE180   Do you want to include the Queue Manager? [Y/N D:N]:
```

This question appears only if you selected the User-tailored Executive and you have not included the batch processor. If you included the batch processor, the Queue Manager (QMG) is automatically included and this question does not appear.

QMG provides for input and output spooling. For more information on QMG, see the *RSX–11M–PLUS Batch and Queue Operations Manual.*

```
* CE190   Do you want to include DCL and alternate CLI support? [Y/N D:N]:
```

Executive Options (CE)

This question appears only if you selected the User-tailored Executive and you did not include support for communications products. If you included support for communications products by entering Yes to Question CE120, DCL and alternate CLI support are automatically included and this question does not appear.

DCL is compatible among several Digital operating systems. Alternate CLI support allows you to include your own CLIs in your system. For information on DCL syntax, see the *RSX–11M–PLUS Command Language Manual*. The *RSX–11M–PLUS and Micro/RSX System Management Guide* contains a chapter on the DCL task and other information needed by users who want to write their own CLI.

```
* CE194   Do you want CTRL/C abort support? [Y/N D:N]:
```

This question appears only if you selected the User-tailored Executive.

CTRL/C abort support is a DCL feature that allows you to abort the task running at your terminal by pressing CTRL/C. You can turn this behavior on or off by using the DCL command SET TERMINAL/CONTROL=C. For more information on CTRL/C abort, see the *RSX–11M–PLUS Command Language Manual*.

This feature is not available through MCR; however, it is available through alternative CLIs.

```
* CE200   Which FCP do you want? [S R:1-6 D:"FCPLRG"]:
```

This question appears only if you selected the User-tailored Executive.

The following two versions of the Files–11 Ancillary Control Processor (F11ACP) are available on RSX–11M–PLUS:

- FCPMDL

  This is a 5K-word, overlaid file control processor (FCP), which provides good performance for systems with limited memory. It provides buffering for caching of directories and the bit map, as well as buffer space for about 20 open files. Also included are preaccessed directories, providing for minimum use of system pool.

- FCPLRG

  This is a 9K-word, nonoverlaid FCP, which provides maximum performance for F11ACP. Because it does not use overlays, it incurs no system overhead for executing any code sequence. FCPLRG has the maximum number of buffers for all operations, as well as a large directory buffer.

Both versions of F11ACP have the same software features. The default is FCPLRG.

```
* CE210   Do you want support for file windows in secondary pool? [Y/N D:N]:
```

This question appears only if you selected the User-tailored Executive.

Enter Yes to allow the FCP to put file windows in secondary pool instead of primary pool, which frees valuable primary pool space and reduces the likelihood of pool space problems.

```
* CE214   Do you want decimal version numbers in
*         file specifications? [Y/N D:N]:
```

This question appears only if you selected the User-tailored Executive.

This option determines whether version numbers in file specifications are treated as octal or decimal. If you answer No, version numbers will be in octal. If you answer Yes, version numbers will be in decimal.

File version numbers are stored on disk or tape in binary. This option does not affect how the files are stored. No matter how you answer this question, you can still access all versions of your files. This option affects only how you refer to the files and how the file specifications are displayed: either with octal or decimal version numbers.

```
* CE220   Do you want virtual terminal support? [Y/N D:N]:
```

This question appears only if you selected the User-tailored Executive and you did not include batch processor support. If you included batch processor support, virtual terminal support is automatically included and this question does not appear.

Virtual terminal support permits a parent task to simulate terminal I/O for an offspring task. See the *RSX–11M–PLUS and Micro/RSX Executive Reference Manual* for more information on virtual terminal support and the associated Executive directives.

```
* CE230   What is the default virtual terminal unit buffer
*         size? [D R:1.-512. D:120.]:
```

This question appears only if you selected the User-tailored Executive and you included batch processor support or virtual terminal support.

The Create Virtual Terminal (CRVT$) directive creates the data structure for a virtual terminal and links it to the device list. Directive parameters include asynchronous system trap (AST) addresses and the maximum buffer size allowed for offspring I/O requests. If you omit the maximum buffer length in the directive, it defaults to the value you specify in response to this question.

The acceptable range is from 1 to 512_{10}. The default is 120_{10}. See the *RSX–11M–PLUS and Micro/RSX Executive Reference Manual* for more information.

```
* CE240   What is the maximum virtual terminal unit buffer
*         size? [D R:1.-512. D:184.]:
```

This question appears only if you selected the User-tailored Executive and you included batch processor or virtual terminal support.

Enter the maximum buffer size that can be specified in a Create Virtual Terminal (CRVT$) directive.

The acceptable range is from 1 to 512_{10}. The default response is 184_{10}. See the *RSX–11M–PLUS and Micro/RSX Executive Reference Manual* for more information.

```
* CE250   Do you want character translation support? [Y/N D:N]:
```

This question appears only if you selected the User-tailored Executive.

Character translation support is a terminal driver option that allows you to select the translation to be performed between the character set used by your application and the character set used by your terminal. This feature allows applications that use the DEC Multinational Character Set to be used with terminals that support different national character sets.

Executive Options (CE)

You can use the translation routines supplied with RSX–11M–PLUS, or you can use your own. You can load different translation routines for each terminal in your system. If you enter Yes, you also get terminal driver extended I/O support.

```
* CE260   Enter unsolicited input timeout (in seconds) [D R:0.-255. D:30.]:
```

This question appears only if you selected the User-tailored Executive.

The full-duplex terminal driver discards unsolicited input when the timeout value that you specify expires. (The driver issues a CTRL/U.) The valid timeout range is from 0 to 255_{10}.

Enter 0 to inhibit the full-duplex terminal driver unsolicited input timeout feature. The default response is 30_{10} seconds.

```
* CE264   Do you want IP11 industrial I/O subsystem support? [Y/N D:N]:
```

The IP11 industrial I/O subsystem is a package combining hardware and software used for process control and monitoring in manufacturing and industry. It consists of an RSX device driver (IPDRV) and a set of FORTRAN-callable routines that are used to communicate with a variety of hardware I/O modules. See the *RSX–11M–PLUS and Micro/RSX I/O Operations Reference Manual* for more information on installing the software.

Enter Yes if you intend to use the IP11 subsystem hardware and software. If you enter Yes, SYSGEN proceeds to Question CE266.

If you enter No, SYSGEN proceeds to Question CE270.

```
* CE266   Do you want IP11 powerfail support? [Y/N D:N]:
```

This question appears only if you selected IP11 support by answering Yes to Question CE264.

Enter Yes to include IP11 powerfail support in the Executive.

You must include this support in the Executive before you can include powerfail support in the IP11 driver (IPDRV). Choosing this support adds approximately 40_8 bytes to the size of the Executive.

The IP11 subsystem can save the context of digital outputs and digital-to-analog (D/A) converters if system power fails and will restore the outputs when the power is restored. See the I/O operations documentation for more information.

```
* CE270   Do you want to include XDT? [Y/N D:N]:
```

The Executive Debugging Tool (XDT) provides a subset of ODT–11 commands for use in system state. If selected, XDT is included in the Executive. Including XDT allows interactive debugging of Executive modules, privileged tasks, I/O drivers, and interrupt service routines.

If you enter Yes, consistency check code is included in the dynamic memory allocation routines. Note that entering Yes reduces the amount of primary pool if your target processor is a PDP–11/23–PLUS, PDP–11/24, or MicroPDP–11/23 or if you did not include Executive data space support. If you included Executive data space support, XDT does not reduce the available amount of primary pool.

If you enter No, XDT support is not generated into your system. However, the loadable version of XDT can be used.

For more information on XDT, see the *RSX–11M–PLUS and Micro/RSX XDT Reference Manual* and the *RSX–11M–PLUS and Micro/RSX Guide to Writing an I/O Driver*.

```
* CE280    Enter the crash notification device CSR
*          address [O R:160000-177700 D:177564]:
```

If the system crashes, the Executive crash module issues a message at the selected device.

Enter the CSR address (the I/O page address of the transmitter register) for the crash notification device. The normal device is the console terminal, which has a CSR address of 177564_8. This is the default response. If you do not select the default, the acceptable range is from 160000 to 177700_8.

```
* CE290    On what device and unit do you want crash dumps
*          to be written? [S R:2-6]:
```

Enter the device mnemonic and the unit number of the device on which you want the Executive crash module to write memory dumps. Mnemonics of supported devices are DB, DD, DK, DL, DM, DT, DR, DU, MM, MS, MT, and MU. Enter both the device mnemonic and the unit number (for example, DK2: or MS0:).

The crash device must not be a fixed-medium device. For example, if you specify DU3 as the memory dump device and DU3 is an RA80 disk (a fixed-medium device), your system will not be able to perform a memory dump after crashing. The crash dump module will detect that DU3 is a fixed-medium device and will print an error message. SYSGEN cannot check to see whether DU3 is a fixed-medium device; it is your responsibility to ensure that the device you specify is not a fixed-medium device.

If possible, avoid using your system device as the memory dump device. If you must choose the system device as the memory dump device, always remember to replace the system disk with a blank disk before dumping memory to avoid destroying the system disk.

In addition, loadable crash dump support is available for DU-, DL-, MU-, MS-, and MM-type devices. Loadable crash dump support allows you to choose the crash device, to change the crash device, and to turn off crash dump support while the system is operating. (Refer to the *RSX–11M–PLUS and Micro/RSX Crash Dump Analyzer Reference Manual* for information on crash dump devices.)

You can select loadable crash dump support during system generation and choose a loadable crash driver during system startup. Also, for systems that have loadable crash dump support included, you can use either the DCL command SET SYSTEM/CRASH_DEVICE or the MCR command SET /CRASHDEV to change the crash dump or crash notification devices. The previous commands are valid for all RSX–11M–PLUS operating systems. Refer to the *RSX–11M–PLUS Command Language Manual* and the *RSX–11M–PLUS MCR Operations Manual* for more information on the commands.

If you want to include loadable crash dump support in your system, enter "XX:" in response to this question.

```
* CE310    Enter memory size (in K words) [D R:128.-1920. D:256.]:
```

Enter the amount of memory for your processor in 1024-word blocks. The legal range is from 128K to 1920K. The default response is 256_{10}.

Your answer to this question need not be precise. VMR uses this value when it creates the system image file; it does not allow you to create a partition or load anything in memory beyond the value you enter here. When the system is bootstrapped, the actual memory size is calculated and overrides this value.

```
* CE320   Do you want floating point processor support? [Y/N D:N]:
```

The PDP–11 Floating Point Processor performs all floating-point arithmetic operations and converts data from integer to floating-point format and vice versa.

If you enter Yes, the Executive dynamically determines whether the processor has a floating-point unit when the system is bootstrapped.

If you enter No, the Executive will not support a Floating Point Processor.

```
* CE330   Is your system clock programmable (KW11-P)? [Y/N D:N]:
```

RSX–11M–PLUS requires a real-time clock for operation. Three clocks are available: the KW11–P programmable frequency clock, the KW11–L line frequency clock, and the DL11–W line frequency clock/console.

Enter Yes if your system includes the KW11–P and you want to use this clock as your system clock. You must then specify the number of clock interrupts per second.

Enter No if your system does not include the KW11–P, or if your system includes a KW11–P but you do not want to use this clock as your system clock. You must then specify your local line frequency.

```
* CE340   What is the number of interrupts per second? [D R:1.-1000.]:
```

More than 100_{10} clock interrupts per second greatly increases system overhead; you should carefully consider the impact on your system before specifying more than 100_{10} interrupts per second.

Note

The number of interrupts you select must be divisible evenly into $10{,}000_{10}$.

```
* CE350   Is your line frequency 50 Hz? [Y/N D:N]:
```

You can specify a line frequency of either 50 hertz (Hz) (enter Yes) or 60 Hz (enter No or press the RETURN key). In the United States, line frequency is always 60 Hz.

3.2.3 Choosing Peripheral Configuration (CP)

The questions in this section describe the peripheral devices that can be included in your target configuration. The questions define unique hardware and software information that RSX–11M–PLUS uses to communicate with peripheral devices.

In this section, you enter device-dependent parameters that define addressing information as well as special attributes for the peripheral devices. Note that CON and VMR permit you to change vector and CSR assignments, which lessens the importance of precision in this section. The number and type of devices in the target configuration, however, remain critical.

Peripheral Configuration (CP)

If you do not know the correct CSR address for a particular device, specify a CSR address of 160000_8 for that device. CON ignores devices with this value; you can enter the correct address after SYSGEN by using the VMR or MCR command CON.

Appendix B lists the device names, controller names, and corresponding device and controller mnemonics for all RSX–11M–PLUS devices.

In the following questions, a particular controller is defined by and distinguished from other controllers of the same type by the following:

- The controller's CSR and vector address
- The devices that are connected to it

SYSGEN uses a 2-character controller mnemonic followed by a letter to designate a particular controller. For example, "RHA" designates a particular RH controller. The convention is that RHA is the first controller, RHB is the second controller, and so on.

The first controller is the first that you describe to SYSGEN. This is not necessarily the first controller in the hardware configuration. You can designate any controller as controller "A" as long as your use is consistent.

In this section, you will find a number of devices with similar characteristics referred to in a shorthand notation. For example, the term "RM02/03/05/80/RP07 disks" means the RM02, RM03, RM05, RM80, and RP07 disks.

Your answers to questions in this section are put in the saved answer file [200,200]SYSGENSA2.CMD.

The following pages describe all the possible questions in the Choosing Peripheral Configuration (CP) section.

```
* CP0604   How many RH controllers do you have? [D R:0.-15. D:4.]:
```

Enter the number of RH controllers in the target configuration.

The RH controller is the controller for the following device types:

DB RP04/05/06 disks

DR RM02/03/05/80/RP07 disks

DS RS03/04 disks

EM ML11 semiconductor disk emulator

MM TM02/03 and TU16/TE16/TU45/TU77 magnetic tapes

If you enter 0, the system cannot support DB-, DR-, DS-, EM-, or MM-type devices. If you enter a number greater than 0, SYSGEN asks device-specific questions for DB-, DR-, DS-, EM-, and MM-type devices. Note that, in these questions, you must specify the physical connection among the RH controllers and the devices. RSX–11M–PLUS uses the following names to distinguish the RH controllers:

- RHA (first)
- RHB (second)

- RHC (third)
- RHD (fourth)

SYSGEN requests the interrupt vector and CSR assignments for each RH controller after you have described the RH devices. This permits SYSGEN to apply a default interrupt vector and CSR address for each controller based on the attached devices. For example, the default interrupt vector for an RH controller servicing an RP04/05/06 disk subsystem is 254. The following is a list of the default interrupt vector and CSR addresses:

Device Type	Vector	CSR
DB	254	176700
DR	254	176700
DS	204	172040
EM	None	176400
MM	224	172440

If you specify a mixed MASSBUS configuration during the device-specific questions (for example, if you enter RHA as the controller for both DB- and MM-type devices), SYSGEN does not apply defaults for the vector and CSR assignments.

```
* CP0612   Do you want to generate a mixed MASSBUS configuration? [Y/N D:N]:
```

A mixed MASSBUS configuration has different device types on the same RH controller (for example, both DB-type and DR-type devices on RHA). If you choose to generate a mixed MASSBUS configuration, all the MASSBUS device databases will be resident.

Note that the device types differ in a mixed MASSBUS configuration. If you have an RP04 disk drive and an RP06 disk drive connected to the same controller, you do not have a mixed MASSBUS configuration because the RP04 and RP06 disk drives are both DB-type devices. See Appendix B for a list of RSX–11M–PLUS device names and types.

```
* CP0808   How many RP04/05/06 disk drives do you have? [D R:0.-63. D:0.]:
```

Enter the total number of RP04/05/06 disk drives in the target configuration. Each RH controller can support as many as eight RP04/05/06 disk drives.

```
* CP0820   Are any of the units dual-access? [Y/N D:N]:
```

RP04/05/06 disk drives can be connected to two controllers at one time; either controller can access the disk at the option of the system software. If your target configuration includes more than one RH controller, you must specify whether any of the DB-type devices are dual-access units.

```
* CP0836   What is the physical unit number of DBn:? [O R:0-7 D:n]:
```

Enter the physical unit number (found on the unit plug) for each RP04/05/06 disk drive.

```
* CP0840   Is DBn: a dual-access unit? [Y/N D:N]:
```

This question appears only if you indicated that your target system includes dual-access RP04/05/06 disk drives. Enter Yes to designate this drive as a dual-access unit.

```
* CP0844   To which RH controller is DBn: connected? [S R:1-1]:
```

RH controllers are named alphabetically: the first is RHA, the second is RHB, the third is RHC, and the fourth is RHD. Enter the RH controller name for each DB device. (Normally, all DB devices are on the same RH.)

If you designated DBn as a dual-access drive, this question does not appear and Question CP0848 appears instead.

```
* CP0848   To which RH controller is port n of DBn: connected? [S R:1-1]:
```

Enter the RH controller name for each port of the DB device.

```
* CP0860   Is DBn an RP04, RP05, or RP06? [S R:4-4 D:"RP06"]:
```

Enter the drive type for this drive. Note that for SYSGEN purposes, there is no difference between an RP04 and an RP05 disk drive.

```
* CP1008   How many RM02/03/05/80/RP07 disk drives do you
*          have? [D R:0.-63. D:0.]:
```

Enter the total number of RM02/03/05/80/RP07 disk drives in the target configuration. Each RH MASSBUS controller can support as many as eight disk drives.

```
* CP1020   Are any of the units dual-access? [Y/N D:N]:
```

This question appears if your target configuration includes more than one RH MASSBUS controller. Enter Yes if any of the units are dual-access.

The RM02/03/05/80/RP07 disk drives can be connected to two controllers at one time; either controller can access the disk at the option of the system software.

```
* CP1036   What is the physical unit number of DRn:? [O R:0-7 D:n]:
```

Enter the physical unit number (found on the unit plug) for each RM02/03/05/80/RP07 disk drive.

```
* CP1040   Is DRn: a dual-access unit? [Y/N D:N]:
```

This question appears only if you indicated that your target system includes dual-access RM02/03/05/80/RP07 disk drives. Enter Yes to designate this drive as a dual-access unit.

```
* CP1044   To which RH controller is DRn: connected? [S R:1-1]:
```

RH controllers are named alphabetically: the first is RHA, the second RHB, the third RHC, and the fourth RHD. Enter the RH controller name for each DR device. (Normally, all DR devices are on the same RH.)

If you designated DRn as a dual-access device, this question does not appear and Question CP1048 appears instead.

```
* CP1048   To which RH controller is port n of DRn: connected? [S R:1-1]:
```

If you designated DRn as a dual-access drive, you must specify the port connection of the device. Enter the controller connection for each port of the device.

```
* CP1060   Is DRn: an RM02, RM03, RM05, RM80, or RP07? [S R:4-4 D:"RP07"]:
```

Peripheral Configuration (CP)

Enter the drive type for this drive.

```
* CP1208   How many RS03/04 disk drives do you have? [D R:0.-63. D:0.]:
```

Enter the total number of RS03/04 disk drives in the target configuration. Each RH controller can support as many as eight RS03/04 disk drives.

```
* CP1236   What is the physical unit number of DSn:? [O R:0-7 D:n]:
```

Enter the physical unit number for each RS03/04 disk drive.

```
* CP1244   To which RH controller is DSn: connected? [S R:1-1]:
```

RH controllers are named alphabetically: the first is RHA, the second is RHB, the third RHC, and the fourth is RHD. Enter the RH controller name for each DS device. (Normally, all DS devices are on the same RH.)

```
* CP1260   Is DSn: an RS03 or RS04? [S R:4-4 D:"RS04"]:
```

Enter the drive type for this drive.

```
* CP1408   How many ML11 disks do you have? [D R:0.-63. D:0.]:
```

Enter the total number of ML11 semiconductor disk emulator units in the target configuration.

```
* CP1436   What is the physical unit number of EMn:? [O R:0-7 D:n]:
```

Enter the physical unit number for each ML11 unit.

```
* CP1444   To which RH controller is EMn: connected? [S R:1-1]:
```

RH controllers are named alphabetically: the first is RHA, the second is RHB, the third is RHC, and the fourth is RHD. Enter the RH controller name for each EM device. (Normally, all EM devices are on the same RH.)

```
* CP1608   How many TU16/45/77/TE16 tape drives do
*          you have? [D R:0.-n. D:0.]:
```

Enter the total number of TU16/45/77/TE16 magnetic tape drives in the target configuration. Each RH controller can support as many as 64_{10} magnetic tape drives. (The drives interface to the controller through a TM02/03 formatter.)

```
* CP1612   How many TM02/03 magtape formatters do you
*          have? [D R:1.-n. D:n.]:
```

Enter the number of TM02/03 magnetic tape formatters.

The TU16/45/77/TE16 magnetic tape subsystem interfaces to the RH controller through a TM02/03 formatter. Each formatter is connected to the RH controller as one physical unit, and, in turn, can support as many as eight drives (as many as four TU77 drives).

```
* CP1636   What is the physical unit number of the next
*          formatter? [O R:0-7 D:n]:
```

Enter the physical unit number for each TM02/03 formatter.

The physical unit number of a formatter is not determined by the easily visible white unit number plug (or other indicator) on the tape drive. Instead, the physical unit number of a formatter must be determined from the formatter itself. The TM02/03 formatter is usually located behind the lower front door of the first tape drive connected to the formatter (the "master" drive). The physical unit number of the formatter is indicated by the white unit number plug inserted into it.

```
* CP1644   To which RH controller is MMn: connected? [S R:1-1]:
```

RH controller names increment alphabetically: the first is RHA, the second is RHB, the third is RHC, and the fourth is RHD. Enter the RH controller name for each formatter. (Normally, all TM02/03 formatters are on the same RH.)

```
* CP1652   How many tape drives are attached to this
*          formatter? [D R:1.-n. D:n.]:
```

Enter the number of MM drives physically connected to this formatter.

```
* CP1656 What is the physical unit number of MMn:? [O R:0-7 D:n]:
```

Enter the physical unit number of this tape drive on its formatter. This is the number that appears on the unit number plug or on the thumbwheel switch located on the front of the tape drive.

If you have eight or fewer magnetic tape drives (four or fewer TU77 drives), for convenience you should make the physical unit numbers match the LUNs.

Note

Only four TU77 drives are allowed on a formatter. Therefore, TU77 drives cannot have physical unit numbers greater than 3. SYSGEN cannot tell if you have TU77 drives and so does not detect the error if you specify physical unit numbers greater than 3 for TU77 drives. Those tape drives will not be usable in the resulting system.

```
* CP2068   Enter the vector address of RHx [O R:60-774 D:n]:
```

Enter the interrupt vector address for each RH controller. The acceptable range is from 60 to 774_8.

```
* CP2072   What is its CSR address? [O R:160000-177700 D:n]:
```

Enter the CSR address for each RH controller. The acceptable range is from 160000 to 177700_8.

```
* CP2204   How many RK11 cartridge disk controllers do you have? [O D:0]:
```

Enter the number of RK11 disk controllers in the target configuration.

The RK11 is the controller for the RK05 disk subsystem. Each RK11 controller can serve as many as eight RK05 removable-cartridge drives or four RK05F fixed-platter drives.

```
* CP2208   How many RK05F fixed platter drives do you have? [O D:0]:
```

Enter the number of RK05F fixed-platter drives in the target configuration. The RK05F uses a double-density, fixed-platter drive and interfaces to the RK11 such that it appears as two RK05 drives.

Peripheral Configuration (CP)

Note

Enter the actual number of RK05F drives. Do not multiply the number by 2.

```
* CP2216   How many RK05 removable cartridge drives do you have? [O D:0]:
```

Enter the number of RK05 removable-cartridge drives in the target configuration.

```
* CP2232   Is DKn: an RK05 or RK05F? [S R:4-5 D:"RK05"]:
```

This question appears only if your system includes both fixed-platter (RK05F) and removable-cartridge (RK05) drives.

Enter the drive type for this drive.

```
* CP2236   What is the physical unit number of DKn:? [O R:0-7 D:n]:
```

Enter the physical unit number for each drive. Note that the physical unit number for an RK05F must be even (that is, 0, 2, 4, or 6).

```
* CP2244   To which DK controller is DKn: connected? [S R:1-1]:
```

This question appears only if the target configuration includes two or more RK11 controllers.

Enter the controller name to which each unit is physically connected. Note that RK11 controller names are of the form DKx, where x is a character from the Digital standard alphabet (the Digital alphabet omits G, I, O, and Q for clarity).

```
* CP2268   Enter the vector address of DKx [O R:60-774 D:220]:
```

Enter the interrupt vector address for each RK11 controller. The acceptable range is from 60 to 774_8. The default value for the first RK11 (DKA) is 220_8.

Subsequent RK11 controllers do not have a default for the interrupt vector address; therefore, you must enter a value within the acceptable range.

```
* CP2272   What is its CSR address? [O R:160000-177700 D:177404]:
```

Enter the CSR address for each RK11 controller. The acceptable range is from 160000 to 177700_8. The default value for the first RK11 (DKA) is 177404_8.

Note

Unlike the CSR for most devices, the CSR for the RK11/RK05 is not the first of the device registers. The CSR is the third device register (offset 4 from the beginning of the device registers). Therefore, be careful when specifying the CSR addresses for these devices. For example, if the first RK11 controller is listed at 177400_8, the CSR address is 177404_8.

If you enter the wrong CSR address, you can correct it after SYSGEN by using the VMR or MCR command CON.

Subsequent RK11 controllers do not have a default for the CSR address; therefore, you must enter a value within the acceptable range.

```
* CP2404   How many RK611/711 disk cartridge controllers do
*          you have? [O D:0]:
```

Enter the number of RK611/711 disk controllers in the target configuration.

Peripheral Configuration (CP)

The RK611/711 is the controller for the RK06/07 disk subsystem. Each RK611/711 controller can serve as many as eight RK06/07 disk drives.

```
* CP2408   How many RK06/RK07 disk drives do you have? [D R:1.-63. D:1.]:
```

Enter the total number of RK06/07 disk drives in the target configuration.

```
* CP2420   Are any of the units dual-access? [Y/N D:N]:
```

The RK06/07 disk drives can be connected to two RK611/711 controllers at one time; either controller can access the disk at the option of the system software. If your target configuration includes more than one RK611/711 controller, you must specify whether any of the RK06/07 units are dual-access.

```
* CP2436   What is the physical unit number of DMn:? [O R:0-7 D:n]:
```

Enter the physical unit number for each RK06/07 disk drive.

```
* CP2440   Is DMn: a dual-access unit? [Y/N D:N]:
```

This question appears only if you indicated that your target system included dual-access RK06/07 disk drives.

Enter Yes to designate this drive as a dual-access unit.

```
* CP2444  To which DM controller is DMn: connected? [S R:1-1]:
```

This question appears only if the target configuration includes two or more RK611/711 controllers.

Enter the controller name to which each unit is physically connected. Note that RK611/711 controller names are of the form DMx, where x is a character from the Digital standard alphabet (the Digital alphabet omits G, I, O, and Q for clarity).

If you designated DMn as a dual-access device, this question does not appear and Question CP2448 appears instead.

```
* CP2448  To which DM controller is port n of DMn: connected? [S R:1-1]:
```

Enter the name of the controller to which each port is physically connected.

```
* CP2460  Is DMn: an RK06 or RK07? [S R:4-4 D:"RK07"]:
```

Enter the drive type for this drive.

```
* CP2468  Enter the vector address of DMx [O R:60-774 D:210]:
```

Enter the interrupt vector address for each RK611/711 controller. The acceptable range is from 60 to 774_8. The default value for the first RK611/711 controller (DMA) is 210_8.

Subsequent RK611/711 controllers do not have a default for the interrupt vector address; therefore, you must enter a value within the acceptable range.

```
* CP2472  What is its CSR address? [O R:160000-177700 D:177440]:
```

Enter the CSR address for each RK611/711 controller. The acceptable range is from 160000 to 177700_8. The default value for the first RK611/711 controller (DMA) is 177440_8.

Peripheral Configuration (CP)

Subsequent RK611/711 controllers do not have a default for the CSR address; therefore, you must enter a value within the acceptable range.

```
* CP2604  How many RL11/RLV11 disk cartridge controllers do
*         you have? [O D:0]:
```

Enter the number of RL11/RLV11 disk controllers in the target configuration.

The RL11/RLV11 controller is the controller for the RL01/RL02 disk subsystem. Each RL11/RLV11 controller can serve as many as four RL01/RL02 disk drives.

```
* CP2608  How many RL01/RL02 disk drives do you have? [D R:1.-63. D:1.]:
```

Enter the total number of RL01/RL02 disk drives in the target configuration.

```
* CP2636  What is the physical unit number of DLn:? [O R:0-7 D:n]:
```

Enter the physical unit number for each RL01/RL02 disk drive.

```
* CP2644  To which DL controller is DLn: connected? [S R:1-1]:
```

This question appears only if the target configuration includes two or more RL11/RLV11 controllers.

Enter the controller name to which each unit is physically connected.

```
* CP2660  Is DLn: an RL01 or RL02? [S R:4-4 D:"RL02"]:
```

Enter the drive type for this drive.

```
* CP2668  Enter the vector address of DLx [O R:60-774 D:160]:
```

Enter the interrupt vector address for each RL11/RLV11 disk controller. The acceptable range is from 60 to 774_8. The default value for the first controller (DLA) is 160_8.

Subsequent RL11/RLV11 disk controllers do not have a default for the interrupt vector address; therefore, you must enter a value within the acceptable range.

```
* CP2672  What is its CSR address? [O R:160000-177700 D:174400]:
```

Enter the CSR address for each RL11/RLV11 disk controller. The acceptable range is from 160000 to 177700_8. The default CSR address for the first RL11/RLV11 controller (DLA) is 174400_8.

Subsequent RL11/RLV11 disk controllers do not have a default for the CSR address; therefore, you must enter a value within the acceptable range.

```
* CP2804  How many RP11 disk pack controllers do you have? [O D:0]:
```

Enter the number of RP11 disk controllers in the target configuration.

The RP11 is the controller for the RP02/RPR02/RP03 disk subsystem. Each RP11 controller can serve as many as eight RP02/RPR02/RP03 disk drives.

```
* CP2808  How many RP02/RPR02/RP03 disk drives do you
*         have? [D R:1.-63. D:1.]:
```

Enter the total number of RP02/RPR02/RP03 disk drives in the target configuration.

```
* CP2836  What is the physical unit number of DPn:? [O R:0-7 D:n]:
```

Enter the physical unit number for each RP02/RPR02/RP03 disk drive.

```
* CP2844  To which DP controller is DPn: connected? [S R:1-1]:
```

This question appears only if the target configuration includes two or more RP11 controllers.

Enter the controller name to which each unit is physically connected. Note that RP11 controller names are of the form DPx, where x is a character from the Digital standard alphabet (the Digital alphabet omits G, I, O, and Q for clarity).

```
* CP2860  Is DPn: an RP02, RPR02, or RP03? [S R:4-5 D:"RP03"]:
```

Enter the drive type for this drive. Note that for SYSGEN purposes, there is no difference between an RP02 and an RPR02 disk drive.

```
* CP2868  Enter the vector address of DPx [O R:60-774 D:254]:
```

Enter the interrupt vector address for each RP11 controller. The acceptable range is from 60 to 774_8. The default value for the first RP11 controller (DPA) is 254_8.

Subsequent RP11 controllers do not have a default for the interrupt vector address; therefore, you must enter a value within the acceptable range.

```
* CP2872  What is its CSR address? [O R:160000-177700 D:176714]:
```

Enter the CSR address for each RP11 controller. The acceptable range is from 160000 to 177700_8. The default value for the first RP11 controller (DPA) is 176714_8.

Subsequent RP11 controllers do not have a default for the CSR address; therefore, you must enter a value within the acceptable range.

```
* CP3004  How many MSCP disk controllers do you have? [D R:0.-10. D:0.]:
```

Enter the total number of Mass Storage Control Protocol (MSCP) disk controllers in your target configuration.

The RQDX1, RQDX2, RQDX3, RUX50, RQC25, RUC25, KDA50, and UDA50 are MSCP controllers; all the MSCP devices listed in the description following Question CP3008 use an MSCP controller.

The maximum total of MSCP and Tape Mass Storage Control Protocol (TMSCP) controllers combined is 10_{10}. For example, if you specify eight MSCP controllers in response to this question, you can specify only two TMSCP controllers in response to question CP3404.

If you enter 0 or take the default, SYSGEN proceeds to Question CP3404. Otherwise, SYSGEN proceeds to Question CP3008.

```
* CP3008  How many MSCP disk drives do you have? [D R:1.-n. D:1.]:
```

Enter the total number of MSCP disk drives in your target configuration. The following are MSCP disk drives:

RX33
RX50
RD51
RD52
RD53
RD54

Peripheral Configuration (CP)

RC25
RA60
RA70
RA80
RA81
RA82
RA90

The RX33 is a half-height, 5.25-inch, single flexible diskette drive with a formatted capacity of 1.2 megabytes (Mb).

The RX50 contains two 5.25-inch diskette drives; each has a formatted capacity of 400_8 kilobytes (Kb). You should count each RX50 unit (with two diskette drives) as two drives.

The RD51 is a 5.25-inch fixed disk with a formatted capacity of 10Mb. The RD52, RD53, and RD54 are similar, except that the RD52 has a formatted capacity of 31Mb, the RD53 has a formatted capacity of 71Mb, and the RD54 has a formatted capacity of 159Mb.

The RC25 contains both a fixed and a removable disk; both disks mount on the same drive spindle. Each disk has a formatted capacity of 25Mb. You should count each RC25 unit (with two disks: one fixed, one removable) as two drives.

The RA60 is a removable disk drive with a formatted capacity of 205Mb.

The RA70 is a fixed media, Winchester technology disk with a formatted capacity of 280Mb.

The RA80 is a fixed disk with a formatted capacity of 121Mb.

The RA81 is a fixed disk with a formatted capacity of 456Mb.

The RA82 is a fixed disk with a formatted capacity of 622Mb.

The RA90 is a fixed media, Winchester technology disk with a formatted capacity of 1216Mb.

```
* CP3034  What is the device type of DUn:?
```

This question occurs for each DU device. DUn: may be DU0: DU1: etc.

Enter a valid device type. If you enter an invalid device type, the following message is produced:

```
; 'TYPE' is not a valid device type.  The valid device types are:
; RX33, RX50, RD51, RD52, RD53, RD54, RC25, RA60, RA70,
;       RA80, RA81, RA82, RA90
;
```

(where 'TYPE' is the response that you gave)

```
* CP3036  What is the physical unit number of DUn:? [0 R:0-377 D:n]:
```

Enter the physical unit number for each MSCP drive.

The physical unit number of a drive is the number shown on the unit number plug (or other indicator) on the drive. All MSCP devices are DU-type devices.

```
* CP3044  To which DU controller is DUn: connected? [S R:1-1]:
```

This question appears only if the target configuration includes two or more MSCP controllers.

Enter the controller name to which each unit is physically connected.

```
* CP3068  Enter the vector address of DUx [O R:60-774 D:154]:
```

Enter the interrupt vector address for each MSCP controller. The acceptable range is from 60 to 774_8. The default value for the first MSCP controller (DUA) is 154_8.

Subsequent MSCP controllers do not have a default for the interrupt vector address; therefore, you must enter a value within the acceptable range.

```
* CP3072  What is its CSR address? [O R:160000-177700 D:172150]:
```

Enter the CSR address for each MSCP controller. The acceptable range is from 160000 to 177700_8. The default value for the first MSCP controller (DUA) is 172150_8.

Subsequent MSCP controllers do not have a default for the CSR address; therefore, you must enter a value within the acceptable range.

```
* CP3404  How many TMSCP tape controllers do you have? [D R:0.-10. D:0.]:
```

Enter the number of TMSCP tape controllers in your target configuration. The TK50 magnetic tape cartridge and the TU81 magnetic tape drives both use TMSCP controllers; each controller controls one MU-type unit.

The maximum number of MSCP and TMSCP controllers combined is 10_{10}. For example, if you specify four MSCP controllers in response to question CP3004, you can specify only six TMSCP controllers in response to this question.

If you enter 0 or take the default, SYSGEN proceeds to Question CP4004. Otherwise, SYSGEN proceeds to Question CP3436.

```
* CP3436 What is the physical unit number of MUx [O R:0-377 D:0]
```

The physical unit number is set and indicated for each drive by a plug or switch. It is usually set to 0, but it may be set to another value for some systems. You must specify the physical unit number only for the units on your system that are set to a value other than 0.

```
* CP3468  Enter the vector address of MUx [O R:60-774 D:260]:
```

Enter the interrupt vector address for each TMSCP controller. The acceptable range is from 60 to 774_8. The default value for the first TMSCP controller (DUA) is 260_8.

Subsequent TMSCP controllers do not have a default for the interrupt vector address; therefore, you must enter a value within the acceptable range.

```
* CP3472  What is its CSR address? [O R:160000-177700 D:174500]:
```

Enter the CSR address for each TMSCP controller. The acceptable range is from 160000 to 177700_8. The default value for the first TMSCP controller (MUA) is 174500_8.

Subsequent TMSCP controllers do not have a default for the CSR address; therefore, you must enter a value within the acceptable range.

```
* CP4004  How many CM/CR11 card readers do you have? [O D:0]:
```

Peripheral Configuration (CP)

Enter the number of CM/CR11 card readers in the target configuration. (The card reader controllers do not support multiple units per controller.)

If you enter a value greater than 0, you must specify the timeout interval, the interrupt vector address, and the CSR address for each controller.

```
* CP4008  Enter the number of seconds between
*         card reader-not-ready messages [D R:0.-255. D:15.]:
```

Enter the number of seconds you want the system to wait between card-reader-not-ready messages. The Task Termination and Notification program (TKTN) prints the messages at the console terminal. The acceptable range is from 0 to 255_{10}. The default response prints card-reader-not-ready messages every 15 seconds.

To suppress the messages, enter 0.

```
* CP4068  Enter vector address of the next CM/CR11 [O R:60-774 D:230]:
```

Enter the interrupt vector address for each CM/CR11 card reader controller. The acceptable range is from 60 to 774_8. The default value for the first controller is 230_8.

Subsequent CM/CR11 controllers do not have a default for the interrupt vector address; therefore, you must enter a value within the acceptable range.

```
* CP4072  What is its CSR address? [O R:160000-177700 D:177160]:
```

Enter the CSR address for each CM/CR11 card-reader controller. The acceptable range is from 160000 to 177700_8. The default value for the first controller is 177160_8.

Subsequent CM/CR11 controllers do not have a default for the CSR address; therefore, you must enter a value within the acceptable range.

```
* CP4204  How many TA11 dual cassettes do you have? [O D:0]:
```

Enter the number of TA11 dual-drive magnetic tape cassette systems in the target configuration. If you enter a value greater than 0, you must specify the interrupt vector address and the CSR address for each controller.

```
* CP4268  Enter vector address of the next TA11 [O R:60-774 D:260]:
```

Enter the interrupt vector address for each TA11 cassette system. The acceptable range is from 60 to 774_8. The default value for the first TA11 system is 260_8.

Subsequent TA11 cassette controllers do not have a default for the interrupt vector address; therefore, you must enter a value within the acceptable range.

```
* CP4272  What is its CSR address? [O R:160000-177700 D:177500]:
```

Enter the CSR address for each TA11 cassette system. The acceptable range is from 160000 to 177700_8. The default value for the first system is 177500_8.

Subsequent TA11 cassette controllers do not have a default for the CSR address; therefore, you must enter a value within the acceptable range.

```
* CP4404  How many TS11/TU80/TSV05/TK25
*         magtape controllers do you have? [O D:0]:
```

Enter the number of TS11/TU80/TSV05/TK25 magnetic tape controllers in the target configuration.

If you enter a value greater than 0, you must specify the interrupt vector address and the CSR address for each controller.

```
* CP4468  Enter vector address of the next
*         TS11/TU80/TSV05/TK25 [O R:60-774 D:224]:
```

Enter the interrupt vector address for each TS11/TU80/TSV05/TK25 magnetic tape controller. The acceptable range is from 60 to 774_8. The default value for the first controller is 224_8.

Subsequent TS11/TU80/TSV05/TK25 controllers do not have a default for the interrupt vector address; therefore, you must enter a value within the acceptable range.

```
* CP4472  What is its CSR address? [O R:160000-177700 D:172522]:
```

Enter the CSR address for each TS11/TU80/TSV05/TK25 magnetic tape controller. The acceptable range is from 160000 to 177700_8. The default CSR address for the first controller is 172522_8.

Subsequent TS11/TU80/TSV05/TK25 magnetic tape controllers do not have a default for the CSR address; therefore, you must enter a value within the acceptable range.

```
* CP4604  How many TC11 DECtape controllers do you have? [O D:0]
```

The TC11 is the controller for the TU56 DECtape subsystem. Each TC11 controller can serve a maximum of four dual-transport DECtape drives.

Enter the number of TC11 DECtape controllers in the target configuration.

If you enter a value greater than 0, you must specify the interrupt vector address, the CSR address, and the number of TU56 drives for each controller.

```
* CP4668  Enter vector address of the next TC11 [O R:60-774 D:214]:
```

Enter the interrupt vector address for each TC11 DECtape controller. The acceptable range is from 60 to 774_8. The default value for the first controller is 214_8.

Subsequent TC11 DECtape controllers do not have a default for the interrupt vector address; therefore, you must enter a value within the acceptable range.

```
* CP4672  What is its CSR address? [O R:160000-177700 D:177342]:
```

Enter the CSR address for each TC11 DECtape controller. The acceptable range is from 160000 to 177700_8. The default CSR address for the first TC11 controller is 177342_8.

Subsequent TC11 DECtape controllers do not have a default for the CSR address; therefore, you must enter a value within the acceptable range.

```
* CP4676  How many drives does DTx have? [D R:1.-8. D:2.]:
```

Enter the number of TU56 drives on the controller. The acceptable range is from 1 to 8.

Each TC11 DECtape controller supports as many as four dual-transport TU56 drives.

```
* CP4804  How many RX11 disk controllers do you have? [O D:0]:
```

The RX11 is the controller for the RX01 diskette system. Each RX11 controller can serve as many as two RX01 diskette drives.

Peripheral Configuration (CP)

Enter the number of RX11 diskette controllers in the target configuration. If you enter a value greater than 0, you must specify the interrupt vector address, the CSR address, and the number of RX01 drives for each controller.

```
* CP4868  Enter vector address of the next RX11 [O R:60-774 D:264]:
```

Enter the interrupt vector address for each RX11 diskette controller. The acceptable range is from 60 to 774_8. The default value for the first RX11 controller is 264_8.

Subsequent RX11 diskette controllers do not have a default for the interrupt vector address; therefore, you must enter a value within the acceptable range.

```
* CP4872  What is its CSR address? [O R:160000-177700 D:177170]:
```

Enter the CSR address for each RX11 diskette controller. The acceptable range is from 160000 to 177700_8. The default CSR address for the first RX11 controller is 177170_8.

Subsequent RX11 diskette controllers do not have a default for the CSR address; therefore, you must enter a value within the acceptable range.

```
* CP4876  How many drives does DXx have? [D R:1.-2. D:2.]:
```

Enter the number of RX01 drives on the controller. The acceptable range is from 1 to 2.

Each RX11 diskette controller supports as many as two RX01 diskette drives.

```
* CP5004  How many RX211/RXV21 diskette controllers do you have? [O D:0]:
```

Enter the number of RX211/RXV21 diskette controllers in the target configuration.

The RX211/RXV21 diskette controller is the controller for the dual-density (single or double density) RX02 diskette system. Each RX211/RXV21 diskette controller can serve as many as two RX02 diskette drives.

If you enter a value greater than 0, you must specify the interrupt vector address, the CSR address, and the number of RX02 diskette drives for each controller.

```
* CP5068  Enter vector address of the next RX211/RXV21 [O R:60-774 D:264]:
```

Enter the interrupt vector address for each RX211/RXV21 diskette controller. The acceptable range is from 60 to 774_8. The default value for the first RX211/RXV21 controller is 264_8.

Subsequent RX211/RXV21 diskette controllers do not have a default for the interrupt vector address; therefore, you must enter a value within the acceptable range.

```
* CP5072  What is its CSR address? [O R:160000-177700 D:177170]:
```

Enter the CSR address for each RX211/RXV21 diskette controller. The acceptable range is from 160000 to 177700_8. The default CSR address for the first RX211 controller is 177170_8.

Subsequent RX211/RXV21 diskette controllers do not have a default for the CSR address; therefore, you must enter a value within the acceptable range.

```
* CP5076  How many drives does DYx have? [D R:1.-2. D:2.]:
```

Enter the number of RX02 drives on the controller. The acceptable range is from 1 to 2.

Each RX211/RXV21 diskette controller supports as many as two RX02 diskette drives.

```
* CP5204  How many TU58 controllers do you have? [O D:0]:
```

Enter the number of TU58 DECtape II controllers in the target configuration.

The TU58 is the controller for the DECtape II subsystem. Each TU58 controller can serve as many as two DECtape II drives.

If you enter a value greater than 0, you must specify the interrupt vector address, the CSR address, and the number of DECtape II drives for each TU58 controller.

```
* CP5268  Enter vector address of next TU58 [O R:60-774 D:300]:
```

Enter the interrupt vector address for each TU58 DECtape II controller. The acceptable range is from 60 to 774_8. The default value for the first controller is 300_8.

Subsequent TU58 DECtape II controllers do not have a default for the interrupt vector address; therefore, you must enter a value within the acceptable range.

```
* CP5272  What is its CSR address? [O R:160000-177700 D:176500]:
```

Enter the CSR address for each TU58 DECtape II controller. The acceptable range is from 160000 to 177700_8. The default CSR address for the first TU58 controller is 176500_8.

Subsequent TU58 DECtape II controllers do not have a default for the CSR address; therefore, you must enter a value within the acceptable range.

```
* CP5276  How many drives does DDx have? [D R:1.-2. D:2.]:
```

Enter the number of DECtape II drives on the controller. The acceptable range is from 1 to 2.

Each TU58 DECtape II controller can support as many as two DECtape II drives.

```
* CP5404  How many LP/LS/LV11/LA180 line printers do you have? [O D:0]:
```

Enter the number of line printer controllers in the target configuration.

If you enter a value greater than 0, you must specify the timeout interval (for printer-not-ready messages), the interrupt vector address, the CSR address, and the line printer type.

```
* CP5408  Enter the number of seconds between
*         line printer-not-ready messages [D R:0.-255. D:15.]:
```

Enter the number of seconds you want the system to wait between line-printer-not-ready messages. (TKTN prints the messages at the console terminal.) The acceptable range is from 0 to 255_{10}. The default response prints line-printer-not-ready messages every 15 seconds.

To suppress the messages, enter 0.

```
* CP5468  Enter vector address of the next line
*         printer [O R:60-774 D:200]:
```

Enter the interrupt vector address for each line printer controller. The acceptable range is from 60 to 774_8. The default value for the first controller is 200_8.

Peripheral Configuration (CP)

Subsequent line printer controllers do not have a default for the interrupt vector address; therefore, you must enter a value within the acceptable range.

```
* CP5472  What is its CSR address? [O R:160000-177700 D:177514]:
```

Enter the CSR address for each line printer controller. The acceptable range is from 160000 to 177700_8. The default value for the first controller is 177514_8.

Subsequent line printer controllers do not have a default for the CSR address; therefore, you must enter a value within the acceptable range.

```
* CP5480  Enter line printer type for LPx [S R:4-5 D:"LP25"]:
```

The following is a table of the valid line printer types and their characteristics:

Printer Type	Controller	No. of Columns	Lines per Minute	Supports Optimization
LA180	LA180	132	150	No
LA210	LA210	132	90	N/A
LG01	LG01[1]	N/A	600	N/A
LG02	LG02[1]	N/A	600	N/A
LN01	LN01	132	600	N/A
LP01	LP11–F/H	80	170–1110	Yes
LP02	LP11–J/K	132	170–1110	Yes
LP04	LP11–R/S	132	1110	Yes
LP05	LP11–V/W	132	300	No
LP06	LP11–Y/Z	132	460–600	No
LP07	LP11–G	132	1200	No
LP14	LP11–C/D	132	660–900	No
LP25	LP11–A/B	132	215–300	No
LP26	LP11–E	132	445-600	No
LP27	LP11–U	132	800–1200	No
LS11	LS11	132	60–200	No
LV01	LV11	132	500	Yes

[1]The LG01 includes either a serial or a parallel interface. The LG02 includes both serial and parallel interfaces, which are selectable from the printer control panel. Only parallel interface is supported as an LP: device. Serial interface is supported only as a receive-only TT: device.

The printer type is used to set the following two characteristics in the Unit Control Block (UCB):

- Column or buffer width

You can set this characteristic in VMR or MCR with the SET /BUF command.

- Fast line printer support

  This support allows the driver to eliminate unnecessary print cycles. You cannot set this characteristic in VMR or MCR. Fast line printer support does not apply to the LN01 printer.

  If you specify the wrong printer type and the driver does not support fast line printing, you may occasionally lose a line of a listing when the printer is taken off line or you might cause the printer to run a little more slowly, but there will be no other adverse effects.

If you do not know the correct printer type for your printer, take the default. This will give you a 132-column printer without fast line printer support. Once your system is running, you can change the number of columns, if necessary, with the MCR command SET.

```
* CP5484  Does LPx have lowercase characters? [Y/N D:N]:
```

Enter Yes if your line printer has both uppercase and lowercase characters. If it only has uppercase characters, enter No.

Your answer determines the initial setting for lowercase character conversion on this printer. You can change this setting at any time by using the MCR command SET /LOWER.

```
* CP5604  How many TM/TMA/TMB11 magtape controllers do you have? [O D:0]:
```

Enter the number of TM11 magnetic tape controllers in the target configuration.

The TM11 magnetic tape controller is the controller for the TU10, TU10W, TE10, and TS03 tape drives. Each TM11 controller can serve as many as eight tape drives.

If you enter a value greater than 0, you must specify the interrupt vector address, the CSR address, and the number of tape drives for each controller.

```
* CP5668  Enter vector address of the next
*         TM/TMA/TMB11 [O R:60-774 D:224]:
```

Enter the interrupt vector address for each TM11 magnetic tape controller. The acceptable range is from 60 to 774_8. The default value for the first controller is 224_8.

Subsequent TM11 controllers do not have a default for the interrupt vector address; therefore, you must enter a value within the acceptable range.

```
* CP5672  What is its CSR address? [O R:160000-177700 D:172522]:
```

Enter the CSR address for each TM11 magnetic tape controller. The acceptable range is from 160000 to 177700_8. The default CSR address for the first TM11 controller is 172522_8.

Subsequent TM11 controllers do not have a default for the CSR address; therefore, you must enter a value within the acceptable range.

```
* CP5676  How many drives does MTx have? [D R:1.-8. D:1.]:
```

Enter the number of magnetic tape drives on the controller. The acceptable range is from 1 to 8.

Peripheral Configuration (CP)

Each TM11 controller can support as many as eight TU10, TU10W, TE10, or TS03 magnetic tape drives.

```
* CP5804  How many PC11 paper tape reader/punches do you have? [O D:0]:
```

Enter the number of PC11 paper tape reader/punches in the target configuration.

If you enter a value greater than 0, you must specify the interrupt vector address and the CSR address for each PC11 paper tape controller.

In your generated system, a PC11 paper tape reader/punch is treated as two separate devices, a paper tape punch (PP) and a paper tape reader (PR). For example, if you have one PC11 and one PR11 paper tape reader, your resulting system will have one PP device in it and two PR devices. The one PP and the first PR represent the PC11 paper tape reader/punch. The second PR represents the PR11 reader.

```
* CP5868  Enter vector address of the next PC11 [O R:60-774 D:70]:
```

Enter the interrupt vector address for each PC11 controller. The acceptable range is from 60 to 774_8. The default is 70_8.

Subsequent PC11 controllers do not have a default for the interrupt vector address; therefore, you must enter a value within the acceptable range.

```
* CP5872  What is its CSR address? [O R:160000-177700 D:177550]:
```

Enter the CSR address for each PC11 paper tape reader/punch. The acceptable range is from 160000 to 177700_8. The default CSR address for the first PC11 paper tape reader/punch is 177550_8.

Subsequent PC11 paper tape reader/punches do not have a default for the CSR address; therefore, you must enter a value within the acceptable range.

```
* CP6004  How many PR11 paper tape readers do you have? [O D:0]:
```

Enter the number of PR11 paper tape readers in the target configuration. Do not include any PC11 paper tape reader/punches you may have in this number.

If you enter a value greater than 0, you must specify the interrupt vector address and the CSR address for each paper tape reader.

```
* CP6068  Enter vector address of the next PR11 [O R:60-774 D:70]:
```

Enter the interrupt vector address for each paper tape reader. The acceptable range is from 60 to 774_8. The default is 70_8.

Subsequent paper tape readers do not have a default for the interrupt vector address; therefore, you must enter a value within the acceptable range.

```
* CP6072  What is its CSR address? [O R:160000-177700 D:177550]:
```

Enter the CSR address for each paper tape reader. The acceptable range is from 160000 to 177700_8. The default CSR address is 177550_8.

Subsequent paper tape readers do not have a default for the CSR address; therefore, you must enter a value within the acceptable range.

```
* CP6204  How many LPA11 lab subsystems do you have? [D R:0.-16. D:0.]:
```

Enter the number of LPA11–K laboratory subsystems in the target configuration.

If you enter a value greater than 0, you must specify the interrupt vector address and the CSR address for each LPA11–K subsystem.

```
* CP6268  Enter vector address of the next LPA11 [O R:300-774]:
```

Enter the interrupt vector address for each LPA11–K subsystem. The acceptable range is from 300 to 774_8. There is no default.

The vector address is assigned from floating vector space; consult Digital Customer Service if the location is unknown.

```
* CP6272  What is its CSR address? [O R:160000-177700 D:170460]:
```

Enter the CSR address for the LPA11–K subsystem. The acceptable range is from 160000 to 177700_8. The default is 170460. There is no default CSR for a subsequent LPA11–K subsystem.

The required CSR address is that of the first word of the LPA11–K CSR group. Consult Digital Customer Service if the location is unknown.

```
* CP6280  What is the maximum number of UMRs to be saved? [D R:0.-24. D:5.]:
```

The LPA11–K driver can handle up to eight concurrent nonprocessor request (NPR) transfers, each of which must be mapped through UNIBUS Mapping Registers (UMRs). Enter the maximum number of UMRs that the driver may access at any instant to map all requests that may be active.

```
* CP6804 Enter number of additional DL11/DLV11 line interfaces [O D:0]:
```

Enter the number of additional DL11/DLV11 line interfaces in the target configuration. Enter only the number of DL11/DLV11 line interfaces used as terminal interfaces. Do not include any DL11/DLV11 interfaces used as controllers for TU58 DECtape II drives.

An RSX–11M–PLUS system requires a DL11/DLV11 line interface for operation. SYSGEN automatically generates the database for the required DL11/DLV11 line interface.

If your system includes an additional DL11/DLV11 line interface, you must specify the type of terminal and whether the line requires modem support as well as the interrupt vector and CSR addresses.

```
* CP6820  Do any of the DL11/DLV11 lines require modem support? [Y/N D:N]:
```

Enter Yes if any of the DL11/DLV11 lines will be used as dial-up lines.

```
* CP6832  Enter terminal type for YLx [S R:4-6 D:"LA120"]:
```

Your answer to this question establishes the default terminal type for the YL controller. You can change the default terminal types at any time without performing a new SYSGEN, so you should choose the default answer for this question if you do not know which terminal types are or will be connected. See Chapter 4 for more information on changing default terminal types.

Peripheral Configuration (CP)

RSX–11M–PLUS SYSGEN supports the following types of terminals:

ASR33	LA12	VT05B
ASR35	LA30P	VT50
DTC01	LA30S	VT52
KSR33	LA34	VT55
	LA36	VT61
	LA38	VT100
	LA50	VT101
	LA75	VT102
	LA100	VT105
	LA120	VT125
	LA180S	VT131
	LA210	VT132
	LN03	VT2xx
	PC3xx	VT3xx

```
* CP6868  Enter vector address of YLx [O R:300-770]:
```

Enter a value within the range of 300 to 770_8. Consult Digital Customer Service if the interrupt vector addresses of additional lines are unknown.

The standard interrupt vector address for the first DL11/DLV11 line (YLA, the required line) is 60_8. Interrupt vector addresses for additional DL11/DLV11 lines are assigned from the floating vector space starting at 300_8. There are no default vector addresses for any additional DL11/DLV11 lines.

```
* CP6872  What is its CSR address? [O R:160000-177700]:
```

The standard CSR address for the first DL11/DLV11 line (YLA, the required line) is 177560_8. CSR addresses for additional DL11/DLV11 lines are assigned from floating address space starting at 176000_8. There are no default CSR addresses for any additional DL11/DLV11 lines. You must enter a value within the range of 176000 to 176770_8. Consult Digital Customer Service if the CSR addresses of additional lines are unknown.

```
* CP7004   Enter number of DH11 asynchronous line
*          multiplexers [D R:0.-n. D:0.]:
```

Enter the number of DH11 asynchronous line multiplexers in the target configuration.

```
* CP7020  Enter total number of DH11 dial-up lines [D R:0.-n. D:0.]:
```

Enter the total number of dial-up lines. SYSGEN assigns remote lines to consecutive line locations. If you enter more than 16 remote lines, they must occupy consecutive DH11 multiplexers.

The acceptable range is from 0 to 16_{10} times the number of DH11 multiplexers specified in your response to Question CP7004.

One DH11 multiplexer with a DM11–BB interface can serve as many as 16_{10} remote lines that occupy consecutive line locations.

If you enter a number greater than 0, SYSGEN proceeds to Question CP7028. If you enter 0 or take the default, dial-up support is not included and SYSGEN proceeds to Question CP7040.

```
* CP7028  At which baud rate do you want to answer? [S R:2-5 D:"300"]:
```

If your DH11 multiplexer has remote lines, you must enter the default answer speed for the remote lines. The answer speed can be changed for individual lines with the VMR or MCR command SET /SPEED.

Acceptable answer speed baud rates for the DH11 multiplexer are: 50, 75, 110, 134.5, 150, 200, 300, 600, 1200, 1800, 2400, 4800, or 9600. The default answer speed is 300. In addition, there are two external clock baud rates, EXTA and EXTB, that allow nonstandard baud rates. You must connect your DH11 to an external clock to use these. See the DH11 multiplexer hardware documentation for more information.

```
* CP7040  Enter total number of DH11 local lines [D R:n.-n. D:n.]:
```

Local lines occupy consecutive line locations and DH11 multiplexers. Their assignment follows the assignment of any remote lines you specified in Question CP7020. The DH11 can serve as many as 16 lines for each controller.

```
* CP7068  Enter vector address of YHx [O R:300-770]:
```

Enter a vector address in the range of 300 to 770_8. Consult Digital Customer Service if the interrupt vector address is unknown.

The interrupt vector address for the DH11 multiplexer is assigned from floating vector space starting at location 300_8. Therefore, there is no default vector assignment for the DH11.

```
* CP7072  What is its CSR address? [O R:160000-177700]:
```

Enter a CSR address in the range of 160010 to 177700_8. Consult Digital Customer Service if the CSR address is unknown.

The CSR address for the DH11 multiplexer is assigned from floating address space starting at 160010_8. Therefore, there is no default CSR assignment for the DH11 multiplexer.

```
* CP7076  Enter vector address of the DM11-BB associated
*         with YHx [O R:300-774]:
```

If you have a DH11 multiplexer and you answered Question CP7020 ("total number of dial-up lines") with a number greater than 0, a DM11–BB line interface is required. One DM11–BB interface can service as many as 16_{10} dial-up lines.

The DM11–BB interrupt vector address is assigned from floating vector space starting at 300_8. Therefore, you must enter a value in the range of 300 to 774_8 to include DM11–BB modem support. Consult Digital Customer Service if the interrupt vector address is unknown.

```
* CP7080  What is its CSR address? [O R:160000-177700 D:170500]:
```

Peripheral Configuration (CP)

The standard CSR address for the DM11–BB is 170500_8. If you include DM11–BB support, enter 170500_8 or a value in the range of 160000 to 177700_8 for the CSR assignment.

```
* CP7084  Enter terminal type for YHx [S R:4-6 D:"VT100"]:
```

Your answer to this question establishes the default terminal type for the YH controller. You can change the default terminal types at any time without performing a new SYSGEN, so you should choose the default answer for this question if you do not know which terminal types are or will be connected. See Chapter 4 for more information on changing default terminal types.

RSX–11M–PLUS SYSGEN supports the following types of terminals:

ASR33	LA12	VT05B
ASR35	LA30P	VT50
DTC01	LA30S	VT52
KSR33	LA34	VT55
	LA36	VT61
	LA38	VT100
	LA50	VT101
	LA75	VT102
	LA100	VT105
	LA120	VT125
	LA180S	VT131
	LA210	VT132
	LN03	VT2xx
	PC3xx	VT3xx

```
* CP7104  Enter number of DHU11/DHV11/DHQ11/CXA16/CXB16/CXY08 asynchronous line
*         multiplexers [D R:0.-n. D:0.]:
```

Enter the number of DHU11/DHV11/DHQ11/CXA16/CXB16/CXY08 asynchronous line multiplexers in the target configuration.

If any of your DHU11, DHV11, DHQ11, or CXY08 (**not** CXA16 and CXB16) multiplexers support dial-up lines, you must use the VMR or MCR command SET /REMOTE to enable the dial-up lines and to set the answer speed. You may want to pause during SYSGEN to edit the SYSVMR.CMD file or you may edit it manually, by using MCR, after the SYSGEN.

```
* CP7120  Enter the total number of YV: controller dial-up lines [D R:0.-16. D:0.]:
```

Enter the total number of dial-up lines. If you enter 0, modem control support will not be included for the YV controller dial-up lines.

The DHU11, DHV11, and CXY08 controllers support modem control, but the CXA16 and CXB16 controllers do not. Because SYSGEN cannot determine if the controllers in your configuration support dial-up lines, it is not possible to automatically set any remote lines. You must use the VMR or MCR command SET /REMOTE to enable remote lines. You can pause and edit file VMRTTY.CMD at the end of SYSGEN to add the necessary SET /REMOTE commands.

If you enter a number greater than 0, SYSGEN proceeds to Question CP7128. If you enter 0 or take the default, SYSGEN proceeds to Question CP7176.

```
* CP7128  At which baud rate do you want to answer? [S R:2-5 D:"300"]:
```

If your YV controller has remote lines, you must enter the default answer speed for the remote lines. The answer speed can be changed for individual lines with the VMR or MCR command SET /SPEED.

Acceptable answer speed baud rates are 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, and 9600. The default is 300.

```
* CP7168  Enter vector address of YVx [O R:300-770]:
```

Enter a vector address in the range of 300 to 770_8. Consult Digital Customer Service if the interrupt vector address is unknown.

The interrupt vector address for the DHV11/DHU11/DHQ11/CXA16/CXB16/CXY08 multiplexer is assigned from floating vector space starting at location 300_8. Therefore, there is no default vector assignment for the DHV11/DHU11/DHQ11/CXA16/CXB16/CXY08 multiplexer.

```
* CP7172  What is its CSR address? [O R:160000-177700]:
```

Enter a CSR address that is a multiple of 20_8 in the range of 160020 to 177700_8. Consult Digital Customer Service if the CSR address is unknown.

The CSR address for the DHV11/DHU11/DHQ11/CXA16/CXB16/CXY08 multiplexer is assigned from floating address space starting at 160020_8. Therefore, there is no default CSR assignment for the DHV11/DHU11/DHQ11/CXA16/CXB16/CXY08 multiplexer.

```
* CP7176  How many lines does YVA support?  [D R:1.-16. D:16.]:
```

Enter the maximum number of lines your YV-type multiplexers can support.

You can specify less than the maximum number of lines supported, but you will be unable to add more lines without performing another SYSGEN.

The maximum number of lines for each YV-type multiplexer is as follows:

- DHU11=16
- CXA16=16
- CXB16=16
- DHV11=8

- DHQ11=8
- CXY08=8

```
* CP7184 Enter terminal type for YVx [S R:4-6 D:"VT100"]:
```

Your answer to this question establishes the default terminal type for the YV controller. You can change the default terminal types at any time without performing a new SYSGEN, so you should choose the default answer for this question if you do not know which terminal types are or will be connected. See Chapter 4 for more information on changing default terminal types.

RSX–11M–PLUS SYSGEN supports the following types of terminals:

ASR33	LA12	VT05B
ASR35	LA30P	VT50
DTC01	LA30S	VT52
KSR33	LA34	VT55
	LA36	VT61
	LA38	VT100
	LA50	VT101
	LA75	VT102
	LA100	VT105
	LA120	VT125
	LA180S	VT131
	LA210	VT132
	LN03	VT2xx
	PC3xx	VT3xx

```
* CP7204  Enter number of DJ11 asynchronous line
*         multiplexers [D R:0.-n. D:0.]:
```

Enter the number of DJ11 asynchronous line multiplexers in the target configuration.

If you enter a value greater than 0, you must specify the interrupt vector address, the CSR address, and the number of lines for each DJ11 multiplexer.

```
* CP7268  Enter vector address of YJx [O R:300-770]:
```

Enter a vector address in the range of 300 to 770_8. Consult Digital Customer Service if the vector address is unknown.

The interrupt vector address for the DJ11 multiplexer is assigned from floating vector space starting at 300_8. Thus, there is no default vector assignment for the DJ11 multiplexer.

```
* CP7272  What is its CSR address? [O R:160000-177700]:
```

Enter a CSR address in the range of 160010 to 177700_8. Consult Digital Customer Service if the CSR address is unknown.

The CSR address for the DJ11 multiplexer is assigned from floating address space starting at 160010_8. Thus, there is no default CSR assignment for the DJ11 multiplexer.

```
* CP7280  How many lines does YJx have? [D R:1.-n. D:16.]:
```

Each DJ11 multiplexer can serve as many as 16_{10} asynchronous serial lines. Enter the total number of lines. The default is 16.

```
* CP7284  Enter terminal type for YJx [S R:4-6 D:"VT100"]:
```

Your answer to this question establishes the default terminal type for the YJ controller. You can change the default terminal types at any time without performing a new SYSGEN, so you should choose the default answer for this question if you do not know which terminal types are or will be connected. See Chapter 4 for more information on changing default terminal types.

RSX–11M–PLUS SYSGEN supports the following types of terminals:

ASR33	LA12	VT05B
ASR35	LA30P	VT50
DTC01	LA30S	VT52
KSR33	LA34	VT55
	LA36	VT61
	LA38	VT100
	LA50	VT101
	LA75	VT102
	LA100	VT105
	LA120	VT125
	LA180S	VT131
	LA210	VT132
	LN03	VT2xx
	PC3xx	VT3xx

```
* CP7404  Enter number of DZ11/DZQ11/DZV11 asynchronous line
*         multiplexers [D R:0.-n. D:0.]:
```

Enter the number of DZ11/DZQ11/DZV11 asynchronous line multiplexers in the target configuration.

```
* CP7420  Do any of the DZ lines require modem support? [Y/N D:N]:
```

Peripheral Configuration (CP)

The DZ11/DZQ11/DZV11 multiplexer can maintain a full-duplex connection through a full-duplex modem (for example, a Bell 103A-type modem). However, modem support requires additional code in the terminal database as well as in the driver and thus increases system overhead; select modem support only if needed. If you want to include modem support, you must specify the answer speed baud rate.

Note that, if you include modem support, you can dynamically set the DZ11/DZQ11/DZV11 multiplexer line type (local or remote) by using the /[NO]REMOTE keyword of the MCR command SET (see the *RSX–11M–PLUS MCR Operations Manual*).

```
* CP7428  At which baud rate do you want to answer? [S R:2-5 D:"300"]:
```

Enter the default answer speed for the remote lines. The answer speed can be changed for individual lines with the VMR or MCR command SET /SPEED. Acceptable answer speed baud rates are: 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, and 9600. The default is 300.

```
* CP7468  Enter vector address of YZx [O R:300-770]:
```

The interrupt vector address for the DZ11/DZQ11/DZV11 multiplexer is assigned from floating vector space starting at 300_8. Thus, there is no default vector assignment for the DZ11/DZQ11/DZV11 multiplexer. Enter a vector address in the range of 300 to 770_8. Consult Digital Customer Service if the vector address is unknown.

```
* CP7472  What is its CSR address? [O R:160000-177700]:
```

Enter a CSR address in the range of 160010 to 177700_8. Consult Digital Customer Service if the CSR address is unknown.

The CSR address for the DZ11/DZQ11/DZV11 multiplexer is assigned from floating address space starting at 160010_8. Thus, there is no default CSR assignment for the DZ11/DZQ11/DZV11 multiplexer.

```
* CP7480  How many lines does YZx have? [D R:1.-n. D:8.]:
```

Enter the total number of lines. The default is 8.

Each DZ11 multiplexer can serve as many as eight asynchronous lines. Each DZQ11 or DZV11 multiplexer can serve as many as four asynchronous lines.

```
* CP7484  Enter terminal type for YZx [S R:4-6 D:"VT100"]:
```

Your answer to this question establishes the default terminal type for the YZ controller. You can change the default terminal types at any time without performing a new SYSGEN, so you should choose the default answer for this question if you do not know which terminal types are or will be connected. See Chapter 4 for more information on changing default terminal types.

RSX–11M–PLUS SYSGEN supports the following types of terminals:

ASR33	LA12	VT05B
ASR35	LA30P	VT50
DTC01	LA30S	VT52

KSR33	LA34	VT55
	LA36	VT61
	LA38	VT100
	LA50	VT101
	LA75	VT102
	LA100	VT105
	LA120	VT125
	LA180S	VT131
	LA210	VT132
	LN03	VT2xx
	PC3xx	VT3xx

```
* CP7604  Do you have any intercomputer communication devices? [Y/N D:N]:
```

Enter Yes if the target configuration includes any of the following intercomputer communication devices:

PCL11	Receiver/transmitter
DMC11/DMR11	Synchronous line interface
DUP11	Synchronous line interface
DEUNA	Ethernet communications controller

Do not include any devices that will be used with the DECnet package. Those devices should be included when you generate the DECnet package by using NETGEN. See the DECnet installation documentation for more information.

If you enter No, SYSGEN proceeds to Question CP9604.

```
* CP7804 How many PCL11 receiver/transmitters do you have? [O D:0]:
```

Enter the number of PCL11 receiver/transmitters in the target configuration.

```
* CP7868  Enter vector address of the next PCL11 receiver [O R:300-774]:
```

Enter a vector address in the range of 300 to 774_8. Consult Digital Customer Service if the vector address is unknown.

The interrupt vector address for the PCL11 receiver is assigned from floating vector space starting at 300_8. Thus, there is no default vector address for the PCL11 receiver.

```
* CP7872  What is its CSR address? [O R:160000-177700]:
```

Enter a CSR address in the range of 160010 to 177700_8. Consult Digital Customer Service if the CSR address is unknown.

The CSR address for the PCL11 receiver is assigned from floating address space starting at 160010_8. Thus, there is no default CSR assignment for the PCL11 receiver.

```
* CP8068 Enter vector address of the next PCL11 transmitter [O R:300-774]:
```

Peripheral Configuration (CP)

Enter a vector address in the range of 300 to 774_8. Consult Digital Customer Service if the vector address is unknown.

The interrupt vector address for the PCL11 transmitter is assigned from floating vector space starting at 300_8. Thus, there is no default vector address for the PCL11 transmitter.

```
* CP8072  What is its CSR address? [O R:160000-177700]:
```

Enter a CSR address in the range of 160010 to 177700_8. Consult Digital Customer Service if the CSR address is unknown.

The CSR address for the PCL11 transmitter is assigned from floating address space starting at 160010_8. Thus, there is no default CSR assignment for the PCL11 transmitter.

```
* CP8204  How many DMC11/DMR11 synchronous line interfaces do
*         you have? [O D:0]:
```

Enter the number of DMC11/DMR11 communication links in the target configuration.

```
* CP8268  Enter vector address of the next DMC11/DMR11 [O R:300-774]:
```

Enter a vector address in the range of 300 to 774_8. Consult Digital Customer Service if the vector address is unknown.

The vector address for the DMC11/DMR11 interprocessor link is assigned from floating vector space starting at 300_8. Thus, there is no default interrupt vector address for the DMC11/DMR11 interface.

```
* CP8272 What is its CSR address? [O R:160000-177700]:
```

Enter a CSR address in the range of 160010 to 177700_8. Consult Digital Customer Service if the CSR address is unknown.

The CSR address for the DMC11/DMR11 interprocessor link is assigned from the floating address space starting at 160010_8. Thus, there is no default CSR assignment for the DMC11/DMR11 interface.

```
* CP8280  Is it a half-duplex line? [Y/N D:N]:
```

Normally, the DMC11/DMR11 is a full-duplex serial communications link. When the DMC11/DMR11 is used on a half-duplex line, one end of the line must be the primary station and the other end must be the secondary station.

If you enter Yes, you must specify whether the line is the primary or secondary station.

```
* CP8284  Is it the primary station? [Y/N D:N]:
```

Enter Yes to indicate that the line is a primary station. Enter No to indicate a secondary station.

```
* CP8404  How many DUP11 synchronous line interfaces do you have? [O D:0]:
```

Enter the number of DUP11 synchronous line interfaces in the target configuration.

```
* CP8468  Enter vector address of the next DUP11 [O R:300-774]:
```

Enter a vector address in the range of 300 to 774_8. Consult Digital Customer Service if the vector address is unknown.

The vector address for the DUP11 synchronous line interface is assigned from the floating vector space starting at 300_8. Thus, there is no default interrupt vector address for the DUP11 interface.

```
* CP8472  What is its CSR address? [O R:160000-177700]:
```

Enter a CSR address in the range of 160010 to 177700_8. Consult Digital Customer Service if the CSR address is unknown.

The CSR address for the DUP11 synchronous line interface is assigned from the floating address space starting at 160010_8. Thus, there is no default CSR assignment for the DUP11 interface.

```
* CP8480  Is it a half-duplex line? [Y/N D:N]:
```

Enter Yes if the line is a half-duplex line.

Enter No if the line is a full-duplex line.

```
* CP8484  How many sync characters are required in a sync
*         leader? [D R:3.-14.]:
```

Enter a value in the range of 3 to 14_{10}. A typical response is from 4 to 6_{10}. If the line will run at high speeds or if you expect the system load to be heavy, specify a greater number of sync characters. There is no default for this question.

```
* CP8504   How many DEUNA Ethernet controllers do you have? [O R:0-1 D:0]:
```

Enter the number of DEUNA Ethernet controllers in the target configuration.

```
* CP8568   Enter vector address of the next DEUNA [O R:60-774 D:120]:
```

Enter the interrupt vector address for the DEUNA Ethernet controller. The acceptable range is from 60 to 774_8. The default value for the first controller is 120_8.

```
* CP8572  What is its CSR address? [O R:160000-177700 D:174510]:
```

Enter the CSR address for the DEUNA Ethernet controller. The acceptable range is from 160010 to 177700_8. The default CSR address for the first controller is 174510_8.

```
* CP9604  Enter device mnemonics for user-supplied drivers [S]:
```

If you do not want to include any user-supplied drivers, press the RETURN key in response to this question. If you want to include user-supplied drivers, enter the driver mnemonics in response to this question. Note that the device mnemonics you enter must not include a colon (:) and should start with the letters J or Q to avoid conflict with Digital-supplied drivers.

The driver source files must reside in directory [11,10] and be named in the format ddDRV.MAC and ddTAB.MAC, where dd is the device mnemonic entered in this question. Any user-supplied drivers and their databases are assembled, task built, and loaded as part of the SYSGEN procedure.

When you have listed all the driver mnemonics, press the RETURN key in response to the prompt.

```
* CP9612 Do you want the xx: driver to be loadable? [Y/N D:N]:
```

Enter Yes to make the specified driver loadable. Enter No to make the specified driver resident.

It is easier to change the device configuration if the driver and database are both loadable. Unless you have a specific reason not to, you should enter Yes.

If you enter No, Question CP9616 does not appear because, if a driver is resident, its database must also be resident.

```
* CP9616  Do you want the xx: driver's database to be loadable? [Y/N D:N]:
```

Enter Yes to make the database for the specified driver loadable. Enter No to make the specified database resident.

It is easier to change the device configuration if the driver and database are both loadable. Unless you have a specific reason not to, you should enter Yes.

If you entered No to Question CP9612, this question does not appear because, if a driver is resident, its database must also be resident.

```
* CP9632  What is the highest interrupt vector
*          address? [O R:n-774 D:n]:
```

The highest interrupt vector address can range from 374 to 774_8. SYSGEN uses the highest interrupt address you specified when answering the previous peripheral questions as the default for this question.

If you will be adding other devices after completing this system generation or if you have included user-supplied drivers, you should set the highest interrupt vector address high enough to accommodate the vectors for those devices.

3.2.4 Assembling the Executive and Drivers (AE)

In this section, SYSGEN assembles the Executive, the drivers, and the driver databases. SYSGEN allows you to decide whether you want assembly listings and, if so, whether to direct them to a file or to the line printer. After assembly is completed, SYSGEN creates the Executive object library file.

Your answers to the questions in this section are put in the saved answer file [200,200]SYSGENSA1.CMD.

The questions on the following page are asked before SYSGEN begins assembling the Executive and drivers. If you are not performing a PREPGEN, you must wait until the assembly is completed before being asked the questions in the next section.

```
* AE010  Do you want assembly listings of the Executive and
*        drivers? [Y/N D:N]:
```

Enter Yes if you want to produce assembly listings. Because assembly listings require considerable time to produce and usually are not needed, you should enter No.

If you enter Yes, you must specify the listing device.

```
* AE020  What is to be the listing device [ddu:]? [S R:2-5 D:"SY:"]:
```

Enter the device for the assembly listing files. If you omit the colon from the device specification, SYSGEN appends a colon.

If the listing device is a disk, the listings are put in directory [11,34]. SYSGEN creates this directory if it does not already exist on the listing device.

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

If you need to edit any of the assembly files, enter Yes. SYSGEN pauses and allows you to invoke an editor of your choice.

If your host system is RSX–11M–PLUS, enter the following command line to continue with SYSGEN after pausing:

```
> UNS AT. RET
```

If your host system is VAX–11 RSX, enter the following command line to continue with SYSGEN after pausing:

```
> RES RET
```

SYSGEN then begins assembling the Executive and drivers.

3.2.5 Building the Executive and Drivers (BE)

In this section, SYSGEN task builds the Executive and the drivers. The Executive and driver task image files are put in directory [1,54] on the target system disk. If there is an old system from a previous system generation in directory [1,54], SYSGEN transfers it to another directory before building the new system if you want.

Your answers to the questions in this section are put in the saved answer file [200,200]SYSGENSA1.CMD.

The following material describes all the possible questions in the Building the Executive and Drivers section.

```
* BE010  Do you want to move the old system in [1,54] to
*        another directory? [Y/N D:N]:
```

If there is an old system image file (RSX11M.SYS) in directory [1,54] on your target system disk, SYSGEN asks this question to allow you to move that system and its associated files to another directory before building the new system in directory [1,54].

If you want to save files on the target disk from a previous SYSGEN, enter Yes. SYSGEN asks you to enter the directory to which you want to move the files, and SYSGEN then copies the contents of directory [1,54] to the directory you designate.

```
* BE020  What directory do you want to move it to? [S R:3.-11.]:
```

Enter the directory to which you want to move the system currently in directory [1,54]. SYSGEN creates this directory if it does not already exist and moves the files in directory [1,54] to the specified directory.

```
* BE030  Do you want to pause to edit any files before
*        task-building? [Y/N D:N]:
```

If you are doing a complete SYSGEN, you can choose to pause at this point and edit the following files:

- The Executive and driver task-build command files

- The privileged task task-build command files
- The system image initialization command file, SYSVMR.CMD

If you are doing a complete SYSGEN (that is, if you entered Yes to Question SU120) or if you are continuing a SYSGEN from some point (that is, if you entered Yes to Question SU130), SYSGEN does not give you any further opportunities to pause. After this question, SYSGEN builds the Executive and drivers, and then it proceeds to the Building the Privileged Tasks (BP) and Creating the System Image File (CS) sections. This saves you time because you do not have to wait around for SYSGEN to finish task building the Executive or the privileged tasks before you can edit the SYSVMR.CMD file or other files.

If you are doing an individual section of SYSGEN, you can pause at this point and edit the Executive and driver task-build command files only.

If you want to edit any files before proceeding, enter Yes. SYSGEN pauses and allows you to invoke an editor.

If your host system is RSX–11M–PLUS, enter the following command line to continue with SYSGEN after pausing:

```
> UNS AT. RET
```

If your host system is VAX–11 RSX, enter the following command line to continue with SYSGEN after pausing:

```
> RES RET
```

SYSGEN then begins building the Executive and drivers.

3.2.6 Building the Privileged Task (BP)

In this section, SYSGEN task builds the privileged system task SAV. All other privileged tasks are vectored; therefore, it is not necessary to rebuild them during SYSGEN.

Your answers to the questions in this section are put in the saved answer file [200,200]SYSGENSA1.CMD.

The following material describes all the possible questions in the Building the Privileged Task (BP) section.

```
* BP040  Do you want the maps of the privileged task? [Y/N D:N]:
```

Enter Yes if you want to produce task-build maps of the privileged task. However, because the maps require considerable time to produce and usually are not needed, it is more likely that you will want to enter No.

```
* BP050  What is to be the map device [ddu:]? [S R:2-5 D:"SY"]:
```

Enter the device for the privileged task map files. If the map device is a disk, the maps are put in directory [1,34]. SYSGEN creates this directory if it does not already exist on the map device.

```
* BP060  Do you want to pause to edit any files before
*        task-building? [Y/N D:N]:
```

This question appears only if you are performing an individual section of SYSGEN. If you are performing a complete SYSGEN, you must edit the privileged task task-build command files in the Building the Executive and Drivers (BE) section.

If you want to edit any of the task-build files for the privileged task, enter Yes. SYSGEN pauses and allows you to invoke an editor.

The MCR command INS allows you to specify both the task name and the task partition as keywords. In most cases, there is no need to edit the task-build command file.

If your host system is RSX–11M–PLUS, enter the following command line to continue with SYSGEN after pausing:

```
> UNS AT. RET
```

If your host system is VAX–11 RSX, enter the following command line to continue with SYSGEN after pausing:

```
> RES RET
```

SYSGEN then begins building the privileged task.

3.2.7 Rebuilding the Supplied System Tasks (BN)

This section allows you to rebuild any supplied system tasks (nonprivileged utilities and vectored privileged tasks) that you have patched. Digital-supplied system tasks are prebuilt and can be found in the library directory on the target system disk. If you have not altered any of the supplied system tasks listed in Question BN020, you should skip over this section by entering No to Question BN010.

The supplied system tasks are in three forms:

xxx.TSK	Tasks built with the File Control Services (FCS) routines contained in their task images
xxxRES.TSK	Tasks built to link to the FCSRES resident library
xxxFSL.TSK	Tasks built to link to the FCSFSL supervisor-mode library

The versions of the supplied system tasks that you can use with your system depend on your processor type and your answers to certain questions in the Choosing the Executive Options (CE) section of SYSGEN.

You can use the xxxFSL.TSK tasks if you have a PDP–11/44, PDP–11/70, MicroPDP–11/73, MicroPDP–11/83, or PDP–11/84 processor and if you included supervisor-mode library support (Question CE080).

You can use the xxxRES.TSK tasks on any of the supported processors if the FCSRES library is installed. SYSVMR automatically installs the FCSRES library if you entered Yes to Question CE090. Even if you entered No to CE090, you can install the FCSRES library yourself. You can install the appropriate tasks in your system in the STARTUP.CMD file or the SYSVMR.CMD file. Refer to Chapter 4 for more information.

Question BN012 has been added to allow you to specify that the tasks be built to link to the FCSFSL or FCSRES libraries.

Rebuilding Supplied System Tasks (BN)

The list accompanying Question BN020 lists the supplied system tasks. System tasks not specified in the table may be rebuilt if a task-build command file for the system task exists in directory [1,24]. Note that not all of the tasks listed in Question BN020 are furnished in xxxFSL.TSK and xxxRES.TSK versions.

Some system tasks are not built to link to the FCSFSL supervisor-mode library because they do not benefit from being linked to this library. If a task does not make use of the extra Active Page Register (APR) that is gained by using supervisor mode, then the supervisor mode may be slower than the standard resident library.

Note

If you are using a SYSVMR.CMD file that includes obsolete supervisor-mode versions of tasks, you must edit SYSVMR.CMD to install the correct versions of the tasks.

You also should manually delete any obsolete FSL versions of tasks that exist in your system library directory after you have installed the new version of the task.

Usually, you do not need to rebuild any of the supplied system tasks because the distribution kit contains prebuilt copies of all the tasks listed in Question BN020. You would need to rebuild one or more of these tasks if you applied patches to the files or if your only copy of a task image (TSK file type) was corrupted or accidentally deleted.

However, you might want to modify the priority of the system logout task BYE. You can increase the priority to process user logouts more efficiently and to quickly free system resources.

Increasing the BYE task priority can cause scheduling conflicts with other tasks that run during user logout processing. Therefore, Digital recommends that you increase BYE task priority only a small amount in order to avoid any scheduling conflicts.

If BYE has a priority value that is slightly greater than 50, BYE will be scheduled before tasks that run at the default priority. However, scheduling conflicts are unlikely to occur with system tasks that have a priority higher than 50 and that are required for log-out processing and system processing.

You can modify the BYE task's priority by rebuilding the BYE task in the Rebuilding the Supplied System Tasks section of SYSGEN. You must first edit the task-build command file [1,24]BYEBLD.CMD and specify the option PRI=n.

You must either save the system after you modify the BYE task priority or use the VMR command INSTALL to make the BYE task and its new priority recognizable to the system and to retain the new priority when the system is rebooted.

To rebuild the DTE and MFT supplied system tasks during the BN section of SYSGEN, you must first install RMS–11.

Answers to the questions in this section are placed in the saved answer file [200,200]SYSGENSA3.CMD. SYSGEN allows you to include an identifying comment at the beginning of the file before asking the questions in this section.

The following pages describe all the possible questions in the Rebuilding the Supplied System Tasks (BN) section.

```
* BN010  Do you want to rebuild any system tasks? [Y/N D:N]:
```

Rebuilding Supplied System Tasks (BN)

Enter No if you have not patched any of the supplied system tasks.

Enter Yes if you have patched any of the supplied system tasks (see the list in the description accompanying Question BN020).

If you enter No, SYSGEN proceeds to Question CS010.

If you enter Yes, SYSGEN proceeds to Question BN012.

```
* BN012  Do you want tasks to be linked to the FCSRES or FCSFSL libraries? [Y/N D:Y]
```

This question appears only if you entered Yes to Question BN010.

If you enter Yes, SYSGEN tries to build the xxxFSL.TSK tasks. If it is unable to build the xxxFSL.TSK tasks, SYSGEN tries to build the xxxRES.TSK tasks. If SYSGEN cannot build either task, then it builds the xxx.TSK tasks.

If you enter No, you may specify in question BN020 that individual xxxFSL.TSK, xxxRES.TSK, and xxx.TSK tasks are to be rebuilt.

```
* BN020  Enter task name(s) [S]:
```

This question appears only if you entered Yes to Question BN010.

Enter the names of the tasks you want to rebuild, choosing from the following list:

ACC	COT	FLX (R & F)	LPP	QMGCLI	UFD
ACD	CRF (R & F)	FMT	MAC (R & F)	QMGPRT	UML
ACNT (R & F)	CRP	FTB (R & F)	MCD	RCT	UNL
ACS	DCL	FXR	MCR	RMD	VFY (R & F)
BAD	DLD	HEL	MFT	RPT (F)	VMR
BOO	DMO	HRC	MOU	SHA	XDT
BRO	DMP (R & F)	ICM (R & F)	MTA	SHF	ZAP
BRU	DSC	INI	PAT	SHU	
BYE	DTE	INS	PIP (R & F)	SLP	
CDA	EDI (R & F)	IOX (R & F)	PMD	SYL	
CFL (F)	EDT (R & F)	IPP	PMT	TDX	
CMP (R & F)	ELI	LBR (R & F)	PSW	TKB (R & F)	
CON	ERL	LOA	QMG	TKN	

The tasks that have xxxFSL.TSK and xxxRES.TSK versions are listed as follows:

```
xxx (R & F)
```

The tasks that have the xxxFSL.TSK version are listed as follows:

```
xxx (F)
```

The following responses are possible for BN020:

- Entering ALL will rebuild all tasks.

Rebuilding Supplied System Tasks (BN)

If you entered Yes to BN012, SYSGEN tries to build the xxxFSL.TSK tasks. If it is unable to build the xxxFSL.TSK tasks, SYSGEN tries to build the xxxRES.TSK tasks. If SYSGEN cannot build either task, then it builds the xxx.TSK tasks.

If you entered No to BN012, then all xxx.TSK tasks will be rebuilt.

- Entering ALLVAN will rebuild all xxx.TSK tasks.
- Entering ALLFSL will rebuild all xxxFSL.TSK tasks.
- Entering ALLRES will rebuild all xxxRES.TSK tasks.

In response to BN020, you can enter the task names or versions (ALL, ALLVAN, ALLFSL, and ALLRES) separated by commas and on more than one line. When you are done, finish the list with a period or press the RETURN key in response to the prompt.

Note

It is not recommended that more than one task version (ALL, ALLVAN, ALLFSL, or ALLRES) be entered at once because of the large number of tasks and limited amount of symbol table space for SYSGEN.

If you want to rebuild the DTE and MFT supplied system tasks during the Rebuilding the Supplied System Tasks (BN) section of SYSGEN, you must first install RMS–11. Refer to the *RSX–11M–PLUS Release Notes* for information on installing RMS–11.

```
* BN024  What is the library UFD of the target
*        system? [S R:3.-11. D:"[3,54]"]:
```

This question appears only if you choose to rebuild any of the supplied system tasks in Question BN010 and the library User File Directory (UFD) has not been defined previously.

Enter the library directory for the target system. SYSGEN puts the supplied system tasks that you rebuild in the directory you choose in this question. The supplied system tasks are normally kept in the system's library directory.

If you are performing a complete SYSGEN, this directory is normally [3,54], and you should take the default. If you are performing this section of SYSGEN on an already-generated system to rebuild supplied system tasks that you have altered, enter the library directory of the current system.

```
* BN030  Do you want the maps of the supplied system  tasks? [Y/N D:N]:
```

This question appears only if you chose to rebuild any of the supplied system tasks in Question BN010.

Enter Yes if you want to produce task-build maps of the supplied system tasks. Because the maps require considerable time to produce and usually are not needed, you should enter No.

```
* BN040  What is to be the map device [ddu:]? [S R:2-5 D:"SY:"]:
```

This question appears only if you chose to rebuild any of the supplied system tasks in Question BN010 and if you answered Yes to Question BN030.

Enter the device on which you want to put the supplied system task map files. If the map device is a disk, the maps are put in directory [1,34]. SYSGEN creates this directory if it does not already exist on the map device.

```
* BN050  Do you want to pause to edit any files before
*        task-building? [Y/N D:N]:
```

This question appears only if you chose to rebuild any of the supplied system tasks in Question BN010.

Enter Yes to pause. Enter No to begin building the supplied system tasks you specified.

If your host system is RSX–11M–PLUS, enter the following command line to continue with SYSGEN after pausing:

```
>UNS AT. RET
```

If your host system is VAX–11 RSX, enter the following command line to continue with SYSGEN after pausing:

```
>RES RET
```

SYSGEN then begins rebuilding supplied system tasks.

3.2.8 Creating the System Image File (CS)

In this section, SYSGEN creates and initializes the system image file. A VMR indirect command file named SYSVMR.CMD creates the partitions, loads the drivers, and installs the privileged tasks in the system image file.

Your answers to the questions in this section are put in the saved answer file [200,200]SYSGENSA1.CMD.

The following pages describe all the possible questions in the Creating the System Image File (CS) section.

```
* CS010  Do you want to pause to edit SYSVMR before creating
*        the system image file? [Y/N D:N]:
```

This question appears only if you are performing an individual section of SYSGEN. If you are performing a complete SYSGEN, you must edit the SYSVMR.CMD file in the Building the Executive and Drivers (BE) section.

SYSGEN creates a VMR indirect command file, [1,54]SYSVMR.CMD, that is used with VMR to initialize your system image file. The commands in the command file set up primary and secondary pool, create partitions, load the loadable drivers, set the size of the terminal driver's buffer space, install all the privileged tasks, set the system tuning parameters, and set the default terminal characteristics.

You might want to tailor this command file for your system. For example, SYSGEN creates secondary pool with 16K words. If you have a large number of terminals or plan a very large number of simultaneously open files, this amount of space may be too small. If you have a smaller system with few terminals and open files, this amount of space may be too large.

Creating System Image File (CS)

Usually, you would want to edit the SYSVMR.CMD file to do the following:

- Change which tasks are installed.
- Change the size of secondary pool.
- Adjust the size of the terminal driver's buffer space.
- Change the terminal characteristics.

You might want to modify the priority of the system logout task BYE. You can increase the priority to process user logouts more efficiently and to quickly free system resources.

You should be careful when you increase the BYE task priority because this may cause scheduling conflicts with tasks that run during user logout processing. If you want to increase the BYE task priority, Digital recommends that you only increase the priority a small amount in order to avoid any scheduling conflicts.

If BYE has a priority value that is slightly greater than 50, BYE will be scheduled before tasks that run at the default priority. However, scheduling conflicts are unlikely to occur with system tasks that have a priority higher than 50 and that are required for log-out processing and system processing.

You can modify the BYE task's priority by editing the VMR file [1,54]SYSVMR.CMD during the Creating the System Image File section of SYSGEN. Specify the priority you want in the command that installs the BYE task.

You must either save the system after you modify the BYE task priority or use the VMR command INSTALL to make the BYE task and its new priority recognizable to the system and to retain the new priority when the system is rebooted.

If you enter Yes to CS010, SYSGEN pauses and allows you to invoke an editor and edit the SYSVMR.CMD file.

If your host system is RSX–11M–PLUS, enter the following command line to continue with SYSGEN after pausing:

```
> UNS AT. RET
```

If your host system is VAX–11 RSX, enter the following command line to continue with SYSGEN after pausing:

```
> RES RET
```

If you enter No, SYSGEN immediately continues.

When SYSGEN continues, it creates the system image file and initializes it by using the SYSVMR command file. SYSGEN accomplishes these tasks by using the following command sequence:

```
>SET /UIC=[1,54] RET
>PIP RSX11M.SYS/CO/NV/BL:1026.=RSX11M.TSK RET
>ASN SY:=LB: RET
>VMR @SYSVMR RET
```

VMR always prints the following diagnostic messages when it initializes the system image file by using the SYSVMR.CMD file:

```
VMR -- *DIAG*-Installed tasks or commons may no longer fit in partition
SET /TOP=SYSPAR:-*
VMR -- *DIAG*-Loadable driver larger than 4K
LOA TT:
VMR -- *DIAG*-Installed tasks or commons may no longer fit in partition
SET /TOP=DRVPAR:-*
```

These messages do not indicate errors in your system.

When this section completes, SYSGEN is finished and it exits. If you were performing a PREPGEN, invoke SYSGEN again and specify the saved answer files that the PREPGEN just created as input. If you were performing a SYSGEN, you now have a system image ready for bootstrapping. Proceed to Chapter 4 for information on bootstrapping and saving the new system.

Chapter 4
After SYSGEN

After SYSGEN exits, there are several steps remaining that must be performed before you have a working system. This chapter describes those steps and provides other information to help you set up and run your system. If you generated your new system on a type of media that *is not* supported by the target computer, you must follow the procedure described in Section 4.1. If you generated your new system on media that is supported by the target computer, you must refer to Section 4.2 for information on saving and bootstrapping the new system.

4.1 Copying an Unsaved System

If you have generated a system on a type of media that is not supported by the computer on which the new system will be run, you must copy the unsaved system to the target system disk before you can save the new system. For example, if a system is generated by a VAX host running VAX–11 RSX on media that is not supported by the PDP–11 target computer, you must copy the unsaved system to the target system disk before you save it.

After you have generated the new system, you must use BRU to create a backup set of the unsaved system. For example, if the system was generated on an RA60 disk and you want to back up the unsaved system to a TK50 tape, use the following commands to back up the unsaved system:

```
> MOU DU0:/FOR [RET]
> MOU MU0:/FOR [RET]
> BRU/VERIFY DU0: MU0: [RET]
```

Then, you must boot BRUSYS on the PDP–11 target computer and copy the backup set of the unsaved system to the target system disk. For example, if the backup set of the unsaved system is on a TK50 tape and the target system disk is an RD53, use the following commands to copy the backup set:

```
> RUN BRU [RET]
>
BRU> /INI/VERIFY/MAXIMUM:8529/HEADERS:4264  MU0:  DU0: [RET]
```

Specify the appropriate values for the /MAXIMUM and /HEADERS qualifiers for your target system disk type. (Refer to Table 2–1 for a list of qualifier values.)

You must then hardware bootstrap the target computer to start the baseline system running.

You must then use VMR to create a new system image in directory [1,54]. For example, if the target system disk is an RD53, use the following commands to create a new system image:

```
> ASN DU0:=SY: RET
> ASN DU0:=LB: RET
> SET /NONAMED RET
> SET /UIC=[1,54] RET
> DEL RSX11M.SYS;* RET
> PIP RSX11M.SYS/CO/NV/BL:1024.=RSX11M.TSK RET
> VMR @SYSVMR.CMD RET
```

Refer to Section 4.2 for information on bootstrapping and saving the new system.

4.2 Bootstrapping and Saving the Unsaved System

When you have finished performing SYSGEN as detailed in Chapter 3 and, if necessary, have copied the unsaved system to the appropriate media, your target system disk contains a bootable, unsaved RSX–11M–PLUS system image.

To bootstrap the unsaved system and to save the system image, complete the following steps:

1. If the target system disk is not already spinning in a drive, load the disk and mount it. For example, if your target system disk is DB0, use the following command line:

   ```
   > MOU DB0:RSX11MPBLnn RET
   ```

2. Software bootstrap the unsaved system in directory [1,54] on your target system. Note that this step should not be performed on an online system unless you are the only user logged in to the system, because software bootstrapping the target system stops the host system. For example, if your target system disk is DB0, use the following command line:

   ```
   > BOO DB0:[1,54] RET
   ```

   The BOO command brings the unsaved system into memory, where the initialization module INITL initializes it. If the INITL module encounters an error condition, it prints an error message. For more information on system initialization errors and error messages, see Section 4.10.

3. If you have included the Executive Debugging Tool (XDT) in your system, a prompt from XDT appears on your terminal. In response to the prompt, type "G" (without pressing the RETURN key). The system begins executing and prints an identification message. For example:

   ```
   XDT: 46

   XDT> G
   RSX-11M-PLUS Vr.u  BLnn
   ```

   If you did not include XDT in your system, the system begins running immediately and prints the version and base level identification message.

4. Enter the current time and date. For example:

```
> TIM 09:42 13-APR-89 RET
```

5. To verify that your system is working, enter the TIM command. If the system responds, it indicates that the system works properly. For example:

```
> TIM RET
09:42:03 13-APR-89
```

6. Save the system image by using the SAV command without any switches. For example:

```
> SAV RET
```

Caution

Do not use the /WB switch with the SAV command before you have determined that the system can be saved properly. If you use the /WB switch to rewrite the boot block and saving the system causes the system image to be corrupted, you will not be able to hardware bootstrap either the baseline system or your new system. You will be able to recover access to your generated system only by using a running RSX–11M–PLUS system to software bootstrap your generated system.

The SAV command writes the system image back to the target system disk, reads the saved image back into memory, and brings up the system by using the startup command file, [1,2]STARTUP.CMD.

7. When STARTUP.CMD prompts you for the time and date, press CTRL/Z to exit from the startup command file.

8. If the system appears to be working correctly and there were no error messages printed after you used the SAV command, software bootstrap the system again. When the STARTUP prompts you for the time and date, press CTRL/Z to exit from the startup command file. Then save the system again, this time rewriting the boot block with the /WB switch. The system begins executing and prints an identification message. For example:

```
> SAV /WB RET
DM0 -- SYSTEM dismounted from DB0:     *** Final dismount initiated ***
RSX-11M-PLUS  Vr.u  BLnn  576.K System:"JCFROG"
>
```

The /WB switch causes the SAV command to alter the boot-block pointer on your target system disk. The next time the target system disk is hardware bootstrapped, your new system will come up instead of the baseline system.

For information on the SAV command that might help you determine the source of any difficulties in saving your system, see the description of the SAV command in the *RSX–11M–PLUS MCR Operations Manual*. For more information on the Digital-supplied startup command file, see Section 4.5.1.

4.3 Backing Up the Saved System

As soon as you have saved your system, you should make a backup copy to guard against accidental corruption of the target disk contents. You can use the Backup and Restore Utility (BRU) to make hardware-bootable copies of your system disk. If you have more than one disk drive available, you can use BRU on line to copy disk to disk. If you have only one disk drive available, you can use the BRUSYS system to copy disk to tape and then tape to disk. (For information on backing up RL02 pregenerated systems, see Chapter 5.) If you do not want to use a disk, you should back up your new system to magnetic tape; you can restore the system to disk should the need arise.

For more information on using BRU to copy system images, see the *RSX–11M–PLUS Utilities Manual*. For information on valid bootable devices under RSX–11M–PLUS, see the *RSX–11M–PLUS MCR Operations Manual*.

4.4 Recovering Disk Space After a System Generation

Most of the files on the RSX–11M–PLUS distribution kit are used only for system generation or for user reference. Once you have completed a SYSGEN, you can delete these files from your system disk. Doing so results in a considerable saving of disk space.

The only files that must be present on the running system disk are the following:

- All files in the Master File Directory (MFD) (the directory [0,0])
- All files in the [1,*] directories
- All files in the library directory (normally, directory [3,54])
- All files in the system directory (normally, directory [1,54])

Using BRU to copy your target system disk to another media reorganizes the files and provides the largest possible contiguous space.

4.5 Other System Setup Information

The following sections describe various tasks the system manager should perform to prepare a newly generated system for general use.

4.5.1 The Startup Command File

Each time the system is bootstrapped, the file named [1,2]STARTUP.CMD is invoked. The prototype startup file provided on your system performs various functions that may or may not be appropriate for your system, depending on the Executive options you chose during SYSGEN. You should tailor this file now to your particular system needs.

The following are functions commonly performed at system startup:

- The system-controlled checkpoint space is allocated.
- All devices configured into the system are brought on line.
- The Console Logger is started.
- The error logging system is started.
- DCL and any user-supplied command line interpreters (CLIs) are initialized.

- Resource Accounting is started.
- The Queue Manager (QMG) and batch processor (BPR) are started.
- The speed and type of terminals are set.
- Resident libraries, utilities, and system and user tasks are installed.

Certain system privileged and supplied system tasks are installed by the [1,54]SYSVMR.CMD file when you use SYSGEN to create the system image file. You will probably want to install additional system and user tasks in your system or to alter terminal characteristics if they have changed since you performed SYSGEN. You can do this in two different ways.

First, you can install tasks or change terminal characteristics in the system image by using VMR. When you use VMR, the tasks are installed as soon as the system is bootstrapped. You can use VMR commands directly, or you can run the Creating the System Image (CS) section of SYSGEN again and edit the SYSVMR.CMD file to suit your needs. You should use VMR if it is most important that the system is ready for use as soon as it is bootstrapped.

Second, you can install tasks or change certain terminal characteristics by using MCR commands in the STARTUP.CMD file. You can use the features of the Indirect Command Processor (Indirect) to install tasks or to perform other system initialization duties conditionally. If you have not edited the SYSVMR.CMD file, the STARTUP.CMD file can serve as a record of the changes and additions you have made to the "standard" system.

4.5.2 Loadable Crash Dump Support

Loadable crash dump support is available for RSX–11M–PLUS operating systems that are not pregenerated. Crash dump devices can be DU-, DL-, MU-, MS-, and MM-type devices. Loadable crash dump support allows you to specify the crash device, to change the crash device, and to turn off crash dump support while the system is operating. Refer to the *RSX–11M–PLUS and Micro/RSX Crash Dump Analyzer Reference Manual* for information on crash dump support.

If you want loadable crash dump support for generated RSX–11M–PLUS operating systems, you must enter XX: in response to Question CE290 in the Executive Options section of SYSGEN.

If you want to use the saved answer file SYSGENSA1.CMD as input to the SYSGEN procedure and you want to include loadable crash dump support in your system, you must delete the saved answer to Question CE290. (Refer to the *RSX–11M–PLUS System Generation and Installation Guide* for more information.)

If you have included loadable crash dump support in your system, you can use the DCL command SET SYSTEM/CRASH_DEVICE (see the *RSX–11M–PLUS Command Language Manual*) or the MCR command SET /CRASHDEV (see the *RSX–11M–PLUS MCR Operations Manual*) to load a specific crash driver into a main memory partition or to specify the crash device to be used by the Crash Dump Analyzer (CDA).

Note

The DCL command SET SYSTEM/CRASH_DEVICE and the MCR command SET /CRASHDEV are now valid for all RSX–11M–PLUS operating systems.

4.5.3 Installing the RMS–11 Tasks, Utilities, and Libraries

RMS–11 Version 2.0 is included on the RSX–11M–PLUS distribution kit and is therefore already on your target system disk. To use RMS–11, you need only install the resident libraries and RMS–11 utilities.

To make installation easier, the prototype STARTUP.CMD file supplied on the distribution kit contains all the necessary installation commands. If you want to use RMS–11, activate these commands by editing the [1,2]STARTUP.CMD file to remove the periods and semicolons from the beginning of each command line you want to use.

For more information on installing RMS–11, see the *RSX–11M–PLUS Release Notes*. See *RSX–11M/M–PLUS RMS–11: An Introduction* for information on using RMS–11.

4.5.4 Login and Batch Job Message Files

When you log in, the system prints the login information file [1,2]LOGIN.TXT on your terminal. You should edit this file to provide installation news and notices to system users. See the description of the HEL/LOG command in the *RSX–11M–PLUS MCR Operations Manual* for details on the LOGIN.TXT file.

If you have included batch processor support in your system, you should edit the [1,2]BATCH.TXT file, which is included at the beginning of each batch job log.

4.5.5 The Account File

If you have a previously created account file, copy the account file to the new system disk. If you do not already have an account file, run the Account File Maintenance Program (ACNT) to create an account file and user accounts. See the *RSX–11M–PLUS and Micro/RSX System Management Guide* for information on using ACNT.

The account file supplied on the distribution kit contains two accounts: one privileged and one nonprivileged, as follows:

```
UIC:           [1,1]
Account name:  SYSTEM
Password:      SYSTEM

UIC:           [200,1]
Account name:  USER
Password:      USER
```

To preserve the security of your system, you should change the passwords to these accounts as the first step in setting up an account file.

All new passwords in the account file are encrypted automatically; that is, the operating system uses an algorithm to scramble the passwords so that only the system is able to read them. If you are copying an account file from a previous version of RSX–11M–PLUS to this version, you can encrypt the passwords either by changing the passwords in the account file or by having the system users issue the MCR command SET /PASSWORD (or DCL command SET PASSWORD) to change them. For more information on password encryption, see the *RSX–11M–PLUS and Micro/RSX System Management Guide*.

The directory [200,1] account and the directory [USER], which contains several introductory files, are supplied for use in conjunction with the warm-up session for new users presented in the *Introduction to RSX–11M–PLUS*. New users coming into the system can use the account with the User File Directory (UFD) [200,1] that has been provided in the account file supplied with your distribution kit and the directory [USER] to follow along with the warm-up session.

The directory [USER] also contains two sample device drivers and their associated databases that you or system programmers may find interesting (XXDRV.MAC, XXTAB.MAC, BMDRV.MAC, and BMTAB.MAC).

4.5.6 Help Files

Short-form information on the use of many RSX–11M–PLUS commands, utilities, and features is available on line through the HELP command. You can add help files to provide users with installation-specific information.

The HELP files supplied with your system are located in directory [1,2] on your target system disk. See the *RSX–11M–PLUS MCR Operations Manual* or the *RSX–11M–PLUS Command Language Manual* for a description of the HELP command and the help file format.

4.5.7 Installing and Using System Tasks

Many privileged and supplied system tasks are installed in your system image by the [1,54]SYSVMR.CMD file when you create the system image file by using SYSGEN. You can install other system tasks that you might want to use by editing the STARTUP.CMD file or the SYSVMR.CMD file as described in Section 4.5.1 or by installing the tasks yourself by using the MCR command INS.

Many of the supplied system tasks are supplied in xxxFSL.TSK and xxxRES.TSK versions. If you have chosen supervisor-mode library support in Question CE080, you should use the xxxFSL.TSK tasks that are supplied.

If you have not chosen supervisor-mode library support, you can use the xxxRES.TSK tasks. If you chose to build the privileged system tasks to link to FCSRES by entering Yes to Question CE090, you can use the xxxRES.TSK tasks simply by installing those tasks you need.

You can use the xxxRES.TSK tasks even if you entered No to Question CE090. You need only install the FCSRES library by entering the following MCR command line:

```
>INS [1,1]FCSRES.TSK/PAR=GEN/RON=YES RET
```

You can then install and use any of the xxxRES.TSK supplied system tasks.

4.5.8 Modifying BYE Task Priority

Digital supplies the system logout task, BYE. BYE uses the default scheduling priority of 50. You can increase the priority to process user logouts more efficiently and to quickly free system resources.

You should be careful when you increase the BYE task priority because this may cause scheduling conflicts with tasks that run during user logout processing. If you want to increase the BYE task priority, Digital recommends that you only increase the priority a small amount in order to avoid any scheduling conflicts.

If BYE has a priority value that is slightly greater than 50, BYE will be scheduled before tasks that run at the default priority. However, scheduling conflicts are unlikely to occur with system tasks that have a priority higher than 50 and that are required for logout processing and system processing.

You can modify the BYE task's priority by using one of the following methods:

- You can rebuild the BYE task by using the Rebuilding the Supplied System Tasks section of SYSGEN. You must first edit the task-build command file [1,24]BYEBLD.CMD and specify the option PRI=n.
- You can edit the VMR file [1,54]SYSVMR.CMD during the Creating the System Image File section of SYSGEN. Specify the priority you want in the command that installs the BYE task.
- You can install the BYE task by using the MCR command INSTALL and specifying the /PRI=n keyword.
- You can modify the BYE task priority by using the MCR command ALT and specifying the /PRI=n keyword.

You must either save the system after you modify the BYE task priority or use the VMR command INSTALL to make the BYE task and its new priority recognizable to the system and to retain the new priority when the system is rebooted.

4.6 Installing Layered Products

If you intend to include any Digital layered products on your system, see the appropriate layered product installation documentation for specific instructions.

4.7 Finding Out More About the System

If you are not already familiar with RSX–11M–PLUS, you should read the *Introduction to RSX–11M–PLUS* and you should perform the online terminal session.

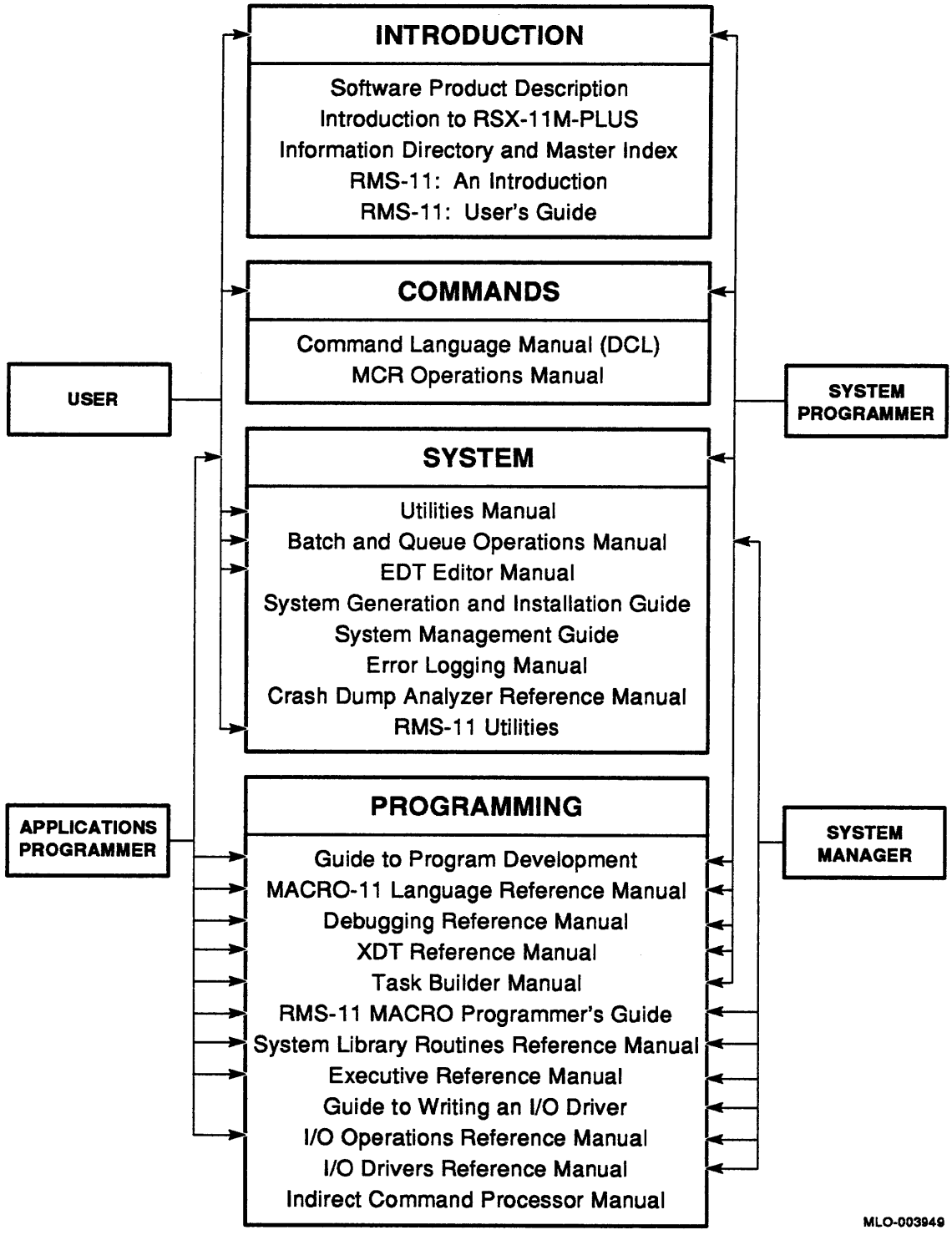
If you are to be the manager of an RSX–11M–PLUS system, you should read the *RSX–11M–PLUS and Micro/RSX System Management Guide* to become familiar with the system management utilities you will need to use.

The quickest way to find information on a specific subject is to use the Master Index contained in the *RSX–11M–PLUS Information Directory and Master Index*. The Master Index consists of all the individual manual indexes merged into a comprehensive reference to the entire documentation set.

Figure 4–1 groups the manuals in the RSX–11M–PLUS documentation set in the following ways to help you learn where to find the information you need:

By subject area	Introduction to RSX–11M–PLUS Command Interfaces System Structure and Operation Applications and System Programming
By user area	User Level Interfacing with the System Applications Programming System Programming Managing System Resources

Figure 4–1: Organization of the Documentation by Subject and by Function



4.8 Changing the System Without Repeating SYSGEN

You must perform a new system generation if you want to choose different Executive options or to alter the peripheral configuration for devices that have resident databases. You can use saved answer files for those sections you do not want to alter, thus reducing the number of questions you must answer.

Many system parameters and characteristics, however, can be changed without performing a complete system generation. The following is a list of some of the changes you can make:

- You can alter the system parameters and terminal characteristics in the SYSVMR.CMD file.
- You can change the device control and status register (CSR) and the device vector addresses by using the VMR or MCR command CON SET.
- You can change the device configuration for devices that were generated with loadable databases.
- You can add loadable drivers for devices not included during system generation.
- You can rebuild any of the supplied system tasks.

4.8.1 Using VMR to Alter System Parameters

The following system parameters are set and the following functions are performed in the SYSVMR.CMD file:

- Secondary pool size is set.
- Partitions are created.
- The directive commons are installed.
- The size of the terminal data space buffers (TTCOM) is set.
- The drivers are loaded.
- Tasks are installed.
- The round-robin scheduling interval and priority range are set.
- The Executive-level disk swapping interval and priority range are set.
- Pool limit parameters are set for the Pool Monitor Task (PMT).
- Terminal line speed, buffer size, terminal type, and other characteristics are set.

To alter system parameters by using VMR, edit the [1,54]SYSVMR.CMD file where necessary, and then re-create the system image file. For example:

```
> SET /UIC=[1,54] RET
> PIP RSX11M.SYS/NV/CO/BL:1026.=RSX11M.TSK RET
> ASN SY:=LB: RET
> VMR @SYSVMR RET
```

When VMR exits, bootstrap and save the system, as described in Section 4.2.

4.8.2 Adding Devices

If you change your hardware configuration or obtain new devices, you might be able to make the corresponding changes to your RSX–11M–PLUS system without repeating SYSGEN.

If you are adding a device type that does not exist in your current system, invoke SYSGEN and choose the Adding a Device (AD) section in Question SU160. This section creates a loadable database and assembles and builds the driver for the new device. You must re-create your system image file and load the new driver and database.

If you are changing the configuration for a device type that already exists in your current system (for example, you have three DB-type devices generated into your system and want to have five, or you want to change which devices are on which controller) and the device driver was originally generated with a loadable database, perform the Adding a Device (AD) section of SYSGEN to create a new loadable database and reassemble and rebuild the driver. You must then re-create your system image file and load the driver and the new database.

There are some restrictions on adding devices without performing a complete SYSGEN. See Section 4.8.2.1.

To add a device or change a device's configuration, invoke SYSGEN and enter No to the following questions:

```
* SU120    Do you want to do a complete SYSGEN?

* SU130    Do you want to continue a previous SYSGEN from
*          some point?
```

When SYSGEN asks which individual section of SYSGEN you want to perform in Question SU160, choose the Adding a Device (AD) section. (You cannot use a saved answer file when you are performing this section of SYSGEN.) SYSGEN then asks you all the questions in the Choosing Peripheral Configuration (CP) section.

Specify the number of controllers or devices only for the device type that you are adding or changing; specify zero controllers or devices for all the others. For MASSBUS devices (device mnemonics DB, DR, DS, EM, and MM), specify the full number of RH controllers that you have, but do not specify any MASSBUS devices that you are not adding or changing.

When all the questions in the Choosing Peripheral Configuration (CP) section have been asked, SYSGEN assembles and task builds the driver and database for the device you specified.

When SYSGEN exits, edit the [1,54]SYSVMR.CMD file to add the LOA command to load the new driver and database on your system. If you are adding or changing a MASSBUS device (device mnemonics DB, DR, DS, EM, or MM) or an RK06 or RK07 disk drive (device mnemonic DM), you must use the /CTB switch with the LOA command.

Format

LOA dd:/CTB=cca

Parameters

dd:

Specifies the device mnemonic (for example, DB, DM).

cc

Specifies the controller mnemonic (RH for MASSBUS devices, DM for RK06 or RK07 disks).

a

Specifies the controller letter (or letters separated by commas) of the controllers to which the device is connected.

Create a new system image file containing the new driver and database. For example:

```
> SET /UIC=[1,54] RET
> PIP RSX11M.SYS/NV/CO/BL:1026.=RSX11M.TSK RET
> ASN SY:=LB: RET
> VMR @SYSVMR RET
```

When VMR exits, bootstrap and save the system, as described in Section 4.2.

4.8.2.1 Restrictions on Adding Devices After SYSGEN

There are some restrictions on what devices you can add after SYSGEN. Choices you made during SYSGEN can also affect your ability to add new devices.

If a device has a resident database, it cannot be added or changed after SYSGEN. The following devices always have resident databases:

TT All terminals

LA LPA11-K Laboratory Peripheral Accelerator

If you have generated a mixed MASSBUS configuration, all the MASSBUS devices (device mnemonics DB, DR, DS, EM, and MM) have resident databases, and additions or changes cannot be made without performing a complete SYSGEN.

If you did not generate any MASSBUS devices into your system, you cannot add any MASSBUS devices after SYSGEN. If you generated at least one MASSBUS device into your system, you can change that device or add any of the other MASSBUS devices after SYSGEN.

If you did not generate any RK06 or RK07 disk drives (device mnemonic DM) into your system, you cannot add that device type after SYSGEN.

Another restriction is that you cannot add any device with a vector address that is higher than the highest interrupt vector address you specified. For this reason, you should always specify a highest interrupt vector address of 774_8 at the end of the Choosing Peripheral Configuration (CP) section—in case you want to add devices later.

4.8.3 Rebuilding Supplied System Tasks

You can rebuild supplied system tasks at any time by invoking SYSGEN and by selecting the Rebuilding the Supplied System Tasks (BN) section. See Chapter 3 for a description of the questions asked in this section.

4.9 Putting More than One System on the Same Volume

There may be instances where you want to put two or more RSX–11M–PLUS systems on a single disk volume. Each system might contain different hardware configurations or different software components and features.

If you want to place two or more RSX–11M–PLUS systems on a single disk volume, you must take certain precautions to avoid possible conflicts or confusion. Each system must have in its system directory separate copies of the system image file and all nonvectored privileged task files. The supplied system task files in the library directory can be shared by both systems, as can the system libraries in directory [1,1].

Note

The following procedure for putting two RSX–11M–PLUS systems on a single disk volume assumes that both the systems are RSX–11M–PLUS Version 4.2 systems. You may encounter various software incompatibilities if you attempt to put RSX–11M–PLUS systems of dissimilar versions on the same disk volume.

To add an RSX–11M–PLUS system to a volume that already contains an RSX–11M–PLUS system, use the following procedure. (Note that the system already on the volume is referred to as the *first system*, and the system you are adding is referred to as the *second system*. The volume-designated SY contains the first system and will later contain the second one as well. The volume-designated DB1 contains the second system. Both SY and DB1 are assumed to be mounted already.)

1. Create a separate directory on the volume, such as directory [4,54], for the second system. Set your default User Identification Code (UIC) to this directory. For example:

```
> UFD SY:[4,54] RET
> SET /UIC=[4,54] RET
```

2. Copy all files from directory [1,54] of the disk that contains the second system to the directory you created in step 1. For example:

```
> PIP SY:[4,54]/CD=DB1:[1,54]*.* RET
```

3. Delete the second system's RSX11M.SYS file. For example:

```
> PIP RSX11M.SYS;*/DE RET
```

4. Create a file named RSX11M.SYS from the second system's RSX11M.TSK file. For example:

```
> PIP RSX11M.SYS/CO/NV/BL:1026.=RSX11M.TSK RET
```

5. Use the second system's SYSVMR file and VMR to set up partitions, to install tasks, and to load drivers. For example:

```
> ASN SY:=LB: RET
> VMR @SYSVMR RET
```

6. Set the proper default system UIC to ensure that the install-run-remove option of the RUN command works properly. Use the SET /SYSUIC command to set the system UIC to the UIC to which you copied the second system. For example:

```
> SET /SYSUIC=[4,54] RET
```

7. Set the library UIC to the library UIC of the first system. For example:

```
> SET /LIBUIC=[3,54] RET
```

8. Save the second system with the SAV command. Use the /WB switch only if you want to have the second system be the one that comes up when you hardware bootstrap the volume. Note that only one system on a volume can be hardware bootable.

```
> SAV RET
```

9. Software bootstrap the second system by using the BOO command as follows:

```
> BOO RET
```

The volume now contains two systems.

The following is an example of adding a second system (on DB1) to an existing system (on the system device):

```
> UFD SY:[4,54] RET
> SET /UIC=[4,54] RET
> PIP SY:[4,54]/CD=DB1:[1,54]*.* RET
> PIP RSX11M.SYS;*/DE RET
> PIP RSX11M.SYS/CO/NV/BL:1026.=RSX11M.TSK RET
> ASN SY:=LB: RET
> VMR @SYSVMR RET
          .
          .  [Messages from VMR appear here]
          .
> BOO RET

 RSX-11M-PLUS Vr.u  BLnn
> SET /SYSUIC=[4,54] RET
> SET /LIBUIC=[3,54] RET
> SAV RET

 RSX-11M-PLUS Vr.u  BLnn    576.K System:"NANCY"
```

In order to run a task, the task header must be initialized to contain system-specific information. This can be done when the task is installed (using the MCR or VMR command INSTALL) by writing the information into the disk-resident task header in the task image file. However, if a task that is installed in the current running system is installed in a different system image by using the VMR command INSTALL, the information in the task header will no longer be correct for the current running system. The loader validates the task header information when the task is run. If the information is not correct, the task aborts with the message "Task installed in more than one system."

You can avoid this problem by removing the task and reinstalling it in the current running system, forcing the task header to be rewritten with the correct system-specific information.

RSX–11M–PLUS Version 4.2 includes an enhancement to avoid this problem called "deferred binding." When a task is installed using deferred binding, the task header is initialized by the loader with the system-specific information. Deferred binding is the default condition, but it can be overridden by specifying the /-DFB switch with the INSTALL command.

Digital recommends that you use deferred binding with all supplied system tasks in order to avoid problems when VMR installs the tasks into a newly generated system. If you do not use deferred binding, the system may hang or crash if the newly generated system shares the library directory with the current running system that performed the VMR.

4.10 System Initialization Errors

When an unsaved system is bootstrapped, the system initialization module INITL establishes data structures and performs sanity checks on the system. If the INITL module encounters an error condition, it prints an error message on the system console terminal. The state of the system depends on whether XDT is present and whether the error condition is classified as "Warning" or "Fatal."

If your system does not have XDT, the INITL module halts the processor. Either of two error messages appears:

- If the message is labeled "Warning," you can proceed with system initialization by pressing the CONT switch on the processor console panel.
- If the message is labeled "Fatal," you cannot continue system initialization; you must fix the problem and rebootstrap the disk.

If the system includes XDT, the INITL module executes a breakpoint trap (BPT) instruction, which causes control to pass to XDT. Then, XDT prints a breakpoint error (BE) message and prompts you for input, as follows:

- If the message is labeled "Warning," you can use XDT commands to examine locations and to correct the problem. Enter the P command to continue system initialization.
- If the message is labeled "Fatal," you cannot continue with system initialization; you must fix the problem and rebootstrap the system.

4.10.1 System Initialization Warning Messages

The following are the possible INITL warning messages:

Warning—Crash device not found in system tables:

R0=device type (ASCII)

R1=logical unit number

Enter CSR address in R2, physical unit number in R1

type P

and

hit continue

Explanation: The device that you specified for crash dumps does not have an associated Device Control Block (DCB) in the system device tables.

User Action: The INITL module allows you to enter the control and status register (CSR) of the crash dump device so that you can continue system operation without having to rebuild the Executive.

Warning—Device xx Vector address above V$$CTR

Explanation: In examining the vector assignments, the INITL module finds that the vector address for this device is higher than the highest possible address for vectors on this system.

User Action: You can use the VMR command CON SET to change the value S.VCT/K.VCT in the device database. See the *RSX–11M–PLUS and Micro/RSX System Management Guide* for a description of the VMR command CON SET.

Warning—Device xx Vector in use

Explanation: The INITL module finds that the vector for device xx points to something other than an Executive nonsense interrupt entry point.

User Action: Either the vector itself has been corrupted (use XDT or the Task/File Patch Program [ZAP] to correct this) or the vector has been incorrectly specified (use the VMR command CON SET to correct this).

4.10.2 System Initialization Fatal Messages

The following are the possible INITL fatal error messages:

Fatal error—Boot device not found in system tables:

R0=device type (ASCII)

R1=Physical unit number

R2=CSR address

Explanation: You have bootstrapped your system from a device for which there is no database in your generated system. For example, you might have a hardware configuration that contains four DB-type devices but the RSX–11M–PLUS system you are running has only two DB-type devices generated into it.

User Action: Bootstrap your system from a device that is present in your running system.

Fatal error— { ccaa / unit ddnn: } didn't come on line

error code in R1

Explanation: If a controller mnemonic appears in the message, the driver database contains the wrong CSR address, or there is an error in the driver. If a device unit mnemonic appears, there is an error in the driver.

User Action: If the problem is an incorrect CSR address, you can change the faulty CSR address by using the VMR command CON SET. If there is an error in a Digital-supplied driver, submit a Software Performance Report (SPR) to Digital. If there is an error in a user-supplied driver, you must diagnose and correct the error.

Fatal error–Device xx Driver does not support controller type

Explanation: There is an error in the driver or the driver was assembled with the wrong RSXMC file.

User Action: If there is an error in the driver and it is Digital-supplied, submit an SPR to Digital. If the driver is not the problem, reassemble the driver by using the proper RSXMC file.

Fatal error—Device xx Driver not loaded

Explanation: You have not loaded the driver.

User Action: Use VMR to load the driver, and rebootstrap your system.

Fatal error—Directive partition not fixed in memory

Explanation: You have not fixed your directive partitions in memory.

User Action: Use VMR to load and fix the directive partitions into your system image.

Fatal error–Driver didn't return control after { controller / unit } online call

Driver error—If the driver is a Digital-supplied driver, submit an SPR to Digital.

Explanation: The system image is corrupted or there is an error in the driver.

User Action: If the system image is corrupted, perform SYSGEN again by using the saved answer files previously produced. If the driver is the problem, submit an SPR to Digital.

Fatal error—Executive data space not loaded

Explanation: You have not used VMR to create the system image file.

User Action: Perform the Creating the System Image File (CS) section of SYSGEN to create the system image file.

Fatal error—Secondary pool not created with VMR

Explanation: You have not created a secondary pool partition in your system image file.

User Action: Use the VMR command SET to create a secondary pool partition.

Chapter 5

Pregenerated RSX–11M–PLUS Kits

The pregenerated RSX–11M–PLUS kit provides the quickest and easiest way to begin running an RSX–11M–PLUS system on your PDP–11 hardware.

The other RSX–11M–PLUS distribution kits require you to spend considerable time generating an RSX–11M–PLUS system that suits your hardware and programming needs. The pregenerated kit, however, contains a ready-to-run RSX–11M–PLUS system that is suitable for many hardware configurations, especially those that do not have large-capacity disk drives and many peripheral devices.

You need to perform only a few simple operations before you are ready to begin using your pregenerated system. The sections in this chapter guide you through those operations step by step.

Section 5.1 briefly describes the pregenerated kits and the systems they contain. Section 5.2 then explains the steps necessary to install the pregenerated kit on your hardware system, and Section 5.3 gives an example of one of those steps, copying the system. Section 5.4 tells you how to tailor various system files to suit your needs and describes other tasks related to preparing the system for use. Section 5.5 provides detailed descriptions of the features and restrictions of the pregenerated system. Finally, Section 5.6 describes various methods of changing certain aspects of your system, such as adding device drivers, supporting laboratory I/O peripherals, or including the DECnet package.

You should read through this chapter and familiarize yourself with the pregenerated kit and the operations you must perform before you attempt to do anything with your kit disk.

5.1 Short Descriptions of the Kit and the System

The following sections briefly describe the contents of the pregenerated kit and the features of the RSX–11M–PLUS system the kit contains. A detailed description of the features, characteristics, and limitations of the pregenerated systems is given in Section 5.5.2.

The pregenerated distribution kit consists of one RL02 disk. The kit disk contains all the necessary RSX–11M–PLUS system files and utilities, and RMS–11 Version 2.0 files and utilities, as well as some special-purpose files. The disk also contains two ready-to-run system images.

5.1.1 Description of the Pregenerated RSX–11M–PLUS System

The pregenerated system is an RSX–11M–PLUS image that incorporates most RSX–11M–PLUS features. When you bootstrap the disk, an automatic system startup procedure identifies the peripheral devices connected to your processor and performs various other housekeeping tasks. Once the startup procedure is finished, you can use your RSX–11M–PLUS system immediately.

For the automatic system startup procedure to be able to properly identify the peripheral devices connected to your processor, those devices must be at Digital-standard control and status register (CSR) and vector addresses. If you have a PDP–11/23–PLUS, PDP–11/24, or one of the MicroPDP–11 series packaged systems, your devices are probably at the standard CSR and vector addresses. If you are not sure about whether your system is configured properly, consult Digital Customer Service.

Two pregenerated system images are provided on the kit disk: one for use on processors that support separate instruction- and data-space (I- and D-space) mapping (such as the PDP–11/44, PDP–11/53, PDP–11/70, MicroPDP–11/73, MicroPDP–11/83, and PDP–11/84), the other for use on processors that do not (such as the PDP–11/23–PLUS, PDP–11/24, and MicroPDP–11/23).

See Section 5.5.2 for detailed descriptions of the Executive features and devices supported.

5.2 Installing the Pregenerated System

Before you do anything else with your pregenerated system, you must perform the following operations:

- Copy the Digital-supplied distribution kit disk to a blank disk.
- Delete unnecessary files to provide more free space on the system disk.

The following sections help you decide how to perform the operations and guide you step by step through the process of installing your system.

5.2.1 Copying the Digital-Supplied Kit Disk

You must make a copy of the kit disk that you received from Digital. You should do this before you alter the kit disk in any way. You can then save the Digital-supplied disk as a backup in case something goes wrong and your system disk is damaged or corrupted or in case your needs change and you have to set up your system differently. The procedures described in the following sections require you to delete files from the system disk; if you use the Digital-supplied disk as your system disk, you will destroy your only master copy of the RSX–11M–PLUS software.

The copying procedure you use depends on your hardware configuration:

- If you have a small system with two RL02 disk drives, you can copy the kit to a blank RL02 disk.
- If you have a MicroPDP–11 processor, you might want to copy the kit to the fixed disk.

If you want to copy the Digital-supplied RL02 kit disk to another RL02 disk, turn to Section 5.2.2.

If you want to copy the RL02 kit disk to an RD51, RD52, or other disk, turn to Section 5.2.3.

5.2.2 Copying the RL02 Kit Disk to a Blank RL02 Disk

This section describes how to copy an RL02 kit disk to another RL02 disk by using the BRUSYS supplied system on the kit disk. It also describes the procedure for deleting unused system files to increase available space on the system disk.

You need one blank RL02 disk to make a copy of the RL02 kit disk.

Section 5.3 contains an example of the copying and deleting procedures. You might find it helpful to remove those pages from the binder and refer to the example as you read through the following instructions.

Use the following procedure to copy the kit disk. (The *output disk* referred to in this section is the blank RL02 disk to which you are copying the kit disk.)

1. Place the kit disk and the output disk in their respective drives. If you are not familiar with the procedure for using RL02 disk drives, consult the hardware documentation for the RL02 disk drive.

2. Hardware bootstrap the kit disk. (Consult Digital Customer Service or your processor documentation for information on hardware bootstrapping devices.) This brings the pregenerated system into memory. The system startup procedure is invoked automatically and prompts you for the date and time. Press CTRL/C in response to the prompt. Then, type ABO AT. in response to the MCR prompt to abort Indirect and to exit from the startup procedure.

   The following is an example of bootstrapping a kit disk loaded in drive DL0 on a PDP–11/23–PLUS processor:

```
TESTING MEMORY
0512.KW
START?  DL [RET]

RSX-11M-PLUS Vr.u  BLnn    512.KW  System:"RL02SY"
>RED DL1:=SY:
>RED DL1:=LB:
>RED DL1:=SP:
>MOU DL1:"PREGENNEDSYS"
>@DL1:[1,2]STARTUP

                        RSX-11M-PLUS system startup procedure

          Copyright  (C)  1989 by Digital Equipment Corporation

          Please enter the time and date. The time must be
          in 24-hour format (example: 13:00 for 1:00 p.m.).
          The month name must be three characters long
          (example: SEP). After entering the time and date,
          press the return key. Example: 13:55 11-MAR-89

          Time and date :  [CTRL/C]
MCR> ABO AT. [RET]

12:00:47  Task  "AT.TO " terminated
          Aborted via directive or CLI
```

If you cannot bootstrap your system, check your system's site configuration documentation or consult Digital Customer Service to see whether your hardware has the standard CSR and vector addresses for the RL02 drive controller. The CSR address must be 174400_8 and the vector 160_8.

3. Write-protect the kit disk by using the write-protect switch on the drive. Software bootstrap the BRUSYS standalone system by entering the following command line:

```
>BOO [6,54]BRUSYS RET
```

This brings the BRUSYS system into memory. The BRUSYS system prints an identification line on the console terminal and then runs the Standalone Configuration and Disk Sizing Program (CNF).

4. Enter the device specifications in response to the prompts from CNF. The "first device" is the drive containing the kit disk; the "second device" is the drive containing the output disk. For example:

```
Enter first device:  DL0: RET
Enter second device:  DL1: RET
```

5. Press the RETURN key, and then enter the date and time by using the TIM command. Use the TIM command again to verify that you entered the correct date and time. For example:

```
Hit RETURN and enter date and time as 'TIM HH:MM MM/DD/YY'  RET
> TIM 11:45 03/01/89 RET
> TIM RET
11:45:01 01-MAR-89
>
```

6. Run the Bad Block Locator Utility (BAD) on your output disk. For example, if your output device is DL1, use the following command sequence:

```
> RUN BAD RET
>
BAD> DL1:/LIST RET
BAD -- DL1: Total bad blocks= 0.
BAD> CTRL/Z
```

If BAD finds bad blocks on your output disk, the blocks are marked on the disk and are not used again by RSX–11M–PLUS. If your output disk has a large number of bad blocks (for example, more than 10) or if block 0 is bad, you should use another disk.

7. Run the Backup and Restore Utility (BRU) to copy the kit disk to the output disk. For example, if the kit disk is mounted on DL0 and the output disk is mounted on DL1, use the following command sequence:

```
> RUN BRU RET
>
BRU> /VERIFY RET
From:    DL0: RET
To:      DL1: RET
BRU - Starting verify pass

BRU - Completed

BRU>  CTRL/Z
```

If BRU prints messages indicating that the verify operation failed, repeat this entire step. If the verify operation fails again, use a new RL02 output disk. If the verify operation fails once again, it is likely that your kit disk is defective and should be replaced.

When BRU finishes, the output disk contains a complete copy of the Digital-supplied kit disk. Remove the kit disk from its drive and safely store it for later use in making fresh copies, should the need arise.

The output disk is now referred to as the *system disk*.

You must now decide which of the two system images on the system disk you want to use. Read Section 5.2.2.1 next.

5.2.2.1 Deleting the Unused System from the System Disk

There are two RSX–11M–PLUS system images supplied on the pregenerated kit disk.

In directory [1,54] there is an RSX–11M–PLUS system image that does not take advantage of I- and D-space mapping hardware. (For clarity, this chapter refers to this system as "the [1,54] system.") This system is intended primarily for processors that do not incorporate I- and D-space mapping hardware, such as the PDP–11/23–PLUS, PDP–11/24, and MicroPDP–11/23.

The [1,54] system does not support user- or kernel-mode I- and D-space tasks or supervisor-mode libraries. Support for Shadow Recording (SHA), Console Logging, and parity memory has also been omitted from this system.

The [1,54] system can also run on processors that include separate I- and D-space mapping hardware. However, note that, when you run the [1,54] system on these processors, the system does not take advantage of the I- and D-space mapping hardware.

When you hardware bootstrapped your kit disk for copying, the [1,54] system was the system that began running.

In directory [2,54] there is an RSX–11M–PLUS system image that does take advantage of I- and D-space mapping hardware. (This chapter refers to this system as "the [2,54] system.") This system can be run only on the PDP–11/44, PDP–11/53, PDP–11/70, MicroPDP–11/73, MicroPDP–11/83, and PDP–11/84 processors, all of which incorporate separate I- and D-space mapping hardware. If you are running the pregenerated system on any of these processors, you should use the [2,54] system to take advantage of the mapping hardware.

The [2,54] system supports user- and kernel-mode I- and D-space tasks and supervisor-mode libraries. It includes all RSX–11M–PLUS Executive features.

Both the [1,54] and [2,54] systems support the same devices (see Section 5.5.2.2 for a complete list).

Once you have decided which system you want to use, do the following to delete the unused system:

1. If it is not still mounted, place the system disk in a drive on your system. If you are not familiar with the procedure for using RL02 disk drives, consult the hardware documentation for the RL02 drive.

2. Hardware bootstrap the system disk. (Consult Digital Customer Service or your processor documentation for information on hardware bootstrapping devices.) This brings the [1,54] system into memory. The system startup procedure is invoked automatically and prompts you for the date and time. Press CTRL/C in response to the prompt. Then, type ABO AT. in response to the MCR prompt to abort Indirect and to exit from the startup procedure.

   The following is an example of bootstrapping a system disk mounted in drive DL1 on a PDP–11/84 processor:

```
TESTING MEMORY
0512.KW
START? DL1 [RET]

RSX-11M-PLUS Vr.u  BLnn   512.KW  System:"RL02SY"
>RED DL1:=SY:
>RED DL1:=LB:
>RED DL1:=SP:
>MOU DL1:"PREGENNEDSYS"
>@DL1:[1,2]STARTUP
                        RSX-11M-PLUS system startup procedure

          Copyright  (C)  1989 by Digital Equipment Corporation

          Please enter the time and date. The time must be
          in 24-hour format (example: 13:00 for 1:00 p.m.).
          The month name must be three characters long
          (example: SEP). After entering the time and date,
          press the return key. Example: 13:55 11-MAR-89

          Time and date :  [CTRL/C]
MCR> ABO AT. [RET]

12:00:47  Task  "AT.TO " terminated
          Aborted via directive or CLI
```

3. If you intend to use the [1,54] system, skip to step 5.

   If you intend to use the [2,54] system, software bootstrap that system by entering the following MCR command line:

```
> BOO [2,54]RSX11M [RET]
```

   This brings the [2,54] system into memory, and the system prints an identification message. The system startup procedure is invoked automatically again, and the system prompts you for the date and time. Press CTRL/C in response to the prompt. Then, type ABO AT. in response to the MCR prompt to abort Indirect and to exit from the startup procedure.

   The following is an example of software bootstrapping the [2,54] system:

```
> BOO [2,54]RSX11M [RET]
RSX-11M-PLUS Vr.u  BLnn   512.KW  System:"RL02ID"
>RED DL1:=SY:
>RED DL1:=LB:
>RED DL1:=SP:
>MOU DL1:"PREGENNEDSYS"
>@DL1:[1,2]STARTUP
```

```
                    RSX-11M-PLUS system startup procedure

          Copyright  (C)  1989 by Digital Equipment Corporation

          Please enter the time and date. The time must be
          in 24-hour format (example: 13:00 for 1:00 p.m.).
          The month name must be three characters long
          (example: SEP). After entering the time and date,
          press the return key. Example: 13:55 11-MAR-89

          Time and date :  CTRL/C
MCR>ABO AT. RET

12:00:47  Task  "AT.T0 " terminated
          Aborted via directive or CLI
```

Remember that the [2,54] system only runs on processors that include the I- and D-space mapping hardware. If you software bootstrap the [2,54] system on a processor that does not have I- and D-space hardware, the system will not run.

4. Make the [2,54] system hardware bootable. Enter the following MCR command line:

```
> SAVE /WB RET
```

This makes the [2,54] system hardware bootable. The [2,54] system begins running again, and the startup procedure is automatically invoked once again. Press CTRL/C in response to the prompt. Then, type ABO AT. in response to the MCR prompt to abort Indirect and to exit from the startup procedure.

The following is an example of making the [2,54] system hardware bootable:

```
> SAV /WB RET
DMO -- System disk being dismounted
DMO -- SYSTEM dismounted from DL1:    *** Final dismount initiated ***
12:10:17  *** DL1:  -- Dismount complete
>

RSX-11M-PLUS Vr.u  BLnn   512.KW  System:"RL02ID"
>RED DL1:=SY:
>RED DL1:=LB:
>RED DL1:=SP:
>MOU DL1:"PREGENNEDSYS"
>@DL1:[1,2]STARTUP

                    RSX-11M-PLUS system startup procedure

          Copyright  (C)  1989 by Digital Equipment Corporation

          Please enter the time and date. The time must be
          in 24-hour format (example: 13:00 for 1:00 p.m.).
          The month name must be three characters long
          (example: SEP). After entering the time and date,
          press the return key. Example: 13:55 11-MAR-89

          Time and date :  CTRL/C
MCR> ABO AT. RET

12:00:47  Task  "AT.T0 " terminated
          Aborted via directive or CLI
```

5. Delete the files that belong to the system that you chose not to use. Note that, if you should later change your mind and decide to use the system you delete in this step, you can make a new system disk copy from the Digital-supplied kit disk.

   The system disk contains an automated procedure, called DELETESYS.CMD, that makes deleting the unused system easy. Invoke this procedure by entering the following MCR command line:

   ```
   >@[1,2]DELETESYS RET
   ```

   This procedure deletes only the files that belong to the system you are not presently running. The procedure asks you to confirm that you have made a copy of your kit disk and that you are sure you want to delete the unused system.

6. When the DELETESYS.CMD procedure finishes, the installation of your pregenerated system is complete.

The following is an example of invoking the DELETESYS.CMD procedure to delete the [2,54] system:

```
>@[1,2]DELETESYS RET

This procedure deletes those files specific to the currently nonactive
system.  This procedure assumes that you are now running the system that
you have made hardware bootable.

Have you made a copy of your distribution kit?  Y RET

This procedure will delete the I- and D-space system in
[2,54], the FCS supervisor-mode library, and the tasks
linked to that library.

Are you sure that you want to continue?  Y RET

The following display shows the number of blocks used and the number
of blocks free before deleting anything.
DL1: has 207. blocks free, 20273.  blocks used out of 20480.
Largest contiguous space =2207. blocks
631. file headers are free, 628. headers used out of 1259.

Deleting...

The following display shows the number of blocks used and the number
now free for use on the system disk.

DL1: has 5199. blocks free, 15281.  blocks used out of 20480.
Largest contiguous space = 3430. blocks
772. file headers are free, 487. headers used out of 1259.

End of DELETESYS.CMD

>
```

Turn next to Section 5.4 for information on other changes you might want to make to the system.

5.2.3 Copying the RL02 Kit Disk to an DU-Type Disk

This section describes how to copy the RL02 kit disk to an RD51, RD52, RD53, RD54, or other DU-type disk. (The DU-type disks include the RA60, RA70, RA80, RA81, RA82 RA90, RC25, RD51, RD52, RD53, and RD54.) This section also describes the procedure for deleting unused system files to increase available space on the system disk.

There are three major steps in the process of copying the RL02 kit disk for use on a DU-type system disk, as follows:

1. Copy the RL02 kit disk to the DU-type system disk.
2. Create a new system image file by using the appropriate VMR command file.
3. Bootstrap the system, save the system, and make it hardware bootable.

You need one blank DU-type disk to make a copy of the RL02 kit disk.

Use the procedure described in the following sections to copy the kit disk. (The *output disk* referred to in this section is the blank DU-type disk to which you are copying the kit disk.)

5.2.3.1 Copying the Kit Disk

Use the following procedure to copy the RL02 kit disk to the DU-type output disk:

1. Place the kit disk and the output disk in their respective drives. If you are not familiar with the procedure for using either of the disk drives, consult the hardware documentation for the appropriate disk drives.
2. Hardware bootstrap the kit disk. (Consult Digital Customer Service or your processor documentation for information on hardware bootstrapping devices.) This brings the pregenerated system into memory. The system startup procedure is invoked automatically and prompts you for the date and time. Press CTRL/C in response to the prompt. Then, type ABO AT. in response to the MCR prompt to abort Indirect and to exit from the startup procedure. This procedure is invoked again after you copy your kit. The following is an example of bootstrapping a kit disk mounted in drive DL0 on a PDP–11/23–PLUS processor:

```
TESTING MEMORY
0512.KW
START? DL [RET]

RSX-11M-PLUS Vr.u  BLnn   512.KW  System:"RL02SY"
>RED DL:=SY:
>RED DL:=LB:
>RED DL:=SP:
>MOU DL:"PREGENNEDSYS"
>@DL:[1,2]STARTUP

                    RSX-11M-PLUS system startup procedure

          Copyright  (C)  1989  by Digital Equipment Corporation

          Please enter the time and date. The time must be
          in 24-hour format (example: 13:00 for 1:00 p.m.).
          The month name must be three characters long
          (example: SEP). After entering the time and date,
          press the return key. Example: 13:55 11-MAR-89
```

```
          Time and date :  CTRL/C
MCR> ABO AT.  RET

12:00:47  Task  "AT.T0 " terminated
          Aborted via directive or CLI
```

If you cannot bootstrap your system, check your system's site configuration documentation or consult Digital Customer Service to see whether your hardware has the standard CSR and vector addresses for the RL02 drive controller. The CSR address must be 174400_8 and the vector 160_8.

3. Write-protect the kit disk by using the write-protect switch on the drive. Software bootstrap the BRUSYS standalone system by entering the following command line:

```
> BOO [6,54]BRUSYS  RET
```

This brings the BRUSYS system into memory. The BRUSYS system prints an identification line on the console terminal and then runs the Standalone Configuration and Disk Sizing Program (CNF).

4. Enter the device specifications in response to the CNF prompts. The "first device" is the drive containing the kit disk; the "second device" is the drive containing the output disk. For example:

```
Enter first device:  DL0:  RET

Enter second device:  DU0:  RET
```

5. Press the RETURN key, and then enter the date and time by using the TIM command. Use the TIM command again to verify that you entered the correct date and time. For example:

```
Hit RETURN and enter date and time as 'TIM HH:MM MM/DD/YY'  RET

> TIM 10:17 03/02/89 RET
> TIM  RET
10:17:01 2-MAR-89
>
```

6. Run the Bad Block Locator Utility (BAD) on your output disk. For example, if your output device is DU0, use the following command sequence:

```
> RUN BAD  RET
>
BAD>  DU0:/LIST  RET
BAD -- DU0: Total bad blocks= 0.
BAD>  CTRL/Z
```

If BAD finds that your output disk has bad blocks on it, the blocks are marked on the disk and are not used again by RSX–11M–PLUS. If your output disk has a large number of bad blocks (for example, more than 10), or if block 0 is bad, you should use another disk.

7. Run the Backup and Restore Utility (BRU) to copy the kit disk to the output disk. For example, if the kit disk is mounted on DL0 and the output disk is an RD51 drive designated DU0, use the following command sequence:

```
>RUN BRU [RET]
>
BRU>/VERIFY/MAX:9633/HEADERS:1204 [RET]
From:    DL0: [RET]
To:      DU0: [RET]
BRU - This disk will not contain a hardware bootable system
BRU - Starting verify pass

BRU - Completed

BRU> [CTRL/Z]
```

You should alter the values specified in the /MAXIMUM and /HEADERS qualifiers to suit the output disk volume. Use the appropriate values from the following table for the arguments of the /MAXIMUM and /HEADERS qualifiers. (This table is the equivalent of Table 2–1.)

Device	Value for /MAXIMUM	Value for /HEADERS
RA60	24617	12308
RA70	34180	25593
RA80	14629	7314
RA81	54815	51699
RA82	65500	51699
RA90	65500	64595
RC25	3130	1565
RD31	2558	10236
RD32	5117	20471
RD51	1328	664
RD52	3719	1859
RD53	8529	4264
RD54	19143	9571

If BRU prints messages indicating that the verify operation failed, repeat this entire step. If the verify operation fails again, use a new output disk (or, if the output disk is a fixed-medium device, have the drive serviced). If the verify operation fails once again, it is likely that your kit disk is defective and should be replaced.

When BRU finishes, the output disk contains a complete copy of the Digital-supplied kit disk. Leave both disks spinning in their respective drives, as they are both needed in the next step.

At this point, the system image on your output disk is neither hardware nor software bootable, since the DU driver is not loaded in the pregenerated system.

From this point on, the output disk you created in this section will be referred to as the *system disk*.

5.2.3.2 Using VMR to Create the New System Image File

The system disk contains two unsaved system task files: [1,54]RSX11M.TSK and [2,54]RSX11M.TSK. You use one of these system task files to create the new system image file.

In directory [1,54] there is an RSX–11M–PLUS system task file that does not take advantage of I- and D-space mapping hardware. (For clarity, this chapter refers to this system as "the [1,54] system.") This system is intended primarily for the MicroPDP–11/23, PDP–11/23–PLUS, and PDP–11/24 processors, none of which incorporate I- and D-space mapping hardware.

The [1,54] system does not support user- or kernel-mode I- and D-space tasks or supervisor-mode libraries. Support for Shadow Recording (SHA), Console Logging, and parity memory has also been omitted from this system.

The [1,54] system can also run on processors that include I- and D-space mapping hardware. However, note that, when you run the [1,54] system on processors that include separate I- and D-space mapping hardware, the system does not take advantage of that mapping hardware.

When you hardware bootstrapped your kit disk for copying, the [1,54] system was the system that began running.

In directory [2,54] there is an RSX–11M–PLUS system image that does take advantage of I- and D-space mapping hardware. (This chapter refers to this system as "the [2,54] system.") This system can be run only on the PDP–11/44, PDP–11/53, PDP–11/70, MicroPDP–11/73, MicroPDP–11/83, and PDP–11/84 processors, all of which incorporate I- and D-space mapping hardware. If you are running the pregenerated system on any of these processors, you should use the [2,54] system.

The [2,54] system supports user- and kernel-mode I- and D-space tasks and supervisor-mode libraries. It includes all RSX–11M–PLUS Executive features.

Both the [1,54] and [2,54] systems support the same devices (see Section 5.5.2.2 for a complete list).

Decide which of the systems is appropriate for your hardware installation. Then use the following procedure to create a new system image file (RSX11M.SYS):

1. Hardware bootstrap the kit disk. This brings the [1,54] system into memory. The startup procedure is invoked automatically and prompts you for the date and time. Press CTRL/C in response to the prompt. Then, type ABO AT. in response to the MCR prompt to abort Indirect and to exit from the startup procedure.
2. Load the DU driver by entering the following MCR command line:

   ```
   > LOA DU:/VEC/PAR=GEN RET
   ```

3. Install the RCT task by entering the following MCR command line:

   ```
   > INS $RCT RET
   ```

4. Write-protect the kit disk by using the write-protect switch on the drive.

5. Bring the DU-type disk drive on line by entering the following CON command line:

```
> CON ONL ALL RET
```

6. Mount the target system disk. For example, if the system disk is device DU0, enter the following MCR command line:

```
> MOU DU0:PREGENNEDSYS RET
```

7. Set your default directory to [1,54] if you intend to use the [1,54] system. Set your default directory to [2,54] if you intend to use the [2,54] system. For example, if you intend to use the [2,54] system, enter the following MCR command line:

```
> SET /UIC=[2,54] RET
```

8. Assign logical devices SY and LB to the system disk. For example, if your system disk is DU0, enter the following MCR command sequence:

```
> ASN DU0:=SY: RET
> ASN DU0:=LB: RET
```

9. Delete the RSX11M.SYS file and create a new, unsaved file from the RSX11M.TSK file. Enter the following MCR command sequence:

```
> DEL RSX11M.SYS;* RET
> PIP RSX11M.SYS/CO/NV/BL:1026.=RSX11M.TSK RET
```

10. Run VMR by using the DUVMR.CMD command file. Disregard any messages that are printed by VMR. Enter the following MCR command sequence:

```
> VMR @DUVMR RET

.
.  [Messages from VMR appear here]
.
```

When VMR finishes, your system disk contains a software-bootable, unsaved system image.

5.2.3.3 Bootstrapping and Saving the New System Image

Use the following procedure to save the new system image and to make it hardware bootable:

1. Software bootstrap the new system image. For example, if your system disk is DU0 and you just re-created the system image in directory [2,54], enter the following MCR command line:

```
> BOO DU0:[2,54] RET
```

This brings the [2,54] system into memory and prints an identification message on the console terminal. For example:

```
RSX-11M-PLUS Vr.u  BLnn
```

2. Save the system and make it hardware bootable by entering the following MCR commmand line:

```
> SAV /WB RET
```

The system prints an identification message, and the system startup procedure is invoked and prompts you for the date and time. Press CTRL/C in response to the prompt. Then, enter ABO AT. in response to the MCR prompt to abort Indirect and to exit from the startup procedure.

The following is an example of making the [1,54] system hardware bootable:

```
> SAV /WB [RET]

RSX-11M-PLUS Vr.u  BLnn   512.KW  System:"RL02SY"
>RED DU:=SY:
>RED DU:=LB:
>RED DU:=SP:
>MOU DU:"PREGENNEDSYS"
>@DU:[1,2]STARTUP
                        RSX-11M-PLUS system startup procedure

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          Please enter the time and date. The time must be
          in 24-hour format (example: 13:00 for 1:00 p.m.).
          The month name must be three characters long
          (example: SEP). After entering the time and date,
          press the return key. Example: 13:55 11-MAR-89

          Time and date :  [CTRL/C]
MCR> ABO AT. [RET]

12:00:47  Task  "AT.TO " terminated
          Aborted via directive or CLI
```

3. Your system disk now contains a hardware-bootable system.

You must now delete the system image and files of the system that you do not intend to use.

5.2.3.4 Deleting the Unused System from the System Disk

Use the following procedure to delete the system you did not make hardware bootable in the previous section:

1. If you are not already running the hardware-bootable system, mount the system disk and hardware bootstrap it as you did before.

   This brings the hardware-bootable system into memory. The startup command file is invoked automatically and prompts you for the date and time. Press CTRL/C in response to the prompt. Then, enter ABO AT. in response to the MCR prompt to abort Indirect and to exit from the startup command file.

2. Delete the files that belong to the system that you chose not to use. Note that if you should later change your mind and decide to use the system you delete in this step, you can make a new system disk copy from the Digital-supplied kit disk, and you can perform the procedure detailed in the previous sections again.

   The system disk contains an automated procedure called DELETESYS.CMD that makes deleting the unused system easy. Invoke this procedure by entering the following MCR command line:

   ```
   > @[1,2]DELETESYS [RET]
   ```

This procedure deletes only the files that belong to the system you are not presently running. The procedure asks you to confirm that you are sure you want to delete the files.

3. When the DELETESYS.CMD procedure finishes, the installation of your pregenerated system is complete.

The following is a sample of a terminal trace produced by a user invoking the DELETESYS.CMD procedure to delete the [1,54] system:

```
> @[1,2]DELETESYS RET

This procedure deletes those files specific to the currently nonactive
system. This procedure assumes that you are now running the system that
you have made hardware bootable.

Have you made a copy of your distribution kit?  Y RET

This procedure will delete the non-I- and D-space system
in [1,54], the FCS resident library, and the tasks linked
to that library.

Are you sure that you want to continue?  Y RET

The following display shows the number of blocks used and the number
of blocks free before deleting anything.
DU0: has 1327. blocks free, 20273.  blocks used out of 21600.
Largest contiguous space = 1327. blocks
700. file headers are free, 628. headers used out of 1328.

Deleting...

The following display shows the number of blocks used and the number
now free for use on the system disk.
DU0: has 5717. blocks free, 15883.  blocks used out of 21600.
Largest contiguous space = 3100. blocks
823. file headers are free, 505. headers used out of 1328.

End of DELETESYS.CMD

>
```

Your system disk now contains a single, hardware-bootable system. Turn next to Section 5.4 for information on other changes you may want to make to the system.

5.3 An Example of Copying the System

The following is an example terminal trace produced by a user bootstrapping the RL02 kit disk on a PDP–11/23–PLUS system, copying the kit disk to another RL02 disk, deleting the unused [2,54] system, and determining the current system crash device:

```
@

TESTING MEMORY
0512.KW
START? DL0 RET
```

```
RSX-11M-PLUS Vr.u  BLnn   512.K  System:"RL02SY"
> RED DL:=SY:
> RED DL:=LB:
> RED DL:=SP:
> MOU DL:"PREGENNEDSYS"
> @DL:[1,2]STARTUP

                        RSX-11M-PLUS system startup procedure

          Copyright  (C)  1989  by Digital Equipment Corporation

          Please enter the time and date. The time must be
          in 24-hour format (example: 13:00 for 1:00 p.m.).
          The month name must be three characters long
          (example: SEP). After entering the time and date,
          press the return key. Example: 13:55 11-MAR-89

          Time and date : CTRL/C
MCR>ABO AT. RET

12:00:47  Task  "AT.T0 " terminated
          Aborted via directive or CLI
> BOO [6,54]BRUSYS RET

RSX-11M/RSX-11M-PLUS Standalone Copy System V04

RSX-11M/RSX-11M-PLUS Standalone Configuration and Disk Sizing Program

Valid switches are:
        /CSR=nnnnnn to change the default device CSR
        /VEC=nnn to change the default device vector
        /FOR=n to change the default magtape formatter number
        /DEV to list all default device CSR and vectors

Enter first device: DL0: RET

Enter second device: DL1: RET

Hit RETURN and enter date and time as 'TIM HH:MM MM/DD/YY' RET

> TIM 13:34 03/06/89 RET
> TIM RET
13:34:01 6-MAR-89
> RUN BAD RET
>
BAD>DL1:/LIST RET
BAD -- DL1: Total bad blocks= 0.
BAD>CTRL/Z
> RUN BRU RET
>
BRU> /VERIFY RET
From:   DL0: RET
To:     DL1: RET
BRU -- Starting verify pass

BRU -- Completed
BRU> CTRL/Z

>

[Here system is halted, then system disk is hardware bootstrapped again.]
@
```

```
TESTING MEMORY
0512.KW
START? DL1 [RET]

RSX-11M-PLUS Vr.u  BLnn   512.K  System:"RL02SY"
> RED DL1:=SY:
> RED DL1:=LB:
> RED DL1:=SP:
> MOU DL1:"PREGENNEDSYS"
> @DL1:[1,2]STARTUP

                        RSX-11M-PLUS system startup procedure

          Copyright  (C)  1989  by Digital Equipment Corporation

          Please enter the time and date. The time must be
          in 24-hour format (example: 13:00 for 1:00 p.m.).
          The month name must be three characters long
          (example: SEP). After entering the time and date,
          press the return key. Example: 13:55 11-MAR-89

          Time and date : [CTRL/C]
MCR> ABO AT. [RET]

12:00:47  Task  "AT.T0 " terminated
          Aborted via directive or CLI
> @[1,2]DELETESYS [RET]

This procedure deletes those files specific to the currently nonactive
system.  This procedure assumes that you are now running the system that
you have made hardware bootable.
Have you made a copy of your distribution kit? Y [RET]

This procedure will delete the I- and D-space system in
[2,54], the FCS supervisor-mode library, and the tasks
linked to that library.

Are you sure that you want to continue? Y [RET]

The following display shows the number of blocks used and the number
of blocks free before deleting anything.

DL1: has 2229. blocks free, 18251.  blocks used out of 20480.
Largest contiguous space = 2229. blocks
719. file headers are free, 540. headers used out of 1259.

Deleting...

The following display shows the number of blocks used and the number
now free for use on the system disk.

DL1: has 6720. blocks free, 13760.  blocks used out of 20480.
Largest contiguous space = 3022. blocks
825. file headers are free, 434. headers used out of 1259.

End of DELETESYS.CMD

>

[System is halted again; system disk is mounted and bootstrapped on DL0:.]

@

TESTING MEMORY
0512.KW
START? DL0 [RET]
```

```
RSX-11M-PLUS Vr.u  BLnn   512.K  System:"RL02SY"
> RED DL1:=SY:
> RED DL1:=LB:
> RED DL1:=SP:
> MOU DL1:"PREGENNEDSYS"
> @DL1:[1,2]STARTUP

                      RSX-11M-PLUS system startup procedure

          Copyright  (C)  1989  by Digital Equipment Corporation

          Please enter the time and date. The time must be
          in 24-hour format (example: 13:00 for 1:00 p.m.).
          The month name must be three characters long
          (example: SEP). After entering the time and date,
          press the return key. Example: 13:55 11-MAR-89

          Time and date : 14:05 06-MAR-89 RET
> TIM RET
14:05:01 6-MAR-89

Step  1 - Installation of DAPRES
          System configuration does not include RMS DECnet (DAPRES)

Step  2 - Allocating checkpoint space and secondary pool
          System checkpoint file size is 512. blocks
          Secondary pool extension size is 0 32 word blocks

Step  3 - Loading Executive Debugging Tool (XDT) if desired
          The Executive Debugging Tool will not be loaded

Step  4 - Creating command interpreters

Step  5 - Set remote line handling characteristics

Step  6 - Establishing device configuration
          (Note: Depending upon system configuration, this may take up
          to a minute to complete.

          If an existing ACFPAR.DAT file is found, the following message
          is issued:

          "The existing device configuration information will be used.")

Step  7 - Loading auxiliary device drivers
          No auxiliary driver will be loaded

Step  8 - Loading Crash driver if desired
          No Crash Driver will be loaded

Step  9 - Setting terminal characteristics (slave only)
Step 10 - Configuring devices on line
          All available devices will be configured on line

Step 11 - Starting Error Logging
          Error logging will be started

Step 12 - Setting data caching parameters
          The system disk will not be cached

Step 13 - Mounting additional disk volumes (if any)

Step 14 - Setting terminal characteristics

Step 15 - Starting Resource Accounting
```

```
Step 16 - Starting Queue Manager
          The Queue Manager (QMG) will be started

Step 17 - Starting batch processors
          1 batch processor will be started

Step 18 - Starting print processors
          No print processors will be started

Step 19 - Installing applications
          No applications will be installed

Step 20 - Invoked auxiliary startup file
          There is no auxiliary startup file

Step 21 - Finished
*************************************************************************
*                                                                       *
*              S y s t e m  C u s t o m i z a t i o n                    *
*              -----------  -------------------------                   *
*                                                                       *
*       After installing your system, you will probably want to         *
*       perform the following customizations:                           *
*                                                                       *
*       1) Add user accounts - See the RSX-11M-PLUS                     *
*          System Management Guide.                                     *
*                                                                       *
*       2) Modify the system startup parameter file, which is the       *
*          data file that controls the startup procedure. This          *
*          file ([1,2]SYSPARAM.DAT) should be modified to reflect       *
*          your particular hardware/software configuration. See         *
*          Chapter 5 of the RSX-11M-PLUS System Generation and          *
*          Installation Guide.                                          *
*                                                                       *
*       3) You may want to modify the following text and command        *
*          files to suit your installation                              *
*                                                                       *
*          File                 Purpose                                 *
*          ----                 -------                                 *
*          [1,2]SHUTUP.CMD      Invoked by SHUTUP when taking down      *
*                               the system to perform system            *
*                               dependent shutdown tasks                *
*                                                                       *
*          [1,2]QMGSTOP.CMD     Invoked by SHUTUP to stop the Queue     *
*                               Manager and spooling subsystem          *
*                                                                       *
*          [1,2]LOGIN.TXT       Displayed on user's terminal when       *
*                               logging in                              *
*          [1,2]BATCH.TXT       Displayed at the beginning of each      *
*                               batch log file                          *
*                                                                       *
*************************************************************************
Press return to continue

RET
```

```
**********************************************************************
*                                                                    *
*                  Installation of your RSX-11M-PLUS                 *
*                                                                    *
*             operating system has completed successfully            *
*                                                                    *
**********************************************************************

>

          STARTUP - Console logging off

>
Have a Good Evening
06-MAR-89 20:10 TT0:  logged off RL02SY
>
> HEL SYSTEM/SYSTEM [RET]

RSX-11M-PLUS Vr.u  BLnn    [1,54] System      RL02SY
06-MAR-89 20:11  Logged on Terminal TT0:  as SYS1
Good Evening

20:11:03  Login  user SYSTEM           [1,1] TT0:

        ****************************************************************
        *                                                              *
        *                     Welcome to RSX-11M-PLUS                  *
        *                                                              *
        *                   Version 4.2  Base level 58                 *
        *                 This is file LB:[1,2]LOGIN.TXT               *
        *                                                              *
        ****************************************************************

>
```

5.4 System Management Files

There are files and procedures in the pregenerated RSX–11M–PLUS system that you can use to manage and enhance your system. This section describes the files that are used for starting up and shutting down the system, as well as for logging in to and logging out of the system, and shows how you can change the files to suit your needs. It also explains how you can create your own files to perform other system management tasks and how you can use and enhance the online help facility.

5.4.1 The System Startup Procedure

Whenever you bootstrap your system disk, the system startup procedure is invoked automatically. This procedure, controlled by a command file named STARTUP.CMD, performs various housekeeping tasks, determines the peripheral configuration, and brings all available peripheral devices on line.

For the automatic system startup procedure to be able to identify properly the peripheral devices connected to your processor, those devices must be at Digital-standard control and status register (CSR) and vector addresses. If you have a PDP–11/23–PLUS or PDP–11/24 packaged system, or one of the MicroPDP–11 series packaged systems, your devices are probably at the standard CSR and vector addresses. If you are not sure about whether your system is configured properly, consult Digital Customer Service.

If, after the startup procedure has finished, you are unable to use a particular peripheral device connected to your system, you should check to see whether that device appears at the standard CSR and vector addresses. If it does not, you must connect the device to the standard CSR and vector addresses if you want to use it with the pregenerated system.

You might want to make changes to the startup procedure to suit your hardware and your requirements. For example, if you install the DECnet package, you can change the startup procedure so that DECnet is started up automatically each time you bootstrap the system. You might also want to change the startup procedure to set the characteristics of the terminals connected to your system or to install applications.

This section explains how the startup procedure works and shows you how to edit the procedure to suit your needs.

5.4.1.1 How the Startup Procedure Works

The system startup procedure involves three or more files, all of which are contained in directory [1,2] on the system disk. These files work together to prepare your RSX–11M–PLUS system for use.

Two of the files are indirect command files. These are the files that actually perform the startup tasks. The indirect command files get the parameters they use for issuing commands to the system from a configuration file. You can edit this file to alter the startup parameters. The statements in the configuration file are mostly plain-English words (instead of DCL commands or Indirect directives), so you do not have to know the proper DCL commands or learn how to use Indirect before you can alter the startup command procedure.

The startup procedure is controlled by the [1,2]STARTUP.CMD file. This file invokes the [1,2]READCON.CMD file, which interprets statements contained in the configuration data file, [1,2]SYSPARAM.DAT. The STARTUP.CMD file uses the data obtained by the READCON.CMD file to generate the correct set of commands to perform various tasks. The following is an example of a statement in the configuration file:

```
QUEUE_MANAGER=YES
```

This statement controls whether the Queue Manager (QMG) is installed. If you specify QUEUE_MANAGER=YES, the startup procedure installs the Queue Manager tasks and starts QMG. The startup procedure issues the following DCL command:

```
START/QUEUE/MANAGER
```

You should study the Digital-supplied configuration file and understand the effects of the statements in it before you try to make any changes.

5.4.1.2 Description of the Configuration File Statements

This section describes the syntax and function of each of the statements in the Digital-supplied configuration data file that you can include or change to suit your needs.

If you eliminate any of the statements from the configuration data file, the startup procedure uses a default value for that statement. The default for each statement is indicated after the description. If you are uncertain about the effects of altering the value for a particular statement, use the default value.

The following are descriptions, in alphabetical order, of the statements that can be contained in the configuration file:

ACCOUNT_FILES=n

Specifies the limit on the number of versions of the Resource Accounting transaction file, LB:[1,6]ACNTRN.SYS, that are kept on the system disk. The latest *n* files are retained and the older versions are purged each time the startup procedure is invoked.

The *RSX–11M–PLUS and Micro/RSX System Management Guide* contains more information on Resource Accounting.

Default: ACCOUNT_FILES=2

APPLICATION=description,filename

Specifies a command file to be invoked to install an application program or package. It also allows you to specify descriptive text that is printed on the terminal by the startup procedure as this statement is processed.

If you include this statement, the startup procedure invokes the command file specified as a nested indirect command file. You can use this command file to install languages or other application packages.

You can include this statement in the configuration file as many times as necessary to install all your applications.

The first option (description) is a text string that describes the application to be installed. This text string is printed on the console terminal if the PARAMETERS=YES statement is included in the startup configuration file. The text string is printed in the following format:

```
Installing 'description' application
```

The second option (filename) is the file specification of the command file that contains the commands to install the application. If you do not specify a file type, the startup procedure defaults to a file type of INS for the command file.

The following is an example of the APPLICATION statement:

```
APPLICATION=FORTRAN,LB:[1,2]F77.INS
```

The startup procedure would process the statement in the example by invoking the F77.INS file as a nested indirect command file.

If you do not want to install any applications, you can omit this statement, or you can specify APPLICATION=NONE. See the documentation that accompanies the application program or package for information on the commands necessary to install that particular application.

Default: No applications are installed.

BATCH_PROCESSORS=n

Specifies the number of batch processor tasks to be initialized. If you specify BATCH_PROCESSORS=2, two batch processor tasks, named BAP0 and BAP1, are initialized during the startup procedure.

See the *RSX–11M–PLUS Batch and Queue Operations Manual* for more information on initializing batch processors.

Default: BATCH_PROCESSORS=1.

CACHE=(CREATE=CACHE)

Enables data caching on the system device. For information on formats and options for the MCR command SET /CACHE, refer to the *RSX–11M–PLUS MCR Operations Manual*.

CHECKPOINT_SPACE=n

Specifies, in decimal disk blocks, the size of the system checkpoint file that is allocated. This is a system performance parameter, and it should be altered only by someone with a thorough understanding of the RSX–11M–PLUS operating system.

Default: CHECKPOINT_SPACE=512.

CLI=cliname

Specifies the name of the command line interpreter (CLI) to be used when the startup procedure invokes another command file for the STARTFILE statement. You can specify "DCL" or the name of a user-written CLI as arguments to this statement. Note that all the commands in the system startup procedure (STARTUP.CMD and subsidiary files) are sent to DCL, regardless of the argument you specify for this statement.

See also the description of the STARTFILE statement.

Default: CLI=MCR

COMM_EXEC=YES

Enables the communications executive required for products such as RSX/PSI or LAT if DECnet support is not included.

COMMANDS=YES/NO

Controls whether the actual MCR or DCL commands issued by the startup procedure are printed on the console terminal.

For each major step it performs, the startup procedure can print none, some, or all of the following types of information:

```
Step n      Description of step
            Explanatory text
            Parameters from configuration file
            The actual command or commands used to perform the step
```

The following is an example of what the startup procedure could print on the system console for step 3:

```
Step 3      Allocating checkpoint space and secondary pool
            Allocating system-controlled checkpoint space . . .
            System checkpoint file size is 1024. blocks
            Secondary pool extension size is 0 bytes
            ACS SY:/BLKS=1024.
```

In the example, the line reading "ACS SY:/BLKS=1024." is printed only if the configuration file contains the COMMANDS=YES statement.

You might specify COMMANDS=YES in the course of debugging changes you make to the configuration file or in learning about what the startup procedure does. However, you should normally use the default for this statement (NO) to avoid producing a confusing display every time the system is restarted.

See also the descriptions of the LONG_TEXT, SETDISPLAY, PARAMETERS, and QUIET statements.

Default: COMMANDS=NO

CON_ONLINE_ALL=YES/NO

Controls whether the startup procedure issues a CON ONLINE ALL command to attempt to bring all configured devices on line. If you specify CON_ONLINE_ALL=NO, the CON ONLINE ALL command normally issued by the startup procedure is suppressed, which means that no hardware devices other than the system disk and the console terminal are on line when the startup procedure finishes. You should use the default for this statement unless you want to bring devices on line individually by using the CONFIGURE statement.

See the *RSX–11M–PLUS and Micro/RSX System Management Guide* for more information on the CON ONLINE ALL command.

Default: CON_ONLINE_ALL=YES

CONFIGURE=filename

Specifies a command file to be invoked before all peripheral devices are brought on line with the CON ONLINE ALL command.

You should include the full file specification (device, directory, and file name) for the command file.

If you include this statement, the command file specified is invoked before the startup procedure interprets the CON_ONLINE_ALL statement. You can place peripheral configuration commands in the specified command file to alter the hardware configuration.

This statement might be useful in bringing a subset of all available devices on line in the course of tracking down a hardware problem or when you use one hardware system for two distinctly different applications. See the *RSX–11M–PLUS and Micro/RSX System Management Guide* for information on what configuration commands and options are available.

If you do not need to include any additional configuration commands, you can omit this statement or you can specify CONFIGURE=NONE.

See also the description of the CON_ONLINE_ALL statement.

Default: CONFIGURE=NONE

CRASH_DEVICE=ddnn:

Loads a crash driver at startup time. The argument **ddnn:** specifies the name of the crash device.

Default: CRASH_DEVICE=NONE

DAPRES=YES/NO

Controls whether the DECnet Record Management Services (RMS) data access protocol (DAP) is installed. If you specify DAPRES=YES, [1,1]DAPRES.TSK is installed when the startup procedure is invoked. DAPRES.TSK is the resident library that is necessary to support transparent network file access using RMS.

See the DECnet and the RMS documentation for more information on DAPRES.TSK. See also the descriptions of the DECNET and DECNETRMS statements.

Default: DAPRES=NO

DECNET=option

Controls whether memory space normally reserved for the DECnet Communications Executive (CEX) is deallocated, and whether the [1,2]NETSTART.CMD file is invoked during the startup procedure. If the DECnet package is installed on your system, specify DECNET=YES. If the DECnet package is not installed on your system, specify DECNET=NO so that the memory space is deallocated and the size of the dynamic storage region (pool) is increased.

If you specify DECNET=YES, memory space for the CEX is not deallocated and a network startup file, named [1,2]NETSTART.CMD, is invoked.

If you specify DECNET=[directory], STARTUP checks for file [directory]NTL.TSK and deallocates the communications executive if that file is not found.

See the DECnet documentation for more information on CEX and DECnet. See also the descriptions of the DAPRES and DECNET_RMS statements.

Default: The startup procedure determines whether or not the DECnet package is installed on your system and takes the appropriate action.

DECNET_RMS=YES/NO

Equivalent to the DAPRES statement; see the description of that statment. See also the description of the DECNET statement.

Default: DECNET_RMS=NO

DRIVER=dd:

Loads user-supplied device drivers. For example, if you specify DRIVER=KX in the configuration file, the KX device driver is loaded before the startup procedure interprets the CON_ONLINE_ALL statement. You can include this statement in the configuration file as many times as necessary to load the drivers you require. Each statement causes the startup procedure to load a single driver.

Note that, after the startup procedure has automatically determined the devices connected to your system, it loads all of the necessary Digital-supplied device drivers. You do not use this statement for any of the Digital-supported MicroPDP–11 or PDP–11 devices; you use it only for drivers that you have written or obtained for non-Digital devices.

Default: No user-supplied drivers are loaded.

ERROR_DISPLAY=YES/NO

Controls whether the error logging summary totals are displayed in the course of the startup procedure. See the *RSX–11M–PLUS and Micro/RSX Error Logging Manual* for more information on using this statement and on the easy interface to the error logging system.

See also the descriptions of the ERROR_LIMIT, ERROR_LOG, and ERROR_SIZE statements.

Default: ERROR_DISPLAY=NO

ERROR_LIMIT=n

Specifies the limit on the number of versions of the master error logging file ([1,6]LOG.ERR) kept on the system disk. The latest *n* files are retained and the older versions are purged each time the startup procedure is invoked.

See the *RSX–11M–PLUS and Micro/RSX Error Logging Manual* for information on the effect of this statement and on the use of the error logging system.

Also see the descriptions of the ERROR_DISPLAY, ERROR_LOG, and ERROR_SIZE statements.

Default: ERROR_LIMIT=3

ERROR_LOG=YES/NO

Controls whether the startup procedure starts the error logging system. Note that if you specify COMMANDS=NO, no messages are displayed when error logging is started, regardless of whether error logging has been successfully started.

See the *RSX–11M–PLUS and Micro/RSX Error Logging Manual* for information on the error logging system.

Also see the descriptions of the ERROR_DISPLAY, ERROR_LIMIT, and ERROR_SIZE statements.

Default: ERROR_LOG=YES

ERROR_SIZE=n

Specifies the maximum size in disk blocks of the master error logging file ([1,6]LOG.ERR). The value of the argument is a decimal number that specifies the maximum number of blocks for the [1,6]LOG.ERR file. See the *RSX–11M–PLUS and Micro/RSX Error Logging Manual* for information on the effect of this statement and on the use of the error logging system.

See also the descriptions of the ERROR_DISPLAY, ERROR_LIMIT, and ERROR_LOG statements.

Default: ERROR_SIZE=100.

LOGOUT=YES/NO

Controls whether the startup procedure logs out of the console terminal after it finishes. The console terminal is logged in when you power on the system or when you restart the system by pressing the RESTART button, and it remains logged in while the system startup procedure executes.

You should use the default for this statement unless you have a specific reason to do otherwise. If you specify LOGOUT=NO when the startup procedure finishes, the console terminal is left logged in and privileged.

Default: LOGOUT=YES

LONG_TEXT=YES/NO

Controls whether an explanatory message describing the action being taken in each step is printed by the startup procedure.

For each major step it performs, the startup procedure can print none, some, or all of the following types of information:

```
Step n  description of step
  explanatory text
  parameters from configuration file
  the actual command or commands used to perform the step
```

The following is an example of what the startup procedure could print on the system console for step 3:

```
Step 3  Allocating checkpoint space and secondary pool
  Allocating system-controlled checkpoint space . . .
  System checkpoint file size is 1024. blocks
  Secondary pool extension size is 0 bytes
  ACS SY:/BLKS=1024.
```

In the example, the "Allocating system-controlled checkpoint space ..." line is displayed only if the configuration file contains the LONG_TEXT=YES statement.

You might specify LONG_TEXT=YES in the course of debugging changes you make to the configuration file or in learning about what the startup procedure does. However, you should normally use the default for this statement to avoid producing a confusing display every time the system is restarted.

Also see the descriptions of the COMMANDS, PARAMETERS, STEP_DISPLAY, and QUIET statements.

Default: LONG_TEXT=NO

MODEM_PARAMETER=n

Determines the terminal driver characteristics for handling remote ("dial-up") terminal lines. The value of the argument *n* determines when the Data Terminal Ready (DTR) signal is enabled and whether or not the system disconnects the remote line immediately upon loss of the carrier signal.

Specify one of the following values for *n*:

0	Enables the DTR signal when the modem detects a signal on the remote line. The system disconnects the line 2 seconds after loss of the carrier signal.
1	Enables the DTR signal when the modem detects a signal on the remote line. The system disconnects the line immediately upon loss of the carrier signal.
2	Enables the DTR signal when the terminal line is set to remote. The system disconnects the line 2 seconds after loss of the carrier signal.
3	Enables the DTR signal when the terminal line is set to remote. The system disconnects the line immediately upon loss of the carrier signal.

For most European telephone systems, the value of *n* should be 1.

The value of *n* in the original distribution kit, which is generally correct for interfacing with the United States telephone system, is 2.

Default: MODEM_PARAMETER=2

MOUNT=ddnn:(label)(/keyword...)

Allows additional disk volumes to be mounted during STARTUP. Refer to the description of the MCR command MOUNT in the *RSX-11M-PLUS MCR Operations Manual*.

PARAMETERS=YES/NO

Controls whether a line indicating the parameter values specified along with each statement is printed on the terminal.

For each major step it performs, the startup procedure can print none, some, or all of the following types of information:

```
Step n  description of step
  explanatory text
  parameters from configuration file
  the actual command or commands used to perform the step
```

The following is an example of what the startup procedure could print on the system console for step 3:

```
Step 3  Allocating checkpoint space and secondary pool
  Allocating system-controlled checkpoint space . . .
  System checkpoint file size is 1024. blocks
  Secondary pool extension size is 0 bytes
  ACS SY:/BLKS=1024.
```

In the example, the lines reading "System checkpoint file size is 1024. blocks" and "Secondary pool extension size is 0 bytes" are printed only if the configuration file contains the PARAMETERS=YES statement.

See also the descriptions of the COMMANDS, LONG_TEXT, STEP_DISPLAY, and QUIET statements.

Default: PARAMETERS=YES

PRINTER=ddnn,form,flag

Specifies printer characteristics for spooled printers that use the LP driver. If you do not have any printers attached to your system, or if the printers you do have use the terminal driver (TT), you do not need to include this statement in the configuration file.

For each printer attached to your system, there must be a corresponding PRINTER statement in the configuration file. You must specify several arguments in each PRINTER statement.

The first argument (**ddnn**) is the device name of the printer (for example, LP0). The second argument (**form**) is the form type, specified in the format FORM:n. The third argument (**flag**) is the number of flag pages, specified in the format FLAG:n.

The startup procedure issues commands to initialize a spooled printer for each PRINTER statement you include in the configuration file. You may include any number of PRINTER statements in the configuration file; each PRINTER statement sets the characteristics for one printer.

The following is an example of a typical PRINTER statement:

```
PRINTER=LP0,FORM:0,FLAG:1
```

See the *RSX–11M–PLUS Batch and Queue Operations Manual* and the *RSX–11M–PLUS and Micro/RSX System Management Guide* for more information on printers and the Queue Manager (QMG).

Default: No spooled printers are established.

QUEUE_MANAGER=YES/NO

Controls whether the Queue Manager (QMG) is installed. If you specify QUEUE_MANAGER=YES, the startup procedure installs the QMG tasks and starts the Queue Manager. This statement does not control batch processors or spooled printers; see the BATCH_PROCESSORS and PRINTER statements, respectively.

See the *RSX–11M–PLUS Batch and Queue Operations Manual* and *RSX–11M–PLUS and Micro/RSX System Management Guide* for information on setting up queues and using the Queue Manager.

Default: QUEUE_MANAGER=YES

QUIET=YES/NO

Combination of the COMMANDS, LONG_TEXT, STEP_DISPLAY, and PARAMETERS statements. Specifying QUIET=YES is a quick way to choose "silent" system startup, with a minimum of messages appearing on the console terminal.

If you specify QUIET=NO, the startup procedure acts as if you had specified YES to the COMMANDS, LONG_TEXT, STEP_DISPLAY, and PARAMETERS statements. If you specify QUIET=YES, the startup procedure acts as if you had specified NO to all four statements.

To avoid possible confusion, you should not include the QUIET statement in the configuration file if that file contains any or all of the COMMANDS, LONG_TEXT, STEP_DISPLAY, or PARAMETERS statements. Specify QUIET=YES or QUIET=NO only if you want all three statements to be set to YES or to NO. Use the individual statements if you want to pick and choose.

See also the descriptions of the COMMANDS, LONG_TEXT, STEP_DISPLAY, and PARAMETERS statements.

Default: There is no default for this statement.

SECONDARY_POOL=n

Specifies the size of the secondary pool extension in 32-word blocks when the startup procedure executes. This is a system performance parameter, and it should be altered only by someone with a thorough understanding of the RSX–11M–PLUS operating system. Refer to the *RSX–11M–PLUS and Micro/RSX System Management Guide* for information on secondary pool.

Default: SECONDARY_POOL=0

SET_OPTIONS=ddnn,/switch1/switch2 ... /switchn

Sets terminal characteristics not included in the TERMINAL statement (for example, whether the terminal supports form feeds).

Each SET_OPTIONS statement in the configuration file must correspond to a TERMINAL statement. You can specify any number of switches for each SET_OPTIONS statement.

The first argument (**ddnn**) is a terminal number corresponding to a TERMINAL statement already included in the configuration file. The second and subsequent arguments (**/switch1/switch2 .../switchn**) may be any switch that may be used with the MCR command SET. For the second and each subsequent argument, the startup procedure issues a SET /TERM command. For example:

```
SET_OPTIONS=TT2,/FORMFEED/SLAVE
```

Including the above statements in the configuration file causes the startup procedure to issue the following MCR commands:

```
SET /FORMFEED=TT2:
SET /SLAVE=TT2:
```

Note that the statement in the example was assumed to have been preceded in the configuration file by a TERMINAL statement also specifying TT2. For example:

```
TERMINAL=TT2,LA120,FIXED,LOWER
SET_OPTIONS=TT2,/FORMFEED/SLAVE
```

You can include any number of SET statements in the configuration file. Each SET statement sets additional characteristics for one terminal.

See the *RSX–11M–PLUS MCR Operations Manual* for a complete list of switches for the SET command. See also the description of the TERMINAL statement.

Note

If you use the CLI parameter to set your command line interpreter (CLI) to DCL, the switches that are included here must be legal for the DCL command SET. Refer to the *RSX–11M–PLUS Command Language Manual* for a complete list of switches for the SET command.

STARTFILE=filename

Specifies a command file to be used as a secondary startup command file.

If you include this statement, the command file specified is invoked as a nested indirect command file, after the startup procedure has completed its normal steps. You can use this secondary command file to perform additional startup functions. If you do not want to perform any additional startup functions, you can omit this statement, or you can specify STARTFILE=NONE.

You should include the full file specification (device, directory, and file name) for the secondary startup file.

See also the description of the CLI statement.

Default: STARTFILE=NONE

STEP_DISPLAY=YES/NO

Controls whether the numbers and descriptions of the steps in the startup procedure are printed on the console terminal.

For each major step it performs, the startup procedure can print none, some, or all of the following types of information:

```
Step n  description of step
  explanatory text
  parameters from configuration file
  the actual command or commands used to perform the step
```

The following is an example of what the startup procedure could print on the system console for step 3:

```
Step 3  Allocating checkpoint space and secondary pool
  Allocating system-controlled checkpoint space . . .
  System checkpoint file size is 1024. blocks
  Secondary pool extension size is 0 bytes
  ACS SY:/BLKS=1024.
```

In the example, the line beginning "Step 3" is printed only if the configuration file contains the STEP_DISPLAY=YES statement.

See also the descriptions of the COMMANDS, LONG_TEXT, PARAMETERS, and QUIET statements.

Default: STEP_DISPLAY=YES

SYSTEM=string

Defines part of the text string printed by the startup procedure. The startup procedure prints an identification message in the following format:

```
'string' system startup procedure
```

In the preceding format example, 'string' is the text following the equal sign in the statement.

Default: RSX–11M–PLUS

TERMINAL=ddnn,type,speed,upper/lower

Sets terminal characteristics.

The startup procedure always attempts to identify each terminal connected to your RSX–11M–PLUS system. If the terminal can be identified and is a type supported by RSX–11M–PLUS, the appropriate terminal characteristics are set automatically. For each terminal that cannot be automatically identified (or for special applications where you want terminal characteristics different from those issued automatically), you must include one TERMINAL statement in the configuration file.

In each TERMINAL statement, you must specify several arguments. The first argument (**ddnn**) is the terminal number (for example, TT3). The second argument (**type**) is the terminal type (for example, VT100). You can specify any terminal type that is accepted by the MCR command SET. The third argument (**speed**) is the transmit/receive speed (for example, 9600) for the terminal if it is interfaced through a variable-speed multiplexer (DZ11, DZQ11, or DZV11), or FIXED if it is not. The fourth argument (**upper/lower**) is LOWER for terminals that support lowercase characters or NOLOWER for terminals that do not support lowercase characters.

There can be any number of TERMINAL statements in the configuration file. Each TERMINAL statement sets the characteristics for one terminal.

You can set additional terminal characteristics by using the SET_OPTIONS statement. See the description of that statement for more information.

Default: TERMINAL=TT0,LA120,FIXED,LOWER

XDT=option

Specifies that you do or do not want Executive Debugging Tool (XDT) support. You can choose one of the following for the option parameter:

YES	Loads loadable XDT at startup time.
1 or 3	Enables the extended display of registers for XDT upon unexpected entry.
2 or 3	Disables the display of XDT's startup messages.

Default: XDT=NO

The following is a list of the statements contained in the configuration file ([1,2]SYSPARAM.DAT) that is supplied with your RSX–11M–PLUS system:

```
;DECNET=option
;COMM_EXEC=YES
;CACHE=(CREATE=CACHE)
```

```
DAPRES=NO
CONFIGURE=NONE
CON_ONLINE_ALL=YES
CHECKPOINT_SPACE=512.
SECONDARY_POOL=0
QUEUE_MANAGER=YES
BATCH_PROCESSORS=1.
STEP_DISPLAY=YES
LONG_TEXT=NO
COMMANDS=NO
PARAMETERS=YES
ERROR_LOG=YES
ERROR_SIZE=100
ERROR_LIMIT=3
ERROR_DISPLAY=NO
ACCOUNT_FILES=2
STARTFILE=NONE
XDT=NO
CRASH_DEVICE=NONE
;MOUNT=DU1:OTHERDISK/PROC=UNIQUE/SYS
;DRIVER=LP:
;PRINTER=LP0,FORM:0,FLAG:1
;TERMINAL=TT1,LA50,Fixed,LOWER
;SET=TT1,/FORMFEED/NOBROADCAST
;PRINTER=TT1,FORM:0,FLAG:1
;SET=TT2,/SLAVE
MODEM_PARAMETER=2
CLI=MCR
LOGOUT=YES
```

The statements preceded by a semicolon (;) are ignored by the system startup procedure. You can edit the configuration data file to remove the semicolons and to activate these statements.

5.4.1.3 Startup Procedure Error Messages

If, while it is reading the configuration data file, READCON encounters an error in a statement included in that file, the startup procedure prints a message on the console terminal identifying the statement that contains the error. The message appears in the following format:

```
(READCON - [filespec] contains an invalid statement
           The invalid statement was:
           [text of the invalid statement]
           This statement was ignored.
```

In the preceding format example, 'filespec' is the file specification of the configuration data file.

If for some reason the configuration data file cannot be accessed, the startup procedure uses the default values for all statements.

5.4.1.4 Troubleshooting Problems with the Startup Procedure

In most cases, the system startup procedure proceeds in spite of errors or other problems and leaves you with a system that can be used. If the system does not restart at all, see Chapter 4 for suggestions on what to do next.

This section describes some of the problems that may prevent the system from starting up completely or from having all features and devices included.

5.4.1.5 Errors in the Configuration File

If error messages from READCON appear on the console terminal in the course of system startup, the configuration file probably contains a faulty statement. Check the statement indicated by the error message against the descriptions in Section 5.4.1.2, correct the error, and try again.

A line in the configuration data file containing only a space character is interpreted as an invalid statement, so any blank lines in the configuration file should begin with a semicolon.

5.4.1.6 Autoconfigure on Pregenerated RSX–11M–PLUS Systems

The first time you bootstrap your pregenerated RSX–11M–PLUS system, the system startup procedure STARTUP executes the Autoconfigure task LB:[3,54]ACFPRE.TSK. The ACFPRE.TSK task identifies the devices in your peripheral configuration (see Section 5.4.1.7), reads the configuration file LB:[1,2]SYSPARAM.DAT, and creates data structures that describe the devices. (Depending upon the configuration, this part of the startup procedure may take up to 1 minute to complete.) The startup procedure then loads the appropriate device drivers.

In general, you probably will not need to change your peripheral configuration each time you rebootstrap your system. So, to decrease the time required for system startup, the ACFPRE.TSK task stores the information that describes your current configuration in the LB:[1,2]ACFPAR.DAT file. For subsequent system startup procedures, STARTUP uses the information in the ACFPAR.DAT file (instead of running the ACFPRE.TSK task again), and the following message is displayed:

```
The existing device configuration information will be used.
```

If you add a peripheral device to your configuration, delete LB:[1,2]ACFPAR.DAT and rebootstrap the system. To determine and record the configuration information, the system startup procedure runs ACFPRE.TSK again.

5.4.1.7 Using Non-Digital Standard Configurations

Digital uses certain standards to determine the correct control and status register (CSR) addresses and interrupt vectors for peripheral devices on PDP–11 systems. If your devices are set up according to these standards (your Digital Customer Service representative can verify this), the ACFPRE.TSK task can identify them. However, because the system allocates device CSR addresses in a fixed order in the I/O page, adding a peripheral may require changing the CSR and vector addresses of existing devices to comply with Digital standards.

If your system does not meet Digital's configuration standards (for example, certain peripheral options do not allow sufficient flexibility to meet the standards) or if you add a peripheral device and do not want to reconfigure existing peripheral devices, edit the ACFPAR.DAT file to modify the configuration information accordingly.

5.4.1.8 Modifying the ACFPAR.DAT File

To modify the parameter file LB:[1,2]ACFPAR.DAT, edit the file and use the correct record formats. The ACFPAR.DAT file contains the following types of records:

- A central processing unit (CPU) record
- A line frequency record
- Several controller records

The following subsections describe the corresponding formats for each type of record in more detail.

CPU Record

```
CPU=11/xx
```

The variable *xx* represents the model number of your PDP–11 processor. For example, 23 and 73 are valid model numbers for the PDP–11/23 and PDP–11/73 processors, respectively.

Line Frequency Record

```
LIN=n
```

To set the system clock, the ACFPRE.TSK task determines your power-line frequency. If necessary, you can edit the ACFPAR.DAT file to correct the clock frequency.

The variable *n* can be either 50 Hz or 60 Hz. If your line frequency is 50 Hz and your system clock seems to lose time, *n* is set incorrectly to 60 Hz. Conversely, if your line frequency is 60 Hz and your system clock seems to gain time, *n* is set to 50 Hz. Specify a value for *n* that is equal to your actual line frequency.

Controller Records

```
CON=cname,CSR=csradd,VEC=vecadd,UNI=(numuni,lowuni)
```

Parameters

cname

Specifies the controller type and identification code. Valid controller types and their respective devices are as follows:

Controller Type	Devices
DU	MSCP-type devices
MU	TK50 and TU81 magnetic tapes
MS	TS11, TSV05, TU80, and TK25 magnetic tapes

Controller Type	Devices
DL	RL02 disks
YL	DL11 terminal interfaces
YV	DHU11 and DHV11 multiplexers
YZ	DZ11 and DZV11 multiplexers

The identification code is the sequential indicator of the controller from the Digital hardware alphabet.

csradd
Specifies the control and status register (CSR) address for the device.

vecadd
Specifies the first vector address for the device.

numuni
Specifies the number of available units attached to the controller.

lowuni
Specifies the unit number of the lowest numbered device unit (that is, the first unit number).

The **numuni** and **lowuni** parameters are included for DL, DU, and MU device types only.

Example

```
CON=DUB,160340,300,UNI=(2,4)
```

Adds a record describing an RC25 controller with one master unit (an RC25 master unit consists of two drives) as the only extra peripheral on the system. The unit number plug on the drive indicates that it is units 4 and 5.

5.4.2 The Account File

An account file is supplied on the kit disk. It contains two user accounts: one privileged and one nonprivileged, as follows:

```
UIC:           [1,1]
Account name:  SYSTEM
Password:      SYSTEM

UIC:           [200,1]
Account name:  USER
Password:      USER
```

To preserve the security of your system, you should change the passwords to these accounts as the first step in setting up an account file.

All new passwords in the account file are encrypted automatically; that is, the operating system uses an algorithm to scramble the passwords so only the system is able to read them. If you are copying an account file from a previous version of RSX–11M–PLUS to this version, you can encrypt the passwords by either changing the passwords in the account file or by having the users enter the MCR command SET /PASSWORD (or DCL command SET PASSWORD) to change them. For more information on password encryption, see the *RSX–11M–PLUS and Micro/RSX System Management Guide*.

The [200,1] account is supplied for use in conjunction with the warm-up session presented in the *Introduction to RSX–11M–PLUS*.

See the *RSX–11M–PLUS and Micro/RSX System Management Guide* for information on using the Account File Maintenance Program (ACNT).

5.4.3 Login and Batch Job Message Files

When you log in, the system prints the login information file [1,2]LOGIN.TXT on your terminal. You should edit this file to provide installation news and notices to system users. See the description of the HEL/LOG command in the *RSX–11M–PLUS MCR Operations Manual* for information on the use of the LOGIN.TXT file.

If you intend to use the batch processor in your system, you should edit [1,2]BATCH.TXT, which is included at the beginning of each batch job log.

5.4.4 Login and Logout Command Files

When you log in to or log out of the system, RSX–11M–PLUS looks for certain command files. If it finds them, it executes the commands in those files. You can use these command files to set up a particular user environment every time an account is used.

5.4.4.1 SYSLOGIN.CMD, the System Login Command File

You can use the system login command file, [1,2]SYSLOGIN.CMD, to execute a set of commands each time you log in to the system. The system login command file provided with RSX–11M–PLUS does the following things:

- Checks to see whether the terminal should be nonprivileged and issues the appropriate command
- Attempts to identify the terminal type and to set the appropriate terminal characteristics if the terminal is of a type supported on RSX–11M–PLUS
- Checks to see whether the terminal should be unslaved and issues the appropriate command
- Chains to the user's login command file, if one exists

These actions should be sufficient for a large number of applications. If you do not need any further actions taken when all users log in, you need not make any changes to the SYSLOGIN.CMD file.

5.4.4.2 How the SYSLOGIN.CMD File Works

When a user logs in to the system by using the LOGIN (or HELLO) command, the last thing the system does in the login sequence is invoke the LB:[1,2]SYSLOGIN.CMD file, if it exists. (See the description of the HELLO command in the *RSX–11M–PLUS MCR Operations Manual* for a list of all the things the system does in the login sequence.) The SYSLOGIN.CMD file is invoked with privilege so that system-level operations can be performed and set to slaved status so that the user cannot prevent the SYSLOGIN.CMD file from executing.

When it invokes the SYSLOGIN.CMD file, the LOGIN command sets a CLI override bit so that the SYSLOGIN.CMD file can use system commands regardless of the CLI to which the terminal is set when the SYSLOGIN.CMD file is invoked. This bit overrides the current CLI and allows the SYSLOGIN.CMD file to use DCL commands (by entering the special MCR command DCL) as well as MCR commands. For example, the Digital-supplied SYSLOGIN.CMD file sets the terminal to nonslaved status by entering the following command line:

```
DCL SET TERMINAL/NOSLAVE
```

Note

Commands sent to DCL are actually executed by MCR, the command dispatcher. When the CLI override bit is set, commands bypass DCL and go directly to MCR. The special DCL command identifies a command line as a DCL command so that MCR can execute the command properly. If you use any MCR commands in your SYSLOGIN.CMD file, you should not precede them with the special DCL command. These commands are executed directly by MCR.

Before the SYSLOGIN.CMD file exits, it uses the CLI /UNOVR command to clear the override bit and to ensure that commands issued from the terminal go to the correct CLI.

The LOGIN command passes the following information to the SYSLOGIN.CMD file:

```
Default system device                (xxn:)
Login UIC                            ([g,m])
Last name
First initial
If terminal is to be privileged      (P or NP)
If terminal is to be slaved          (S or NS)
If terminal is TT, VT, or batch VT   (T, V, or B)
Account number                       (nnnn)
Session ID                           (xxx)
```

The information is available for use in the SYSLOGIN.CMD file as Indirect parameters P1 to P9.

If the SYSLOGIN.CMD file exists, it must do the following:

- Check the appropriate parameter to see whether the terminal should be privileged or nonprivileged and to set the terminal accordingly.
- Check the appropriate parameter to see whether the terminal should be set to slaved or nonslaved status and to set the terminal accordingly. (You must set a terminal's privilege status before its slave status or else a nonprivileged user could become privileged.)

- Issue the MCR command CLI /UNOVR to clear the override bit so that commands typed at the user's terminal are sent to the correct CLI (DCL or a CLI that you have written).

If the SYSLOGIN.CMD file does not exist, the system does the following:

- Checks the appropriate parameter to see whether the terminal should be set to privileged or nonprivileged status and sets the terminal accordingly.
- Checks the appropriate parameter to see whether the terminal should be set to slaved or nonslaved status and sets the terminal accordingly.
- Clears the CLI override bit.
- Invokes the user's login command file, LOGIN.CMD, if it exists. (The system looks for LOGIN.CMD by using the user's default device and directory as indicated in the account file.)

5.4.4.3 LOGIN.CMD, the User's Login Command File

You can use the user login command file, LOGIN.CMD, to execute a set of commands each time a user logs in to the system.

The system invokes the file LOGIN.CMD if it exists on the user's default device and directory as indicated in the account file. The LOGIN.CMD file is invoked either privileged or nonprivileged, depending on the status of the terminal as set by the SYSLOGIN.CMD file or the LOGIN command. The terminal is not set to slaved status while the LOGIN.CMD file is executing.

5.4.4.4 SYSLOGOUT.CMD, the System Logout Command File

You can use the system logout command file, [1,2]SYSLOGOUT.CMD, to execute a set of commands for each user that logs out of the system. No system logout command file is supplied with RSX–11M–PLUS.

The system invokes the SYSLOGOUT.CMD file (if it exists) when the user logs out of the system by entering the LOGOUT command. The SYSLOGOUT.CMD file is invoked as either privileged or nonprivileged status, depending on the status of the terminal when the LOGOUT command is issued. Commands from the SYSLOGOUT.CMD file go to the CLI that is in effect when the LOGOUT command is issued. The terminal is set to slaved status while the SYSLOGOUT.CMD file executes.

If the SYSLOGOUT.CMD file has not exited 10 seconds after it is invoked by the LOGOUT command, the system aborts it. This prevents a faulty SYSLOGOUT.CMD file from leaving many terminals logged in to the system.

5.4.4.5 LOGOUT.CMD, the User's Logout Command File

You can use the user logout command file, LOGOUT.CMD, to execute a set of commands each time a user logs out.

The system invokes the file LOGOUT.CMD if it exists on the user's default device and directory as indicated in the account file. The LOGOUT.CMD file is invoked as either privileged or nonprivileged, depending on the status of the terminal. The terminal is set to slaved status while the LOGOUT.CMD file is executing.

If the LOGOUT.CMD file has not exited 10 seconds after it is invoked by the LOGOUT command, the system aborts it. This prevents a faulty LOGOUT.CMD file from leaving the terminal logged in to the system.

You could use the LOGOUT.CMD file to purge files and to delete temporary files automatically each time a user logs out.

5.4.5 Designing Your Own System Management Command Files

If you have studied the system management files provided with your RSX–11M–PLUS system, you have become familiar with how you can use system commands and Indirect directives to perform many repetitive system management duties. You can take almost any set of commands that you find yourself typing at a terminal day after day and put them in a command file, thus reducing your typing considerably. When you gain experience with using Indirect, you can write command files that prompt for YES/NO answers or strings and take different paths based on those answers.

You can also write an indirect command file and place it so that it appears to be a new system command. If you give your command file a 3-letter file name and CMD file type and place the file in directory [3,54] (the system library), it can be invoked by any user who types the 3-letter file name.

A simple example is the following command file, called WHO.CMD, which displays your terminal number and present default device and directory:

```
.; WHO.CMD
.;
.;  Prints terminal number, device, and directory
.;
.ENABLE SUBSTITUTION
.DISABLE DISPLAY
.TESTFILE TI:
.TEST <FILSPC> ":"
.SETS TI <FILSPC>[1:<STRLEN>]
;
;Terminal 'TI' is at'<SYDISK>''<SYUNIT>':'<UIC>'
;
```

Here is an example of what you would see on your terminal if you invoked the WHO.CMD file:

```
$  who RET
$
$ Terminal TT2: is at DU0:[1,10]
$
$
```

This is a fast and easy way of creating new system commands, but it has one restriction: if a user has a file in his default directory with the same name as the file you have placed in the system library, RSX–11M–PLUS invokes the user's file and not the one in the system library. For an explanation of why this happens, see the TDX and CATCHALL.CMD descriptions in the *RSX–11M–PLUS and Micro/RSX System Management Guide.*

5.4.6 Modifying Online Help Files

RSX–11M–PLUS has online help text available for all commands and most features. Users can obtain help by entering the HELP command, which is explained in the *RSX–11M–PLUS Command Language Manual*.

You can augment the Digital-supplied help files with information specific to your system or application. This section explains how the RSX–11M–PLUS system help files are arranged and provides some examples of adding your own files. Before you read any further in this section, you should study the HELP command description and the help file format in the *RSX–11M–PLUS Command Language Manual*.

5.4.6.1 How the Help Files Are Set Up

Before you read this section, read the *RSX–11M–PLUS Command Language Manual* for more information on the help file format and on terms used in this section. You should also print a copy of the LB:[1,2]DCL.HLP file to look at as you read the descriptions that follow.

All the RSX–11M–PLUS help files are contained in directory [1,2] and have the file type HLP. They are controlled by the root file, DCL.HLP.

The text in the beginning of the DCL.HLP file is printed when the HELP command is entered without an argument. The rest of the root file contains numbered parameters, indirect file references, and synonym statements. To determine which of the help files is referenced when a particular parameter is specified, search through the root file to find that parameter, and then refer to the specific help file referenced. For example, to find the name of the help file containing information on the BACKUP command, look through the root file until you find the following lines:

```
1 BACKUP
@DCLBACKUP
```

These lines indicate that information on the BACKUP command is contained in the file [1,2]DCLBACKUP.HLP.

5.4.6.2 Creating Your Own Help Files

You can add help files to your RSX–11M–PLUS system by preparing a text file that follows the format rules in the *RSX–11M–PLUS Command Language Manual* and by adding the appropriate parameter name to the root file. You can insert the parameter name at any point in the file, but for the sake of organization and easy transfer to new versions of RSX–11M–PLUS, you should put the parameter names you add at the top of the root file, just after the DCL commands help text.

As an example, here is a portion of a help root file for an RSX–11M–PLUS system. The added help files were placed in directory [1,2] and were named with the file type HLP.

```
      .
      .
      .
 For information on a command, type HELP commandname.  Additional
 help on a command qualifier is often available by typing
 HELP commandname qualifier.  For the short forms of some commands,
 type HELP BRIEF.
1 TERMINALS
@TERMINALS
1 TTY
TERMINALS
1 USERS
TERMINALS
1 SYSTEM
@SYSHLP
1 CHANGES
@CHANGES.DAT
1 MFT
DTE
1 FILE_TRANSFER_UTILITY
DTE
1 DATA_TERMINAL_EMULATION
DTE
1 DTE
@DTE
1 FORTRAN
@FORTRAN
1 DATATRIEVE
@DTRV
1 PASCAL
@PASCAL
1 DIBOL
@DIBOL
1 COBOL
@DCLC81
1 BASIC
@DCLBAS
1 DECTYPE
@DECTYPE
1 RSX_OFIS
ROS
1 OFIS
ROS
1 ROS
@DCLROS
1 ABORT
@DCLABORT
        .
        .
        .
```

When you add your own systemwide help parameters, you should also add them to the system features help page (accessed by typing HELP MORE). Here is another section of the same root file shown in the previous example:

```
        .
        .
        .
1 UNLOAD
@UNL
1 UNLOCK
@DCLUNLOCK
1 MORE
 Help is available for the following utilities and system features.
 Type HELP topic for additional information.
------------------------------------------------------------------------
 RMS--11 (Record Management Services for the PDP--11) Utilities:

    BCK      CNV       DES       DSP       IFL       RST       RMS
------------------------------------------------------------------------
 Utilities:

    BAD      BRU       CMP       DMP       DSC       EDI       FLX
    FMT      LBR       MFT       PAT       PIP       SLP       VFY
    ZAP
------------------------------------------------------------------------
 Other topics:

    ASCII         BATCH       DTE      EXECUTIVE      FCS       IOX
    INDIRECT      SYSLIB      MAG      ODT            PMD       SYSLIB
Information on this system:

    SYSTEM        TERMINALS   CHANGES
1 @OPTION                       .
@OPTION
1 @BACKUP
@BACKUP
1 FCS
@FCS
        .
        .
        .
```

If your application requires that only certain groups of users have access to a set of application help files, you can create your own root help file and have users access it by using the /GROUP qualifier to the HELP command. Likewise, you can restrict help file access to a single account by using the /LOCAL qualifier. See the *RSX-11M-PLUS MCR Operations Manual* for information on these qualifiers.

5.4.7 Installing the RMS–11 Tasks, Utilities, and Libraries

RMS–11 Version 2.0 is included on the pregenerated kit disk. The RMS–11 segmented library (RMSRES, and RMSLBA through RMSLBF) and all the RMS–11 utilities are already installed in the system image. No further installation is needed, unless you install the DECnet package on your system and you want to use the RMS–11 remote access facilities. See Section 5.4.1 for information on installing the RMS–11 remote access package (DAPRES).

For more information on RMS–11, see the *RSX–11M–PLUS Release Notes* and *RSX–11M/M–PLUS RMS–11: An Introduction.*

5.4.8 Installing and Using System Tasks

The system disk contains the standard complement of system tasks. Many of the system tasks are already installed in the pregenerated system image. The file SYSVMR.CMD in [1,54] or [2,54] contains the commands that were used to install tasks in the pregenerated system. Many of the supplied system tasks are supplied in "xxxFSL.TSK" and "xxxRES.TSK" versions. These tasks reside in directory [3,54] on the kit disk.

When you use the DELETESYS.CMD procedure to delete an unused system, the system tasks associated with the unused system are also deleted. When you delete the [1,54] system, the tasks of the form "xxxRES.TSK" are deleted; when you delete the [2,54] system, the tasks of the form "xxxFSL.TSK" are deleted.

Tasks with names of the form "xxxFSL.TSK" are built to link to FCSFSL, the File Control Services (FCS) supervisor-mode library. If you are using the [2,54] system, you should use these tasks.

Tasks with names of the form "xxxRES.TSK" are built to link to FCSRES, the FCS resident library. If you are using the [1,54] system, you should use these tasks.

The system library [1,1]SYSLIB.OLB also contains ANSI-compatible FCS routines. Tasks that cannot link to FCSRES can be built with these FCS routines in their task images.

A library of non-ANSI FCS routines, [1,1]NOANSLIB.OLB, is also provided for building tasks that do not require ANSI support. A task built to link to this library is smaller than the same task built to link to the system library, yet the small task retains full FCS software features.

5.4.9 Installing Layered Products

If you intend to include any Digital layered products in your system, see the appropriate layered product installation documentation for specific instructions.

5.4.10 Installing Other Device Drivers

If you want to use devices for which a device driver is not already loaded in the system, you must load the appropriate device driver.

Since the Executive is pregenerated, thus making it impossible to incorporate resident drivers, all drivers and databases in this system are loadable. This feature saves pool space and makes it possible for you to load only the drivers you need into the system image. Note, however, that once they are loaded, databases cannot be unloaded without rebootstrapping the system (or, if the database was loaded by using VMR, without re-creating the system image with VMR).

All the device drivers supplied have been built to load into the DRVPAR partition. The size of DRVPAR, however, is sufficient only for the drivers that are supplied loaded into the system (see Section 5.5.2.2 for a list of these drivers). If you use the MCR command LOA to load additional drivers, the system returns the "Partition DRVPAR too small" error message.

When you use the DRIVER statement in the configuration file to load an auxiliary driver, the system startup procedure loads the driver in the GEN partition.

If you want to load a driver by hand, you can load the driver into the GEN partition by entering the following command line:

```
LOA xx:/VEC/PAR=GEN
```

5.5 Using the System

Your RSX–11M–PLUS system is now ready for use.

You should consider making a backup copy of the system disk so that you can recover quickly from any accidental corruption of your system disk, without having to make a new copy from the Digital-supplied kit disk and without repeating the setup procedures detailed in the previous sections. You can make a hardware-bootable copy of your system disk quickly and easily by using the Backup and Restore Utility (BRU). The *RSX–11M–PLUS Utilities Manual* provides a description of BRU, along with examples of making backup copies of system disks.

5.5.1 Finding Out More About the System

If you are not already familiar with RSX–11M–PLUS, you should read the *Introduction to RSX–11M–PLUS* and perform the online terminal session.

If you are to be the manager of this system, you should read the *RSX–11M–PLUS and Micro/RSX System Management Guide* to become familiar with the system management utilities you will need to use.

The quickest way to find information on a specific subject is to use the Master Index contained in the *RSX–11M–PLUS Information Directory and Master Index*. The Master Index consists of all the individual manual indexes merged into a comprehensive reference to the entire documentation set.

5.5.2 Detailed Description of Pregenerated Executive Features

This section contains detailed descriptions of the features and limitations of the pregenerated systems.

5.5.2.1 Features of the Pregenerated Systems

The pregenerated systems provide many of the Executive and system features available on the full RSX–11M–PLUS distribution kits, without requiring you to perform a system generation before using your system.

The following is a list of the Executive options, support, and system parameter values included in both the [1,54] and the [2,54] systems:

- Task headers out of pool
- Extended logical name support
- Fast-mapping facility
- Interrupt Control Block (ICB) pool size = 128_{10} words

- DECnet support
- LAT terminal server support
- Disk data caching
- Resource Accounting
- QMG and batch processor
- CTRL/C abort support
- FCP = FCPLRG
- File windows in secondary pool
- Decimal version numbers in file specifications
- Default virtual terminal unit buffer size = 120_{10}
- Maximum virtual terminal unit buffer size = 184_{10}
- Character translation support
- Unsolicited input timeout = 120_{10} seconds
- IP11 industrial I/O subsystem support including powerfail support (Note that the IP11 industrial I/O subsystem must be purchased separately.)
- Crash notification device CSR address = 177564
- Floating Point Processor
- Nonprogrammable system clock

The following is a list of Executive features included in the [2,54] system but not included in the [1,54] system:

- Executive data space support
- User data space support
- Shadow Recording (SHA)
- Console Logging

The [2,54] system has system tasks built to link to FCSFSL, the FCS supervisor-mode library.

The [1,54] system has system tasks built to link to FCSRES, the FCS resident library.

5.5.2.2 Hardware Supported

The following loadable drivers are already loaded in the pregenerated systems provided on the kit disk:

DL	RL02 driver
TT	Terminal driver

VT Virtual terminal driver

RD Reconfiguration driver

NL Null device driver

The following loadable drivers are included on the pregenerated system kit disk, but they are not loaded into the pregenerated systems:

DD TU58 driver

DX RX01 driver

DY RX02 driver

DU RA60, RA70, RA80, RA81, RA82, RA90, RC25, RX50/RD51/RD52/RD53/RD54, RX33 driver

MS TSV05, TS11, TU80 driver

MU TK50, TK70, TU81 driver

LP Line printer driver

LA LPA11-K driver

XE DEUNA Ethernet driver

If you want to use any of the drivers that are not already loaded into your system, you must load them yourself. You can do this by using the DRIVER statement in the system startup procedure. See Section 5.4.1 for information on using the startup procedure to load drivers. See also Section 5.4.10 for restrictions on adding drivers.

Note

If the DU driver is loaded, the Bad Block Replacement Control Task (RCT) must be installed. See the *RSX–11M–PLUS and Micro/RSX System Management Guide* for more information on the RCT task.

Because the source code of the drivers or their databases is not included in the pregenerated system kit, you cannot change the device configuration by any of the standard methods. To provide support for a wide variety of terminal configurations, the pregenerated system kit contains an autoconfiguration task that determines what kinds of terminal interfaces are connected to the UNIBUS or LSI–11 bus and then generates databases for them. The autoconfiguration task is invoked by the system startup procedure.

The autoconfiguration task finds all the terminal interfaces connected to your processor (DL11/DLV11 and DZ11/DZQ11/DZV11 interfaces). To add a user-supplied driver for any of these interfaces, load the driver and its database by using VMR, or use the CONFIGURE statement in the system startup procedure to invoke a command file that loads the user-supplied driver and its database before the autoconfiguration task is run. The autoconfiguration task ignores any interfaces it finds that are already represented by a database.

The autoconfiguration task matches terminal interfaces it finds against databases by checking whether the control and status register (CSR) address contained in offset K.CSR is the same as the CSR of the respective interface. Thus, you must establish the proper value for K.CSR in the driver database source code for user-supplied device drivers.

The autoconfiguration task also determines the line frequency (50 Hz or 60 Hz) and sets the proper number of clock ticks per second.

5.5.2.3 Restrictions

Certain restrictions and limitations apply to the pregenerated RSX–11M–PLUS system.

- The pregenerated system includes two RSX–11M–PLUS operating systems. The first runs on processors that support Executive data space, user data space, and supervisor-mode libraries. This system resides in directory [2,54] on the kit disk and is referred to in this chapter as "the [2,54] system." The second system runs on processors that do not include I- and D-space hardware. This system resides in directory [1,54] on the kit disk and is referred to in this chapter as "the [1,54] system." The [1,54] system, as supplied on the kit disk, is hardware bootable.

  After copying the kit disk and bootstrapping the system appropriate for your processor, you can delete the files for the system that you are not using to gain more disk space for your own applications.

- On the [1,54] system, pool space is more limited than on the [2,54] system.
- The [1,54] system does not include supervisor-mode library support; thus, the "xxxFSL.TSK" versions of tasks, which link to supervisor-mode FCS libraries, cannot be run.
- The [1,54] system does not include support for Shadow Recording (SHA), Console Logging, or software correction or logging of memory parity errors.
- The startup procedure verifies that the system is working properly and prints a confirmation message each time the system is bootstrapped.
- The Executive source files and object libraries are not included nor are assembly and task-build command files used for reassembling or re-task-building any of the system components.
- Because Executive source files are not provided, patching is not possible.
- The device configuration is limited to the following device types, number of controllers, and number of units per controller:

Device Type	Number of Controllers	Number of Units
DD	1	2
DL	4	4
DU	4	4
DX	1	2
DY	1	2
LA	1	1

Device Type	Number of Controllers	Number of Units
LP	1	1
MS	1	1
MU	4	1
XE	1	1

Many of the supplied system tasks are supplied in xxxFSL.TSK and xxxRES.TSK versions. These tasks reside in directory [3,54] on the kit disk.

If you are using the [2,54] system, you should use the xxxFSL.TSK tasks.

If you are using the [1,54] system, you should use the xxxRES.TSK tasks.

- The error logging universal libraries provided on the kit disk ([1,6]ERRLOG.ULB and ERRLOGETC.ULB) have been "tuned" to suit the complement of devices configured into the pregenerated systems.
- The SYSGEN procedure is not included or necessary.

5.6 Changing Your System

While you cannot modify the features of your RSX–11M–PLUS Executive, you can alter certain aspects of your system. This section provides information about the changes you can make and about what you must know to make them.

5.6.1 Recovering Additional Disk Space

As you use the pregenerated system, you may find that there are several files on the disk you never use. These unused files can be deleted from the system disk to make more disk space available for your tasks and applications. Should you at some point in the future have a need for files you have deleted, you can copy them from the original kit disk.

5.6.2 Changing the Crash Dump Device

You can use the MCR command SET /CRASH_DEVICE to set or change the crash device in the presently running system. For example, to change the crash device to DL1 in the running system, enter the following MCR command line:

```
> SET /CRASH_DEVICE=DL1: RET
```

You can edit the SYSPARAM.DAT file so that the crash device is set up each time the system is started.

Note

The MCR command SET /CRASH_DEVICE allows you to specify only DL-, DU-, MS-, and MU-type devices as the system crash device. If you specify the system disk as a crash device, the following messages are displayed:

SET—Warning, System disk chosen as crash device
SET—Crash device <ddnn:> has been successfully loaded

You should not specify a fixed-media device (for example, the RD51 fixed disk) as the crash device. If you do, and then try to get a crash dump, you will receive an error message saying that the specified device is an illegal crash device. At that point, you will not be able to get a crash dump.

For more information on the MCR command SET /CRASH_DEVICE, see the *RSX–11M–PLUS and Micro/RSX System Management Guide.*

5.6.3 K-Series Laboratory Peripherals and LPA11–K Controller

To enable you to generate K-series support routines, directory [200,200] on the kit disk contains the indirect command file SGNKLAB.CMD. For information on invoking and using this file, see the *RSX–11M–PLUS I/O Drivers Reference Manual.*

Also included in directory [200,200] is the indirect command file BLDLAINIT.CMD. This file is used to generate support routines for the LPA11–K Laboratory Peripheral Accelerator. To generate the routines, invoke the command file by entering the following command line:

```
@[200,200]BLDLAINIT
```

If your system does not have K-series peripherals or an LPA11–K controller, you can delete the contents of directory [200,200].

For additional information on K-series devices and the LPA11–K controller, see the *RSX–11M–PLUS and Micro/RSX I/O Drivers Manual.*

5.6.4 DECnet Pool Use

The pregenerated system image includes memory space reserved for installing the DECnet Communications Executive (CEX). If you do not intend to install the DECnet package on your system, the portion of memory that is reserved for installing CEX is not needed and can be deallocated, thereby increasing the size of pool.

Also, you should edit the startup configuration file and change the DECnet statement to read DECNET=NO. See Section 5.4.1 for more information on the system startup procedure and the DECnet statement.

5.6.5 DECnet Interface Modification

The [1,54]RSXMC.MAC symbol definition file supplied on the kit disk defines the processor type as a PDP–11/23–PLUS. The [2,54]RSXMC.MAC file supplied on the kit disk defines the processor type as a PDP–11/44.

The DECnet NETGEN procedure uses the RSXMC.MAC file to obtain system configuration parameters. Therefore, if the processor type listed in the RSXMC.MAC file is a PDP–11/23–PLUS, only LSI–11 bus-compatible devices are allowed for the DECnet interface.

If you are performing a DECnet NETGEN and you intend to use the [1,54] system on a processor other than the PDP–11/23–PLUS, MicroPDP–11/23, MicroPDP–11/73, or MicroPDP–11/83, you must alter the value of the symbol R$$TPR in the [1,54]RSXMC.MAC file before you start the NETGEN, so that UNIBUS-compatible devices can be used for the DECnet interface.

For example, if you are running the [1,54] system on a PDP–11/24 processor, you must alter the following line in the [1,54]RSXMC.MAC file:

```
R$$TPR="23
```

Use an editor to change the line to read:

```
R$$TPR="24
```

Likewise, if you intend to run the [2,54] system on a processor with a LSI–11 bus, you must alter the value of the symbol R$$TPR in the [2,54]RSXMC.MAC file before you start the NETGEN. Doing so allows the LSI–11 bus-compatible devices to be used for the DECnet interface.

Appendix A
Configuration Worksheets

During the Choosing Executive Options (CE) and Choosing Peripheral Configuration (CP) sections, SYSGEN asks a series of questions about the target system's Executive options and peripheral devices. You should gather the data SYSGEN requires before you begin the system generation procedure. This appendix contains a series of worksheets that aid in collecting and organizing the necessary information.

You should make copies of the worksheets and fill them out as you read through Chapter 3 of this manual. Files containing copies of the worksheets are located in directory [200,200] on the distribution kit.

The worksheets and their file names are as follows:

WRKEXECOP.TXT	Executive and processor options worksheet, which describes the various RSX–11M–PLUS Executive and processor options about which SYSGEN asks questions
WRKMASSCO.TXT	MASSBUS controller configuration worksheet, which describes the configuration of the MASSBUS controllers
WRKMASSDR.TXT	MASSBUS drive configuration worksheet, which describes the MASSBUS disk and magnetic tape drives
WRKUNIBCO.TXT	UNIBUS controller configuration worksheet, which describes the configuration of the controllers attached to the UNIBUS
WRKUNIBDR.TXT	UNIBUS drive configuration worksheet, which describes the configuration of the UNIBUS devices

Each worksheet contains a title, spaces for the name of the target system, the name of the person filling out the sheet, and the date. Because you may need more than one copy of some of the worksheets, spaces are provided for numbering those sheets.

At the bottom of some of the worksheets is a sample line that illustrates how to fill in each space. Be sure to have the completed worksheets on hand as you begin the system generation procedure.

E X E C U T I V E A N D P R O C E S S O R O P T I O N S

System: ----------

Author: ----------

Date: ____ _ ______ _ ____

Page: 1 of 3

Always print long explanation:	Yes No
Saved answer file for Executive:	Yes No
Executive saved answer file name:	----------
Saved answer file for peripherals:	Yes No
Peripherals saved answer file name:	----------
Saved answer file for nonprivileged task builds:	Yes No
Nonprivileged task-build saved answer file name:	----------
Is this a PREPGEN:	Yes No
Disk drive containing target system disk:	----------
Autoconfigure host system:	Yes No
Override Autoconfigure results:	Yes No
Processor type:	----------
Full-functionality Executive:	Yes No
Executive data space support:	Yes No
User data space support:	Yes No
Task headers out-of-pool support:	Yes No

(Continued on next page)

E X E C U T I V E A N D P R O C E S S O R O P T I O N S

System: _____

Author: _____

Date: ____ – ______ – ____

Extended logical name support:	Yes	No
Supervisor-mode library support:	Yes	No
FCS resident library support:	Yes	No
Fast map support:	Yes	No
Loadable drivers/databases:	Yes	No
ICB pool size: _____ (decimal words)		
Communications products support:	Yes	No
Host support for LAT servers:	Yes	No
System name: _____ (up to 6 chars)		
Shadow recording support:	Yes	No
Disk data caching support:	Yes	No
Console driver support:	Yes	No
Accounting support:	Yes	No
Batch processor:	Yes	No
Queue Manager:	Yes	No
DCL/alternate CLI support:	Yes	No
CTRL/C abort support:	Yes	No
FCP type:	FCPLRG	FCPMDL
File windows in secondary pool:	Yes	No
Decimal version numbers:	Yes	No

(Continued on next page)

E X E C U T I V E A N D P R O C E S S O R O P T I O N S

System: ----------

Author: ----------

Date: ____ – ______ – ____

Virtual terminal support: Yes No

Default virtual terminal unit buffer size: ----------

Maximum virtual terminal unit buffer size: ----------

Character translation support: Yes No

Terminal driver extended I/O support: Yes No

Unsolicited terminal input timeout: ----------

IP11 industrial I/O subsystem support: Yes No

IP11 powerfail support: Yes No

Executive Debugging Tool (XDT) support: Yes No

Crash notification device CSR address: ----------

Crash device and unit: ----------

Total system memory: _____ (in K words)

Floating point processor support: Yes No

Programmable system clock: Yes No

Interrupts per second: ----------

50 Hz power: Yes No

M A S S B U S C O N T R O L L E R C O N F I G U R A T I O N

System: ____________________

Author: ____________________

Date: ____ - ______ - ____

Mixed MASSBUS: Yes No

Name	Device Type	---Configuration--- Vector	CSR
RHA			
	-------	------	----------
RHB			
	-------	------	----------
RHC			
	-------	------	----------
RHD			
	-------	------	----------

Example:

RHC	DB	254	176700
	-------	------	----------

M A S S B U S D R I V E C O N F I G U R A T I O N

List devices in this order:
DB: RP04/05/06 disk
DR: RM02/03/05/80/RP07 disk
DS: RS03/04 disk
EM: ML11 disk
MM: TU16/45/77/TE16 magtape

System: _____

Author: _____

Date: ____ _ ______ _ ____

Sheet: ____ of ____

Drive Name	Drive Type	Physical Unit No.	---Controller Connections--- Port A	Port B

Example:

DB3:	RP06	2	RHD	---

U N I B U S C O N T R O L L E R C O N F I G U R A T I O N

System: _____

Author: _____

Date: ____ _ ______ _ ____

Sheet: ____ of ____

---Controller Information--- Logical Name	Type	Drives (lines)	--Configuration Information-- Vector	CSR

Example:

DKA	RK11	3	220	177404

U N I B U S D R I V E C O N F I G U R A T I O N

List drive units for multiple drive UNIBUS devices.

System: _____

Author: _____

Date: ____ - _____ - ____

Sheet: ____ of ____

Drive Name	Drive Type	Physical Unit No.	--Controller Connections-- Port A	Port B
DK0:	RK05	0	DKB	---

Appendix B

RSX–11M–PLUS Devices

This appendix contains tables of RSX–11M–PLUS devices. Table B–1 lists for each device the device mnemonic, the respective device controller mnemonic, the controller and device names, and the generic description of each device. Pseudo devices are listed in Table B–2.

The manner in which the controller and device names are listed indicates which controllers can be used with which devices. For example:

RH11/RH70	RM02
RH70	RM03
	RM05
	RM80

The above entries indicate that the RM02 can be used with either an RH11 or RH70 controller, but the RM03, RM05, and RM80 can be used only with an RH70 controller.

Table B–1: RSX–11M–PLUS Devices

Device Mnemonic	Controller Mnemonic	Controller Name	Device Type	Device Description
CR	CR	CM11 CR11		Card reader
CT	CT	TA11	TU60	Cassette tape
DB	RH	RH11/RH70	RP04 RP05 RP06	Disk
DD	DD	DL11	TU58	DECtape II
DK	DK	RK11	RK05 RK05F	Disk

(continued on next page)

Table B–1 (Cont.): RSX–11M–PLUS Devices

Device Mnemonic	Controller Mnemonic	Controller Name	Device Type	Device Description
DL	DL	RL11/RLV11	RL01 RL02	Disk
DM	DM	RK611/RK711	RK06 RK07	Disk
DP	DP	RP11	RP02 RPR02 RP03	Disk
DR	RH	RH11/RH70 RH70	RM02 RM03 RM05 RM80	Disk
DS	RH	RH11/RH70	RS03 RS04	Disk
DT	DT	TC11	TU56	DECtape
DU	DU[1]	RQDX1/RQDX2 RQDX3	RX50 RX33	Diskette
			RD31 RD32 RD51 RD52 RD53 RD54	Disk
		RUX50	RX50	Diskette
		KDA50/UDA50	RA60 RA70 RA80 RA81 RA82 RA90	Disk
		RQC25/RUC25	RC25	Disk
DX	DX	RX11	RX01	Diskette
DY	DY	RX211/RXV21	RX02	Diskette
EM	RH	RH11/RH70	ML11	Semiconductor disk emulator

[1]The DU controller is an MSCP controller.

(continued on next page)

Table B–1 (Cont.): RSX–11M–PLUS Devices

Device Mnemonic	Controller Mnemonic	Controller Name	Device Type	Device Description
LA	LA	LPA11		Lab peripheral accelerator
LP	LP	LA180	LA180	Printer
		LA210		
		LN01	LN01	
		LG01		
		LG02	LP01	
		LP11	LP02	
			LP04	
			LP05	
			LP06	
			LP07	
			LP14	
			LP25	
			LP26	
			LP27	
		LS11	LS11	
		LV11	LV01	
LR	LR	PCL11		Parallel communications link (receiver)
LT	LT	PCL11		Parallel communications link (transmitter)
MM	RH	RH11/RH70 (with TM02/TM03 formatter)	TU16	Magnetic tape
			TE16	
			TU45	
			TU77	
MS	MS		TS11	Magnetic tape
			TSV05	
			TU80	Magnetic tape cartridge
			TK25	
MT	MT	TM11/TMA11/TMB11	TE10	Magnetic tape
			TU10	
			TU10W	
			TS03	

(continued on next page)

Table B–1 (Cont.): RSX–11M–PLUS Devices

Device Mnemonic	Controller Mnemonic	Controller Name	Device Type	Device Description
MU	MU		TK50 TU81 TU81E	Magnetic tape cartridge
PP	PP	PC11		Paper tape reader and punch
PR	PR	PR11		Paper tape reader
TT	YL YH YJ YV YZ	DL11/DLV11 DH11 DJ11 DHU11/DHV11 DZ11/DZQ11/DZV11		Terminal interface
XE	XE	DEUNA		Communications interface
XM	XM	DMC11 DMR11		Synchronous interface
XW	XW	DUP11		Synchronous interface

Table B–2: RSX–11M–PLUS Pseudo Devices

Pseudo Devices	Device Description
CL	Console listing device
CO	Console output device
LB	Library device
NL	Null device
RD	Reconfiguration driver
SP	Spooling device
SY	Default system device
TI	Terminal input device
VT	Virtual terminal

Appendix C

Two System Generation Examples

This appendix contains examples of terminal output from two different system generations. You can use these examples as guides to what you should see on your terminal as you proceed through a system generation. Minor differences in dialogue will occur as the result of different software versions or option selection.

Section C.1 contains a terminal trace from a simple, standalone PREPGEN. If you are generating your RSX–11M–PLUS system for the first time, you should choose these options also; your terminal trace should be similar to this example.

Section C.2 contains a terminal trace from an online system generation performed on a VAX–11 host computer; $$ logical names are used. The SYSGEN command file is invoked; the PREPGEN option is selected; and saved answer files are created. Then SYSGEN is invoked again, using the saved answer files created during the PREPGEN.

C.1 Example of a Standalone System Generation

```
>>>B DB  RET
RSX-11M-PLUS V4.2  BL58  384.KW  System:"Baseline"
>RED DR:=SY:
>RED DR:=LB:
>RED DR:=SP:
>MOU DR:="RSX11MPBL58"
>@[2,54]BASTART
>;
>;
>; RSX-11M-PLUS V4.2 Distribution Kit
>;
>; This is the baseline system of the RSX-11M-PLUS V4.2
>; distribution kit. This system contains an assortment of
>; devices and may in fact be of some use on your target
>; system. The main purpose of the baseline system, however,
>; is to provide a working system environment which may be
>; used to generate a custom-tailored operating system for
>; your target hardware. We will now provide instructions
>; to guide you through the startup procedure.
>;
>;
>; It is important to specify the correct date and time.
>; Use the format "DD-MMM-YY HH:MM".
>;
>* Please enter the date and time [S]: 26-APR-89 9:54  RET
>TIME 26-APR-89 9:54
>;
>; Now allocate checkpoint space for use by system utilities.
>;
>ACS SY:/BLKS=1024.
>;
>; The following information is necessary for this command file
>; to correctly access the remainder of the distribution kit.
>;
>* Did you receive your RSX-11M-PLUS distribution kit on magnetic tape? [Y/N]: Y  RET
>;
>; Please enter the name of the magnetic tape drive, which should
>; still contain the distribution tape. The name is of the form:
>;
>;  MM1: or
>;  MS0: etc...
>;
>* Which tape drive contains the distribution tape [S]: MS0:  RET
>;
>; We will now set the CSR of the controller that will be
>; used to bring in the remainder of the distribution kit to
>; the standard value. If your controller is not at this address
>; it will be necessary for you to manually configure the system
>; by issuing the appropriate CON commands. Answer Yes to the
>; manual configuration question to do this. If your controller
>; is at the standard address, you do not have to do a manual
>; configuration.
>;
```

```
>CON SET RHC CSR=160000
>CON SET MTA CSR=160000
>CON SET MSA CSR=172522
>CON SET MSA VEC=224
>CON SET MUA CSR=160000
>;
>; We will now bring on line all devices which were generated into
>; this baseline image and which exist in your hardware system.
>;
>; If there is hardware in your system occupying a control
>; register address which conflicts with a standard DIGITAL
>; register assignment, it is possible that the "CON ONLINE
>; ALL" command might cause a system crash. This is because
>; a DIGITAL device driver is attempting to manipulate foreign
>; hardware or the CSR address assignments in your system are
>; different from those assumed in this baseline configuration.
>; On the first pass through this file please answer No to the
>; following question. If such a mismatch exists and a crash
>; does occur, rebootstrap the baseline system and answer Yes
>; to this question.  Instructions will then be provided to help
>; circumvent the problem.
>;
>* Do you need to do manual configuration? [Y/N]: N  RET
>;
>CON ONLINE ALL
>;
>; Prepare to bring in the remainder of the distribution kit
>;
>* Is your target system disk an RC25, RK07, or RD52? [Y/N]: N  RET
>;
>; Since the files in the second backup set are not necessary to generate
>; your system you may wish to skip the verify pass to save time.
>;
>* Do you want to verify the second backup set? [Y/N]: Y  RET
>;
>; We will now mount the tape in MS0: for access by BRU.
>;
>MOU MS0:/FOR/DENS=1600
>;
>; Ensure that the BRU task is installed.
>;
>INS $BRU
>;
>; We will now load the remainder of the distribution kit.
>;
>TIME
10:11:24 26-APR-89
>;
>BRU /BAC:MPBL58ASRC/UFD/NOINI/DENS:1600/VER MS0: SY:
BRU - Starting Tape 1 on MS0:
BRU - End of Tape 1 on MS0:
BRU - Starting verify pass Tape 1 on MS0:
BRU - End of Tape 1 on MS0:
BRU - Completed
>;
>DMO MS0:/LOCK=UNLOAD
DMO -- VT1:    dismounted from MS0:    *** Final dismount initiated ***
>;
>TIME
```

```
10:48:00 26-APR-89
>;
>; We will now create any UFDs that must be created on your disk(s).
>; You will not see the UFD commands.
>;
>TIME
10:48:10 26-APR-89
>;
>;
>; The preparation of the RSX-11M-PLUS kit is now complete.  The next
>; time this disk is bootstrapped, this dialog will only be repeated
>; on request.  We will now record the successful installation in the
>; log file on the new system disk, and either exit if the installation
>; was done on line, or proceed with the normal startup sequence if the
>; baseline system was used.
>;
>SET /UIC=[2,54]
>PIP LB:[1,1]KITIDENT.DAT/AP=LB:[2,54]INSTALOG.DAT
>;
>;
>SET /UIC=[200,200]
>;    PLEASE NOTE
>;
>; If you have not yet read the system release notes, please do so
>; now before attempting to perform a SYSGEN or to utilize the new
>; features of this system.
>;
>;
>; In order to start the SYSGEN process, type:
>;
>; >@SYSGEN
>;
>; When SYSGEN has completed and your generated system is
>; running, you may wish to edit several DIGITAL-supplied
>; prototype command and text files to suit your system
>; and application:
>;
>; File   Purpose
>; ----   -------
>; [0,0]RSX11.SYS  An account/password file
>;    This file does contain privileged accounts.
>;
>; [1,2]STARTUP.CMD (This file) Invoked at bootstrap time to
>;    control bringing up the system.
>;
>; [1,2]QMGSTART.CMD Invoked by STARTUP to start up the Queue
>;    Manager and spooling system.
>;
>; [1,2]SHUTUP.CMD  Invoked by SHUTUP when taking down the system
>;    to perform system dependent shutdown tasks.
>;
>; [1,2]QMGSTOP.CMD Invoked by SHUTUP to stop the Queue Manager
>;    and spooling system.
>;
>; [1,2]LOGIN.TXT  Displayed on user's terminal when logging in.
>;
>; [1,2]BATCH.TXT  Displayed at the beginning of each batch log
>;    file.
>;
```

```
>;
>ELI /LOG/LIM
>CLI /INIT=DCL/CTRLC/DPR="<15><12>/$ /"
>INS LB:[1,1]RMSRESAB.TSK/RON=YES/PAR=GEN
>INS LB:[1,1]RMSLBL.TSK/RON=YES/PAR=GEN
>INS LB:[1,1]RMSLBM.TSK/RON=YES/PAR=GEN
>INS $QMGCLI
>INS $QMGCLI/TASK=...PRI
>INS $QMGCLI/TASK=...SUB
>QUE /START:QMG
>INS $QMGPRT/TASK=PRT.../SLV=NO
>QUE LP0:/CR/NM
>START/ACCOUNTING
>CON ESTAT LP0:
>QUE LP0:/SP/FL:2/LOWER/FO:0
>QUE BAP0:/BATCH
>QUE LP0:/AS:PRINT
>QUE BAP0:/AS:BATCH
>@ <EOF>
>
>@[200,200]sysgeN  RET
>;
>; RSX-11M-PLUS  SYSGEN  BL58
>;
>; COPYRIGHT (c) 1989
>; DIGITAL EQUIPMENT CORP., MAYNARD MA., 01754
>;
>SET /DPRO=[RWED,RWED,RWE,R]
>;
>; To exit from the SYSGEN procedure at any time, type CTRL/Z.
>;
>; If you are unsure of the answer to a question for which a de-
>; fault answer exists, use the default answer.
>;
>;
>;
>;=================================================
>;  Choosing SYSGEN Options      26-APR-89 at 10:50
>;=================================================
>;
>;
>;
>; Every question is preceded by a question number (for example SU010)
>; which you can use to find the explanation of the question in the
>; RSX-11M-PLUS System Generation and Installation Guide.
>;
>; An explanation of every question is also available by pressing
>; the ESC key (or the ALTMODE key) in response to the question.
>;
>; If you are unfamiliar with the SYSGEN procedure, the explanation of
>; each question can be printed automatically before the question.
>;
>* SU010   Do you always want the explanation printed? [Y/N D:N]:  RET
>;
>; SYSGEN always creates saved answer files containing your responses
>; to the SYSGEN questions:
>;
>;    SYSGENSA1.CMD     Setup questions, Executive options
>;    SYSGENSA2.CMD     Peripheral configuration
```

```
>;    SYSGENSA3.CMD     Nonprivileged task builds
>;
>; You should perform a PREPGEN first to create saved answer files, and
>; then perform a SYSGEN, specifying those saved answer files as input
>; to the Executive, peripheral, and nonprivileged task build sections.
>;
>* SU020   Do you want to use a saved answer file as input for
>*         the Executive options? [Y/N D:N]:   RET
>;
>* SU040   Do you want to use a saved answer file as input for
>*         the peripheral configuration? [Y/N D:N]:   RET
>;
>* SU060   Do you want to use a saved answer file as input for
>*         the nonprivileged task builds? [Y/N D:N]:   RET
>;
>* SU080   Do you want to do a PREPGEN? [Y/N D:N]: Y  RET
>;
>* SU090   Enter the name of the disk drive containing your
>*         target system disk [ddnn:] [S R:2-5]: DR0:  RET
>;
>ASN DR0:=IN:
>ASN DR0:=OU:
>ASN DR0:=LB:
>ASN DR0:=WK:
>ASN DR0:=TK:
>ASN DR0:=BC:
>ASN DR0:=LI:
>ASN DR0:=OB:
>ASN DR0:=EX:
>ASN DR0:=MP:
>;
>* SU100   Do you want to run Autoconfigure on the host system
>*         hardware? [Y/N D:N]:  RET
>;
>; You can:
>;
>;    o  do a complete SYSGEN
>;
>;    o  continue a previous SYSGEN from where you left off
>;
>;    o  do an individual section of SYSGEN
>;
>;
>* SU120   Do you want to do a complete SYSGEN? [Y/N D:Y]: Y  RET
>;
>!INS [3,54]MAC/TASK=MACV2
>!INS [3,54]PIP/TASK=PIPV2
>!INS [3,54]LBR/TASK=LBRV2
>!INS [3,54]TKB/TASK=TKBV2
>!INS [3,54]VMR/TASK=VMRV2
>;
>;
>;
>;=====================================================
>;  Choosing Executive Options      26-APR-89 at 13:30
>;=====================================================
>;
>;
>;
```

```
>; The answers to the questions in this section are put in the saved
>; answer file [200,200]SYSGENSA1.CMD.
>;
>; Enter a comment for inclusion in the SYSGENSA1 saved answer file.
>; The comment may contain more than one line.  The "V" in the right
>; margin below marks the maximum line length.  When you are done,
>; press RETURN in response to the prompt.
>;                                                                    V
>* Comment [S R:0.-55.]:    RET
>;
>* CE010    What is your target processor type? [S R:5.-12. D:"11/70"]: 11/44  RET
>;
>* CE020    Do you want the Full-functionality Executive? [Y/N D:Y]: Y  RET
>;
>* CE120    Do you want support for communications products
>*          (such as DECnet, PSI, and LAT)? [Y/N D:N]: N  RET
>;
>* CE130    What is the system name? [S R:0-6 D:"RSXMPL"]:    RET
>;
>* CE264    Do you want IP11 industrial I/O subsystem support? [Y/N D:N]: N  RET
>;
>* CE270    Do you want to include XDT? [Y/N D:N]: Y  RET
>;
>* CE280    Enter the crash notification device CSR
>*          address [O R:160000-177700 D:177564]:    RET
>;
>; Note:  Enter both the device and the logical unit number.
>;        For example, MM0: or DL1:.
>;
>; Note:  Enter XX: if you desire loadable DU:, DL:, MU:, MS: or MM:
>;        crash driver support.
>;
>* CE290    On what device and unit do you want crash dumps
>*          to be written? [S R:2-6]: XX:  RET
>;
>* CE310    Enter memory size (in K words) [D R:128.-1920. D:256.]:    RET
>;
>* CE320    Do you want floating point processor support? [Y/N D:N]:    RET
>;
>* CE330    Is your system clock programmable (KW11-P)? [Y/N D:N]:    RET
>;
>* CE350    Is your line frequency 50 Hz? [Y/N D:N]:    RET
>;
>;
>;
>;============================================================
>;  Choosing Peripheral Configuration      26-APR-89 at 13:32
>;============================================================
>;
>;
>;
>; The answers to the questions in this section are put in the saved
>; answer file [200,200]SYSGENSA2.CMD.
>;
>; Enter a comment for inclusion in the SYSGENSA2 saved answer file.
>; The comment may contain more than one line.  The "V" in the right
>; margin below marks the maximum line length.  When you are done,
>; press RETURN in response to the prompt.
>;                                                                    V
```

```
>* Comment [S R:0.-55.]:    RET
>;
>;
>* CP0604  How many RH controllers do you have? [D R:0.-15. D:4.]:    RET
>;
>* CP0612  Do you want to generate a mixed MASSBUS configuration? [Y/N D:N]:    RET
>;
>;
>;   DB:    controllers: RH11, RH70 devices: RP04, RP05, RP06
>;
>* CP0808  How many RP04/05/06 disk drives do you have? [D R:0.-63. D:0.]:    RET
>;
>;
>;   DR:    controllers: RH11, RH70 devices: RM02
>;                       RH70           RM03, RM05, RM80, RP07
>;
>* CP1008  How many RM02/03/05/80/RP07 disk drives do you
>*         have? [D R:0.-63. D:0.]: 1.  RET
>;
>* CP1020  Are any of the units dual-access? [Y/N D:N]:    RET
>;
>;
>* CP1036  What is the physical unit number of DR0:? [O R:0-7 D:0]:    RET
>;
>* CP1044  To which RH controller is DR0: connected? [S R:1-1]: A  RET
>;
>* CP1060  Is DR0: an RM02, RM03, RM05, RM80, or RP07? [S R:4-4 D:"RP07"]: RM03  RET
>;
>;
>;   DS:    controllers: RH11, RH70 devices: RS03, RS04
>;
>* CP1208  How many RS03/04 disk drives do you have? [D R:0.-63. D:0.]:    RET
>;
>;
>;   EM:    controllers: RH11, RH70 device: ML11
>;
>* CP1408  How many ML11 disks do you have? [D R:0.-63. D:0.]:    RET
>;
>;
>;   MM:    controllers: RH11, RH70 devices: TE16, TU16, TU45, TU77
>;          formatters:  TM02, TM03
>;
>* CP1608  How many TU16/45/77/TE16 tape drives do you
>*         have? [D R:0.-256. D:0.]:    RET
>;
>;
>* CP2068  Enter the vector address of RHA [O R:60-774 D:254]:    RET
>;
>* CP2072  What is its CSR address? [O R:160000-177700 D:176700]:    RET
>;
>;
>;                       RH Configuration
>;
>;                     Physical Unit Number
>;
>;     0       1       2       3       4       5       6       7
>;
>; RHA  DR0:
>; RHB
```

```
>; RHC
>; RHD
>;
>;
>;
>;
>;   DK:    controller:  RK11  devices: RK05, RK05F
>;
>* CP2204  How many RK11 cartridge disk controllers do you have? [O D:0]:  RET
>;
>;
>;   DM:    controllers: RK611, RK711 devices: RK06, RK07
>;
>* CP2404  How many RK611/711 disk cartridge controllers do
>*         you have? [O D:0]: 2.  RET
>;
>* CP2408  How many RK06/RK07 disk drives do you have? [D R:1.-63. D:1.]: 2.  RET
>;
>* CP2420  Are any of the units dual-access? [Y/N D:N]:    RET
>;
>;
>* CP2436  What is the physical unit number of DM0:? [O R:0-7 D:0]:    RET
>;
>* CP2444  To which DM controller is DM0: connected? [S R:1-1]: A  RET
>;
>* CP2460  Is DM0: an RK06 or RK07? [S R:4-4 D:"RK07"]:    RET
>;
>;
>* CP2436  What is the physical unit number of DM1:? [O R:0-7 D:1]:    RET
>;
>* CP2444  To which DM controller is DM1: connected? [S R:1-1]: A  RET
>;
>* CP2460  Is DM1: an RK06 or RK07? [S R:4-4 D:"RK07"]:    RET
>;
>;
>* CP2468  Enter the vector address of DMA [O R:60-774 D:210]:    RET
>;
>* CP2472  What is its CSR address? [O R:160000-177700 D:177440]:    RET
>;
>;
>;                        DM Configuration
>;
>;                      Physical Unit Number
>;
>;     0       1       2       3       4       5       6       7
>;
>; DMA  DM0:    DM1:
>; DMB
>;
>;
>;
>;
>;   DL:    controllers: RL11, RLV12 devices: RL01, RL02
>;
>* CP2604  How many RL11/RLV11 disk cartridge controllers do
>*         you have? [O D:0]: 2.  RET
>;
>* CP2608  How many RL01/RL02 disk drives do you have? [D R:1.-63. D:1.]: 2.  RET
>;
```

```
>;
>* CP2636  What is the physical unit number of DL0:? [O R:0-7 D:0]:    RET
>;
>* CP2644  To which DL controller is DL0: connected? [S R:1-1]: A  RET
>;
>* CP2660  Is DL0: an RL01 or RL02? [S R:4-4 D:"RL02"]:    RET
>;
>;
>* CP2636  What is the physical unit number of DL1:? [O R:0-7 D:1]:    RET
>;
>* CP2644  To which DL controller is DL1: connected? [S R:1-1]: A  RET
>;
>* CP2660  Is DL1: an RL01 or RL02? [S R:4-4 D:"RL02"]:    RET
>;
>;
>* CP2668  Enter the vector address of DLA [O R:60-774 D:160]:    RET
>;
>* CP2672  What is its CSR address? [O R:160000-177700 D:174400]:    RET
>;
>;
>;                        DL Configuration
>;
>;                      Physical Unit Number
>;
>;     0       1       2       3       4       5       6       7
>;
>;
>; DLA  DL0:    DL1:
>; DLB
>;
>;
>;
>;
>;   DP:    controller:  RP11  devices: RP02, RPR02, RP03
>;
>* CP2804  How many RP11 disk pack controllers do you have? [O D:0]:    RET
>;
>;
>; DU: controllers: RQDX1, RQDX2, RQDX3, RUX50, RQC25, KDA50, UDA50
>;
>; devices: RX33, RX50, RD31, RD51, RD52, RD53, RD54, RC25,
>;   RA60, RA70, RA80, RA81, RA82, RA90
>;
>;   The total of DU and MU controllers cannot be greater than 10.
>;
>* CP3004  How many MSCP disk controllers do you have? [D R:0.-10. D:0.]: 1.  RET
>;
>* CP3008  How many MSCP disk drives do you have? [D R:1.-4. D:1.]:    RET
>;
>;
>* CP3036  What is the physical unit number of DU0:? [O R:0-377 D:0]:    RET
>;
>;
>* CP3068  Enter the vector address of DUA [O R:60-774 D:154]:    RET
>;
>* CP3072  What is its CSR address? [O R:160000-177700 D:172150]:    RET
>;
>;
>; MU: controllers: TK50, TU81, TU81E, TQ81E
```

```
>;
>* CP3404  How many TMSCP tape controllers do you have? [D R:0.-9. D:0.]:   RET
>;
>;
>;   CR:    controllers: CM11, CR11
>;
>* CP4004  How many CM/CR11 card readers do you have? [O D:0]:   RET
>;
>;
>;   CT:    controller:  TA11  device:  TU60
>;
>* CP4204  How many TA11 dual cassettes do you have? [O D:0]:   RET
>;
>;
>;   MS:    controllers: TS11, TU80, TSV05, TK25
>;
>* CP4404  How many TS11/TU80/TSV05/TK25
>*         magtape controllers do you have? [O D:0]: 1.  RET
>;
>* CP4468  Enter vector address of the next
>*         TS11/TU80/TSV05/TK25 [O R:60-774 D:224]:   RET
>;
>* CP4472  What is its CSR address? [O R:160000-177700 D:172522]:   RET
>;
>;
>;   DT:    controller:  TC11  device:  TU56
>;
>* CP4604  How many TC11 DECtape controllers do you have? [O D:0]:   RET
>;
>;
>;   DX:    controller:  RX11  device:  RX01
>;
>* CP4804  How many RX11 disk controllers do you have? [O D:0]:   RET
>;
>;
>;   DY:    controller:  RX211, RXV21 device:  RX02
>;
>* CP5004  How many RX211/RXV21 disk controllers do you have? [O D:0]:   RET
>;
>;
>;   DD:    controller:  DL11  device:  TU58
>;
>* CP5204  How many TU58 controllers do you have? [O D:0]:   RET
>;
>;
>;   LP:    controllers: LA180, LN01, LP11, LS11, LV11
>;          devices:     LA180, LN01, LP01, LP02, LP04, LP05, LP06,
>;                       LP07,  LP14, LP25, LP26, LP27, LS11, LV01
>;
>* CP5404  How many LP/LS/LV11/LA180 line printers do you have? [O D:0]: 1   RET
>;
>* CP5408  Enter the number of seconds between
>*         line printer-not-ready messages [D R:0.-255. D:15.]:   RET
>;
>* CP5468  Enter vector address of the next line
>*         printer [O R:60-774 D:200]:   RET
>;
>* CP5472  What is its CSR address? [O R:160000-177700 D:177514]:   RET
>;
```

```
>* CP5480  Enter line printer type for LPA [S R:4-5 D:"LP25"]:   RET
>;
>* CP5484  Does LPA have lowercase characters? [Y/N D:N]:   RET
>;
>;
>;   MT:    controllers: TM11, TMA11, TMB11   devices: TE10, TU10, TU10W, TS03
>;
>* CP5604  How many TM/TMA/TMB11 magtape controllers do you have? [O D:0]:   RET
>;
>;
>;   PP:    controller:  PC11
>;
>* CP5804  How many PC11 paper tape reader/punches do you have? [O D:0]:   RET
>;
>;
>;   PR:    controller:  PR11
>;
>* CP6004  How many PR11 paper tape readers do you have? [O D:0]:   RET
>;
>;
>;   LA:    controller:  LPA11
>;
>* CP6204  How many LPA11 lab subsystems do you have? [D R:0.-16. D:0.]:   RET
>;
>;
>;   TT:    controllers: DL11, DLV11    controller mnemonic: YL
>;
>* CP6804  Enter number of additional DL11/DLV11 line interfaces [O D:0]:   RET
>;
>* CP6832  Enter terminal type for YLA [S R:4-6 D:"LA120"]:   RET
>;
>;
>;   TT:    controller:  DH11           controller mnemonic: YH
>;
>* CP7004  Enter number of DH11 asynchronous line
>*         multiplexers [D R:0.-16. D:0.]:   RET
>;
>;
>;   TT:           controller mnemonic: YV
>;
>;    controllers: DHU11, DHV11, CXA16, CXB16, CXY08
>;
>;
>* CP7104  Enter number of DHU11/DHV11/CXA16/CXB16/CXY08 (YV:-type)
>*         asynchronous line multiplexers [D R:0.-32. D:0.]:   RET
>;
>;
>;   TT:    controller:  DJ11           controller mnemonic: YJ
>;
>* CP7204  Enter number of DJ11 asynchronous line
>*         multiplexers [D R:0.-16. D:0.]:   RET
>;
>;
>;   TT:    controllers: DZ11, DZQ11, DZV11, DFA01    controller mnemonic: YZ
>;
>* CP7404  Enter number of DZ11/DZQ11/DZV11/DFA01 asynchronous line
>*         multiplexers [D R:0.-32. D:0.]:   RET
>;
>;
```

```
>* CP7604  Do you have any intercomputer communication devices? [Y/N D:N]:   RET
>;
>;
>; Enter device mnemonics for any user-supplied drivers.  The driver
>; source files must reside in [11,10] and be named ddDRV.MAC and
>; ddTAB.MAC where dd is the device mnemonic.
>;
>; You may enter the mnemonics on more than one line.  When you have
>; listed all the drivers, press RETURN when asked for the device
>; mnemonic.
>;
>; The device mnemonic must not include a colon.
>;
>* CP9604  Enter device mnemonics for user-supplied drivers [S]:   RET
>;
>;
>; The highest vector among the devices you specified in this SYSGEN
>; is 374(octal).  This is the default response for this question.
>;
>* CP9632  What is the highest interrupt vector
>*         address? [O R:374-774 D:374]:   RET
>;
>;
>;
>;================================================================
>;  Assembling the Executive and Drivers      26-APR-89 at 14:40
>;================================================================
>;
>;
>;
>; The answers to the questions in this section are put in the saved
>; answer file [200,200]SYSGENSA1.CMD.
>;
>!PIP RSXMC3.MAC=RSXMC1.MAC,RSXMC2.MAC
>!PIP RSXMC.MAC=RSXMC3.MAC,RSXMC0.MAC
>;
>!SET /UIC=[1,24]
>!PIP [11,10]/NV=[200,200]RSXMC.MAC
>!PIP [11,10]/NV=[200,200]SYSTB.MAC
>!PIP [11,24]/NV=[200,200]RSXASM.CMD
>!PIP [11,24]/NV=[200,200]DRIVERS.ASM
>;
>;
>* AE010   Do you want assembly listings of the Executive and
>*         drivers? [Y/N D:N]:   RET
>;
>!ASN NL:=LS:
>;
>;
>* AE030   Do you wish to pause to edit any files before
>*         assembling? [Y/N D:N]:   RET
>;
>!SET /UIC=[11,24]
>;
>!PIP *.OBJ;*/DE/NM,*.TTY;*
>;
>!TIME
>;
>!MAC @RSXASM
```

```
>;
>!TIME
>;
>!MAC @DRIVERS.ASM
>;
>!TIME
>;
>!PIP RSX11M.OBS=*.OBJ
>!PIP TTDRV.OBS=*.TTY
>;
>!SET /UIC=[200,200]
>!PIP /NV=[11,10]RSXMC.MAC
>;
>!SET /UIC=[1,24]
>!PIP RSXBLD.CMD/PU/NM
>!PIP RSX11M.OLB;*/DE/NM
>!PIP [200,200]RSXMC.MAC/PU/NM
>;
>!LBR RSX11M/CR:256.::256./-EP=[11,24]RSX11M.OBS
>!PIP [11,24]RSX11M.OBS;*,*.OBJ;*/DE
>;
>!LBR TTDRV/CR:40.:392.:128.=[11,24]TTDRV.OBS
>!PIP [11,24]TTDRV.OBS;*,*.TTY;*/DE
>;
>;
>;
>;============================================================
>;  Building the Executive and Drivers      26-APR-89 at 14:40
>;============================================================
>;
>;
>;
>; The answers to the questions in this section are put in the saved
>; answer file [200,200]SYSGENSA1.CMD.
>;
>;
>; Allocate space to be used later for the system image file.
>;
>!SET /UIC=[1,54]
>!PIP RSX11M.TMP/CO/BL:1026.=NL:
>;
>;
>!SET /UIC=[1,54]
>!PIP SYSVMR.CMD=[200,200]SYSVMR.CMD,VMRTTY.CMD
>;
>;
>* BE030   Do you want to pause to edit any files before
>*         task-building? [Y/N D:N]:    RET
>;
>!SET /UIC=[1,24]
>!PIP [1,24]/NV/NM=[200,200]RSXBLD.CMD,RSX11M,DSP11M,LDR11M
>!PIP [1,24]/NV=[200,200]DIR11M.CMD,DR211M,DIRCOM,DR2COM,DIR
>!PIP [1,24]/NV=[200,200]DR311M.CMD,DR411M,DR3COM,DR4COM
>!PIP [1,24]/NV=[200,200]VEC11M.CMD,DCM11M,VECCOM
>;
>!TIME
>;
>!TKB @RSXBLD
>;
```

```
>!TIME
>;
>!TKB @[200,200]DRIVERS.BLD
>;
>!TIME
>;
>;
>;
>;============================================================
>;  Building the Privileged Task      26-APR-89 at 14:42
>;============================================================
>;
>;
>;
>; The answers to the questions in this section are put in the saved
>; answer file [200,200]SYSGENSA1.CMD.
>;
>;
>* BP040   Do you want the maps of the privileged tasks? [Y/N D:N]:   RET
>;
>!ASN NL:=MP:
>;
>!SET /UIC=[1,24]
>;
>!TIME
>;
>!TKB @SAVBLD
>;
>!TIME
>;
>!ASN LB:=OU:
>;
>;
>;
>;============================================================
>;  Rebuilding Supplied System Tasks      26-APR-89 at 14:42
>;============================================================
>;
>;
>;
>; The answers to the questions in this section are put in the saved
>; answer file [200,200]SYSGENSA3.CMD.
>;
>;
>* BN010   Do you want to rebuild any system tasks? [Y/N D:N]:   RET
>;
>;
>;
>;============================================================
>;  Creating the System Image File      26-APR-89 at 14:42
>;============================================================
>;
>;
>!SET /UIC=[1,54]
>;
>!PIP RSX11M.TMP;*/DE/NM
>;
>!PIP RSX11M.SYS/CO/NV/BL:1026.=RSX11M.TSK
>;
```

```
>!ASN LB:=SY:
>!VMR @SYSVMR
>;
>!REM MACV2
>!REM PIPV2
>!REM LBRV2
>!REM TKBV2
>!REM VMRV2
>;
>; End of PREPGEN
>;
>TIME
14:42:42 26-APR-89
>;
>ASN =
>;
>@ <EOF>
```

C.2 Example of an Online System Generation

```
> SET PROC/PRIV=(CMKRNL,SYSNAM,LOG_IO,VOLPRO,SYSPRV)  RET
> SET TERM/NOLINE_EDIT  RET
> SHO LOG $$*  RET

(LNM$PROCESS_TABLE)

(LNM$JOB_803522D0)

(LNM$GROUP_000301)

(LNM$SYSTEM_TABLE)
  "$$0" = "BLKHOL$DJA3:"
  "$$1" = "BLKHOL$DUA0:"
  "$$10" = "$3$DAA2:"
  "$$11" = "$3$DAA3:"
  "$$12" = "$3$DMA0:"
  "$$13" = "$3$DMA1:"
  "$$14" = "$3$DYA0:"
  "$$15" = "$3$DYA1:"
  "$$16" = "BLKHOL$MUA0:"
  "$$17" = "BLKHOL$MUA1:"
  "$$2" = "BLKHOL$DUA4:"
  "$$20" = "CSA1:"
  "$$21" = "SYS$SPECIFIC:"
  "$$22" = "SYS$COMMON:"
  "$$3" = "BLKHOL$DUA5:"
  "$$4" = "BLKHOL$DUA6:"
  "$$5" = "BLKHOL$DUA7:"
  "$$6" = "$3$DAA0:"
  "$$7" = "$3$DAA1:"
> MOU $$17:/FOR  RET
> MOU $$13:/FOR  RET
> BRU  RET
BRU> /DENSITY:1600/VERIFY/INITIALIZE/MAX:3308/HEADERS:1654  RET
From: $$17:  RET
To: $$13:  RET
BRU - Starting Tape 1 on $$17:
```

```
BRU - End of Tape 1 on $$17:
BRU - Starting verify pass Tape 1 on $$17:
BRU - End of Tape 1 on $$17:
BRU - Completed
BRU> CTRL/Z
> DMO $$13:/NOUNLOAD  RET
> MOU $$13:RSX11MPBL58A  RET
> SET DEF $$13:  RET
> SET /UIC=[2,54]  RET
> @BASTART  RET
>;
>; RSX-11M-PLUS V4.2 On-line Distribution Kit Installation Procedure
>;
>; This command file installs the RSX-11M-PLUS V4.2 kit and
>; prepares it for performing a SYSGEN. It assumes the
>; current environment is an up-and-running RSX-11M-PLUS V4.2,
>; RSX-11M-PLUS V3.0, or VAX/VMS system. All the necessary devices
>; must already be configured on line.  The current system will not
>; be affected in any way by the execution of this file.
>;
>ASN $$13:=SY:
>ASN $$13:=LB:
>ASN $$13:=SY0:
>ASN $$13:=LB0:
>;
>; The following information is necessary for this command file
>; to correctly access the remainder of the distribution kit.
>;
>* Did you receive your RSX-11M-PLUS distribution kit on magnetic tape? [Y/N]: Y  RET
>;
>; Please enter the name of the magnetic tape drive, which should
>; still contain the distribution tape. The name is of the form:
>;
>;  MM1: or
>;  MS0: etc...
>;
>* Which tape drive contains the distribution tape [S]: $$17:  RET
>;
>; Valid device types are:  MF, MM, MS, MT, MU
>;
>* Enter device type [dd] [S R:2-2]: MU  RET
>;
>; Prepare to bring in the remainder of the distribution kit
>;
>* Is your target system disk an RC25, RK07, or RD52? [Y/N]: Y  RET
>;
>; The disk onto which you have just loaded your RSX-11M-PLUS V4.2
>; system now contains all the files that will be needed by the SYSGEN
>; procedure.  There is another backup set on the distribution tape
>; that contains all of the other sources shipped as part of the normal
>; distribution.  This backup set will be restored to another disk which
>; you must provide.  This disk can also be used during SYSGEN to hold
>; the Executive listing and maps since they will not fit on the target
>; system disk.
>;
>; Please supply the name of a drive that contains an empty disk to
>; receive the source files.
>;
>; NOTE: All current data on this disk will be lost.
```

```
>;
>* Enter the name of the disk to receive the sources [S]: $$12:  RET
>;
>; We will now mount the disk that will receive the sources.
>;
>MOU $$12:/FOR
>;
>* Do you wish to run the Bad Block Locator on $$12:? [Y/N]: N  RET
>;
>; Since the files in the second backup set are not necessary to generate
>; your system you may wish to skip the verify pass to save time.
>;
>* Do you want to verify the second backup set? [Y/N]: N  RET
>;
>; Ensure that the BRU task is installed.
>;
>INS $BRU/TASK=BRUI0
>;
  21-APR-1989 16:41:47
>;
>; We will now load the remainder of the distribution kit.
>;
>TIME
>BRU /BAC:MPBL58ASRC/NOPRES/INI/HEADER:1654 $$17: $$12:
BRU - Starting Tape 1
BRU - This disk will not contain a hardware bootable system
BRU - End of Tape 1
BRU - Completed
>;
>DMO $$17:/UNLOAD
  21-APR-1989 16:45:04
>DMO $$12:/NOUNLOAD
>;
>TIME
>MOU $$12:/OV=ID
>;
>; We will now copy the help files from the second disk to the target
>; system disk.
>;
>SET /UIC=[1,2]
>PIP SY:[1,2]/CD=$$12:[1,2]
>;
>; We will now create any UFDs that must be created on your disk(s).
>; You will not see the UFD commands.
>;
  21-APR-1989 16:48:24
>;
>TIME
>;
>; The preparation of the RSX-11M-PLUS kit is now complete.  The next
>; time this disk is bootstrapped, this dialog will only be repeated
>; on request.  We will now record the successful installation in the
>; log file on the new system disk, and either exit if the installation
>; was done on line, or proceed with the normal startup sequence if the
>; baseline system was used.
>;
>SET /UIC=[2,54]
>PIP LB:[1,1]KITIDENT.DAT/AP=LB:[2,54]INSTALOG.DAT
>;
```

```
>;
>SET /UIC=[2,54]
>ASN =
>@ <EOF>
> SET /UIC=[200,200]  RET
> SET DEF $$13:  RET
> SHO DEF  RET
  $$13:[200,200]
> @SYSGEN  RET
>;
>; RSX-11M-PLUS  SYSGEN  BL58
>;
>; COPYRIGHT (c) 1989
>; DIGITAL EQUIPMENT CORP., MAYNARD MA., 01754
>;
>SET PROT=(SY:RWED,OW:RWED,GR:RWE,WO:R)/DEFAULT
>;
>; To exit from the SYSGEN procedure at any time, type CTRL/Z.
>;
>; If you are unsure of the answer to a question for which a de-
>; fault answer exists, use the default answer.
>;
>;
>;
>;=================================================
>;  Choosing SYSGEN Options      21-APR-89 at 16:51
>;=================================================
>;
>;
>;
>; Every question is preceded by a question number (for example SU010)
>; which you can use to find the explanation of the question in the
>; RSX-11M-PLUS System Generation and Installation Guide.
>;
>; An explanation of every question is also available by pressing
>; the ESC key (or the ALTMODE key) in response to the question.
>;
>; If you are unfamiliar with the SYSGEN procedure, the explanation of
>; each question can be printed automatically before the question.
>;
>* SU010   Do you always want the explanation printed? [Y/N D:N]: N  RET
>;
>; SYSGEN always creates saved answer files containing your responses
>; to the SYSGEN questions:
>;
>;    SYSGENSA1.CMD     Setup questions, Executive options
>;    SYSGENSA2.CMD     Peripheral configuration
>;    SYSGENSA3.CMD     Nonprivileged task builds
>;
>; You should perform a PREPGEN first to create saved answer files, and
>; then perform a SYSGEN, specifying those saved answer files as input
>; to the Executive, peripheral, and nonprivileged task build sections.
>;
>* SU020   Do you want to use a saved answer file as input for
>*         the Executive options? [Y/N D:N]: N  RET
>;
>* SU040   Do you want to use a saved answer file as input for
>*         the peripheral configuration? [Y/N D:N]: N  RET
>;
```

```
>* SU060    Do you want to use a saved answer file as input for
>*          the nonprivileged task builds? [Y/N D:N]: N  RET
>;
>* SU080    Do you want to do a PREPGEN? [Y/N D:N]: Y  RET
>;
>* SU090    Enter the name of the disk drive containing your
>*          target system disk [ddnn:] [S R:2-5]: $$13:  RET
>;
>ASN $$13:=IN:
>ASN $$13:=OU:
>ASN $$13:=LB:
>ASN $$13:=WK:
>ASN $$13:=TK:
>ASN $$13:=BC:
>ASN $$13:=LI:
>ASN $$13:=OB:
>ASN $$13:=EX:
>ASN $$13:=MP:
>SET DEF $$13:
>;
>ASN $$13:=BC0:
>ASN $$13:=EX0:
>ASN $$13:=IN0:
>ASN $$13:=LB0:
>ASN $$13:=LI0:
>ASN $$13:=MP0:
>ASN $$13:=OB0:
>ASN $$13:=OU0:
>ASN $$13:=TK0:
>ASN $$13:=WK0:
>;
>; You can:
>;
>;    o  do a complete SYSGEN
>;
>;    o  continue a previous SYSGEN from where you left off
>;
>;    o  do an individual section of SYSGEN
>;
>;
>* SU120    Do you want to do a complete SYSGEN? [Y/N D:Y]: Y  RET
>;
>!ASN $$13:[3,54]TKB.TSK=TKB
>!ASN $$13:[3,54]VMR.TSK=VMR
>;
>;
>;
>;============================================================
>;  Choosing Executive Options      21-APR-89 at 16:52
>;============================================================
>;
>;
>;
>; The answers to the questions in this section are put in the saved
>; answer file [200,200]SYSGENSA1.CMD.
>;
>; Enter a comment for inclusion in the SYSGENSA1 saved answer file.
>; The comment may contain more than one line.  The "V" in the right
>; margin below marks the maximum line length.  When you are done,
```

```
>; press RETURN in response to the prompt.
>;                                                                    V
>* Comment [S R:0.-55.]:  RET
>;
>* CE010   What is your target processor type? [S R:5.-12. D:"11/70"]: 11/44  RET
>;
>* CE020   Do you want the Full-functionality Executive? [Y/N D:Y]: Y  RET
>;
>* CE120   Do you want support for communications products
>*         (such as DECnet, PSI, and LAT)? [Y/N D:N]: N  RET
>;
>* CE130   What is the system name? [S R:0-6 D:"RSXMPL"]: RAISIN  RET
>;
>* CE264   Do you want IP11 industrial I/O subsystem support? [Y/N D:N]:  RET
>;
>* CE270   Do you want to include XDT? [Y/N D:N]: Y  RET
>;
>* CE280   Enter the crash notification device CSR
>*         address [O R:160000-177700 D:177564]: 174400  RET
>;
>; Note:  Enter both the device and the logical unit number.
>;        For example, MM0: or DL1:.
>;
>; Note:  Enter XX: if you desire loadable DU:, DL:, MU:, MS: or MM:
>;        crash driver support.
>;
>* CE290   On what device and unit do you want crash dumps
>*         to be written? [S R:2-6]: XX:  RET
>;
>* CE310   Enter memory size (in K words) [D R:128.-1920. D:256.]: 384.  RET
>;
>* CE320   Do you want floating point processor support? [Y/N D:N]:  RET
>;
>* CE330   Is your system clock programmable (KW11-P)? [Y/N D:N]:  RET
>;
>* CE350   Is your line frequency 50 Hz? [Y/N D:N]:  RET
>;
>;
>;
>;============================================================
>;  Choosing Peripheral Configuration      21-APR-89 at 16:58
>;============================================================
>;
>;
>;
>; The answers to the questions in this section are put in the saved
>; answer file [200,200]SYSGENSA2.CMD.
>;
>; Enter a comment for inclusion in the SYSGENSA2 saved answer file.
>; The comment may contain more than one line.  The "V" in the right
>; margin below marks the maximum line length.  When you are done,
>; press RETURN in response to the prompt.
>;                                                                    V
>* Comment [S R:0.-55.]:  RET
>;
>;
>* CP0604  How many RH controllers do you have? [D R:0.-15. D:4.]: 1.  RET
>;
>* CP0612  Do you want to generate a mixed MASSBUS configuration? [Y/N D:N]:  RET
```

```
>;
>;
>;   DB:    controllers: RH11, RH70 devices: RP04, RP05, RP06
>;
>* CP0808  How many RP04/05/06 disk drives do you have? [D R:0.-63. D:0.]:   RET
>;
>;
>;   DR:    controllers: RH11, RH70 devices: RM02
>;                       RH70           RM03, RM05, RM80, RP07
>;
>* CP1008  How many RM02/03/05/80/RP07 disk drives do you
>*         have? [D R:0.-63. D:0.]: 1  RET
>;
>;
>* CP1036  What is the physical unit number of DR0:? [O R:0-7 D:0]:   RET
>;
>* CP1060  Is DR0: an RM02, RM03, RM05, RM80, or RP07? [S R:4-4 D:"RP07"]: RM02  RET
>;
>;
>;   DS:    controllers: RH11, RH70 devices: RS03, RS04
>;
>* CP1208  How many RS03/04 disk drives do you have? [D R:0.-63. D:0.]:   RET
>;
>;
>;   EM:    controllers: RH11, RH70 device: ML11
>;
>* CP1408  How many ML11 disks do you have? [D R:0.-63. D:0.]:   RET
>;
>;
>;   MM:    controllers: RH11, RH70 devices: TE16, TU16, TU45, TU77
>;          formatters:  TM02, TM03
>;
>* CP1608  How many TU16/45/77/TE16 tape drives do you
>*         have? [D R:0.-64. D:0.]:   RET
>;
>;
>* CP2068  Enter the vector address of RHA [O R:60-774 D:254]:   RET
>;
>* CP2072  What is its CSR address? [O R:160000-177700 D:176700]:   RET
>;
>;                        RH Configuration
>;
>;                      Physical Unit Number
>;
>;     0       1       2       3       4       5       6       7
>;
>; RHA  DR0:
>;
>;
>;
>;
>;   DK:    controller:  RK11  devices: RK05, RK05F
>;
>* CP2204  How many RK11 cartridge disk controllers do you have? [O D:0]:   RET
>;
>;
>;   DM:    controllers: RK611, RK711 devices: RK06, RK07
>;
>* CP2404  How many RK611/711 disk cartridge controllers do
```

```
>*         you have? [O D:0]:    RET
>;
>;
>;   DL:    controllers: RL11, RLV12 devices: RL01, RL02
>;
>* CP2604  How many RL11/RLV11 disk cartridge controllers do
>*         you have? [O D:0]: 1  RET
>;
>* CP2608  How many RL01/RL02 disk drives do you have? [D R:1.-63. D:1.]:    RET
>;
>;
>* CP2636  What is the physical unit number of DL0:? [O R:0-7 D:0]:    RET
>;
>* CP2660  Is DL0: an RL01 or RL02? [S R:4-4 D:"RL02"]:    RET
>;
>;
>* CP2668  Enter the vector address of DLA [O R:60-774 D:160]:    RET
>;
>* CP2672  What is its CSR address? [O R:160000-177700 D:174400]:    RET
>;
>;                        DL Configuration
>;
>;                     Physical Unit Number
>;
>;     0       1       2       3       4       5       6       7
>;
>; DLA  DL0:
>;
>;
>;
>;
>;   DP:    controller:  RP11  devices: RP02, RPR02, RP03
>;
>* CP2804  How many RP11 disk pack controllers do you have? [O D:0]:    RET
>;
>;
>; DU: controllers: RQDX1, RQDX2, RQDX3, RUX50, RQC25, KDA50, UDA50
>;
>; devices: RX33, RX50, RD31, RD51, RD52, RD53, RD54, RC25,
>;   RA60, RA80, RA81, RA82
>;
>;   The total of DU and MU controllers cannot be greater than 10.
>;
>* CP3004  How many MSCP disk controllers do you have? [D R:0.-10. D:0.]:    RET
>;
>;
>; MU: controllers: TK50, TU81, TU81E, TQ81E
>;
>* CP3404  How many TMSCP tape controllers do you have? [D R:0.-10. D:0.]:    RET
>;
>;
>;   CR:    controllers: CM11, CR11
>;
>* CP4004  How many CM/CR11 card readers do you have? [O D:0]:    RET
>;
>;
>;   CT:    controller:  TA11  device:  TU60
>;
>* CP4204  How many TA11 dual cassettes do you have? [O D:0]:    RET
```

```
>;
>;
>;   MS:    controllers: TS11, TU80, TSV05, TK25
>;
>* CP4404  How many TS11/TU80/TSV05/TK25
>*         magtape controllers do you have? [O D:0]:   1[RET]
>;
>* CP4468  Enter vector address of the next
>*         TS11/TU80/TSV05/TK25 [O R:60-774 D:224]:   [RET]
>;
>* CP4472  What is its CSR address? [O R:160000-177700 D:172522]:   [RET]
>;
>;
>;   DT:    controller:  TC11  device:  TU56
>;
>* CP4604  How many TC11 DECtape controllers do you have? [O D:0]:   [RET]
>;
>;
>;   DX:    controller:  RX11  device:  RX01
>;
>* CP4804  How many RX11 disk controllers do you have? [O D:0]:   [RET]
>;
>;
>;   DY:    controller:  RX211, RXV21 device:  RX02
>;
>* CP5004  How many RX211/RXV21 disk controllers do you have? [O D:0]:   [RET]
>;
>;
>;   DD:    controller:  DL11  device:  TU58
>;
>* CP5204  How many TU58 controllers do you have? [O D:0]:   [RET]
>;
>;
>;   LP:    controllers: LA180, LN01, LP11, LS11, LV11
>;          devices:     LA180, LN01, LP01, LP02, LP04, LP05, LP06,
>;                       LP07,  LP14, LP25, LP26, LP27, LS11, LV01
>;
>* CP5404  How many LP/LS/LV11/LA180 line printers do you have? [O D:0]: 1   [RET]
>;
>* CP5408  Enter the number of seconds between
>*         line printer-not-ready messages [D R:0.-255. D:15.]:   [RET]
>;
>* CP5468  Enter vector address of the next line
>*         printer [O R:60-774 D:200]:   [RET]
>;
>* CP5472  What is its CSR address? [O R:160000-177700 D:177514]:   [RET]
>;
>* CP5480  Enter line printer type for LPA [S R:4-5 D:"LP25"]:   [RET]
>;
>* CP5484  Does LPA have lowercase characters? [Y/N D:N]:   [RET]
>;
>;
>;   MT:    controllers: TM11, TMA11, TMB11   devices: TE10, TU10, TU10W, TS03
>;
>* CP5604  How many TM/TMA/TMB11 magtape controllers do you have? [O D:0]:   [RET]
>;
>;
>;   PP:    controller:  PC11
>;
```

```
>* CP5804  How many PC11 paper tape reader/punches do you have? [O D:0]:   RET
>;
>;
>;   PR:    controller:  PR11
>;
>* CP6004  How many PR11 paper tape readers do you have? [O D:0]:   RET
>;
>;
>;   LA:    controller:  LPA11
>;
>* CP6204  How many LPA11 lab subsystems do you have? [D R:0.-16. D:0.]:   RET
>;
>;
>;   TT:    controllers: DL11, DLV11    controller mnemonic: YL
>;
>* CP6804  Enter number of additional DL11/DLV11 line interfaces [O D:0]:   RET
>;
>* CP6832  Enter terminal type for YLA [S R:4-6 D:"LA120"]:   RET
>;
>;
>;   TT:    controller:  DH11           controller mnemonic: YH
>;
>* CP7004  Enter number of DH11 asynchronous line
>*         multiplexers [D R:0.-16. D:0.]:   RET
>;
>;
>;   TT:           controller mnemonic: YV
>;
>;    controllers: DHU11, DHV11, CXA16, CXB16, CXY08
>;
>;
>* CP7104  Enter number of DHU11/DHV11/CXA16/CXB16/CXY08 (YV:-type)
>*         asynchronous line multiplexers [D R:0.-32. D:0.]:   RET
>;
>;
>;   TT:    controller:  DJ11           controller mnemonic: YJ
>;
>* CP7204  Enter number of DJ11 asynchronous line
>*         multiplexers [D R:0.-16. D:0.]:   RET
>;
>;
>;   TT:    controllers: DZ11, DZQ11, DZV11, DFA01    controller mnemonic: YZ
>;
>* CP7404  Enter number of DZ11/DZQ11/DZV11/DFA01 asynchronous line
>*         multiplexers [D R:0.-32. D:0.]: 2  RET
>;
>* CP7420  Do any of the DZ lines require modem support? [Y/N D:N]:   RET
>;
>* CP7468  Enter vector address of YZA [O R:300-770]: 310  RET
>;
>* CP7472  What is its CSR address? [O R:160000-177700]: 160100  RET
>;
>* CP7480  How many lines does YZA have? [D R:1.-8. D:8.]:   RET
>;
>* CP7484  Enter terminal type for YZA [S R:4-6 D:"VT100"]:   RET
>;
>* CP7468  Enter vector address of YZB [O R:300-770]: 320  RET
>;
>* CP7472  What is its CSR address? [O R:160000-177700]: 160110  RET
```

```
>;
>* CP7480  How many lines does YZB have? [D R:1.-8. D:8.]:    RET
>;
>* CP7484  Enter terminal type for YZB [S R:4-6 D:"VT100"]:    RET
>;
>;
>* CP7604  Do you have any intercomputer communication devices? [Y/N D:N]:    RET
>;
>;
>; Enter device mnemonics for any user-supplied drivers.  The driver
>; source files must reside in [11,10] and be named ddDRV.MAC and
>; ddTAB.MAC where dd is the device mnemonic.
>;
>; You may enter the mnemonics on more than one line.  When you have
>; listed all the drivers, press RETURN when asked for the device
>; mnemonic.
>;
>; The device mnemonic must not include a colon.
>;
>* CP9604  Enter device mnemonics for user-supplied drivers [S]:    RET
>;
>;
>; The highest vector among the devices you specified in this SYSGEN
>; is 374(octal).  This is the default response for this question.
>;
>* CP9632  What is the highest interrupt vector
>*         address? [0 R:374-774 D:374]:    RET
>;
>;
>;
>;================================================================
>;  Assembling the Executive and Drivers      21-APR-89 at 17:13
>;================================================================
>;
>;
>;
>; The answers to the questions in this section are put in the saved
>; answer file [200,200]SYSGENSA1.CMD.
>;
>!PIP RSXMC3.MAC=RSXMC1.MAC,RSXMC2.MAC
>!PIP RSXMC.MAC=RSXMC3.MAC,RSXMC0.MAC
>;
>!SET /UIC=[1,24]
>!PIP [11,10]/NV=[200,200]RSXMC.MAC
>!PIP [11,10]/NV=[200,200]SYSTB.MAC
>!PIP [11,24]/NV=[200,200]RSXASM.CMD
>!PIP [11,24]/NV=[200,200]DRIVERS.ASM
>;
>;
>* AE010   Do you want assembly listings of the Executive and
>*         drivers? [Y/N D:N]:    RET
>;
>!ASN NL:=LS:
>;
>;
>* AE030   Do you wish to pause to edit any files before
>*         assembling? [Y/N D:N]:    RET
>;
>!SET /UIC=[11,24]
```

```
>;
>!PIP *.OBJ;*/DE/NM,*.TTY;*
>;
>!TIME
>;
>!MAC @RSXASM
>;
>!TIME
>;
>!MAC @DRIVERS.ASM
>;
>!TIME
>;
>!PIP RSX11M.OBS=*.OBJ
>!PIP TTDRV.OBS=*.TTY
>;
>!SET /UIC=[200,200]
>!PIP /NV=[11,10]RSXMC.MAC
>;
>!SET /UIC=[1,24]
>!PIP RSXBLD.CMD/PU/NM
>!PIP RSX11M.OLB;*/DE/NM
>!PIP [200,200]RSXMC.MAC/PU/NM
>;
>!LBR RSX11M/CR:256.::256./-EP=[11,24]RSX11M.OBS
>!PIP [11,24]RSX11M.OBS;*,*.OBJ;*/DE
>;
>!LBR TTDRV/CR:40.:392.:128.=[11,24]TTDRV.OBS
>!PIP [11,24]TTDRV.OBS;*,*.TTY;*/DE
>;
>;
>;
>;============================================================
>;  Building the Executive and Drivers      21-APR-89 at 17:14
>;============================================================
>;
>;
>;
>; The answers to the questions in this section are put in the saved
>; answer file [200,200]SYSGENSA1.CMD.
>;
>;
>; Allocate space to be used later for the system image file.
>;
>!SET /UIC=[1,54]
>!PIP RSX11M.TMP/CO/BL:1026.=NL:
>;
>;
>!SET /UIC=[1,54]
>!PIP SYSVMR.CMD=[200,200]SYSVMR.CMD,VMRTTY.CMD
>;
>;
>* BE030   Do you want to pause to edit any files before
>*         task-building? [Y/N D:N]:   RET
>;
>!SET /UIC=[1,24]
>!PIP [1,24]/NV/NM=[200,200]RSXBLD.CMD,RSX11M,DSP11M,LDR11M
>!PIP [1,24]/NV=[200,200]DIR11M.CMD,DR211M,DIRCOM,DR2COM,DIR
>!PIP [1,24]/NV=[200,200]DR311M.CMD,DR411M,DR3COM,DR4COM
```

```
>!PIP [1,24]/NV=[200,200]VEC11M.CMD,DCM11M,VECCOM
>;
>!TIME
>;
>!TKB @RSXBLD
>;
>!TIME
>;
>!TKB @[200,200]DRIVERS.BLD
>;
>!TIME
>;
>;
>;
>;============================================================
>;  Building the Privileged Task      21-APR-89 at 17:15
>;============================================================
>;
>;
>;
>; The answers to the questions in this section are put in the saved
>; answer file [200,200]SYSGENSA1.CMD.
>;
>;
>* BP040   Do you want the maps of the privileged tasks? [Y/N D:N]:    RET
>;
>!ASN NL:=MP:
>!ASN NL:=MP0:
>;
>!SET /UIC=[1,24]
>;
>!TIME
>;
>!TKB @SAVBLD
>;
>!TIME
>;
>!ASN LB:=OU:
>;
>;
>;
>;============================================================
>;  Rebuilding Supplied System Tasks      21-APR-89 at 17:15
>;============================================================
>;
>;
>;
>; The answers to the questions in this section are put in the saved
>; answer file [200,200]SYSGENSA3.CMD.
>;
>;
>* BN010   Do you want to rebuild any system tasks? [Y/N D:N]: Y  RET
>;
>; Enter a comment for inclusion in the SYSGENSA3 saved answer file.
>; The comment may contain more than one line.  The "V" in the right
>; margin below marks the maximum line length.  When you are done,
>; press RETURN in response to the prompt.
>;                                                                V
>* Comment [S R:0.-55.]:    RET
```

```
>;
>* [Y] BN012 Use the FCSRES and FCSFSL libraries? [Y/N]: Y  RET
>;
>; Press ESC for the list of the nonprivileged utilities and
>; vectored privileged system tasks that may be rebuilt here.
>;
>; Enter ALL to build all the tasks, using FCSFSL and FCSRES.
>; Enter ALLVAN to build all non-FCSRES and non-FCSFSL tasks.
>; Enter ALLRES to build all the FCSRES tasks.
>; Enter ALLFSL to build all the FCSFSL tasks.
>;
>; SYSGEN will attempt to use FCSFSL and FCSRES where possible.
>;
>; Enter the task names separated by commas.  You can enter them o:
>; more than one line.  When you are done, finish the list with a
>; period or press RETURN in response to the prompt.
>;
>* BN020 Enter task name(s) [S]: BRU.
>;
>;
>;
>* BN030   Do you want the maps of the system tasks? [Y/N D:N]:    RET
>;
>!ASN NL:=MP:
>!ASN NL:=MP0:
>;
>* BN050   Do you want to pause to edit any files before
>*         task-building? [Y/N D:N]:    RET
>!SET /UIC=[1,24]
>;
>;
>!TKB @BRUBLD
>;
>;
>;
>;
>;============================================================
>;  Creating the System Image File      21-APR-89 at 17:17
>;============================================================
>;
>;
>!SET /UIC=[1,54]
>;
>!PIP RSX11M.TMP;*/DE/NM
>;
>!PIP RSX11M.SYS/CO/NV/BL:1026.=RSX11M.TSK
>;
>!ASN LB:=SY:
>!VMR @SYSVMR
  21-APR-1989 17:17:05
>;
>;
>!ASN =TKB
>!ASN =VMR
>;
>; End of PREPGEN
>;
>TIME
>ASN =
```

```
>;
>@ <EOF>
> SET PROC/PRIV=(CMKRNL,LOG_IO,SYSNAM,SYSPRV,VOLPRO)  RET
> SET TERM/NOLINE EDIT  RET
> SHO LOG $$*  RET

(LNM$PROCESS_TABLE)

(LNM$JOB_8034D310)

(LNM$GROUP_000301)

(LNM$SYSTEM_TABLE)
  "$$0" = "BLKHOL$DJA3:"
  "$$1" = "BLKHOL$DUA0:"
  "$$10" = "$3$DAA2:"
  "$$11" = "$3$DAA3:"
  "$$12" = "$3$DMA0:"
  "$$13" = "$3$DMA1:"
  "$$14" = "$3$DYA0:"
  "$$15" = "$3$DYA1:"
  "$$16" = "BLKHOL$MUA0:"
  "$$17" = "BLKHOL$MUA1:"
  "$$2" = "BLKHOL$DUA4:"
  "$$20" = "CSA1:"
  "$$21" = "SYS$SPECIFIC:"
  "$$22" = "SYS$COMMON:"
  "$$3" = "BLKHOL$DUA5:"
  "$$4" = "BLKHOL$DUA6:"
  "$$5" = "BLKHOL$DUA7:"
  "$$6" = "$3$DAA0:"
  "$$7" = "$3$DAA1:"
> MOU $$13:RSX11MPBL58A  RET
> SET DEF $$13:  RET
> SET /UIC=[200,200]  RET
> @SYSGEN  RET
>;
>; RSX-11M-PLUS  SYSGEN  BL58
>;
>; COPYRIGHT (c) 1989
>; DIGITAL EQUIPMENT CORP., MAYNARD MA., 01754
>;
>SET PROT=(SY:RWED,OW:RWED,GR:RWE,WO:R)/DEFAULT
>;
>; To exit from the SYSGEN procedure at any time, type CTRL/Z.
>;
>; If you are unsure of the answer to a question for which a de-
>; fault answer exists, use the default answer.
>;
>;
>;
>;=====================================================
>;  Choosing SYSGEN Options      25-APR-89 at 11:21
>;=====================================================
>;
>;
>;
>; Every question is preceded by a question number (for example SU010)
>; which you can use to find the explanation of the question in the
>; RSX-11M-PLUS System Generation and Installation Guide.
```

```
>;
>; An explanation of every question is also available by pressing
>; the ESC key (or the ALTMODE key) in response to the question.
>;
>; If you are unfamiliar with the SYSGEN procedure, the explanation of
>; each question can be printed automatically before the question.
>;
>* SU010   Do you always want the explanation printed? [Y/N D:N]: N  RET
>;
>; SYSGEN always creates saved answer files containing your responses
>; to the SYSGEN questions:
>;
>;    SYSGENSA1.CMD      Setup questions, Executive options
>;    SYSGENSA2.CMD      Peripheral configuration
>;    SYSGENSA3.CMD      Nonprivileged task builds
>;
>; You should perform a PREPGEN first to create saved answer files, and
>; then perform a SYSGEN, specifying those saved answer files as input
>; to the Executive, peripheral, and nonprivileged task build sections.
>;
>* SU020   Do you want to use a saved answer file as input for
>*         the Executive options? [Y/N D:N]: Y  RET
>;
>* SU030   Enter saved answer file name [S D:"SYSGENSA1.CMD"]:    RET
>;
>* SU040   Do you want to use a saved answer file as input for
>*         the peripheral configuration? [Y/N D:N]: Y  RET
>;
>* SU050   Enter saved answer file name [S D:"SYSGENSA2.CMD"]:    RET
>;
>* SU060   Do you want to use a saved answer file as input for
>*         the nonprivileged task builds? [Y/N D:N]: Y  RET
>;
>* SU070   Enter saved answer file name [S D:"SYSGENSA3.CMD"]:    RET
>;
>* SU080   Do you want to do a PREPGEN? [Y/N D:N]:    RET
>;
>* SU090   Enter the name of the disk drive containing your
>*         target system disk [ddnn:] [S R:2-5]: $$13:  RET
>;
>ASN $$13:=IN:
>ASN $$13:=OU:
>ASN $$13:=LB:
>ASN $$13:=WK:
>ASN $$13:=TK:
>ASN $$13:=BC:
>ASN $$13:=LI:
>ASN $$13:=OB:
>ASN $$13:=EX:
>ASN $$13:=MP:
>SET DEF $$13:
>;
>ASN $$13:=BC0:
>ASN $$13:=EX0:
>ASN $$13:=IN0:
>ASN $$13:=LB0:
>ASN $$13:=LI0:
>ASN $$13:=MP0:
>ASN $$13:=OB0:
```

```
>ASN $$13:=OU0:
>ASN $$13:=TK0:
>ASN $$13:=WK0:
>;
>; You can:
>;
>;     o  do a complete SYSGEN
>;
>;     o  continue a previous SYSGEN from where you left off
>;
>;     o  do an individual section of SYSGEN
>;
>;
>* SU120   Do you want to do a complete SYSGEN? [Y/N D:Y]:   RET
>;
>ASN $$13:[3,54]TKB.TSK=TKB
>ASN $$13:[3,54]VMR.TSK=VMR
>;
>;
>;
>;=========================================================
>;  Choosing Executive Options      25-APR-89 at 11:23
>;=========================================================
>;
>;
>; Using saved answer file $$13:[200,200]SYSGENSA1.CMD;1
>; created on 21-APR-89 at 16:52:40.
>;
>;
>;
>;
>;
>;=================================================================
>;  Choosing Peripheral Configuration      25-APR-89 at 11:23
>;=================================================================
>;
>;
>; Using saved answer file $$13:[200,200]SYSGENSA2.CMD;2
>; created on 21-APR-89 at 16:58:17.
>;
>;
>;
>;
>;   DR:    controllers: RH11, RH70 devices: RM02
>;                       RH70           RM03, RM05, RM80, RP07
>;
>;                       RH Configuration
>;
>;                     Physical Unit Number
>;
>;     0       1       2       3       4       5       6       7
>;
>; RHA  DR0:
>;
>;
>;
>;
>;   DM:    controllers: RK611, RK711 devices: RK06, RK07
>;
```

```
>* CP2408  How many RK06/RK07 disk drives do you have? [D R:1.-63. D:1.]: 2  RET
>;
>;
>* CP2436  What is the physical unit number of DM0:? [O R:0-7 D:0]:   RET
>;
>* CP2460  Is DM0: an RK06 or RK07? [S R:4-4 D:"RK07"]:   RET
>;
>;
>* CP2436  What is the physical unit number of DM1:? [O R:0-7 D:1]:   RET
>;
>* CP2460  Is DM1: an RK06 or RK07? [S R:4-4 D:"RK07"]:   RET
>;
>;
>* CP2468  Enter the vector address of DMA [O R:60-774 D:210]:   RET
>;
>* CP2472  What is its CSR address? [O R:160000-177700 D:177440]:   RET
>;
>;                        DM Configuration
>;
>;                      Physical Unit Number
>;
>;     0       1       2       3       4       5       6       7
>;
>; DMA  DM0:    DM1:
>;
>;
>;
>;
>;   DL:    controllers: RL11, RLV12 devices: RL01, RL02
>;
>;                        DL Configuration
>;
>;                      Physical Unit Number
>;
>;     0       1       2       3       4       5       6       7
>;
>; DLA  DL0:
>;
>;
>;
>;
>;   MS:    controllers: TS11, TU80, TSV05, TK25
>;
>;
>;   LP:    controllers: LA180, LN01, LP11, LS11, LV11
>;          devices:     LA180, LN01, LP01, LP02, LP04, LP05, LP06,
>;                       LP07,  LP14, LP25, LP26, LP27, LS11, LV01
>;
>;
>;   TT:    controllers: DL11, DLV11    controller mnemonic: YL
>;
>;
>;   TT:    controllers: DZ11, DZQ11, DZV11, DFA01    controller mnemonic: YZ
>;
>;
>;
>;============================================================
>;  Assembling the Executive and Drivers      25-APR-89 at 11:33
>;============================================================
```

```
>;
>;
>PIP RSXMC3.MAC=RSXMC1.MAC,RSXMC2.MAC
>PIP RSXMC.MAC=RSXMC3.MAC,RSXMC0.MAC
>;
>SET /UIC=[1,24]
>PIP [11,10]/NV=[200,200]RSXMC.MAC
>PIP [11,10]/NV=[200,200]SYSTB.MAC
>PIP [11,24]/NV=[200,200]RSXASM.CMD
>PIP [11,24]/NV=[200,200]DRIVERS.ASM
>;
>;
>ASN NL:=LS:
>;
>;
>SET /UIC=[11,24]
>;
>PIP *.OBJ;*/DE/NM,*.TTY;*
  25-APR-1989 11:34:28
>;
>;
>TIME
>MAC @RSXASM
  25-APR-1989 12:15:25
>;
>;
>TIME
>MAC @DRIVERS.ASM
 25-APR-1989 12:36:49
>;
>;
>TIME
>PIP RSX11M.OBS=*.OBJ
>PIP TTDRV.OBS=*.TTY
>;
>SET /UIC=[200,200]
>PIP /NV=[11,10]RSXMC.MAC
>;
>SET /UIC=[1,24]
>PIP RSXBLD.CMD/PU/NM
>PIP RSX11M.OLB;*/DE/NM
>PIP [200,200]RSXMC.MAC/PU/NM
>;
>LBR RSX11M/CR:256.::256./-EP=[11,24]RSX11M.OBS
>PIP [11,24]RSX11M.OBS;*,*.OBJ;*/DE
>;
>LBR TTDRV/CR:40.:392.:128.=[11,24]TTDRV.OBS
>PIP [11,24]TTDRV.OBS;*,*.TTY;*/DE
>SET /UIC=[200,200]
>;
>;
>;
>;============================================================
>;  Building the Executive and Drivers      25-APR-89 at 12:40
>;============================================================
>;
>;
>;
>; Allocate space to be used later for the system image file.
```

```
>;
>SET /UIC=[1,54]
>PIP RSX11M.TMP/CO/BL:1026.=NL:
>;
>SET /UIC=[200,200]
>;
>SET /UIC=[1,24]
>SET /UIC=[200,200]
>SET /UIC=[1,54]
>PIP SYSVMR.CMD=[200,200]SYSVMR.CMD,VMRTTY.CMD
>;
>SET /UIC=[200,200]
>;
>SET /UIC=[1,24]
>PIP [1,24]/NV/NM=[200,200]RSXBLD.CMD,RSX11M,DSP11M,LDR11M
>PIP [1,24]/NV=[200,200]DIR11M.CMD,DR211M,DIRCOM,DR2COM,DIR
>PIP [1,24]/NV=[200,200]DR311M.CMD,DR411M,DR3COM,DR4COM
>PIP [1,24]/NV=[200,200]VEC11M.CMD,DCM11M,VECCOM
  25-APR-1989 12:48:32
>;
>;
>TIME
>TKB @RSXBLD
 25-APR-1989 12:59:20
>;
>;
>TIME
>TKB @[200,200]DRIVERS.BLD
  25-APR-1989 13:03:22
>;
>TIME
>SET /UIC=[200,200]
>;
>;
>;
>;============================================================
>;  Building the Privileged Task      25-APR-89 at 13:03
>;============================================================
>;
>;
%MCR-I-SUPERSEDE, previous value of MP has been superseded
>ASN NL:=MP0:
>;
>ASN NL:=MP:
%MCR-I-SUPERSEDE, previous value of MP0 has been superseded
>;
>SET /UIC=[1,24]
  25-APR-1989 13:03:29
>;
>;
>TIME
>TKB @SAVBLD
  25-APR-1989 13:06:01
>;
%MCR-I-SUPERSEDE, previous value of OU has been superseded
>;
>TIME
>ASN LB:=OU:
>SET /UIC=[200,200]
```

```
>;
>;
>;
>;================================================================
>;  Rebuilding Supplied System Tasks      25-APR-89 at 13:06
>;================================================================
>;
>;
>;
>;
>SET /UIC=[1,24]
>SET /UIC=[200,200]
%MCR-I-SUPERSEDE, previous value of MP has been superseded
>ASN NL:=MP0:
>;
>ASN NL:=MP:
%MCR-I-SUPERSEDE, previous value of MP0 has been superseded
>SET /UIC=[1,24]
>;
>;
>TKB @BRUBLD
>;
>SET /UIC=[200,200]
>;
>;
>;
>;================================================================
>;  Creating the System Image File      25-APR-89 at 13:11
>;================================================================
>;
>;
>SET /UIC=[1,54]
>;
>PIP RSX11M.TMP;*/DE/NM
>;
>PIP RSX11M.SYS/CO/NV/BL:1026.=RSX11M.TSK
>;
>ASN LB:=SY:
>VMR @SYSVMR
Loading Executive data space
Data space loading completed
VMR -- *DIAG*-Installed tasks or commons may no longer fit in partition
SET /TOP=SYSPAR:-*
VMR -- *DIAG*-Loadable driver larger than 4K
LOA TT:
VMR -- *DIAG*-Installed tasks or commons may no longer fit in partition
SET /TOP=DRVPAR:-*
SECPOL 117734 00172400 00100000  SEC POOL
SYSPAR 117670 00272400 00164200  MAIN
       117624 00272400 00110500  RO COM !DIR11M!
       117434 00403100 00005200  TASK   [...LDR]
       117230 00410300 00033000  TASK   [MCR...]
       117024 00443300 00010100  TASK   [TKTN  ]
       116620 00453400 00003200  TASK   [SHF...]
DRVPAR 116540 00456600 00114100  MAIN
       116474 00456600 00006200  RO COM !TTEXT !
       116410 00465000 00020600  RO COM !TTCOM !
       116324 00505600 00033700  DRIVER (TT:)
       116050 00541500 00005300  DRIVER (DR:)
```

```
        115470 00547000 00005100  DRIVER (DM:)
        115204 00554100 00003500  DRIVER (DL:)
        114674 00557600 00005200  DRIVER (MS:)
        114454 00565000 00001300  DRIVER (LP:)
        114264 00566300 00000100  DRIVER (NL:)
        114220 00566400 00000300  DRIVER (CO:)
        114154 00566700 00002500  DRIVER (VT:)
        114110 00571400 00001300  DRIVER (RD:)
GEN     114044 00572700 02205100  MAIN
...LDR 12.01   117500   SYSPAR 248. 00005200 LB0:-00125267 FIXED
TKTN   07.00   117070   SYSPAR 248. 00010100 LB0:-00055300 FIXED
F11MSG 15.00   111764   GEN    200. 00006200 LB0:-00043230
MTAACP 16.01   111370   GEN    200. 00016200 LB0:-00047334
SHE... 05.01   111120   GEN    200. 00014300 LB0:-00052710
MCR... 06.00   117274   SYSPAR 160. 00033000 LB0:-00046336 FIXED
F11ACP 06.02   113630   GEN    149. 00014400 LB0:-00042001
ERRLOG 05.01   113274   GEN    148. 00056000 LB0:-00041717
PMT... 2.01    112634   GEN    148. 00007100 LB0:-00050211
COT... 2.03    112110   GEN    145. 00022100 LB0:-00036165
HRC... 03.01   111514   GEN    140. 00057400 LB0:-00043505
PMD... 07.04   111244   GEN    140. 00023500 LB0:-00050103
SYSLOG 04.01   112364   GEN    130. 00044200 LB0:-00054126
SHF... 07.00   116664   SYSPAR 105. 00003200 LB0:-00052727 FIXED
FXR... 03.01   111640   GEN    100. 00003300 LB0:-00043222
BAP0   04.11   113420   GEN     80. 00047600 LB0:-00033752
QMG... 03.06   112510   GEN     75. 00030200 LB0:-00050314
LP0    06.02   113054   GEN     70. 00020100 LB0:-00045543
ACNT   06.02   112234   GEN     50. 00052500 LB0:-00033370
SHUTUP 04.02   110774   GEN     50. 00015400 LB0:-00052734
...RMD 4.04    001762+  GEN    225. 00041200 LB0:-00050646
...DCL 5.00    001736+  GEN    160. 00057700 LB0:-00036525
...DMO 04.01   001740+  GEN    160. 00017300 LB0:-00037450
...MCR 05.00   001754+  GEN    160. 00040300 LB0:-00046373
...MOU 26.05   001756+  GEN    160. 00045400 LB0:-00047243
...CA. 14.01   002012+  GEN    150. 00025300 LB0:-00054220
...INS 15.01   001752+  GEN    100. 00052000 LB0:-00044355
...SAV 09.00   002006+  GEN    100. 00061300 LB0:-00125700
...UFD 7.00    002014+  GEN    100. 00014300 LB0:-00055312
...ACS 3.02    001770+  GEN     70. 00020000 LB0:-00033567
...ACC 04.01   001730+  GEN     65. 00046400 LB0:-00032775
...SHA 05.01   002010+  GEN     65. 00030700 LB0:-00052540
...AT. 9.1     001744+  GEN     64. 00054500 LB0:-00043756
...INI 23.02   001746+  GEN     60. 00036000 LB0:-00044263
...HOM 23.02   001750+  GEN     60. 00036000 LB0:-00044263
...BRO 07.00   001732+  GEN     50. 00037200 LB0:-00034077
...BYE 05.00   001734+  GEN     50. 00021200 LB0:-00034367
...HEL 04.04   001742+  GEN     50. 00056100 LB0:-00043243
...PIP 17.06   001760+  GEN     50. 00027400 LB0:-00047732
...UNL 5.03    001764+  GEN     50. 00040000 LB0:-00055356
...ACD 2.00    001766+  GEN     50. 00042400 LB0:-00033227
...BOO 02.00   001772+  GEN     50. 00034300 LB0:-00033713
...CON 03.00   001774+  GEN     50. 00131200 LB0:-00036046
...ELI 04.02   001776+  GEN     50. 00057200 LB0:-00041570
...LOA 5.02    002000+  GEN     50. 00037600 LB0:-00045461
...MAG 03.00   002002+  GEN     50. 00037200 LB0:-00046275
...PSW 03.01   002004+  GEN     50. 00036600 LB0:-00050222
RHA OFL CPA CSR=176700 VEC=254 PRI=5
DMA OFL CPA CSR=177440 VEC=210 PRI=5
YLA OFL CPA CSR=177560 VEC=60 PRI=5
```

```
YZA OFL CPA CSR=160100 VEC=310 PRI=5
YZB OFL CPA CSR=160110 VEC=320 PRI=5
DLA OFL CPA CSR=174400 VEC=160 PRI=5
MSA OFL CPA CSR=172522 VEC=224 PRI=5
LPA OFL CPA CSR=177514 VEC=200 PRI=4
CO0:   OFL DRIVER
TT0: YLA0:  OFL DRIVER
TT1: YZA0:  OFL DRIVER
TT2: YZA1:  OFL DRIVER
TT3: YZA2:  OFL DRIVER
TT4: YZA3:  OFL DRIVER
TT5: YZA4:  OFL DRIVER
TT6: YZA5:  OFL DRIVER
TT7: YZA6:  OFL DRIVER
TT10: YZA7:  OFL DRIVER
TT11: YZB0:  OFL DRIVER
TT12: YZB1:  OFL DRIVER
TT13: YZB2:  OFL DRIVER
TT14: YZB3:  OFL DRIVER
TT15: YZB4:  OFL DRIVER
TT16: YZB5:  OFL DRIVER
TT17: YZB6:  OFL DRIVER
TT20: YZB7:  OFL DRIVER
VT0:   OFL DRIVER
RD0:   ONL DRIVER
DR0: RHA0:  OFL DRIVER
DM0: DMA0:  OFL DRIVER
DM1: DMA1:  OFL DRIVER
DL0: DLA0:  OFL DRIVER
MS0: MSA0:  OFL DRIVER
LP0: LPA0:  OFL DRIVER
NL0:   OFL DRIVER
POOL=1200:13368.:13368.:1724
>SET /UIC=[200,200]
  25-APR-1989 13:16:49
>;
>;
>ASN =TKB
>ASN =VMR
>;
>; End of SYSGEN
>;
>TIME
>ASN =
>;
>@ <EOF>
```

Appendix D
Address and Vector Assignments

Specific algorithms exist for assigning UNIBUS addresses and interrupt vector addresses to all devices attached to PDP–11 hardware. UNIBUS addresses and interrupt vector address assignments are either floating or fixed. If a device has a floating address assignment, the presence or absence of any floating address device affects the assignment of addresses to other floating address devices. Similarly, certain devices have floating vector addresses.

Interrupt vectors must be assigned in a specific sequence, and the presence of one type of device affects the correct assignment of interrupt vectors to other devices. If a device has a fixed address or vector, its location is unaffected by other devices on the system.

This appendix presents the algorithms for assigning floating addresses and vectors. It also lists the fixed assignments for devices supported by the Autoconfigure task. Digital recommends that you configure your hardware according to the configuration rules.

D.1 Autoconfigure Device Support

The following table lists the devices supported by Autoconfigure. The complete list of devices supported by RSX–11M–PLUS can be found in the RSX–11M–PLUS Software Product Description (SPD).

Certain devices have floating control and status register (CSR) addresses. A complete description of the algorithm used to determine these CSR addresses can be found in Section D.2.

Table D–1 also identifies those devices that have floating vectors. These devices can be identified by a ranking priority under the vector label. The floating vectors begin at address 300_8 and proceed continuously upward.

Gaps in the vector assignments are not required. The vector assignment sequence is done based on ascending vector ranking. That is, the device with the lowest rank is assigned the next floating vector address. The autoconfiguration process dynamically computes the vectors of all supported devices. This is done by forcing each present device to interrupt.

Table D–1: Autoconfigure Device Support

Device	CSR Address	Reg. Size	First Vector	Maximum Number Ctrl	Interrupt Priority	Remarks
TA11	177500	4	260	1.	6	
TU58		10		4.	5	On an DL11
RK11	177404	20	220	1.	5	
RL11/RL211	174400	20	160	4.	5	
RK611/RK711	177440	40	210	1.	5	
RP11	176714	40	254	1.	5	
TC11	177342	20	214	1.	6	
KDA50/UDA50	172150	4	154	4.	5	MSCP devices
RQDX/RC25						
RX11/RX211	177170	10	264	1.	5	
RH11/RH70	172040	54	204	1.	5	RS03/RS04
RH11/RH70	172440	54	224	1.	5	TU16/45/77,TE16
RH11/RH70	175400	54	260	1.	5	RS/RP/RM/TU ALT.
RH11/RH70	176300	54	150	1.	5	TU78
RH11/RH70	176400	54	204	1.	5	ML11
RH11/RH70	176700	54	254	1.	5	RP04/05/06/07 or RM02/03/05/80
TM11	172522	20	224	1.	5	
TS11/TU80						
TK25/TSV05	172522	4	224	8.	5	
TK50	174500	4	260	4.	5	
LP/LS/LV11	177514	10	200	1.	4	LPA
LP/LS/LV11	164004	10	170	1.	4	LPB
LP/LS/LV11	164014	10	174	1.	4	LPC
LP/LS/LV11	164024	10	270	1.	4	LPD
LP/LS/LV11	164034	10	274	1.	4	LPE
LP/LS/LV11	164044	10	774	1.	4	LPF

(continued on next page)

RH3 VEC CSR
170 177000
MSA 260 174500

Table D–1 (Cont.): Autoconfigure Device Support

Device	CSR Address	Reg. Size	First Vector	Maximum Number Ctrl	Interrupt Priority	Remarks
LP/LS/LV11	164054	10	770	1.	4	LPG
LP/LS/LV11	164064	10	764	1.	4	LPH
PR11	177550	10	070	1.	4	
PC11	177554	10	074	1.	4	
DH11/DHU11	FLOAT	20	Rank 16	16.	5	
DH/DHU/DHV11	FLOAT	20	Rank 16	16.	5	
DL11–A/B/J	176500	10	Rank 2	16.	5	
DL11–C/D/E	175610	10	Rank 14	31.	5	
DL11–W	177560	10	060	1.	4	Console
DM11–BB	170500	10	Rank 6	16.	5	
DZ11/DQV11	FLOAT	10	Rank 28	16.	5	
DZV11						

D.2 Floating Address Assignment Algorithm

The autoconfiguration process finds only the devices listed in the previous table. If the system contains devices not listed, you must configure them manually.

The floating address space starts at 760010_8 and proceeds upward to 764000_8. A gap in the address space (no SLAVE SYNC) implies that a device does not exist.

The first address of a new type of device is always on a 2*N word boundary, where N is the first integer greater than or equal to LOG M, and M is the number of device registers.

Number of Registers in Device	Possible Boundaries
1	Any word
2	XXXXX0,XXXXX4
3,4	XXXXX0
5,6,7,8	XXXX00,XXXX20,XXXX40,XXXX60
9 to 16	XXXX00,XXXX40

A gap of at least one word is left after each type of device. Note that the gap must be at least one word but may be longer than one word.

Address 760010 is reserved for the first DJ11 controller. Since the DJ11 controller has four registers, additional DJ11 controllers are assigned addresses of modulo 10_8 immediately following the first DJ11 controller (that is, 760010, 760020, and the like.) The modulo 10_8 address following the last DJ11 controller is left empty and is known as the DJ11 gap. If there are no DJ11 controllers, the gap is at 760010. If there is one DJ11 controller, the gap is at 760020. All gaps must be at least one word.

After all DJ11 controller addresses and the DJ11 gap are defined, the address for the first DH11 controller can be assigned. DH11 controllers have eight registers, which implies a modulo 20_8 boundary. The address of the first DH11 controller is the first modulo 20 address following the DJ11 gap. If there are no DJ11 controllers (DJ11 gap at 760010), the first DH11 controller is assigned address 760020. Similarly, if there is one DJ11 controller, the DJ11 gap begins at 760020 and the next available modulo 20 boundary is 760040. All additional DH11 controllers are assigned addresses of modulo 20 immediately after the first DH11 controller. The DH11 gap begins on the modulo 20 boundary following the last DH11 controller,

After all DH11 controller addresses and the DH11 gap are defined, DQ11, DU11, DUP11, LK11, DMC11, DZ11, and KMC11 addresses and the required gaps can be assigned in sequence. Addresses for any future floating address devices will be assigned in a similar manner.

D.3 Floating Address Worksheet

The algorithm for assigning floating addresses can be difficult to follow for a large configuration with multiple units of several types of floating address devices. The floating address worksheet Figure (D–1) is provided as an aid in determining your hardware configuration. The worksheet allows you to assign device addresses quickly, without requiring you to refer to the algorithm. Section D.3.2 contains instructions for using the worksheet, and a completed worksheet is provided as an example in Figure D–2.

D.3.1 Worksheet Format

The worksheet is divided into four sections covering the address range 760010 to 762000. Although the floating address area continues up to address 764000, the worksheet should cover most configurations. If necessary, you can create a second worksheet by adding 2000 to all addresses listed.

D.3.2 Worksheet Instructions

The following are the instructions for the use of the worksheet:

1. Record the quantity of each type of floating address device in the spaces provided on page 1 of the worksheet.
2. Beginning at the upper left of the worksheet at address 760010 and proceeding down the DJ11 controller column, record the unit numbers for all DJ11 controllers in the configuration. Begin with unit 0 and end with unit n-1. (There are n DJ11 controllers in the configuration.)

   Immediately below the last DJ11 unit, mark an "X" for the required DJ11 controller address gap. Also mark an "X" in the box immediately to the right (DH11 controller column).

When numbering device units down the appropriate column, use only the unshaded boxes. The shaded boxes represent illegal addresses for the particular device type. Because the gap address must also be a legal device address, use only an unshaded box for marking the gap with an "X" when numbering down a column.

In marking an "X" in the column to the right of a device address gap, use shaded boxes because the "X" in the next column merely provides a starting point for numbering units of the next device type. If there are no units of a particular device type, enter only the "X's" to mark the gap on the worksheet.

If you use all available space in one section of the worksheet, simply copy the entries on the last line of the full section to the top line of the next section. Then, continue numbering in the new section.

Continue just below the "X" in the DH11 controller column, and number all DH11 controller units. Once again, start with unit 0 and end with unit n-1. Skip the shaded boxes in numbering down the column. In the first unshaded box below the last DH11 controller unit, mark an "X" for the DH11 gap. Also mark an "X" in the box to the right (whether it is shaded or unshaded).

Continue with the remaining floating address devices. In each case, number units from 0 to n-1 down the column beginning in the first unshaded box below the "X." Mark an "X" in the next unshaded box below the last unit and in the box immediately to the right of the last unit (whether that box is shaded or unshaded).

3. After you have recorded all floating address devices, read the UNIBUS address for each device unit directly from the worksheet and list each address in the spaces provided on page 2 of the worksheet.

Figure D–1: Blank Floating Address Worksheet

Address and Vector Assignments

❶ Record quantity of each device:

_____ DJ11	_____ VMV31*	_____ ISB11*
_____ DH11	_____ DWR70*	_____ DMV11*
_____ DQ11*	_____ RL02**	_____ DEUNA*
_____ DU11*	_____ LPA11-K*	_____ UDA50/RQDX**
_____ DUP11	_____ KW11-C*	_____ DMF32*
_____ LK11*	_____ RESERVED*	_____ KMS11*
_____ DMC11	_____ RX01/RX02*	_____ VS100*
_____ DZ11	_____ DR11*	_____ TU81/TK50**
_____ KMC11*	_____ DR11-B*	_____ KMV11*
_____ LPP11*	_____ DMP11*	_____ DHU/DHU11
_____ VMV21*	_____ DPV11*	

❷ Enter unit numbers:

Address	DJ11	DH11	DQ11*	DU11*	DUP11	LK11*	DMC11	DZ11	KMC11*	LPP11*	VMV21*	VMV31*	DWR70*	RL02**	LPA11-K*	KW11-C*	RESERVED*	RX01/RX02*	DR11*	DR11-B*	DMP11*	DPV11*	ISB11*	DMV11*	DEUNA*	UDA50/RQDX**	DMF32*	KMS11*	VS100*	TU81/TK50**	KMV11*	DHU/DHU11
760000																																
760010																																
760020																																
760030																																
760040																																
760050																																
760060																																
760070																																
760100																																
760110																																
760120																																
760130																																
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760160																																
760170																																
760200																																
760210																																
760220																																
760230																																
760240																																
760250																																
760260																																
760270																																
760300																																
760310																																
760320																																

* This device is not supported on RSX-11M-PLUS, but this entry in the worksheet is required as a place holder.

** This device also has a fixed address for the first controller of this type.

MLO-003950

(continued on next page)

Figure D–1 (Cont.): Blank Floating Address Worksheet

Address and Vector Assignments --Continued

1. Record quantity of each device:

_____ DJ11	_____ VMV31*	_____ ISB11*
_____ DH11	_____ DWR70*	_____ DMV11*
_____ DQ11*	_____ RL02**	_____ DEUNA*
_____ DU11*	_____ LPA11-K*	_____ UDA50/RQDX**
_____ DUP11	_____ KW11-C*	_____ DMF32*
_____ LK11*	_____ RESERVED*	_____ KMS11*
_____ DMC11	_____ RX01/RX02*	_____ VS100*
_____ DZ11	_____ DR11*	_____ TU81/TK50**
_____ KMC11*	_____ DR11-B*	_____ KMV11*
_____ LPP11*	_____ DMP11*	_____ DHU/DHU11
_____ VMV21*	_____ DPV11*	

2. Enter unit numbers:

Address	DJ11	DH11	DQ11*	DU11*	DUP11	LK11*	DMC11	DZ11	KMC11*	LPP11*	VMV21*	VMV31*	DWR70*	RL02**	LPA11-K*	KW11-C*	RESERVED*	RX01/RX02*	DR11*	DR11-B*	DMP11*	DPV11*	ISB11*	DMV11*	DEUNA*	UDA50/RQDX**	DMF32*	KMS11*	VS100*	TU81/TK50**	KMV11*	DHU/DHU11
760330																																
760340																																
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760360																																
760370																																
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* This device is not supported on RSX-11M-PLUS, but this entry in the worksheet is required as a place holder.

** This device also has a fixed address for the first controller of this type.

MLO-003951

Figure D–2: Completed Floating Address Worksheet

Address and Vector Assignments

1 Record quantity of each device:

0 DJ11	0 VMV31*	0 ISB11*
0 DH11	0 DWR70*	0 DMV11*
0 DQ11*	0 RL02**	0 DEUNA*
0 DU11*	0 LPA11-K*	2 UDA50/RQDX**
0 DUP11	0 KW11-C*	0 DMF32*
0 LK11*	0 RESERVED*	0 KMS11*
0 DMC11	0 RX01/RX02*	0 VS100*
1 DZ11	0 DR11*	0 TU81/TK50**
0 KMC11*	0 DR11-B*	0 KMV11*
0 LPP11*	0 DMP11*	2 DHU/DHU11
0 VMV21*	0 DPV11*	

2 Enter unit numbers:

Address	DJ11	DH11	DQ11*	DU11*	DUP11	LK11*	DMC11	DZ11	KMC11*	LPP11*	VMV21*	VMV31*	DWR70*	RL02**	LPA11-K*	KW11-C*	RESERVED*	RX01/RX02*	DR11*	DR11-B*	DMP11*	DPV11*	ISB11*	DMV11*	DEUNA*	UDA50/RQDX**	DMF32*	KMS11*	VS100*	TU81/TK50**	KMV11*	DHU/DHU11
760000																																
760010	X																															
760020		X																														
760030			X																													
760040				X																												
760050					X																											
760060						X																										
760070							X																									
760100								O																								
760110								X	X																							
760120									X	X																						
760130										X	X																					
760140											X	X																				
760150																																
760160												X	X																			
760170													X																			
760200														X	X																	
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760270																			X	X												
760300																				X	X											
760310																					X	X										
760320																						X	X									

* This device is not supported on RSX-11M-PLUS, but this entry in the worksheet is required as a place holder.

** This device also has a fixed address for the first controller of this type.

MLO-003952

(continued on next page)

Figure D–2 (Cont.): Completed Floating Address Worksheet

Address and Vector Assignments --Continued

1 Record quantity of each device:

0 DJ11	0 VMV31*	0 ISB11*
0 DH11	0 DWR70*	0 DMV11*
0 DQ11*	0 RL02**	0 DEUNA*
0 DU11*	0 LPA11-K*	2 UDA50/RQDX**
0 DUP11	0 KW11-C*	0 DMF32*
0 LK11*	0 RESERVED*	0 KMS11*
0 DMC11	0 RX01/RX02*	0 VS100*
1 DZ11	0 DR11*	0 TU81/TK50**
0 KMC11*	0 DR11-B*	0 KMV11*
0 LPP11*	0 DMP11*	2 DHU/DHU11
0 VMV21*	0 DPV11*	

2 Enter unit numbers:

Address	DJ11	DH11	DQ11*	DU11*	DUP11	LK11*	DMC11	DZ11	KMC11*	LPP11*	VMV21*	VMV31*	DWR70*	RL02**	LPA11-K*	KW11-C*	RESERVED*	RX01/RX02*	DR11*	DR11-B*	DMP11*	DPV11*	ISB11*	DMV11*	DEUNA*	UDA50/RQDX**	DMF32*	KMS11*	VS100*	TU81/TK50**	KMV11*	DHU/DHU11
760330																							X									
760340																								X	X							
760350																									X	X						
760360																										X						
760370																																
760400																											X	X				
760410																																
760420																												X	X			
760430																																
760440																													X	X		
760450																														X		
760460																															X	X
760470																																
760500																																O
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* This device is not supported on RSX-11M-PLUS, but this entry in the worksheet is required as a place holder.

** This device also has a fixed address for the first controller of this type.

MLO-003953

Index

A

B

C

D

E

F

G

H

O

P

Q

R

S

T

U

V

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